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Analysis of Respirator Cartridge Performance Testing on Hanford Tank SY-102

November 2016

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Prepared for
the U.S. Department of Energy
under Contract DE-AC05-76RL01830

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Executive Summary

Washington River Protection Solutions (WRPS) conducted tests using two types of chemical cartridges for use in air-purifying respirators to determine the period of time that the cartridges would provide adequate protection to workers when exposed to a mixture of Chemicals of Potential Concern (COPCs) from vapors emanating from the headspace of tank SY-102 on the Hanford Site. The Occupational Safety and Health Administration (OSHA) identifies cartridge testing as a valid approach for establishing a cartridge change-out schedule. Testing is commonly applied in situations where mixtures of COPCs exist, and where other approaches, such as manufacturer recommendations and modeling, are less reliable. The tests were designed and conducted to assure measurement and/or control of the key variables OSHA identified as important to estimate cartridge service-life, including temperature, humidity, COPC concentration, breathing rate, and cartridge adsorption capacity.

Testing was conducted over a period from July 8-10, 2016, using headspace vapors from Hanford tank SY-102 under static conditions fed to a respirator cartridge test stand developed by WRPS in collaboration with HiLine Engineering (Richland, Washington). Multipurpose respirator cartridges, SCOTT 7422-SC1 and 7422-SD1 (SCOTT Safety, Monroe, North Carolina) were assessed on separate days with SY-102 headspace vapors. Sample media (sorbent tubes) were used to collect samples of the vapor stream entering and exiting the respirator cartridge, and were subsequently analyzed for COPC concentrations. Pacific Northwest National Laboratory was tasked with conducting an independent analysis of the analytical results and making recommendations based on the results for respiratory cartridge performance and change-out frequency. The key conclusions from the analysis are briefly described below:

- Based on measurements of the cartridge inlet vapor concentrations from tank SY-102, only N-nitrosodimethylamine (NDMA) exceeded its Occupational Exposure Limit, (OEL).¹ This measurement was consistent with maximum SY-102 headspace measurements previously obtained for NDMA, at concentrations up to 0.42 ppb, exceeding its OEL by more than 142%. All outlet measurements for NDMA from both respirator cartridges were below analytical detection limits for the duration of the testing (16 hours), indicating no evidence of breakthrough. The analytical detection limits for NDMA corresponds to approximately 10% of its OEL.
- The inlet vapor concentrations of all other measured COPCs were below the 10% OEL threshold and, in many cases, also less than the corresponding analytical detection limit. For the majority of COPCs, the inlet vapor concentrations during cartridge testing and average measurements from historical SY-102 headspace sampling were all below analytical reporting or detection limits. Only three COPCs—ammonia, furan, and NDMA—have been previously measured in SY-102 headspace above 10% of their respective OELs, and above analytical reporting limits.

¹ Occupational Exposure Limits accepted for Hanford Tank Farm use are based on OELs established by a U.S. governmental agency or national professional organization (e.g., OSHA, National Institute for Occupational Safety and Health, American Conference of Governmental Industrial Hygienists), or if no U.S. OEL exists, standard toxicological practices are applied to develop OELs using non-U.S. exposure limits, other established OELs for chemical surrogates when available, or other standard procedures. The OEL for NDMA was established in 2005 based on the MAK (Maximale Arbeitsplatzkonzentration) Commission standard adopted in Europe.

- Based on the measurements taken for this study, none of the COPCs indicated breakthrough behavior above 10% OEL during the 16-hour testing period. This result supports a recommendation of up to 16 hours for change-out times for the use of SCOTT'S 7422-SC1 and 7422-SD1 cartridges in air-purifying respirators employed by workers at SY-102. However, any known increases in (respirator inlet) concentrations for any COPCs, compared to those measured in the current study, could decrease the recommended cartridge change-out schedule, especially if OEL thresholds are exceeded. In these circumstances additional respirator cartridge evaluations would be necessary to determine proper respiratory protection requirements.

Acronyms and Abbreviations

APR	Air Purifying Respirator
CFR	Code of Federal Regulations
COPC	Chemicals Of Potential Concern
OSHA	Occupational Safety and Health Administration
NIOSH	National Institute for Occupational Safety and Health
OEL	Occupational Exposure Limit
NDMA	N-Nitrosodimethylamine
NDEA	N-Nitrosodiethylamine
NMEA	N-Nitrosomethylethylamine
SCBA	Self-Contained Breathing Apparatus
PPM	Parts Per Million
WRPS	Washington River Protection Solutions
PNNL	Pacific Northwest National Laboratory
VOC	Volatile Organic Compound
SWIHD	Site-Wide Industrial Hygiene Database
TIC	Tentatively Identified Compound
TWINS	Tank Waste Information Network System

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1.0 Introduction/Project Description

As the Tank Operations Contractor for U.S. Department of Energy operations at the Hanford site, Washington River Protection Solutions (WRPS) is responsible for managing highly radioactive wastes stored in tanks at Hanford. WRPS recently identified the need to test air-purifying respirator (APR) chemical cartridges commonly used at Hanford Tank Farms to determine the period of time that the cartridges would provide adequate protection to workers when exposed to a mixture of Chemicals of Potential Concern (COPCs) from any vapors exiting headspaces in the tanks. Occupational Safety and Health Administration (OSHA) Standard 29 Code of Federal Regulations (CFR) 1910.134(d)(3)(iii)(b)(2) specifies that for protection against gases and vapors, employers shall implement a change schedule for cartridges to ensure that change-outs occur before the end of service life.[1-4] The change schedule can be based on objective information or data that ensures cartridge change-outs occur before the end of their service life.[2-5] The primary function of the WRPS APR Cartridge Test Program is to obtain objective data to determine change-out schedules for the APR cartridges in use at Hanford Tank Farms. WRPS contracted Pacific Northwest National Laboratory (PNNL) to analyze the test data and offer an independent analysis and any recommendations. This report summarizes data analysis of cartridge testing on headspace vapors from the Hanford SY-102 double shell tank.

2.0 Regulatory Requirements

2.1 Background on Regulatory Requirements

OSHA Respiratory Protection Standard (29 CFR 1910.134) mandates/requires that employers provide protective equipment, including respirators, to their employees to protect them against potential exposure to contaminants at or above documented Occupational Exposure Limits (OELs) and establish cartridge change-out schedules to ensure cartridges are changed before the end of service life.[1] End of service life is the time when a respirator cartridge can no longer filter/capture harmful contaminants (i.e., the cartridge no longer functions effectively).

Protective respirator cartridges are frequently used in workplaces with low contaminant concentrations, and where respirators provide essential protection for longer periods of time (>2 hours). If the contaminant concentration in a workplace is high, supplied air respirators (SAR) or self-contained breathing apparatuses (SCBA) must be used to provide additional protection. While the use of SARs or SCBAs offers more protection, a tradeoff exists, particularly for SCBAs that employ a large, heavy (~30 pounds), back-mounted compressed air cylinder.[1]

2.2 OSHA-Approved Methods for Determining Cartridge Change-Out Times

The National Institute of Occupational Safety and Health (NIOSH) certifies organic vapor cartridges using the criteria in 42 CFR 84, Approval of Respiratory Protective Devices. Still, there is no widely accepted, standard protocol for performing service-life testing.[4] However, OSHA has identified three valid approaches for establishing cartridge change-out schedules.[3] These approaches are described below.

- *Conduct experimental tests* – First, gather all available information about the nature of all contaminants present in the workplace. Obtain breathing rates of workers and estimate worst-case exposures. For most of the employers, this approach is the most time consuming, and resources needed to perform these tests may not be available. If an employer has the resources needed to pursue this approach, it is the most reliable method of estimating cartridge service life. Concentrations at different points in time are obtained using actual respirator cartridges exposed to actual or simulated gases to gather service-life information. A safety factor that includes the assumptions made, variable factors, or conditions needs to be applied to the service life and used in the respiratory protection program. This approach is commonly used in situations where mixtures of contaminants are present and can also be used to validate an existing cartridge change-out schedule.
- *Use the manufacturer's recommendation* – Once information on airborne contaminants (including concentrations, temperature, and humidity) has been obtained, contact the manufacturer of the respirator to be used and provide all the information. Manufacturers should be able to provide the estimated service life of different cartridges for particular compounds. Manufacturers should also be able to provide the exact objective information they used to project the service life. Using the information obtained, change-out schedules are proposed. This approach is not as reliable as conducting application-specific experiments, and manufacturers may not have all the information for workplace hazards and user factors. If any safety factor is applied considering all the variable factors, it must be clearly identified in the respiratory protection program. For complex mixtures such as those present in the storage tanks at Hanford, manufacturer recommendations may be of limited value, and experimental testing is recommended.

- *Use mathematical models* – Mathematical models are usually applicable for single contaminant exposure situations. OSHA and NIOSH have worked over the years with researchers and industrial partners to develop mathematical models for predicting respirator cartridge service life.[3, 5-11] OSHA offers guidance on using mathematical models to estimate respirator cartridge service life based on single components, but the models have not been adopted for mixtures. NIOSH has developed a computer tool for estimating breakthrough times and service lives of respirator cartridges. Manufacturers can use those results to make service-life recommendations for their particular product (canister/cartridge) in multi-gas environments. Two types of mathematical models are used: 1) predictive models[3, 5-7] and 2) descriptive models.[9] Each model has its own mathematical basis for its estimations. To estimate the service lives of cartridges, the following information is needed:
 - the number of cartridges used by the respirator
 - the mass of the sorbent used in each cartridge
 - the carbon micro-pore volume
 - the density of the packed bed
 - the maximum temperature
 - the maximum relative humidity
 - the maximum concentration of the contaminants and the work (volumetric flow) rate.

The primary advantages of using mathematical models are that they are relatively inexpensive and take little time. However, the estimates are not as accurate as testing; sometimes it might result in a service-life estimate that is shorter than it needs to be because of conservative assumptions used during calculations.

- *Rules of thumb* – In addition to the methods described above, “rules of thumb” can be allowed as part of the overall workplace organic vapor assessment for determining a cartridge change-out schedule. Chapter 36 of the American Industrial Hygiene Association publication, *The Occupational Environment: Its Evaluation and Control and Management*, outlines the approach.[12] The “rules of thumb” may not work for every chemical or situation, but provide an estimation of cartridge life. The following are rules of thumb outlined in the publication:
 - If the compound’s boiling point is $>70^{\circ}\text{C}$ and the concentration is less than 200 ppm, a service life of 8 hours at a normal work rate can be expected.
 - Service life is inversely proportional to worker breathing rate.
 - Reducing the concentration of a contaminant by a factor of 10 will increase service life by a factor of 5.
 - Relative humidity above 85% will reduce the service life by 50%.

These rules of thumb do not apply in certain situations, including for mixtures of hazardous contaminants (e.g., Hanford Tank Farm vapors) and inorganic gases such as ammonia, SO_2 , and H_2S , compositions that vary with time, location, and contaminants that undergo continuous reactions. However, some of the general drivers can help in interpreting the results obtained from experimental testing of respirator cartridges.

3.0 Description of Testing Program

Based on the OSHA guidance described in the previous section, a sample testing approach was pursued for quantifying respirator cartridge effectiveness for Hanford tank vapors. WRPS developed a sampling approach outlined in TFC-PLN-168, “Industrial Hygiene Sampling and Analysis Plan for Respirator Cartridge Testing,” and “Air Purifying Respirator Cartridge Test Apparatus, RPP-STE-59226.”[13,14]

Appendix A provides a description of the respirator cartridge testing setup developed by WRPS and used for measurements of vapors from the SY-102 headspace.[13-15] The test system and methodology were developed in consultation with recognized subject matter experts to follow the example of tank farm headspace field sampling for the purposes of cartridge testing.

The Sampling and Analysis Plan was developed under the direction and oversight of the Industrial Hygienist in conjunction with the Tank Farms Operations Contractor Retrieval and Closure, and Tank Farms Project and/or Production Operations Project Management Team, as applicable. Trained Industrial Hygiene Technicians (IHTs) under the direction of a qualified Industrial Hygienist collected chemical vapor samples from the influent and effluent sides of the cartridge test apparatus. Training was performed at HiLine Engineering (Richland, Washington) on the test stands for WRPS Sampling Equipment Operators, Industrial Hygiene Technicians, and the Field Work Supervisors, prior to transport of the stands to tank farms.

The APR cartridge test assembly was designed and constructed to operate without negative effects on performance to the following environmental conditions:

- Temperature: 32 to 115°F
- Relative Humidity: 5% to 100%
- Precipitation: Up to 4 inches in 6 hours
- Wind: Up to 20 mph with blowing dust.

To ensure the cartridges effectively protect the worker, WRPS developed a testing program with the following conservative conditions:

- The flow rate through each cartridge was set at 30 L/min (equivalent to 60 L/min for a pair of cartridges), which corresponds to more than twice the normal breathing rate and is slightly higher than OSHA recommended testing flow rate of 53.3 L/ min.[3,5]
- Tank farm vapors source sampling was performed on headspace vapors rather than from Hanford Tank Farm atmospheric concentrations (i.e., source sampling vs. the breathing zone).
- 10% OEL for each COPC was considered as a threshold concentration.

Using the cartridge testing setup shown in Appendix A, separate test surveys were performed on two NIOSH-approved respiratory protection twin cartridges: SCOTT 7422-SC1 for Survey 1, and SCOTT 7422-SD1 for Survey 2.[16] These cartridges were chosen because they are suitable for capturing organic vapors, acid gases, ammonia, formaldehyde, and particulates.[16]

Vapor concentrations upstream and downstream of the APR cartridge were monitored with an array of sorbent tubes (see Appendix B). Influent (upstream) concentrations were measured at the beginning and end of each 16-hour verification survey. Downstream sorbent tubes were changed out every 2 hours until the experiment was finished. A measured quantity of sample air was drawn in through the sorbent tube (see Appendix A).[13,14] Compounds from the sorbent tubes were extracted and analyzed using analytical methods referenced in Appendix B.

The characteristics of 59 COPCs were the primary focus of the testing. The 59 COPCs represent a set of tank vapor chemicals found in a tank farm source greater than 10% of the OEL, or are considered “known” or “probable” carcinogens by the International Agency for Research Cancer or other regulatory agencies.[17,18] A full listing of these COPCs is shown in Section 4.0.

4.0 Data Analysis

During the period of July 8-10, 2016, each cartridge was tested for approximately 16 hours of continuous run time. Testing and analysis focused on the 59 COPCs identified in Table 1 and other hazardous airborne contaminants. Sorbent tubes were changed every 2 hours, and more than 200 sorbent tubes were sent to the 222S Laboratory at Hanford and dispositioned for analysis. Appendix C lists the raw data for all of contaminants analyzed during the tests, and Appendix D lists the corresponding calculated concentrations. Appendix C also gives the the average temperatures of the sample slipstream during testing, which ranged from 66 to 91°F as well as the average relative humidity measurements, which ranged from 25 to 78%. Table 1 provides an overview of the results for each of the 59 COPCs. Note that nitrous oxide was not analyzed as it is not susceptible to respirator filtration, and there are no known NIOSH-approved respirator filtration cartridges approved for nitrous oxide. Additionally, methanol was not quantified as part of the COPC data set because it is used as a standard solvent and calibration standard in the analytical procedure for volatile organic compounds (VOC).

Table 1 shows the measured concentrations in the current study for all of the COPCs tested. Here, only N-nitrosodimethylamine (NDMA) was measured in amounts greater than 10% of its corresponding OEL. For NDMA, three of the four inlet values were greater than the detection limit¹ (up to 142% of the OEL), but all cartridge outlet measurements were less than analytical detection limits, which correspond to around 10% of the OEL.

¹ The term “detection limit” is used here to refer either to analytical reporting limit or detection limit. The use of either a reporting or detection limit varied among analytical laboratories. The reporting limit (equivalent to a limit of quantification) was used instead of a detection limit by several laboratories for specific COPC analyses. See Appendix C and F for additional information on the the specific use of reporting or detection limits for each COPC. Nitrosamine analysis results were quantified to a reporting limit.

Table 1. Summary of Analyzed COPCs

COPC Number and Name	CAS Number	Highest Measured Value (this study)	Occupational Exposure Limit (OEL)	Approximate Analytical Detection Limit, DL ¹ (% of OEL)	All Data Values (inlet and outlet) < Detection Limit	Highest Detected Value Compared to OEL
Inorganic						
1 Ammonia	7664-41-7	1.86 ppm	25 ppm	2.45%		< 8% of OEL for all inlet values. All outlets <DL.
2 Nitrous Oxide	10024-97-2	Not Measured	50 ppm			
3 Mercury	7439-97-6	1.71 ug/m3	25 ug/m3	6.80%	X	
Hydrocarbons						
4 1,3-Butadiene	106-99-0	0.0197 ppm	1 ppm	1.90%	X	
5 Benzene	71-43-2	0.0005 ppm	0.5 ppm	0.025%		< 0.2% of OEL for all in/out values
6 Biphenyl	92-52-4	0.0001 ppm	0.2 ppm	0.045%	X	
Alcohols						
7 1-Butanol	71-36-3	0.0075 ppm	20 ppm	0.002%		< 0.1% of OEL for all in/out values
8 Methanol	67-56-1	Not Measured	200 ppm			
Ketones						
9 2-Hexanone	591-78-6	0.0002 ppm	5 ppm	0.003%	X	
10 3-Methyl-3-butene-2-one	814-78-8	Not Detected	0.02 ppm	TIC ²	X	
11 4-Methyl-2-hexanone	105-42-0	0.0002 ppm	0.5 ppm	0.028%	X	
12 6-Methyl-2-heptanone	928-68-7	Not Detected	8 ppm	TIC	X	
13 3-Buten-2-one	78-94-4	0.0005 ppm	0.2 ppm	0.090%		< 0.3% of OEL for all in/out values
Aldehydes						
14 Formaldehyde	50-00-0	0.0105 ppm	0.3 ppm	0.570%		< 4% of OEL for all in/out values
15 Acetaldehyde	75-07-0	0.0078 ppm	25 ppm	0.005%		< 0.1% of OEL for all in/out values
16 Butanal	123-72-8	0.0007 ppm	25 ppm	0.004%		< 0.1% of OEL for all inlet values. All outlets <DL.
17 2-Methyl-2-butenal	1115-11-3	Not Detected	0.03 ppm	TIC	X	
18 2-Ethyl-hex-2-enal	645-62-5	Not Detected	0.1 ppm	TIC	X	

¹ Approximate Detection Limit (DL) is calculated using the reported detection limits (or reporting limits) from the analytical laboratory and the average volume (from flowrate x time) of vapor exposed to the sorbent tube.

² Tentatively Identified Compound (TIC) indicates that a mass spectrometry “peak” not associated with calibrated compounds has been tentatively assigned to a compound based on an adequate match to the analytical methods reference library. Reference standards for the compound are not available to accurately quantify, assign an analytical detection limit, or definitively confirm the identity of the TIC. TICs are reported when the peak area is sufficiently large, estimated as ≥ 5 nanograms of TIC mass, and other analytical criteria are met. For the respirator cartridge testing, this mass of TIC represents an approximate concentration of <1.0 ppb, based on the average of all TICs in the COPC list.

Table 1. (continued)

COPC Number and Name	CAS Number	Highest Measured Value (this study)	Occupational Exposure Limit (OEL)	Approximate Analytical Detection Limit, DL ¹ (% of OEL)	All Data Values (inlet and outlet) < Detection Limit	Highest Detected Value Compared to OEL
Furans						
19 Furan	110-00-9	0.02 ppb	1 ppb	0.860%		< 2% of OEL for all in/out values
20 2,3-Dihydrofuran	1191-99-7	0.02 ppb	1 ppb	1.69%		< 2% of OEL for all inlet values. All outlets <DL.
21 2,5-Dihydrofuran	1708-29-8	0.02 ppb	1 ppb	2.27%	X	
22 2-Methylfuran	534-22-5	0.02 ppb	1 ppb	1.94%	X	
23 2,5-Dimethylfuran	625-86-5	0.03 ppb	1 ppb	3.10%	X	
24 2-Ethyl-5-methylfuran	1703-52-2	Not Detected	1 ppb	TIC ²	X	
25 4-(1-Methylpropyl)-2,3-dihydrofuran	34379-54-9	Not Detected	1 ppb	TIC	X	
26 3-(1,1-Dimethylethyl)-2,3-dihydrofuran	34314-82-4	Not Detected	1 ppb	TIC	X	
27 2-Pentylfuran	3777-69-3	0.06 ppb	1 ppb	1.70%		< 7% of OEL for all in/out values
28 2-Heptylfuran	3777-71-7	0.02 ppb	1 ppb	1.06%		< 3% of OEL for all inlet values. All outlets <DL.
29 2-Propylfuran	4229-91-8	0.06 ppb	1 ppb	2.76%		< 6% of OEL for all in/out values
30 2-Octylfuran	4179-38-8	Not Detected	1 ppb	TIC	X	
31 2-(3-Oxo-3-phenylprop-1-enyl)furan	717-21-5	Not Detected	1 ppb	TIC	X	
32 2-(2-Methyl-6-oxoheptyl)furan	51595-87-0	Not Detected	1 ppb	TIC	X	
Phthalates						
33 Diethylphthalate	84-66-2	0.0009 mg/m3	5 mg/m3	0.015%	X	
Nitriles						
34 Acetonitrile	75-05-8	0.229 ppm	20 ppm	0.010%		< 2% of OEL for all in/out values
35 Propanenitrile	107-12-0	0.0002 ppm	6 ppm	0.004%	X	
36 Butanenitrile	109-74-0	0.0002 ppm	8 ppm	0.003%	X	
37 Pentanenitrile	110-59-8	0.0003 ppm	6 ppm	0.004%		< 0.1% of OEL for all in/out values
38 Hexanenitrile	628-73-9	0.0002 ppm	6 ppm	0.003%	X	
39 Heptanenitrile	629-08-3	Not Detected	6 ppm	TIC	X	
40 2-Methylene butanenitrile	1647-11-6	Not Detected	0.3 ppm	TIC	X	
41 2,4-Pentadienenitrile	1615-70-9	Not Detected	0.3 ppm	TIC	X	
Amines						
42 Ethylamine	75-04-7	0.0047 ppm	5 ppm	0.094%	X	
Nitrosamines						
43 N-Nitrosodimethylamine	62-75-9	0.42 ppb	0.3 ppb	10.2%		Up to 142% of OEL (inlet), all outlets <DL
44 N-Nitrosodiethylamine	55-18-5	0.03 ppb	0.1 ppb	21.4%	X	All inlets and outlets < DL (21.4% of OEL)
45 N-Nitrosomethylethylamine	10595-95-6	0.03 ppb	0.3 ppb	8.56%	X	All inlets and outlets < DL (~8.6% of OEL)
46 N-Nitrosomorpholine	59-89-2	0.02 ppb	0.6 ppb	3.09%	X	All inlets and outlets < DL (~3.1% of OEL)
Organophosphates						
47 Tributyl phosphate	126-73-8	0.0002 ppm	0.2 ppm	0.078%	X	
48 Dibutyl butylphosphonate	78-46-6	0.0001 ppm	0.007 ppm	1.14%	X	

Table 1. (continued)

COPC Number and Name	CAS Number	Highest Measured Value (this study)	Occupational Exposure Limit (OEL)	Approximate Analytical Detection Limit, DL ¹ (% of OEL)	All Data Values (inlet and outlet) < Detection Limit	Highest Detected Value Compared to OEL
Halogenated						
49 Chlorinated Biphenyls	Varies	Not Detected	1 mg/m ³	TIC ²	X	
50 2-Fluoropropene	1184-60-7	Not Detected	0.1 ppm	TIC	X	
Pyridines						
51 Pyridine	110-86-1	0.0003 ppm	1 ppm	0.024%	X	
52 2,4-Dimethylpyridine	108-47-4	0.0003 ppm	0.5 ppm	0.053%	X	
Organonitrites						
53 Methyl nitrite	624-91-9	Not Detected	0.1 ppm	TIC	X	
54 Butyl nitrite	544-16-1	Not Detected	0.1 ppm	TIC	X	
Organonitrates						
55 Butyl nitrate	928-45-0	Not Detected	2.5 ppm	TIC	X	
56 1,4-Butanediol, dinitrate	3457-91-8	Not Detected	0.05 ppm	TIC	X	
57 2-Nitro-2-methylpropane	594-70-7	Not Detected	0.3 ppm	TIC	X	
58 1,2,3-Propanetriol, 1,3-dinitrate	623-87-0	Not Detected	0.05 ppm	TIC	X	
Isocyanates						
59 Methyl Isocyanate	624-83-9	Not Detected	20 ppb	TIC	X	

5.0 Plots of COPCs with Significant Detected Values

Of the 59 COPCs in Table 1, only NDMA had detected (cartridge inlet) concentrations greater than 10% of its corresponding OEL (see COPCs highlighted in yellow in Table 1). This section provides more detail on the NDMA results, along with plots of the corresponding data. Note that Appendix E shows plots and descriptions for other COPCs with measured inlet concentrations between 2% and 10%, or detection limits >10% of their corresponding OELs.

Note that in Table 1 the inlet and outlet concentrations for N-nitrosodiethylamine (NDEA) were identified as being greater than 10% of the OEL. However, these values were below the analytical detection level for that compound in all cases, which corresponds to approximately 21% of the OEL. As such, the concern threshold for NDEA was increased from 10% of the OEL to the analytical detection limit. The NDEA data is plotted in Appendix E.

N-Nitrosodimethylamine (see Figure 1) – The detection limit for NDMA corresponds to approximately 10% of the OEL. All of the respirator outlet measurements were below analytical detection limits. For both respirator cartridges, three of the four inlet values were greater than the detection limit (up to 142% of the OEL). The first inlet concentration measured for Respirator Cartridge #1 was 107% OEL and the second, after 16 hours, was close to the detection limit, which could either indicate a change in inlet concentration or an error in the latter measurement. Inlet concentrations for Respirator Cartridge #2 were at 110% OEL and 142% OEL for the first and second inlet samples, respectively. Based on the outlet measurements, there is no evidence of breakthrough over the measured time period for either cartridge tested.

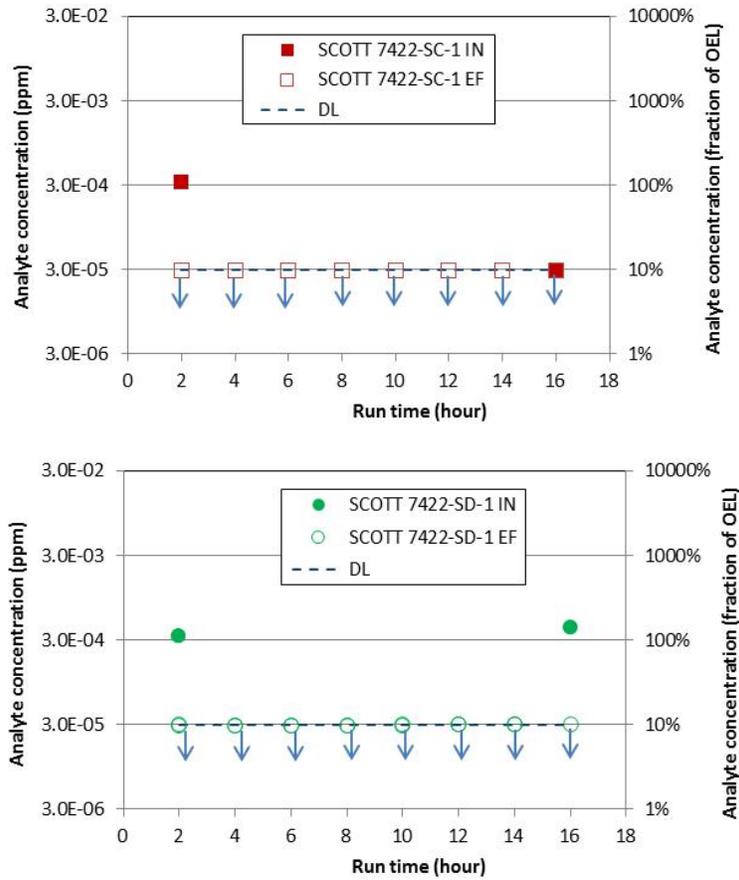


Figure 1. Plot of Measured N-Nitrosodimethylamine Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (cartridge #1 = SCOTT 7422-SC1 and cartridge #2 = SCOTT 7422-SD1). Data points noted with ↓ indicates measurements less than the detection or reporting limit (DL).

6.0 Factoring in Historical Concentration Data

To fully assess respirator performance for COPC removal, historical data were reviewed to determine if the recent inlet measurements were representative of typical values. Historical SY-102 data from TWINS and the Site-Wide Industrial Hygiene Database were used for this assessment.

A complete table with historical and measured results for all 59 COPCs and their boiling point data is shown in Appendix F, along with a description of the historic source data that were used. Table 2 shows a subset of data for COPCs with boiling points below 70°C because a low boiling point can be a general indicator of poor adsorption on solid media. The yellow-highlighted COPCs in Table 2 indicate the single compound, ammonia, with historical average measurements close to or greater than 10% of the corresponding OELs, and/or higher average historical concentrations compared to the average of the measurements in the current study.

Only three COPCs—ammonia, furan, and NDMA—have been previously measured in the SY-102 headspace at concentrations above 10% of their respective OELs and above analytical reporting limits. However, there are relatively few historic measurement results for SY-102, and for several COPCs, headspace concentrations vary by one to two orders of magnitude over time. For example, maximum ammonia concentrations ranged from 550 ppm in samples collected in 2000 to 3.3 ppm in samples collected in 2016. Similarly, only one of four measurements for furan exceeded the 5 ppb reporting limit in 2000, with a quantitative result of 20.1 ppb. In 2016, all furan measurements were less than the reporting limit.¹ Significant waste transfer activities were conducted in and out of SY-102 between 1999 and 2007.² Therefore, headspace sampling results from 2000 may not be particularly relevant to conditions in SY-102 today. Previous waste-disturbing events may have contributed to elevated concentrations of several COPCs in 2000, and the nature of the wastes in SY-102 today may be substantially different than than wastes that were present in 2000.

The majority of analyses results for SY-102 headspace came from a recent June 2016 sampling campaign that was completed several weeks before respirator cartridge testing. Therefore, these more recent results are expected to better represent current headspace conditions. From this most recent 2016 headspace sampling of SY-102, ammonia and NDMA concentrations were found to be comparable to the inlet respirator cartridge concentrations. Table 2 shows that the maximum inlet ammonia concentration in the respirator cartridge testing (7.5% OEL) was approximately equal to the average concentration of 12 ammonia headspace samples in 2016 (7.1% OEL).³ Furan concentrations in the headspace were below reporting limits, and near 1% of OEL in the respirator cartridge inlet.

¹ Thirty six Furan measurements were reported in June 2016, using two separate sorbent tubes. The reporting limits for each analysis result vary, ranging from 0.36 to 7.04 ppb.

² As evident from tank transfer activity reported in the TWINS Tank Transfers database (<https://twins.labworks.org/twinsdata/Forms/About.aspx?subject=TankTransfers>)

³ If the two ammonia samples taken in 2000 are included in this analysis, the average and maximum ammonia concentration from SY-102 are biased high, and are inconsistent with current tank measurements.

Table 2. Historical Tank SY-102 Headspace Data for COPCs with Boiling Points less than 70°C (158°F)

COPC Number and Name	CAS Number	Boiling Point (°C)	Boiling Point (°F)	OEL	Historical Measurements ¹					Measurements in this Study	
					# of Values	Maximum Value	Average Value	Max Value (% OEL)	Average Value (% OEL)	Max Inlet Value (% OEL)	Highest Value from Respirator Outlet (% OEL)
2 Nitrous Oxide	10024-97-2	-88	-127	50 ppm	0 18	n/a <RL	n/a <RL	n/a <RL	n/a <RL	Not Measured	
1 Ammonia	7664-41-7	-33	-28	25 ppm	12 14	3.31 551	1.78 80	13.2% 2204%	7.1% 320%	7.5%	2.5% (RL) ²
50 2-Fluoropropene	1184-60-7	-24	-11	0.1 ppm	0	n/a	n/a	n/a	n/a	Not Detected - TIC	
14 Formaldehyde	50-00-0	-21	-6	0.3 ppm	12	0.003	0.0025	1.00%	0.83%	3.5%	1.7%
53 Methyl nitrite	624-91-9	-12	10	0.1 ppm	0	n/a	n/a	n/a	n/a	Not Detected - TIC	
4 1,3-Butadiene	106-99-0	-4	24	1 ppm	36	<RL	<RL	<RL	<RL	2% (RL)	2% (RL)
42 Ethylamine	75-04-7	17	62	5 ppm	12	<RL	<RL	<RL	<RL	0.1% (RL)	0.1% (RL)
15 Acetaldehyde	75-07-0	21	69	25 ppm	24	0.025	0.0074	0.10%	0.03%	0.03%	0.03%
19 Furan	110-00-9	31	89	1 ppb	36	<RL	<RL	<RL	<RL	1.7%	1.6%
59 Methyl Isocyanate	624-83-9	39	103	0.02 ppm	0	n/a	n/a	n/a	n/a	Not Detected - TIC	
20 2,3-Dihydrofuran	1191-99-7	55	130	1 ppb	12	<RL	<RL	<RL	<RL	1.9%	1.8% (DL)
22 2-Methylfuran	534-22-5	64	147	1 ppb	36	<RL	<RL	<RL	<RL	1.9% (DL)	1.9% (DL)
8 Methanol	67-56-1	65	148	200 ppm	8	0.17	0.0778	0.09%	0.04%	Not Measured	
21 2,5-Dihydrofuran	1708-29-8	67	152	1 ppb	36	<RL	<RL	<RL	<RL	2.3% (DL)	2.3% (DL)

¹ Historical data from TWINS industrial hygiene vapor database and SWIH database; see Appendix F for additional information and dates of queries. Values in italics include those data plus data from the TWINS headspace database, all samples earlier than May 2005.

"< RL" indicates that all pertinent measurements of the analyte were less than the reporting limit

Plain font in the table indicates that only the recent databases (SWIHD headspace and TWINS Industrial Hygiene) were included. Italics (second row for nitrous oxide and ammonia only) mean that the pre-2006 TWINS headspace data were also included.

"n/a" indicates no historical data was found in the databases

² "(DL)" indicates value represents approximate detection limit (DL), which is calculated using the reported detection limit (or reporting limit - RL, where noted) from the analytical laboratory and the average volume (from flowrate x time) of vapor exposed to the sorbent tube.

7.0 Conclusions

Testing was conducted during the July 8-10, 2016 period using headspace vapors from Hanford tank SY-102 under static conditions. The vapors were fed to a respirator cartridge test stand developed by WRPS in collaboration with HiLine Engineering (Richland, Washington). Multipurpose respirator cartridges SCOTT 7422-SC1 and 7422-SD1 (SCOTT Safety, Monroe, North Carolina) were each assessed with the tank headspace vapors in tests conducted on separate days. Sorbent tubes were used to collect samples of the vapor stream entering and exiting the respirator cartridge, and were subsequently analyzed for COPC concentrations. PNNL was tasked to conduct independent analysis of the analytical results, and make recommendations based on the results for respiratory cartridge performance and change-out frequency.

The SY-102 data are expected to provide conservatively high COPC concentrations compared to the ambient concentrations inside and outside the tank farm. Further, the flow rate through each respirator cartridge was maintained conservatively high compared to normal human breathing rates. The average temperatures of the sample slipstream during testing ranged from 66 to 91°F, and the average relative humidity ranged from 25 to 78%. The inlet concentrations measured are shown in Table 1. Thus, any conclusions on respirator cartridge performance pertain to the above-stated conditions.

The following are the key conclusions from the assessment of the 59 COPCs in the current analysis:

- Based on measurements of the cartridge inlet vapor concentrations from tank SY-102, only NDMA exceeded its OEL. The NDMA inlet vapor concentrations were consistent with maximum SY-102 headspace measurements previously obtained, at concentrations up to 0.42 ppb, which exceeds the OEL by more than 142%. All outlet measurements from both respirator cartridges were below analytical detection limits for the duration of the testing (16 hours), which indicates no evidence of breakthrough for NDMA. The analytical detection limit for NDMA corresponds to approximately 10% of its OEL.
- Inlet vapor concentrations of all other measured COPCs, with the exception of NDEA¹, were below 10% OEL thresholds, and in many cases, they also were less than the corresponding analytical detection limits; thus, there is no evidence of cartridge breakthrough above 10% OEL for any compounds over the 16 hours of testing.
- Historical concentrations of the COPCs in SY-102 headspace were analyzed to identify any differences compared to those measured in this current study. Only three COPCs—ammonia, furan, and NDMA—have been previously measured in SY-102 headspace in concentrations above 10% of their respective OELs, and above analytical reporting limits. Most of the historical results from analyses for SY-102 headspace vapors came from a recent June 2016 sampling campaign that was completed several weeks before the respirator cartridge testing. Therefore, these more recent results are expected to better represent current headspace conditions. From these data for vapors in SY-102 headspace, ammonia and NDMA concentrations were found to be comparable to the inlet respirator cartridge concentrations measured in the current study. Furan concentrations in the headspace were below reporting limits, and near 1% of OEL in the respirator cartridge inlet.

¹ All inlet and outlet measurements of NDEA were less than the detection limit. However, the detection limit for NDEA is greater than the 10% OEL threshold.

8.0 Recommendations

- Because no COPCs in the current study indicated breakthrough behavior above 10% OEL during the 16-hour testing period, a change-out time of up to 16 hours is recommended for the SCOTTS 7422-SC1 and 7422-SD1 cartridges when used in APRs employed at Hanford tank SY-102.
- Any known increases in concentrations for any COPCs at the respirator inlet, compared to those measured in the current study, could alter (i.e., shorten) the above recommended cartridge change-out period, especially if OEL thresholds are exceeded. Decreases to change-out times may also be recommended if there are significant increases in temperature or relative humidity of the gas entering respirator cartridges compared to those represented in the current testing.
- Additional recommendations related to NDMA and NDEA detection limits, tentatively identified compounds, further data assessment, and future testing documented in PNNL-25860¹ for respirator cartridge testing on a slipstream from the Hanford AP tank exhauster are also relevant to testing the SY-102 headspace. Future testing and analysis of tank vapors with higher concentrations of COPCs such as furans should help improve understanding of cartridge performance.

¹ Nune, SK, J Liu, CJ Freeman, and TM Brouns. 2016. *Analysis of Respirator Cartridge Performance Testing on a Hanford AP Tank Farm Primary Exhauster Slipstream*. PNNL-25860, Pacific Northwest National Laboratory, Richland, Washington. (Unpublished)

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Appendix A

Description of Respirator Cartridge Testing Setup

Appendix A

Description of Respirator Cartridge Testing Setup

The respirator cartridge testing system was developed by Washington River Protection Solutions and HiLine Engineering as a means to comprehensively test respirator cartridge performance with actual Hanford tank headspace gases. The system was designed to draw vapors from a tank or exhauster and flow the vapors through the respirator cartridge being tested.[13,14] The test equipment allows for sampling the vapor stream both before and after the cartridge, so that performance for a given COPC can be quantified. Sorbent media tubes were used to capture the COPCs and other hazardous contaminants. After a given test segment, the sorbent tubes were removed and analyzed. Sampling of the exhaust gas was performed every 2 hours, but this timing can be modified as necessary.

Figure A.1 provide a general schematic diagram for the respirator cartridge test apparatus, and Figure A.2 shows photographs of the actual equipment. The test system operates using vacuum pressure to draw tank gases/vapors into the unit so that the potential for leakage to atmosphere is minimized until the gases/vapors are under positive pressure downstream of the vacuum pumps. By the time gases reach the vacuum pump, the COPCs are essentially captured/ removed by either the sorbent tubes or the respirator cartridge.[13,14]

Flows through the respirator cartridge and through each sorbent tube are set and controlled/maintained using manual flow control valves on the outlet of each rotameter, and rotameters were calibrated against Dry-Cal primary flow calibrators before and after testing. All equipment connections were leak tested prior to initiation of the test. Temperature, relative humidity, and pressure of the inlet gas/vapor stream are monitored by calibrated instrumentation.

Using Industrial-Hygiene-approved materials, cartridge test equipment was constructed so that it would not influence/interfere with vapor analysis. Stainless steel or Teflon tubing and fittings were incorporated into the design where possible because of their relatively inert nature to the vapors being analyzed. Limited portions of the assembly used acrylic, Viton, glass, and Masterflex C-flex tubing, which are commonly used for various vapor-sampling applications.

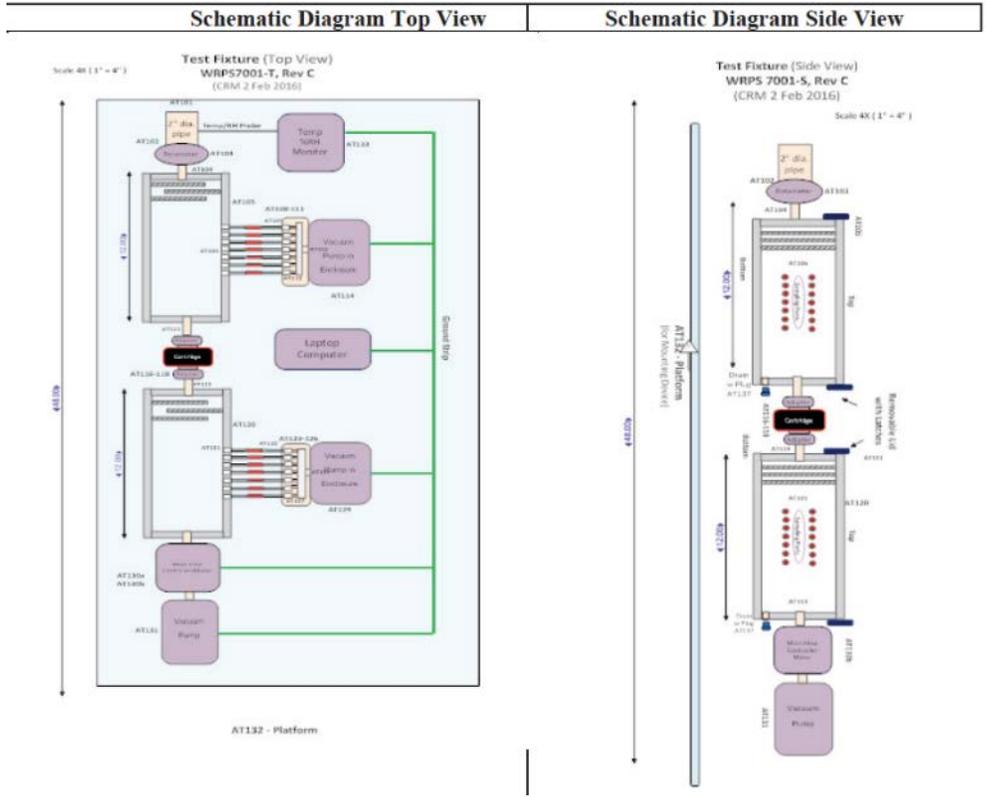


Figure A.1. General Schematic of Respirator Cartridge Test Apparatus

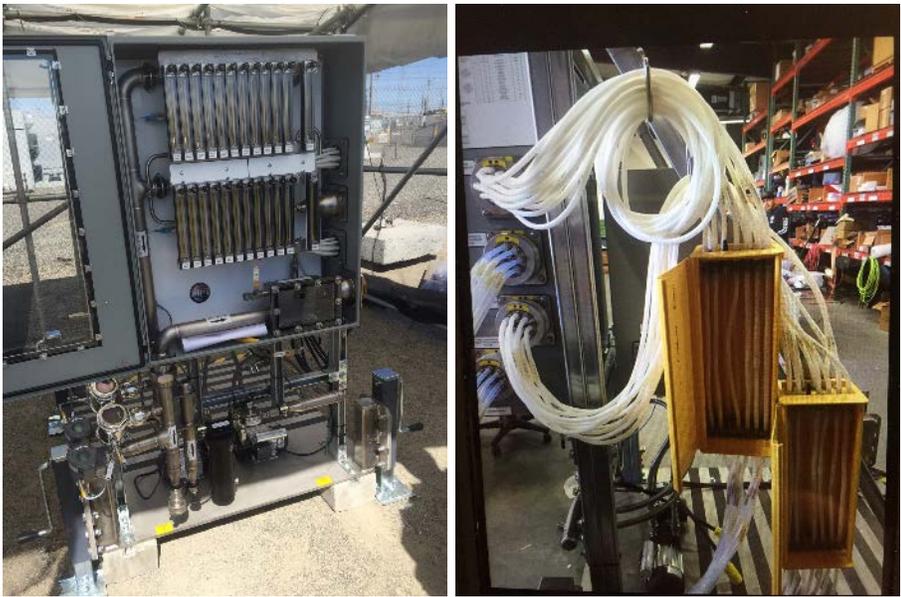


Figure A.2. Photographs of the Respirator Cartridge Test Equipment

Appendix B

Analytical Testing

Appendix B

Analytical Testing

The Sampling and Analysis Plan was developed under the direction and oversight of the Industrial Hygienist in conjunction with the Tank Farms Operations Contractor Retrieval and Closure, and Tank Farms Project and/or Production Operations Project Management Team.

Chemical compounds in the tank samples were analyzed using approved industrial hygiene methods or National Institute of Occupational Safety and Health (NIOSH)-approved methods for quantifying hazardous airborne contaminants in the tank farm vapors. Methods including gas chromatography/mass spectrometry, were used as the primary analytical techniques for identifying hazardous airborne contaminants (see Table B.1).

Table B.1. Information on Sorbent Media used to Capture Contaminants, Flow Rates Used, Analytical Methods to Extract Analyte from Sorbent Media, and Method Analysis to Quantify or Estimate the Concentrations of Hazardous Contaminant

Analyte	Media	Flow Rate (mL/min)	Analytical Method	Instrument Used ^{a,b}	Analysis Location ^b
Acetonitrile	Charcoal Tube, SKC-226-09	100	NIOSH 1606	GC-FID	ALS
Acetonitrile	Carbotrap 300 TDU Tube	33	EPA TO-17 Modified	GC/MS	WRPS
Furans	TDU Tenax TA	33	EPA TO-17 Modified	GC/MS	WRPS
SVOC	Carbotrap 150 TDU Tube	33	EPA TO-17 Modified	GC/MS	WRPS
VOC	Carbotrap 300 TDU tube	33	EPA TO-17 Modified	GC/MS	WRPS
Mercury	Anasorb C300, SKC-226-17-1A	250	NIOSH-6009	CVAA	WHL
Ammonia	Anasorb 747 (sulfuric acid), SKC-226-29	200	OSHA-ID-188	IC	WHL
1,3-butadiene	Charcoal, SKC-226-37 (Part A & Part B)	200	NIOSH-1024	GC-FID	ALS
Aldehyde	DNPH Treated Silica Gel, SKC-226-119	200	TO-11A	HPLC	ALS
Pyridine	Coconut Shell Charcoal, SKC-226-01offsite	1000	NIOSH-1613	GC-FID	ALS

Table B.1. (continued)

Analyte	Media	Flow Rate (mL/min)	Analytical Method	Instrument Used^{a,b}	Analysis Location^b
Nitrosamines	Thermosorb/N	2000	NIOSH-2522 Modified	GC/TEA	RJ Lee
Ethylamine	XAD-7 (NBD) Chloride), SKC 226-96	200	OSHA-ID-34, 36, 40,and 41	HPLC-UV	ALS

^a Method Instrument used for analysis

EPA-United States Environmental Protection Agency
NIOSH-National Institute of Occupation Safety and Health
OSHA-Occupational Safety and Health Administration
GC/MS-Gas Chromatography/Mass Spectrometry
CVAA-Cold Vapor Atomic Absorption
GC-FID-Gas Chromatography-Flame Ionization Detector
HPLC-High Performance Liquid Chromatography
IC-Ion Chromatography
SVOC-Semivolatile organic compound
TEA-Thermal Energy Analyzer
VOC-Volatile organic compound

^b Location where the analysis was performed

WRPS-222S-Washington River Protection Solutions, Organic Studies group
WHL-222S- Wastren Hanford laboratory
ALS- ALS Environmental Salt Lake City
CBAL-Columbia Basin Analytical Laboratory, part of R. J. Lee

Appendix C

Raw Analytical Data

Appendix C

Raw Analytical Data

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Description

This appendix includes raw data of flow rate, temperature, pressure, humidity and analytical data for the SY-101 data set. Calculations using this data are given in Appendix D.

The raw analytical data is only given in this appendix. WRPS converted these data into Excel data spreadsheets that were transmitted to PNNL. The following are comments on that conversion:

- The analytical measurement results listed in results spreadsheet columns were transferred from entries labeled 'result' in the raw analytical .pdf files. The results were transferred into three rows in the spreadsheets. The first row contained the relevant information with the appropriate units. Where a results entry was given as 'ND' in the .pdf, a '<' symbol was used. Where a detection/reporting limit was listed as 'n/a,' the result entry in the spreadsheet was given as '0.0,'
- The use of the terms reporting limit or detection limit varied among analytical laboratories. The term reporting limit (equivalent to a limit of quantification) was used instead of a detection limit by ALS, RJ Lee, and WHL (see Table F.1 in Appendix F for a complete correlation of which COPCs used a reporting limit or detection limit). The WRPS laboratory provided a detection limit, in contrast to a reporting limit. Neither reporting nor detection limits were provided for tentatively identified compounds (TICs).
- Chain of custody information is provided clearly in the raw analytical data .pdf files, including analyte name, sample numbers and laboratory-assigned numbers. Chemical Abstract Service numbers were not provided.

The nomenclature of the sample ID is the same for every set of chemicals. It is generally composed of a survey number, tank farm ID, test location, sample line, and tube bundle ID. Descriptions of these nomenclatures are given as follows:

- 'BK-BASE' means measurements obtained for blank experiment before plugging into the system. 'BASE' means measurement obtained for ambient air (fresh air vs. tank vapor).
- '5629' designations correspond to testing with the SCOTT 7422-SC1 respirator cartridge, whereas '5793' designations correspond to testing with the SCOTT 7422-SD1 respirator cartridge.
- Position designators 'A1' and 'H1' were respirator cartridge inlet measurements at 0 to 2 hours and 14 to 16 hours, respectively. The other position designators corresponded to respirator cartridge outlet measurements: A2 (0 to 2 hours), B1 (2 to 4 hours), C1 (4 to 6 hours), D1 (6 to 8 hours), (8 to 10 hours), F1 (10 to 12 hours), G1 (12 to 14 hours), and H2 (14 to 16 hours).
- For example, sample ID 16-05629-5-A1 corresponds to the first cartridge survey (16-05629), sample line 5, and the first (0 to 2hr) influent sample bundle (A1).

The flow rate passing through the respirator cartridge was approximately 30 L/min, while the sampling flow rates through the sorption tubes ranged between 30 and 200 mL/min for different chemicals that were being collected. WRPS provided these flow rates in files 'SY Farm 7-8 and 7-9.xlsx' and 'SY Farm 7-9 7-10.xlsx.' The information is shown in the tables below.

WRPS provided the temperature and humidity information in files 'SY-102 DRI July 8-9.xls' and 'SY-102 DRI July 9-10.xls.' The information is shown in the tables below.

The raw analytical data for chemicals in each category are summarized together. Examples of chemicals in each category follow:

- SVOC (or SVOA): Biphenyl, Diethylphthalate, Tributyl phosphate, Dibutyl butylphosphonate, Dodecane, Hexadecane
- SVOCTIC (or SVOATIC): Undecane, Cyclotetrasiloxane, octamethyl, Decamethylcyclopentasiloxane, Dodecane,4,6-dimethyl
- VOC (or VOA): Acetone, Acetonitrile, Acetophenone, Benzene, Butanal,1-Butanol, Butanenitrile, 3-Buten—2one, Cyclohexane, Decane, Ethanol, Ethylbenzene, Furan, Hexane, Hexanone, Methylene Chloride, Propanenitrile, Styrene, Tetrachloroethene, Toluene, Trichlorofluoromethane
- VOCTIC (or VOATIC): 2,6-Dimethyldecane, Decane, 2,3,5,8-tetramethyl-, Decane, 3,7-dimethyl-, Methenamine, Undecane, 2,6-dimethyl-
- Furans: 2,3-Dihydrofuran, 2-Pentylfuran, Furan, Tetrafulan
- Ethylamine (amines): Dimethylamine, Ethylamine, Methylamine
- Acetonitrile: Acetonitrile
- Mercury: Mercury
- Ammonia: Ammonia
- Aldehyde: Acetaldehyde, Acetone, Butyraldehyde. Formaldehyde, Hexanal, Propionaldehyde, Valeraldehyde
- 1,3 Butadiene: 1,3-Butadiene
- Pyridines: 2,4-Dimethylpyridine,Pyridine
- Nitrosamines: N-Nitrosodimethylamine.

Notes: VOC: volatile organic compound; SVOC: semi-volatile organic compound; TIC: tentatively identified compound.

First Cartridge, or Survey 1 (7/8-7/9) SY-102

Volumes Air Collected (L)

Sample Box Number		Mach.	Mach.	A1	A2	B1	C1	D1	E1	F1	G1	H1	H2
Analyte	Line	Base 1	Base 2										
SVOC	A	3.82	4.08	3.75	3.98	3.91	3.96	3.85	3.93	3.89	3.97	3.87	3.96
VOC	B	4.10	3.83	4.37	3.66	3.76	3.79	3.76	3.94	3.90	3.98	3.85	4.01
Furans	C	4.14	4.16	4.12	4.03	4.09	4.07	4.09	4.16	4.15	4.13	4.08	4.15
Ethylamine	D	12.24	12.45	12.08	12.44	13.12	12.45	11.96	11.54	12.01	11.83	11.95	11.83
Acetonitrile	E	12.57	12.65	12.40	12.36	12.74	12.69	12.40	11.72	11.84	11.72	11.90	11.72
Mercury	F	30.55	31.28	29.72	30.50	30.75	30.81	30.44	30.02	29.43	30.08	29.86	29.93
Ammonia	G	24.60	24.38	24.81	23.50	23.70	23.62	23.18	23.97	23.41	24.15	23.63	23.82
Aldehyde	H	23.75	24.28	23.52	23.38	23.81	23.57	23.18	23.98	23.69	23.60	23.56	23.60
1,3-Butadiene	I	23.91	24.24	23.09	23.90	24.62	24.52	23.90	23.89	23.30	23.56	23.53	23.62
Pyridine	J	130.54	128.10	126.60	122.40	125.40	123.60	123.60	121.80	121.80	121.20	121.14	121.80
Nitrosamines	K	242.96	245.83	235.20	238.80	239.40	240.00	238.80	237.00	236.40	237.60	244.80	237.60

Flow Rates (ml/min)

Sample Box Number		Mach.	Mach.	A1	A2	B1	C1	D1	E1	F1	G1	H1	H2
Analyte	Line	Base 1	Base 2										
SVOC	A	31.83	34.04	32.89	34.95	32.60	33.00	32.10	32.76	32.42	33.05	32.25	33.00
VOC	B	34.16	31.95	38.32	32.11	31.35	31.55	31.30	32.80	32.50	33.20	32.08	33.45
Furans	C	34.47	34.67	36.16	35.37	34.05	33.95	34.05	34.65	34.60	34.40	34.00	34.60
Ethylamine	D	102.02	103.75	106.00	109.11	109.35	103.75	99.70	96.20	100.05	98.60	99.55	98.55
Acetonitrile	E	104.72	105.38	108.74	108.42	106.15	105.75	103.30	97.65	98.65	97.65	99.15	97.65
Mercury	F	254.62	260.67	260.68	267.53	256.25	256.75	253.65	250.15	245.25	250.70	248.85	249.40
Ammonia	G	205.01	203.18	206.79	206.16	197.50	196.80	193.20	199.75	195.10	201.25	196.90	198.50
Aldehyde	H	197.95	202.32	206.32	205.11	198.40	196.45	193.20	199.80	197.45	196.70	196.30	196.70
1,3-Butadiene	I	199.27	201.96	202.58	209.63	205.15	204.35	199.15	199.05	194.19	196.35	196.10	196.85
Pyridine	J	1087.8	1067.5	1110.5	1073.7	1045.0	1030.0	1030.0	1015.0	1015.0	1010.0	1009.5	1015.0
Nitrosamines	K	2024.7	2048.6	2063.2	2094.7	1995.0	2000.0	1990.0	1975.0	1970.0	1980.0	2040.0	1980.0

Second Cartridge, or Survey 2 (7/9-7/10) SY-102

Volumes Air Collected (L)

Sample Box Number	Mach.	Mach.	A1	A2	B1	C1	D1	E1	F1	G1	H1	H2	
Analyte	Line	Base 1	Base 2										
SVOC	A	3.90	3.72	3.55	3.84	3.92	3.91	3.92	3.77	3.97	3.90	3.94	3.98
VOC	B	3.54	3.86	3.90	3.50	3.78	3.78	3.82	3.76	3.92	3.86	3.91	4.06
Furans	C	3.74	3.79	3.72	3.53	3.79	3.78	3.80	3.86	3.93	3.87	4.07	4.07
Ethylamine	D	11.82	12.15	11.88	12.08	12.31	12.45	12.37	11.91	11.75	11.96	12.11	11.99
Acetonitrile	E	12.16	11.69	12.12	11.80	12.49	12.20	12.28	12.13	11.85	11.87	12.13	12.32
Mercury	F	30.29	29.55	29.37	29.75	29.98	30.09	29.83	29.30	29.82	29.51	30.18	31.66
Ammonia	G	24.74	23.78	23.82	23.37	24.25	24.38	24.34	23.88	23.83	23.92	24.05	24.12
Aldehyde	H	24.18	24.14	22.62	23.23	24.83	23.98	23.92	23.57	23.67	23.94	24.11	23.91
1,3-Butadiene	I	23.81	23.78	23.40	23.01	24.16	24.13	23.88	23.94	23.84	23.75	23.84	24.64
Pyridine	J	122.40	123.00	114.57	116.85	124.20	125.40	124.20	124.80	123.00	123.60	118.80	124.80
Nitrosamines	K	251.40	239.40	237.69	226.86	240.00	240.00	240.00	239.40	242.40	236.40	247.80	238.20

Flow Rates (ml/min)

Sample Box Number	Mach.	Mach.	A1	A2	B1	C1	D1	E1	F1	G1	H1	H2	
Analyte	Line	Base 1	Base 2										
SVOC	A	32.51	31.02	31.17	33.72	32.67	32.62	32.68	31.41	33.08	32.50	32.85	33.20
VOC	B	29.50	32.16	34.23	30.74	31.50	31.53	31.82	31.35	32.70	32.15	32.60	33.80
Furans	C	31.21	31.55	32.67	31.00	31.55	31.51	31.71	32.15	32.75	32.25	33.95	33.95
Ethylamine	D	98.50	101.25	104.24	106.00	102.55	103.76	103.07	99.25	97.90	99.70	100.90	99.90
Acetonitrile	E	101.31	97.39	106.31	103.54	104.08	101.64	102.36	101.05	98.75	98.90	101.10	102.70
Mercury	F	252.44	246.22	257.65	260.96	249.87	250.78	248.61	244.20	248.50	245.95	251.50	263.80
Ammonia	G	206.14	198.16	198.54	204.97	202.12	203.18	202.86	199.00	198.55	199.30	200.45	201.00
Aldehyde	H	201.54	201.16	198.43	203.76	206.92	199.87	199.30	196.40	197.25	199.50	200.90	199.25
1,3-Butadiene	I	198.46	198.13	205.30	201.83	201.37	201.11	198.99	199.50	198.65	197.90	198.68	205.35
Pyridine	J	1020.0	1025.0	1005.0	1025.0	1035.0	1045.0	1035.0	1040.0	1025.0	1030.0	990.0	1040.0
Nitrosamines	K	2095.0	1995.0	2085.0	1990.0	2000.0	2000.0	2000.0	1995.0	2020.0	1970.0	2065.0	1985.0

First Cartridge, or Survey 1 - SY-102 - 29 L/min through main respirator

Influent - Pre		After Sample Taken								
Reading	UOM	Baseline	A	B	C	D	E	F	G	H
Temperature	F	75.2	81.6	84	86.9	85	75.6	70.7	77.2	66.9
Pressure	Torr	732.5	710	712.6	711.6	711.6	713.4	714.4	714.5	724.7
Relative Humidity	%	55.4	92.4	56	47.8	49	60.4	68.3	67.2	76.5
NH3	ppm									
VOC	ppm									

Influent - Post		After Sample Taken								
Reading	UOM	Baseline	A	B	C	D	E	F	G	H
Temperature	F	80.6	84.5	87.3	85.5	76.9	72.5	66.9	68.5	66.4
Pressure	Torr	732.5	709.9	712.1	711.3	712.5	714.4	714.3	715.1	725.9
Relative Humidity	%	50.7	52.6	47.8	48.3	58.7	65.1	77.9	73.4	74.4
NH3	ppm		0	2	0	1	0	0	0	0
VOC	ppm		6.1	6	3.4	4.3	3.7	2.8	2.5	0.5

Effluent - Pre		After Sample Taken								
Reading	UOM	Baseline	A	B	C	D	E	F	G	H
Temperature	F	72.3	80.4	84.7	88	85.9	77.9	72	67.9	67.4
Pressure	Torr	396.5	387.5	387.4	385.6	387.5	384.2	393.5	387.2	400.2
Relative Humidity	%	37.9	37.7	27.3	23.6	23.3	27	31.5	36.4	36.6
NH3	ppm									
VOC	ppm									

Effluent - Post		After Sample Taken								
Reading	UOM	Baseline	A	B	C	D	E	F	G	H
Temperature	F	81.2	87.9	91.3	89.6	82.6	75.3	68.5	68.5	66.3
Pressure	Torr	400.6	403.1	403.5	404.4	404.6	401.7	396	396.1	403.6
Relative Humidity	%	25.6	25.1	21.5	21.7	25.8	30.1	37.1	37.1	35.7
NH3	ppm		0	0	0	0	0	0	0	0
VOC	ppm		1.2	1	2.7	3.2	2.4	2	0	0.3

Second Cartridge, or Survey 2 - SY-102 - 27 L/min through main respirator

Influent - Pre		After Sample Taken								
Reading	UOM	Baseline	A	B	C	D	E	F	G	H
Temperature	F	77.7	77.1	82	83.8	85.9	83.1	75.2	72.8	68.4
Pressure	Torr	735.1	715.7	717.7	716.9	716.7	716.6	717.9	718.1	715.8
Relative Humidity	%	58.8	63.4	49.9	48.7	44.7	46.2	55.7	57.8	64.2
NH3	ppm									
VOC	ppm									

Influent - Post		After Sample Taken								
Reading	UOM	Baseline	A	B	C	D	E	F	G	H
Temperature	F	77.1	83.4	83.9	86.5	83.2	78.4	73.6	69.2	69
Pressure	Torr	735.4	715.4	717.1	716.4	716.6	717.5	718.3	717.9	727.5
Relative Humidity	%	52.5	49.6	48.8	44.4	45.9	50.6	56.7	63	64.3
NH3	ppm		1	0	1	1	0	0	0	0
VOC	ppm		5.6	3.4	6.3	6.3	1.5	2.9	2.9	2.3

Effluent - Pre		After Sample Taken								
Reading	UOM	Baseline	A	B	C	D	E	F	G	H
Temperature	F	72.9	76	81	84.2	85.8	82.4	75.6	71.8	68.1
Pressure	Torr	387.7	391.1	384.8	391	390.8	390.8	398.8	398.7	401.3
Relative Humidity	%	34.5	28.9	25.2	22.5	20.3	21.1	23.4	25.7	29.1
NH3	ppm									
VOC	ppm									

Effluent - Post		After Sample Taken								
Reading	UOM	Baseline	A	B	C	D	E	F	G	H
Temperature	F	76.3	82.3	86.2	87.8	84.2	80.3	72.4	69.1	66.6
Pressure	Torr	405.7	406.6	405.6	406.4	405.3	406	402.2	401.8	405
Relative Humidity	%	24.9	25.2	21.9	19.5	20.3	21.4	26.1	28.3	29.1
NH3	ppm		0	0	0	0	0	0	0	0
VOC	ppm		3.3	3.4	0.6	1.9	0.4	0.5	0.4	0.5

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032
 SDG Number:
 Customer Sample ID: 16-05629-1-A2
 Customer Sample ID: 16-05629-1-A2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Dot Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVCA #2															
S16T020415			3891-98-3	2,6,10-Trimethyldecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	
S16T020415			95-48-7	2-Methylphenol	NGS	99	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	
S16T020415			108-39-4M	Cresol (m & p)	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020415			92-52-4	Biphenyl	NGS	86	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020415			78-46-6	Dibutyl butylphosphonate	NGS	93	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	
S16T020415			84-66-2	Diethylphthalate	NGS	86	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020415			112-40-3	Dodecane	NGS	93	<0.81	58	n/a	n/a	n/a	n/a	0.81	n/a	E
S16T020415			544-76-3	Hexadecane-	NGS	92	<1.9	2.6	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020415			629-59-4	Tetradecane	NGS	92	<1.2	4.5	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T020415			126-73-8	Tributyl phosphate	NGS	92	<6.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	
S16T020415			629-50-5	Tridecane	NGS	94	<0.50	13	n/a	n/a	n/a	n/a	0.46	n/a	
S16T020415			629-78-7	Heptadecane	NGS	93	<5.2	<5.2	n/a	n/a	n/a	n/a	5.2	n/a	
S16T020415			629-62-9	Pentadecane	NGS	92	<2.8	5.4	n/a	n/a	n/a	n/a	2.8	n/a	J

Handwritten signature and date: 8/11/16

N - Named TIC
 T - Tentatively Identified Compound
 J - Estimated
 NA = Not Analyzed, ND = Not Detected
 E - Outside Calibration Range

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032
 SDG Number:
 Customer Sample ID: 16-05629-1-B1
 Customer Sample ID: 16-05629-1-B1

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T020417			3891-98-3	2,6,10-Trimethyldecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	
S16T020417			95-48-7	2-Methylphenol	NGS	99	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	
S16T020417			108-39-4M	Cresol (m & p)	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020417			92-52-4	Biphenyl	NGS	86	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020417			78-46-6	Dibutyl butylphosphonate	NGS	93	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	
S16T020417			84-66-2	Diethylphthalate	NGS	86	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020417			112-40-3	Dodecane	NGS	93	<0.81	63	n/a	n/a	n/a	n/a	0.81	n/a	E
S16T020417			544-76-3	Hexadecane-	NGS	92	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020417			629-59-4	Tetradecane	NGS	92	<1.2	5.4	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T020417			126-73-8	Tributyl phosphate	NGS	92	<6.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	
S16T020417			629-50-5	Tridecane	NGS	94	<0.50	15	n/a	n/a	n/a	n/a	0.46	n/a	
S16T020417			628-78-7	Heptadecane	NGS	93	<5.2	<5.2	n/a	n/a	n/a	n/a	5.2	n/a	
S16T020417			629-62-9	Pentadecane	NGS	92	<2.8	4.0	n/a	n/a	n/a	n/a	2.8	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032
 SDG Number:
 Customer Sample ID: 16-05629-1-BLANK
 Customer Sample ID: 16-05629-1-BLANK

Sample#	R	AIJ	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T020418			3891-98-3	2,6,10-Trimethyldodecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	
S16T020418			95-48-7	2-Methylphenol	NGS	99	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	
S16T020418			108-39-4M	Cresol (m & p)	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020418			92-52-4	Biphenyl	NGS	86	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020418			78-46-6	Dibutyl butylphosphonate	NGS	93	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	
S16T020418			84-66-2	Diethylphthalate	NGS	86	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020418			112-40-3	Dodecane	NGS	93	<0.81	1.2	n/a	n/a	n/a	n/a	0.81	n/a	J
S16T020418			544-76-3	Hexadecane-	NGS	92	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020418			629-59-4	Tetradecane	NGS	92	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	
S16T020418			126-73-8	Tributyl phosphate	NGS	92	<6.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	
S16T020418			629-50-5	Tridecane	NGS	94	<0.50	<0.50	n/a	n/a	n/a	n/a	0.50	n/a	
S16T020418			629-78-7	Heptadecane	NGS	93	<5.2	<5.2	n/a	n/a	n/a	n/a	5.2	n/a	
S16T020418			629-62-9	Pentadecane	NGS	92	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	

NA = Not Analyzed, ND = Not Detected
 E - Outside Calibration Range

J - Estimated

T - Tentatively Identified Compound

N - Named TIC

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032
 SDG Number:
 Customer Sample ID: 16-05629-1-C1
 Customer Sample ID: 16-05629-1-C1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T020420		3891-98-3		2,6,10-Trimethyldecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	
S16T020420		95-48-7		2-Methylphenol	NGS	99	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	
S16T020420		108-39-4M		Cresol (m & p)	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020420		92-52-4		Biphenyl	NGS	86	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020420		78-46-6		Dibutyl butylphosphonate	NGS	93	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	
S16T020420		84-66-2		Diethylphthalate	NGS	86	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020420		112-40-3		Dodecane	NGS	93	<0.81	87	n/a	n/a	n/a	n/a	0.81	n/a	E
S16T020420		544-76-3		Hexadecane-	NGS	92	<1.9	5.2	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020420		629-59-4		Tetradecane	NGS	92	<1.2	6.6	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T020420		126-73-8		Tributyl phosphate	NGS	92	<6.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	
S16T020420		629-50-5		Tridecane	NGS	94	<0.50	24	n/a	n/a	n/a	n/a	0.46	n/a	
S16T020420		629-78-7		Heptadecane	NGS	93	<5.2	5.6	n/a	n/a	n/a	n/a	5.2	n/a	J
S16T020420		629-62-9		Pentadecane	NGS	92	<2.8	8.9	n/a	n/a	n/a	n/a	2.8	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032
 SDG Number:
 Customer Sample ID: 16-05629-1-D1
 Customer Sample ID: 16-05629-1-D1

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T020421			3891-98-3	2,6,10-Trimethyldodecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	
S16T020421			95-48-7	2-Methylphenol	NGS	99	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	
S16T020421			108-39-4M	Cresol (m & p)	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020421			92-52-4	Biphenyl	NGS	86	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020421			78-46-6	Dibutyl butylphosphonate	NGS	93	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	
S16T020421			94-66-2	Diethylphthalate	NGS	86	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020421			112-40-3	Dodecane	NGS	93	<0.81	44	n/a	n/a	n/a	n/a	0.81	n/a	
S16T020421			544-76-3	Hexadecane-	NGS	92	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020421			629-59-4	Tetradecane	NGS	92	<1.2	4.3	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T020421			126-73-8	Tributyl phosphate	NGS	92	<6.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	
S16T020421			629-50-5	Tridecane	NGS	94	<0.50	12	n/a	n/a	n/a	n/a	0.46	n/a	
S16T020421			629-78-7	Heptadecane	NGS	93	<5.2	<5.2	n/a	n/a	n/a	n/a	5.2	n/a	
S16T020421			629-62-9	Pentadecane	NGS	92	<2.8	3.6	n/a	n/a	n/a	n/a	2.8	n/a	J

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 J - Estimated
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 E - Outside Calibration Range

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032
 SDG Number:
 Customer Sample ID: 16-05629-1-E1
 Customer Sample ID: 16-05629-1-E1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T020422			3891-98-3	2,6,10-Trimethyldodecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	
S16T020422			95-48-7	2-Methylphenol	NGS	99	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	
S16T020422			108-39-4M	Cresol (m & p)	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020422			92-52-4	Biphenyl	NGS	86	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020422			78-46-6	Dibutyl butylphosphonate	NGS	93	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	
S16T020422			94-66-2	Diethylphthalate	NGS	86	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020422			112-40-3	Dodecane	NGS	93	<0.81	34	n/a	n/a	n/a	n/a	0.81	n/a	
S16T020422			544-76-3	Hexadecane-	NGS	92	<1.9	2.1	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020422			629-59-4	Tetradecane	NGS	92	<1.2	3.2	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T020422			126-73-8	Tributyl phosphate	NGS	92	<6.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	
S16T020422			629-50-5	Tridecane	NGS	94	<0.50	8.0	n/a	n/a	n/a	n/a	0.46	n/a	J
S16T020422			629-78-7	Heptadecane	NGS	93	<5.2	<5.2	n/a	n/a	n/a	n/a	5.2	n/a	
S16T020422			629-62-9	Pentadecane	NGS	92	<2.8	4.0	n/a	n/a	n/a	n/a	2.8	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032
 SDG Number:
 Customer Sample ID: 16-05629-1-EFF-BASE
 Customer Sample ID: 16-05629-1-EFF-BASE

Sample#	R	AF	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T020423			3891-98-3	2,6,10-Trimethyldecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	
S16T020423			95-48-7	2-Methylphenol	NGS	99	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	
S16T020423			108-39-4M	Cresol (m & p)	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020423			92-52-4	Biphenyl	NGS	86	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020423			78-46-6	Dibutyl butylphosphonate	NGS	93	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	
S16T020423			84-66-2	Diethylphthalate	NGS	86	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020423			112-40-3	Dodecane	NGS	93	<0.81	46	n/a	n/a	n/a	n/a	0.81	n/a	
S16T020423			544-76-3	Hexadecane-	NGS	92	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020423			628-59-4	Tetradecane	NGS	92	<1.2	5.1	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T020423			126-73-8	Tributyl phosphate	NGS	92	<6.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	
S16T020423			629-50-5	Tridecane	NGS	94	<0.50	14	n/a	n/a	n/a	n/a	0.46	n/a	
S16T020423			629-78-7	Heptadecane	NGS	93	<5.2	<5.2	n/a	n/a	n/a	n/a	5.2	n/a	
S16T020423			629-62-9	Pentadecane	NGS	92	<2.8	6.0	n/a	n/a	n/a	n/a	2.8	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032
 SDG Number:
 Customer Sample ID: 16-05629-1-F1
 Customer Sample ID: 16-05629-1-F1

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Dot Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T020424			3891-98-3	2,6,10-Trimethyldecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	
S16T020424			95-48-7	2-Methylphenol	NGS	99	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	
S16T020424			108-39-4M	Cresol (m & p)	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020424			92-52-4	Biphenyl	NGS	86	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020424			78-46-6	Dibutyl butylphosphonate	NGS	93	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	
S16T020424			84-66-2	Diethylphthalate	NGS	86	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020424			112-40-3	Dodecane	NGS	93	<0.81	28	n/a	n/a	n/a	n/a	0.81	n/a	
S16T020424			544-76-3	Hexadecane-	NGS	92	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020424			829-59-4	Tetradecane	NGS	92	<1.2	1.7	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T020424			126-73-8	Tributyl phosphate	NGS	92	<6.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	
S16T020424			829-50-5	Tridecane	NGS	94	<0.50	6.5	n/a	n/a	n/a	n/a	0.46	n/a	J
S16T020424			829-78-7	Heptadecane	NGS	93	<5.2	<5.2	n/a	n/a	n/a	n/a	5.2	n/a	
S16T020424			829-62-9	Pentadecane	NGS	92	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032
 SDG Number:
 Customer Sample ID: 16-05629-1-H1
 Customer Sample ID: 16-05629-1-H1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T020426			3891-98-3	2,6,10-Trimethyldodecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	
S16T020426			95-48-7	2-Methylphenol	NGS	99	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	
S16T020426			108-39-4M	Cresol (m & p)	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020426			92-52-4	Biphenyl	NGS	86	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020426			78-46-6	Dibutyl butylphosphonate	NGS	93	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	
S16T020426			84-66-2	Diethylphthalate	NGS	86	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020426			112-40-3	Dodecane	NGS	93	<0.81	38	n/a	n/a	n/a	n/a	0.81	n/a	
S16T020426			544-76-3	Hexadecane-	NGS	92	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020426			629-59-4	Tetradecane	NGS	92	<1.2	2.1	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T020426			126-73-8	Tributyl phosphate	NGS	92	<6.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	
S16T020426			629-50-5	Tridecane	NGS	94	<0.50	12	n/a	n/a	n/a	n/a	0.46	n/a	
S16T020426			629-78-7	Heptadecane	NGS	93	<5.2	<5.2	n/a	n/a	n/a	n/a	5.2	n/a	
S16T020426			629-62-9	Pentadecane	NGS	92	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032
 SDG Number:
 Customer Sample ID: 16-05629-1-H2
 Customer Sample ID: 16-05629-1-H2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T020427			3891-98-3	2,6,10-Trimethyldecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	
S16T020427			95-48-7	2-Methylphenol	NGS	99	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	
S16T020427			108-39-4M	Cresol (m & p)	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020427			92-52-4	Biphenyl	NGS	86	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020427			78-46-6	Dibutyl butylphosphonate	NGS	93	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	
S16T020427			84-66-2	Diethylphthalate	NGS	86	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020427			112-40-3	Dodecane	NGS	93	<0.81	28	n/a	n/a	n/a	n/a	0.81	n/a	
S16T020427			544-76-3	Hexadecane-	NGS	92	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020427			629-59-4	Tetradecane	NGS	92	<1.2	2.2	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T020427			126-73-8	Tributyl phosphate	NGS	92	<6.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	
S16T020427			629-50-5	Tridecane	NGS	94	<0.50	8.1	n/a	n/a	n/a	n/a	0.46	n/a	J
S16T020427			629-78-7	Heptadecane	NGS	93	<5.2	<5.2	n/a	n/a	n/a	n/a	5.2	n/a	
S16T020427			629-62-9	Pentadecane	NGS	92	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032
 SDG Number:
 Customer Sample ID: 16-05629-1-IN-BASE
 Customer Sample ID: 16-05629-1-IN-BASE

Sample#	R	AF	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T020428			3891-98-3	2,6,10-Trimethyldecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	
S16T020428			95-48-7	2-Methylphenol	NGS	99	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	
S16T020428			108-39-4M	Cresol (m & p)	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020428			92-52-4	Biphenyl	NGS	86	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020428			78-46-6	Dibutyl butylphosphonate	NGS	93	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	
S16T020428			84-66-2	Diethylphthalate	NGS	86	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020428			112-40-3	Dodecane	NGS	93	<0.81	48	n/a	n/a	n/a	n/a	0.81	n/a	
S16T020428			544-76-3	Hexadecane-	NGS	92	<1.9	3.2	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020428			629-59-4	Tetradecane	NGS	92	<1.2	4.1	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T020428			126-73-8	Tributyl phosphate	NGS	92	<6.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	
S16T020428			629-50-5	Tridecane	NGS	94	<0.50	8.3	n/a	n/a	n/a	n/a	0.46	n/a	J
S16T020428			629-78-7	Heptadecane	NGS	93	<5.2	<5.2	n/a	n/a	n/a	n/a	5.2	n/a	
S16T020428			629-62-9	Pentadecane	NGS	92	<2.8	5.8	n/a	n/a	n/a	n/a	2.8	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032
 SDG Number:
 Customer Sample ID: 16-05629-1-A2
 Customer Sample ID: 16-05629-1-A2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T020415				Unknown-1	-	4.42	NGS	470	JT
S16T020415				2-Propyl-1-pentanol	58175-57-8	4.85	NGS	78	JNT
S16T020415				1-Heptanol, 4-methyl-	817-91-4	4.91	NGS	43	JNT
S16T020415				Methyltris(trimethylsiloxy)sil	17928-28-8	5.01	NGS	67	JNT
S16T020415				Decane, 3,7-dimethyl-	17312-54-8	5.08	NGS	210	JNT
S16T020415				Acetophenone	98-86-2	5.22	NGS	48	JNT
S16T020415				2,3-Dimethyldecane	17312-44-6	5.39	NGS	44	JNT
S16T020415				Undecane	1120-21-4	5.47	NGS	260	JNT
S16T020415				2,6-Dimethyldecane	13150-81-7	5.51	NGS	37	JNT
S16T020415				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	47	JNT
S16T020415				Benzothiazole	95-16-9	6.64	NGS	83	JNT
S16T020415				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.92	NGS	67	JNT
S16T020415				Dodecamethylcyclohexasiloxane	540-97-6	7.08	NGS	47	JNT
S16T020415				Dodecane, 2,6,10-trimethyl-	3891-98-3	7.28	NGS	40	JNT
S16T020415				2,2,4-Trimethyl-1,3-pentanedio	6846-50-0	9.20	NGS	33	JNT
S16T020415			BLNK	Chrysene-D12	1719-03-5	14.05	NGS	28	
S16T020415			BLNK	Perylene-D12	1520-96-3	15.82	NGS	19	

Handwritten signature and date: 8/11/16

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032
 SDG Number:
 Customer Sample ID: 16-05629-1-B1
 Customer Sample ID: 16-05629-1-B1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T020417				Unknown-1	-	4.41	NGS	530	JT
S16T020417				Acetic acid, trifluoro-, 3,7-d	28745-07-5	4.50	NGS	38	JNT
S16T020417				1-Hexene, 3,5-dimethyl-	7423-69-0	4.85	NGS	88	JNT
S16T020417				1-Heptanol, 6-methyl-	1653-40-3	4.89	NGS	54	JNT
S16T020417				1-Heptanol, 4-methyl-	817-91-4	4.92	NGS	110	JNT
S16T020417				5-Methyl-1-heptanol	7212-53-5	4.98	NGS	35	JNT
S16T020417				1,1,1,3,5,5-Heptamethyltrisiloxane	1873-88-7	5.01	NGS	67	JNT
S16T020417				Decane, 3,7-dimethyl-	17312-54-8	5.07	NGS	130	JNT
S16T020417				2,6-Dimethyldecane	13150-81-7	5.12	NGS	41	JNT
S16T020417				Acetophenone	98-86-2	5.21	NGS	89	JNT
S16T020417				1-Octanol, 2-butyl-	3913-02-8	5.39	NGS	57	JNT
S16T020417				Undecane, 4,6-dimethyl-	17312-82-2	5.46	NGS	280	JNT
S16T020417				Undecane, 2,6-dimethyl-	17301-23-4	5.51	NGS	30	JNT
S16T020417				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	57	JNT
S16T020417				Benzothiazole	95-16-9	6.63	NGS	70	JNT
S16T020417				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.92	NGS	50	JNT
S16T020417				Dodecamethylcyclohexasiloxane	540-97-6	7.08	NGS	38	JNT
S16T020417				Dodecane, 4,6-dimethyl	61141-72-8	7.28	NGS	33	JNT
S16T020417			BLNK	Chrysene-D12	1719-03-5	14.05	NGS	28	
S16T020417			BLNK	Perylene-D12	1520-96-3	15.82	NGS	19	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032

SDG Number:

Customer Sample ID: 16-05629-1-BLANK

Customer Sample ID: 16-05629-1-BLANK

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T020418				Phenol	108-95-2	4.41	NGS	28	JNT
S16T020418				Undecane	1120-21-4	5.45	NGS	6.1	JNT
S16T020418			BLNK	Chrysene-D12	1719-03-5	14.05	NGS	28	
S16T020418			BLNK	Perylene-D12	1520-96-3	15.82	NGS	19	

N - Named TIC

T - Tentatively Identified Compound

J - Estimated

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032

SDG Number:

Customer Sample ID: 16-05629-1-C1

Customer Sample ID: 16-05629-1-C1

Sample#	R	Alt	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T020420				Unknown-1	--	4.40	NGS	390	JT
S16T020420				Phenol	108-95-2	4.44	NGS	46	JNT
S16T020420				2-Propyl-1-pentanol	58175-57-8	4.85	NGS	59	JNT
S16T020420				1-Heptanol, 4-methyl-	817-91-4	4.91	NGS	46	JNT
S16T020420				1,1,1,3,5,5,5-Heptamethyltrisiloxane	1873-88-7	5.01	NGS	46	JNT
S16T020420				Decane, 3,7-dimethyl-	17312-94-8	5.08	NGS	110	JNT
S16T020420				2,6-Dimethyldecane	13150-81-7	5.13	NGS	38	JNT
S16T020420				Acetophenone	98-86-2	5.22	NGS	72	JNT
S16T020420				1-Octanol, 2-butyl-	3913-02-8	5.39	NGS	66	JNT
S16T020420				Undecane	1120-21-4	5.46	NGS	230	JNT
S16T020420				Undecane, 2,6-dimethyl-	17301-23-4	5.51	NGS	30	JNT
S16T020420				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	36	JNT
S16T020420				Benzothiazole	95-16-9	6.63	NGS	60	JNT
S16T020420				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.92	NGS	43	JNT
S16T020420				Dodecane, 2,7,10-trimethyl-	74645-98-0	6.98	NGS	12	JNT
S16T020420				Dodecamethylcyclohexasiloxane	540-97-6	7.08	NGS	33	JNT
S16T020420				Dodecane, 2,6,10-trimethyl-	3891-98-3	7.28	NGS	26	JNT
S16T020420				2,2,4-Trimethyl-1,3-pentanediole	6846-50-0	9.21	NGS	48	JNT
S16T020420			BLNK	Chrysene-D12	1719-03-5	14.05	NGS	28	
S16T020420			BLNK	Perylene-D12	1520-96-3	15.82	NGS	19	

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J - Estimated

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 E - Outside Calibration Range

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032

SDG Number:

Customer Sample ID: 16-05629-1-D1

Customer Sample ID: 16-05629-1-D1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T020421				Unknown-1	--	4.39	NGS	260	JT
S16T020421				2-Propyl-1-pentanol	58175-57-8	4.84	NGS	29	JNT
S16T020421				1-Heptanol, 6-methyl-	1653-40-3	4.90	NGS	30	JNT
S16T020421				Acetophenone	98-86-2	5.21	NGS	42	JNT
S16T020421				Undecane	1120-21-4	5.46	NGS	89	JNT
S16T020421				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	42	JNT
S16T020421				Benzothiazole	95-16-9	6.63	NGS	60	JNT
S16T020421				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.91	NGS	38	JNT
S16T020421				Dodecamethylcyclodhexasiloxane	540-97-6	7.08	NGS	33	JNT
S16T020421				2,2,4-Trimethyl-1,3-pentanedio	6846-60-0	9.20	NGS	49	JNT
S16T020421			BLNK	Chrysene-D12	1719-03-5	14.05	NGS	28	
S16T020421			BLNK	Perylene-D12	1520-96-3	15.82	NGS	19	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032

SDG Number:

Customer Sample ID: 16-05629-1-E1

Customer Sample ID: 16-05629-1-E1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T020422				Unknown-1	--	4.38	NGS	200	JT
S16T020422				Acetophenone	98-86-2	5.20	NGS	18	JNT
S16T020422				Undecane	1120-21-4	5.45	NGS	62	JNT
S16T020422				Undecane, 2,6-dimethyl-	17301-23-4	5.51	NGS	15	JNT
S16T020422				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	65	JNT
S16T020422				Benzothiazole	95-16-9	6.62	NGS	66	JNT
S16T020422				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.91	NGS	35	JNT
S16T020422				Dodecamethylcyclohexasiloxane	540-97-6	7.08	NGS	27	JNT
S16T020422			BLNK	Chrysene-D12	1719-03-5	14.05	NGS	28	
S16T020422			BLNK	Perylene-D12	1520-96-3	15.82	NGS	19	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032

SDG Number:

Customer Sample ID: 16-05629-1-EFF-BASE
 Customer Sample ID: 16-05629-1-EFF-BASE

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T020423				Tetrachloroethene	127-18-4	2.80	NGS	6.0	JNT
S16T020423				Unknown-1	-	4.42	NGS	630	JT
S16T020423				Phenol	108-95-2	4.44	NGS	77	JNT
S16T020423				2-Methyl-1-undecanol	10522-26-6	4.50	NGS	39	JNT
S16T020423				2-Propyl-1-pentanol	58175-57-8	4.85	NGS	110	JNT
S16T020423				1-Heptanol, 4-methyl-	817-91-4	4.91	NGS	110	JNT
S16T020423				5-Methyl-1-heptanol	7212-53-5	4.97	NGS	30	JNT
S16T020423				Methyltris(trimethylsiloxy)sil	17928-28-8	5.01	NGS	83	JNT
S16T020423				2,6-Dimethyldecane	13150-81-7	5.07	NGS	140	JNT
S16T020423				3,3-Dimethylhexane	563-16-6	5.12	NGS	40	JNT
S16T020423				Acetophenone	98-96-2	5.21	NGS	32	JNT
S16T020423				Unknown-2	-	5.22	NGS	33	JT
S16T020423				1-Octanol, 2-butyl-	3913-02-8	5.39	NGS	46	JNT
S16T020423				Undecane	1120-21-4	5.46	NGS	280	JNT
S16T020423				Undecane, 2,6-dimethyl-	17301-23-4	5.51	NGS	31	JNT
S16T020423				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	67	JNT
S16T020423				Benzothiazole	95-16-9	6.62	NGS	61	JNT
S16T020423				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.91	NGS	47	JNT
S16T020423				Dodecamethylcyclohexasiloxane	540-97-6	7.08	NGS	32	JNT
S16T020423				Dodecane, 2,6,10-trimethyl-	3891-98-3	7.27	NGS	29	JNT
S16T020423			BLNK	Chrysene-D12	1719-03-5	14.05	NGS	28	
S16T020423			BLNK	Perylene-D12	1520-96-3	15.82	NGS	19	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032

SDG Number:

Customer Sample ID: 16-05629-1-F1

Customer Sample ID: 16-05629-1-F1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T020424				Unknown-1	--	4.36	NGS	72	JT
S16T020424				Phenol	108-95-2	4.42	NGS	36	JNT
S16T020424				Unknown-2	--	4.84	NGS	49	JT
S16T020424				1-Octene, 3,7-dimethyl-	4984-01-4	4.90	NGS	38	JNT
S16T020424				2,6-Dimethyldecane	13150-81-7	5.07	NGS	44	JNT
S16T020424				Acetophenone	98-86-2	5.20	NGS	8.8	JNT
S16T020424				Undecane	1120-21-4	5.45	NGS	68	JNT
S16T020424				Undecane, 2,6-dimethyl-	17301-23-4	5.51	NGS	19	JNT
S16T020424				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	45	JNT
S16T020424				Benzothiazole	95-16-9	6.61	NGS	52	JNT
S16T020424				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.90	NGS	24	JNT
S16T020424			BLNK	Chrysene-D12	1719-03-5	14.05	NGS	28	
S16T020424			BLNK	Perylene-D12	1520-96-3	15.82	NGS	19	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032

SDG Number:

Customer Sample ID: 16-05629-1-H1

Customer Sample ID: 16-05629-1-H1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T020426				Unknown-1	-	4.39	NGS	150 JT	
S16T020426				Unknown-2	-	4.85	NGS	76 JT	
S16T020426				Undecane	1120-21-4	5.46	NGS	92 JNT	
S16T020426				Undecane, 2,6-dimethyl-	17301-23-4	5.51	NGS	21 JNT	
S16T020426				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	49 JNT	
S16T020426				Benzothiazole	95-16-9	6.62	NGS	41 JNT	
S16T020426				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.91	NGS	27 JNT	
S16T020426				Unknown-3	-	9.20	NGS	27 JT	
S16T020426			BLNK	Chrysene-D12	1719-03-5	14.05	NGS	28	
S16T020426			BLNK	Perylene-D12	1520-96-3	15.82	NGS	19	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032

SDG Number:

Customer Sample ID: 16-05629-1-H2

Customer Sample ID: 16-05629-1-H2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T020427				Unknown-1	-	4.36	NGS	100	JT
S16T020427				1-Pentadecene, 2-methyl-	28833-69-0	4.50	NGS	29	JNT
S16T020427				1-Hexanol, 2-ethyl-	104-76-7	4.84	NGS	49	JNT
S16T020427				1-Octanol, 3,7-dimethyl-	106-21-8	4.91	NGS	37	JNT
S16T020427				Heptadecane, 2,6-dimethyl-	54105-67-8	5.07	NGS	44	JNT
S16T020427				Acetophenone	98-96-2	5.20	NGS	6.8	JNT
S16T020427				Undecane	1120-21-4	5.46	NGS	62	JNT
S16T020427				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	47	JNT
S16T020427				Benzothiazole	96-16-9	6.61	NGS	34	JNT
S16T020427				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.90	NGS	15	JNT
S16T020427			BLNK	Chrysene-D12	1719-03-5	14.05	NGS	28	
S16T020427			BLNK	Perylene-D12	1520-96-3	15.82	NGS	19	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162032

SDG Number:

Customer Sample ID: 16-05629-1-IN-BASE
 Customer Sample ID: 16-05629-1-IN-BASE

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T020428				Unknown-1	-	4.39	NGS	540	JT
S16T020428				Phenol	108-95-2	4.44	NGS	54	JNT
S16T020428				2-Propyl-1-pentanol	58175-57-8	4.85	NGS	91	JNT
S16T020428				1-Heptanol, 4-methyl-	817-91-4	4.91	NGS	87	JNT
S16T020428				Methyltris(trimethylsiloxy)sil	17928-28-8	5.01	NGS	63	JNT
S16T020428				2,6-Dimethyldecane	13150-81-7	5.07	NGS	100	JNT
S16T020428				3,3-Dimethylhexane	563-16-6	5.12	NGS	26	JNT
S16T020428				Acetophenone	98-96-2	5.21	NGS	32	JNT
S16T020428				Undecane, 3,7-dimethyl-	17301-29-0	5.46	NGS	210	JNT
S16T020428				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	67	JNT
S16T020428				Hexanoic acid, 2-ethyl-	149-57-5	5.87	NGS	43	JNT
S16T020428				Benzothiazole	95-16-9	6.63	NGS	73	JNT
S16T020428				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.91	NGS	49	JNT
S16T020428				Dodecamethylcyclohexasiloxane	540-97-6	7.08	NGS	41	JNT
S16T020428				Dodecane,4,6-dimethyl	61141-72-8	7.27	NGS	28	JNT
S16T020428			BLNK	Chrysene-D12	1719-03-5	14.05	NGS	28	
S16T020428			BLNK	Perylene-D12	1520-96-3	15.82	NGS	19	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162033
 SDG Number:
 Customer Sample ID: 16-05793-1-A1
 Customer Sample ID: 16-05793-1-A1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T020438			3891-98-3	2,6,10-Trimethylidodecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	
S16T020438			95-48-7	2-Methylphenol	NGS	99	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	
S16T020438			108-39-4M	Cresol (m & p)	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020438			92-52-4	Biphenyl	NGS	86	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020438			76-46-6	Dibutyl butylphosphonate	NGS	93	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	
S16T020438			84-66-2	Diethylphthalate	NGS	86	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020438			112-40-3	Dodecane	NGS	93	<0.81	43	n/a	n/a	n/a	n/a	0.81	n/a	
S16T020438			544-76-3	Hexadecane-	NGS	92	<1.9	2.6	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020438			629-59-4	Tetradecane	NGS	92	<1.2	4.1	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T020438			126-73-8	Tributyl phosphate	NGS	92	<6.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	
S16T020438			629-50-5	Tridecane	NGS	94	<0.50	12	n/a	n/a	n/a	n/a	0.46	n/a	
S16T020438			629-78-7	Heptadecane	NGS	93	<5.2	<5.2	n/a	n/a	n/a	n/a	5.2	n/a	
S16T020438			629-62-9	Pentadecane	NGS	92	<2.8	4.9	n/a	n/a	n/a	n/a	2.8	n/a	J
S16T020449			3891-98-3	2,6,10-Trimethylidodecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	
S16T020449			95-48-7	2-Methylphenol	NGS	86	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	
S16T020449			108-39-4M	Cresol (m & p)	NGS	90	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020449			92-52-4	Biphenyl	NGS	83	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020449			76-46-6	Dibutyl butylphosphonate	NGS	97	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	
S16T020449			84-66-2	Diethylphthalate	NGS	83	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020449			112-40-3	Dodecane	NGS	90	<0.81	27	n/a	n/a	n/a	n/a	0.81	n/a	
S16T020449			544-76-3	Hexadecane-	NGS	88	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020449			629-59-4	Tetradecane	NGS	87	<1.2	1.8	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T020449			126-73-8	Tributyl phosphate	NGS	110	<6.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	
S16T020449			629-50-5	Tridecane	NGS	95	<0.50	7.4	n/a	n/a	n/a	n/a	0.46	n/a	J
S16T020449			629-78-7	Heptadecane	NGS	100	<5.2	<5.2	n/a	n/a	n/a	n/a	5.2	n/a	
S16T020449			629-62-9	Pentadecane	NGS	88	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	

Janet J...
 8/11/16

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162033
 SDG Number:
 Customer Sample ID: 16-05793-1-A2
 Customer Sample ID: 16-05793-1-A2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T020439			3891-98-3	2,6,10-Trimethyldecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	
S16T020439			95-48-7	2-Methylphenol	NGS	99	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	
S16T020439			108-39-4M	Cresol (m & p)	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020439			92-52-4	Biphenyl	NGS	86	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020439			78-46-6	Dibutyl butylphosphonate	NGS	93	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	
S16T020439			84-66-2	Diethylphthalate	NGS	86	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020439			112-40-3	Dodecane	NGS	93	<0.81	44	n/a	n/a	n/a	n/a	0.81	n/a	
S16T020439			544-76-3	Hexadecane-	NGS	92	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020439			629-59-4	Tetradecane	NGS	92	<1.2	3.7	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T020439			126-73-8	Tributyl phosphate	NGS	92	<6.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	
S16T020439			629-50-5	Tridecane	NGS	94	<0.50	10	n/a	n/a	n/a	n/a	0.46	n/a	
S16T020439			629-76-7	Heptadecane	NGS	93	<5.2	<5.2	n/a	n/a	n/a	n/a	5.2	n/a	
S16T020439			629-62-9	Pentadecane	NGS	92	<2.8	3.5	n/a	n/a	n/a	n/a	2.8	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162033
 SDG Number:
 Customer Sample ID: 16-05793-1-B1
 Customer Sample ID: 16-05793-1-B1

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVCA #2															
S16T020440			3891-98-3	2,6,10-Trimethyldecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	
S16T020440			95-48-7	2-Methylphenol	NGS	86	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	
S16T020440			108-39-4M	Cresol (m & p)	NGS	90	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020440			92-52-4	Biphenyl	NGS	83	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020440			78-46-6	Dibutyl butylphosphonate	NGS	97	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	
S16T020440			84-66-2	Diethylphthalate	NGS	83	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020440			112-40-3	Dodecane	NGS	90	<0.81	48	n/a	n/a	n/a	n/a	0.81	n/a	
S16T020440			544-76-3	Hexadecane-	NGS	88	<1.9	2.0	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020440			629-59-4	Tetradecane	NGS	87	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	
S16T020440			126-73-8	Tributyl phosphale	NGS	110	<6.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	
S16T020440			629-50-5	Tridecane	NGS	95	<0.50	12	n/a	n/a	n/a	n/a	0.46	n/a	
S16T020440			629-78-7	Heptadecane	NGS	100	<5.2	<5.2	n/a	n/a	n/a	n/a	5.2	n/a	
S16T020440			629-62-9	Pentadecane	NGS	88	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	

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 E - Outside Calibration Range

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162033
 SDG Number:
 Customer Sample ID: 16-05793-1-BLANK
 Customer Sample ID: 16-05793-1-BLANK

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T020441			3891-98-3	2,6,10-Trimethyldecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	n/a
S16T020441			95-48-7	2-Methylphenol	NGS	86	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	n/a
S16T020441			108-39-4M	Cresol (m & p)	NGS	90	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	n/a
S16T020441			92-52-4	Biphenyl	NGS	83	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	n/a
S16T020441			78-46-6	Dibutyl butylphosphonate	NGS	97	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	n/a
S16T020441			84-66-2	Diethylphthalate	NGS	83	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	n/a
S16T020441			112-40-3	Dodecane	NGS	90	<0.81	<0.81	n/a	n/a	n/a	n/a	0.81	n/a	n/a
S16T020441			544-76-3	Hexadecane-	NGS	88	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	n/a
S16T020441			629-59-4	Tetradecane	NGS	87	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	n/a
S16T020441			126-73-8	Tributyl phosphate	NGS	110	<6.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	n/a
S16T020441			629-50-5	Tridecane	NGS	95	<0.50	<0.50	n/a	n/a	n/a	n/a	0.50	n/a	n/a
S16T020441			629-78-7	Heptadecane	NGS	100	<5.2	<5.2	n/a	n/a	n/a	n/a	5.2	n/a	n/a
S16T020441			629-62-9	Pentadecane	NGS	88	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	n/a

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162033
 SDG Number:
 Customer Sample ID: 16-05793-1-C1
 Customer Sample ID: 16-05793-1-C1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cont Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T020442			3891-98-3	2,6,10-Trimethylidodecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	
S16T020442			95-48-7	2-Methylphenol	NGS	86	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	
S16T020442			108-39-4M	Cresol (m & p)	NGS	90	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020442			92-52-4	Biphenyl	NGS	83	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020442			78-46-6	Dibutyl butylphosphonate	NGS	97	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	
S16T020442			84-86-2	Diethylphthalate	NGS	83	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020442			112-40-3	Dodecane	NGS	90	<0.81	62	n/a	n/a	n/a	n/a	0.81	n/a	E
S16T020442			544-76-3	Hexadecane-	NGS	88	<1.9	4.2	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020442			629-59-4	Tetradecane	NGS	87	<1.2	5.7	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T020442			126-73-8	Tributyl phosphate	NGS	110	<6.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	
S16T020442			629-50-5	Tridecane	NGS	95	<0.50	24	n/a	n/a	n/a	n/a	0.46	n/a	
S16T020442			629-78-7	Heptadecane	NGS	100	<5.2	<5.2	n/a	n/a	n/a	n/a	5.2	n/a	
S16T020442			629-62-9	Pentadecane	NGS	88	<2.8	7.2	n/a	n/a	n/a	n/a	2.8	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162033
 SDG Number:
 Customer Sample ID: 16-05793-1-E1
 Customer Sample ID: 16-05793-1-E1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T020444			3891-98-3	2,6,10-Trimethyldecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	
S16T020444			95-48-7	2-Methylphenol	NGS	86	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	
S16T020444			108-39-4M	Cresol (m & p)	NGS	90	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020444			92-52-4	Biphenyl	NGS	83	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020444			78-46-6	Dibutyl butylphosphonate	NGS	97	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	
S16T020444			84-66-2	Diethylphthalate	NGS	83	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020444			112-40-3	Dodecane	NGS	90	<0.81	44	n/a	n/a	n/a	n/a	0.81	n/a	
S16T020444			544-76-3	Hexadecane-	NGS	88	<1.9	3.3	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020444			629-59-4	Tetradecane	NGS	87	<1.2	4.6	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T020444			126-73-8	Tributyl phosphate	NGS	110	<6.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	
S16T020444			629-50-5	Tridecane	NGS	95	<0.50	12	n/a	n/a	n/a	n/a	0.46	n/a	
S16T020444			629-78-7	Heptadecane	NGS	100	<5.2	<5.2	n/a	n/a	n/a	n/a	5.2	n/a	
S16T020444			629-62-9	Pentadecane	NGS	88	<2.8	7.1	n/a	n/a	n/a	n/a	2.8	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162033
 SDG Number:
 Customer Sample ID: 16-05793-1-EFF-BASE
 Customer Sample ID: 16-05793-1-EFF-BASE

Sample#	R	AI#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T020445			3891-98-3	2,6,10-Trimethylidodecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	
S16T020445			95-48-7	2-Methylphenol	NGS	86	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	
S16T020445			108-39-4M	Cresol (m & p)	NGS	90	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020445			92-52-4	Biphenyl	NGS	83	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020445			78-46-6	Dibutyl butylphosphonate	NGS	97	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	
S16T020445			84-66-2	Diethylphthalate	NGS	83	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020445			112-40-3	Dodecane	NGS	90	<0.81	58	n/a	n/a	n/a	n/a	0.81	n/a	E
S16T020445			544-76-3	Hexadecane-	NGS	88	<1.9	2.4	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020445			629-59-4	Tetradecane	NGS	87	<1.2	6.7	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T020445			126-73-8	Tributyl phosphate	NGS	110	<6.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	
S16T020445			629-50-5	Tridecane	NGS	95	<0.50	20	n/a	n/a	n/a	n/a	0.46	n/a	
S16T020445			629-78-7	Heptadecane	NGS	100	<5.2	<5.2	n/a	n/a	n/a	n/a	5.2	n/a	
S16T020445			629-62-9	Pentadecane	NGS	88	<2.8	7.8	n/a	n/a	n/a	n/a	2.8	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162033
 SDG Number:
 Customer Sample ID: 16-05793-1-F1
 Customer Sample ID: 16-05793-1-F1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T020446			3891-98-3	2,6,10-Trimethyldecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	
S16T020446			95-48-7	2-Methylphenol	NGS	86	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	
S16T020446			108-39-4M	Cresol (m & p)	NGS	90	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020446			92-52-4	Biphenyl	NGS	83	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020446			78-46-6	Dibutyl butylphosphonate	NGS	97	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	
S16T020446			84-66-2	Diethylphthalate	NGS	83	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020446			112-40-3	Dodecane	NGS	90	<0.81	28	n/a	n/a	n/a	n/a	0.81	n/a	
S16T020446			544-76-3	Hexadecane-	NGS	88	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020446			829-59-4	Tetradecane	NGS	87	<1.2	1.6	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T020446			126-73-8	Tributyl phosphate	NGS	110	<8.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	
S16T020446			829-50-5	Tridecane	NGS	95	<0.50	6.0	n/a	n/a	n/a	n/a	0.46	n/a	J
S16T020446			829-78-7	Heptadecane	NGS	100	<5.2	<5.2	n/a	n/a	n/a	n/a	5.2	n/a	
S16T020446			829-62-9	Pentadecane	NGS	88	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	

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J - Estimated

T - Tentatively Identified Compound

N - Named TIC

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162033
 SDG Number:
 Customer Sample ID: 16-05793-1-G1
 Customer Sample ID: 16-05793-1-G1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Dot Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVCA #2															
S16T020447			3891-98-3	2,6,10-Trimethyldecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	
S16T020447			95-48-7	2-Methylphenol	NGS	86	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	
S16T020447			108-39-4M	Cresol (m & p)	NGS	90	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020447			92-52-4	Biphenyl	NGS	83	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020447			78-46-6	Dibutyl butylphosphonate	NGS	97	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	
S16T020447			84-66-2	Diethylphthalate	NGS	83	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020447			112-40-3	Dodecane	NGS	90	<0.81	28	n/a	n/a	n/a	n/a	0.81	n/a	
S16T020447			544-76-3	Hexadecane-	NGS	88	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020447			629-59-4	Tetradecane	NGS	87	<1.2	2.1	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T020447			126-73-8	Tributyl phosphate	NGS	110	<6.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	
S16T020447			629-50-5	Tridecane	NGS	95	<0.50	6.5	n/a	n/a	n/a	n/a	0.46	n/a	J
S16T020447			629-78-7	Heptadecane	NGS	100	<5.2	<5.2	n/a	n/a	n/a	n/a	5.2	n/a	
S16T020447			629-62-9	Pentadecane	NGS	88	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162033
 SDG Number:
 Customer Sample ID: 16-05793-1-H1
 Customer Sample ID: 16-05793-1-H1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T020448			3891-98-3	2,6,10-Trimethyldecane	NGS	88	<1.1	<1.1	n/a	n/a	n/a	n/a	1.1	n/a	n/a
S16T020448			95-48-7	2-Methylphenol	NGS	86	<3.4	<3.4	n/a	n/a	n/a	n/a	3.4	n/a	n/a
S16T020448			108-39-4M	Cresol (m & p)	NGS	90	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	n/a
S16T020448			82-52-4	Biphenyl	NGS	83	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	n/a
S16T020448			78-46-6	Dibutyl butylphosphonate	NGS	97	<2.9	<2.9	n/a	n/a	n/a	n/a	2.9	n/a	n/a
S16T020448			84-66-2	Diethylphthalate	NGS	83	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	n/a
S16T020448			112-40-3	Dodecane	NGS	90	<0.81	38	n/a	n/a	n/a	n/a	0.81	n/a	n/a
S16T020448			544-76-3	Hexadecane-	NGS	88	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	n/a
S16T020448			629-59-4	Tetradecane	NGS	87	<1.2	2.5	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T020448			126-73-8	Tributyl phosphate	NGS	110	<6.0	<6.0	n/a	n/a	n/a	n/a	6.0	n/a	n/a
S16T020448			629-50-5	Tridecane	NGS	95	<0.50	14	n/a	n/a	n/a	n/a	0.46	n/a	n/a
S16T020448			629-78-7	Heptadecane	NGS	100	<5.2	<5.2	n/a	n/a	n/a	n/a	5.2	n/a	n/a
S16T020448			629-62-9	Pentadecane	NGS	88	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	n/a

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162033

SDG Number:

Customer Sample ID: 16-05793-1-A1

Customer Sample ID: 16-05793-1-A1

Sample#	R	Ad	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T020438				Unknown-1	-	4.40	NGS	300 JT	
S16T020438				Unknown-2	-	4.84	NGS	30 JT	
S16T020438				Methyltris(trimethylsiloxy)sil	17928-28-8	5.00	NGS	36 JNT	
S16T020438				Decane, 3,7-dimethyl-	17312-54-8	5.08	NGS	54 JNT	
S16T020438				Acetophenone	98-86-2	5.21	NGS	24 JNT	
S16T020438				Undecane	1120-21-4	5.45	NGS	100 JNT	
S16T020438				Undecane, 2,6-dimethyl-	17301-23-4	5.51	NGS	26 JNT	
S16T020438				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	76 JNT	
S16T020438				Heptanoic acid, 2-ethyl-	3274-29-1	5.86	NGS	36 JNT	
S16T020438				Ethanol, 2-phenoxy-	122-99-6	6.53	NGS	48 JNT	
S16T020438				Benzothiazole	95-16-9	6.62	NGS	43 JNT	
S16T020438				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.91	NGS	46 JNT	
S16T020438				Dodecamethylcyclohexasiloxane	540-97-6	7.08	NGS	43 JNT	
S16T020438				Dodecane, 2,7,10-trimethyl-	74645-98-0	7.27	NGS	26 JNT	
S16T020438			BLNK	Chrysene-D12	1719-03-5	14.05	NGS	28	
S16T020438			BLNK	Perylene-D12	1520-96-3	15.82	NGS	19	
S16T020449				Cyclotrisiloxane, octamethyl	556-67-2	4.35	NGS	56 JNT	
S16T020449				1-Hexanol, 2-ethyl-	104-76-7	4.84	NGS	26 JNT	
S16T020449				isocianol	26952-21-6	4.90	NGS	28 JNT	
S16T020449				Decane, 2,4,6-trimethyl-	82108-27-4	5.12	NGS	14 JNT	
S16T020449				Undecane	1120-21-4	5.45	NGS	51 JNT	
S16T020449				Undecane, 2,6-dimethyl-	17301-23-4	5.50	NGS	22 JNT	
S16T020449				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	59 JNT	
S16T020449				Benzothiazole	95-16-9	6.60	NGS	39 JNT	
S16T020449				Dodecane, 2,6,10-trimethyl-	3891-98-3	7.26	NGS	11 JNT	

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N - Named TIC

T - Tentatively Identified Compound

J - Estimated

NA = Not Analyzed, ND = Not Detected
 E - Outside Calibration Range

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162033

SDG Number:

Customer Sample ID: 16-05793-1-A2

Customer Sample ID: 16-05793-1-A2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T020439				Unknown-1	-	4.39	NGS	440 JT	
S16T020439				Unknown-2	-	4.43	NGS	41 JT	
S16T020439				2-Propyl-1-pentanol	58175-57-8	4.85	NGS	57 JNT	
S16T020439				1-Heptanol, 6-methyl-	1653-40-3	4.91	NGS	41 JNT	
S16T020439				1,1,1,3,5,5,5-Heptamethyltrisil-	1873-88-7	5.01	NGS	45 JNT	
S16T020439				2,6-Dimethyldecane	13150-81-7	5.07	NGS	83 JNT	
S16T020439				Acetophenone	98-96-2	5.21	NGS	65 JNT	
S16T020439				1-Heptanol, 2-propyl-	10042-59-8	5.39	NGS	39 JNT	
S16T020439				Undecane, 3,7-dimethyl-	17301-29-0	5.46	NGS	180 JNT	
S16T020439				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	72 JNT	
S16T020439				Hexanoic acid, 2-ethyl-	149-57-5	5.86	NGS	29 JNT	
S16T020439				Benzothiazole	95-16-9	6.63	NGS	69 JNT	
S16T020439				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.91	NGS	44 JNT	
S16T020439				Dodecamethylcyclohexasiloxane	540-97-6	7.08	NGS	37 JNT	
S16T020439				Dodecane, 2,7,10-trimethyl-	74645-98-0	7.27	NGS	26 JNT	
S16T020439			BLNK	Chrysene-D12	1719-03-5	14.05	NGS	28	
S16T020439			BLNK	Perylene-D12	1520-96-3	15.82	NGS	19	

N - Named TIC
 T - Tentatively Identified Compound
 J - Estimated
 NA = Not Analyzed, ND = Not Detected
 E - Outside Calibration Range

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162033

SDG Number:

Customer Sample ID: 16-05793-1-B1

Customer Sample ID: 16-05793-1-B1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T020440				Propanoic acid, 2,2-dimethyl-	75-98-9	3.22	NGS	53 JNT	
S16T020440				Cyclotetrasiloxane, octamethyl	556-67-2	4.38	NGS	270 JNT	
S16T020440				Phenol	108-95-2	4.44	NGS	70 JNT	
S16T020440				1-Octene, 3,7-dimethyl-	4984-01-4	4.50	NGS	79 JNT	
S16T020440				Isooctanol	28952-21-6	4.89	NGS	97 JNT	
S16T020440				1-Heptanol, 4-methyl-	817-91-4	4.91	NGS	80 JNT	
S16T020440				5-Methyl-1-heptanol	7212-53-5	4.97	NGS	28 JNT	
S16T020440				Decane, 2,4,6-trimethyl-	62108-27-4	5.07	NGS	92 JNT	
S16T020440				Acetophenone	98-86-2	5.21	NGS	70 JNT	
S16T020440				1-Octanol, 2-butyl-	3913-02-8	5.39	NGS	51 JNT	
S16T020440				2,6-Dimethyldecane	13150-81-7	5.46	NGS	190 JNT	
S16T020440				Undecane, 2,6-dimethyl-	17301-23-4	5.51	NGS	24 JNT	
S16T020440				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	42 JNT	
S16T020440				Benzothiazole	95-16-9	6.63	NGS	65 JNT	
S16T020440				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.91	NGS	39 JNT	
S16T020440				Undecane	1120-21-4	6.98	NGS	16 JNT	
S16T020440				Dodecamethylcyclohexasiloxane	540-97-5	7.08	NGS	29 JNT	
S16T020440				Dodecane, 2,6,10-trimethyl-	3891-98-3	7.27	NGS	25 JNT	

N - Named TIC
 T - Tentatively Identified Compound
 J - Estimated
 NA = Not Analyzed, ND = Not Detected
 E - Outside Calibration Range

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162033
 SDG Number:
 Customer Sample ID: 16-05793-1-BLANK
 Customer Sample ID: 16-05793-1-BLANK

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T020441				Cycloletrasiloxane, octamethyl	556-67-2	4.36	NGS	19	JNT
S16T020441				Phenol	108-95-2	4.41	NGS	7.7	JNT
S16T020441				Undecane, 4-methyl-	2980-69-0	5.45	NGS	5.0	JNT
S16T020441				Unknown-1	-	15.82	NGS	17	JT

N - Named TIC
 T - Tentatively Identified Compound
 J - Estimated
 NA = Not Analyzed, ND = Not Detected
 E - Outside Calibration Range

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162033

SDG Number:

Customer Sample ID: 16-05793-1-C1

Customer Sample ID: 16-05793-1-C1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T020442				Cyclotrisiloxane, hexamethyl-	541-05-9	2.98	NGS	65 JNT	
S16T020442				Propanoic acid, 2,2-dimethyl-	75-98-9	3.25	NGS	97 JNT	
S16T020442				Cyclotetrasiloxane, octamethyl	556-67-2	4.39	NGS	440 JNT	
S16T020442				Decane, 2,2,3-trimethyl-	62338-09-4	4.51	NGS	36 JNT	
S16T020442				1-Hexene, 3,5-dimethyl-	7423-69-0	4.84	NGS	37 JNT	
S16T020442				1-Octene, 3,7-dimethyl-	4984-01-4	4.90	NGS	27 JNT	
S16T020442				1,1,1,3,5,5,5-Heptamethyltrisi	1873-88-7	5.01	NGS	37 JNT	
S16T020442				Decane, 2,4,6-trimethyl-	62108-27-4	5.12	NGS	24 JNT	
S16T020442				Acetophenone	98-86-2	5.21	NGS	56 JNT	
S16T020442				1-Octanol, 2-butyl-	3913-02-8	5.39	NGS	38 JNT	
S16T020442				Undecane	1120-21-4	5.46	NGS	190 JNT	
S16T020442				Undecane, 2,6-dimethyl-	17301-23-4	5.51	NGS	23 JNT	
S16T020442				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	56 JNT	
S16T020442				Benzothiazole	95-16-9	6.62	NGS	64 JNT	
S16T020442				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.91	NGS	50 JNT	
S16T020442				Undecane, 3,7-dimethyl-	17301-29-0	7.27	NGS	33 JNT	

N - Named TIC
 T - Tentatively Identified Compound
 J - Estimated
 NA = Not Analyzed, ND = Not Detected
 E - Outside Calibration Range

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162033

SDG Number:

Customer Sample ID: 16-05793-1-E1

Customer Sample ID: 16-05793-1-E1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T020444				Decane, 2,4,6-trimethyl-	62108-27-4	5.12	NGS	6.5 JNT	
S16T020444				Acetophenone	98-96-2	5.20	NGS	34 JNT	
S16T020444				Undecane	1120-21-4	5.46	NGS	79 JNT	
S16T020444				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	43 JNT	
S16T020444				Benzothiazole	95-16-9	6.63	NGS	79 JNT	
S16T020444				Octane, 2,3,6,7-tetramethyl-	52670-34-5	6.91	NGS	42 JNT	
S16T020444				Dodecamethylcyclohexasiloxane	540-97-6	7.08	NGS	32 JNT	
S16T020444				Undecane, 3,7-dimethyl-	17301-29-0	7.27	NGS	23 JNT	

NA = Not Analyzed, ND = Not Detected
 E - Outside Calibration Range

J - Estimated

T - Tentatively Identified Compound

N - Named TIC

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162033

SDG Number:

Customer Sample ID: 16-05793-1-EFF-BASE

Customer Sample ID: 16-05793-1-EFF-BASE

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T020445				Cyclohexiloxane, hexamethyl-	541-05-9	2.92	NGS	71	JNT
S16T020445				Propanoic acid, 2,2-dimethyl-	75-98-9	3.17	NGS	40	JNT
S16T020445				Cyclohexiloxane, octamethyl	556-67-2	4.39	NGS	450	JNT
S16T020445				Phenol	108-95-2	4.44	NGS	52	JNT
S16T020445				2,2,7,7-Tetramethyloctane	1071-31-4	4.50	NGS	110	JNT
S16T020445				1-Hexanol, 2-ethyl-	104-76-7	4.85	NGS	58	JNT
S16T020445				Isocitranol	26952-21-6	4.89	NGS	27	JNT
S16T020445				1-Octene, 3,7-dimethyl-	4984-01-4	4.91	NGS	80	JNT
S16T020445				Tetrasiloxane, decamethyl-	141-82-8	5.01	NGS	31	JNT
S16T020445				Decane, 2,4,6-trimethyl-	62108-27-4	5.12	NGS	24	JNT
S16T020445				Acetophenone	98-96-2	5.21	NGS	65	JNT
S16T020445				2-Methyl-1-undecanol	10522-26-6	5.39	NGS	52	JNT
S16T020445				2,6-Dimethyldecane	13150-81-7	5.46	NGS	240	JNT
S16T020445				Undecane, 2,6-dimethyl-	17301-23-4	5.51	NGS	22	JNT
S16T020445				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	51	JNT
S16T020445				Benzothiazole	95-16-9	6.63	NGS	80	JNT
S16T020445				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.92	NGS	60	JNT
S16T020445				Dodecamethylcyclohexasiloxane	540-97-6	7.08	NGS	35	JNT
S16T020445				Dodecane, 2,7,10-trimethyl-	74645-98-0	7.28	NGS	36	JNT
S16T020445				Dodecane, 2,6,10-trimethyl-	3891-98-3	7.35	NGS	24	JNT

N - Named TIC
 T - Tentatively Identified Compound
 J - Estimated
 NA = Not Analyzed, ND = Not Detected
 E - Outside Calibration Range

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162033

SDG Number:

Customer Sample ID: 16-05793-1-F1

Customer Sample ID: 16-05793-1-F1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T020446				Cyclotetrasiloxane, octamethyl	556-67-2	4.36	NGS	79	JNT
S16T020446				1-Hexanol, 2-ethyl-	104-76-7	4.84	NGS	25	JNT
S16T020446				Isoclanol	26952-21-6	4.90	NGS	25	JNT
S16T020446				Undecane	1120-21-4	5.45	NGS	69	JNT
S16T020446				Undecane, 2,6-dimethyl-	17301-23-4	5.51	NGS	24	JNT
S16T020446				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	48	JNT
S16T020446				Benzothiazole	95-16-9	6.61	NGS	54	JNT
S16T020446				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.90	NGS	26	JNT

N - Named TIC

T - Tentatively Identified Compound

J - Estimated

NA = Not Analyzed, ND = Not Detected
 E - Outside Calibration Range

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162033
 SDG Number:
 Customer Sample ID: 16-05793-1-G1
 Customer Sample ID: 16-05793-1-G1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T020447				Cycloletrasiloxane, octamethyl	556-67-2	4.39	NGS	120	JNT
S16T020447				Undecane	1120-21-4	5.46	NGS	78	JNT
S16T020447				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	59	JNT
S16T020447				Benzothiazole	95-16-9	6.61	NGS	41	JNT
S16T020447				Dodecane, 4,6-dimethyl	61141-72-8	6.91	NGS	27	JNT
S16T020447				Dodecane, 2,6,10-trimethyl-	3991-98-3	7.27	NGS	18	JNT

N - Named TIC

T - Tentatively Identified Compound

J - Estimated

NA = Not Analyzed, ND = Not Detected
 E - Outside Calibration Range

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162033

SDG Number:

Customer Sample ID: 16-05793-1-H1

Customer Sample ID: 16-05793-1-H1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T020448				Cyclotetrasiloxane, octamethyl	556-67-2	4.39	NGS	290 JNT	
S16T020448				1-Hexanol, 2-ethyl-	104-76-7	4.84	NGS	39 JNT	
S16T020448				1-Octene, 3,7-dimethyl-	4984-01-4	4.90	NGS	28 JNT	
S16T020448				Decane, 3,7-dimethyl-	17312-54-8	5.07	NGS	52 JNT	
S16T020448				Decane, 2,4,6-trimethyl-	62108-27-4	5.12	NGS	22 JNT	
S16T020448				2-Methyl-1-undecanol	10522-26-6	5.38	NGS	31 JNT	
S16T020448				Undecane	1120-21-4	5.46	NGS	96 JNT	
S16T020448				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	51 JNT	
S16T020448				Benzothiazole	95-16-9	6.61	NGS	42 JNT	
S16T020448				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.91	NGS	23 JNT	

N - Named TIC

T - Tentatively Identified Compound

J - Estimated

NA = Not Analyzed, ND = Not Detected
 E - Outside Calibration Range

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-A1
 Customer Sample ID: 16-05629-2-A1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020463		79-34-5		1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020463		79-00-5		1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020463		75-34-3		1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020463		75-35-4		1,1-Dichloroethane	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020463		107-06-2		1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020463		542-75-6		1,3-Dichloropropene (Total)	NGS	100	<1.8	2.4	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020463		106-46-7		1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020463		123-91-1		1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020463		71-36-3		1-Butanol	NGS	110	<4.3	99	n/a	n/a	n/a	n/a	4.3	n/a	Y
S16T020463		111-70-6		1-Heptanol	NGS	120	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	
S16T020463		71-23-8		1-Propanol	NGS	120	<8.9	47	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020463		108-47-4		2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020463		1708-29-8		2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020463		78-93-3		2-Butanone	NGS	95	<3.1	11	n/a	n/a	n/a	n/a	3.1	n/a	J
S16T020463		4170-30-3		2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020463		110-43-0		2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020463		591-78-6		2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020463		534-22-5		2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020463		107-83-5		2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020463		78-94-4		3-Buten-2-one	NGS	100	<1.9	4.6	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020463		106-35-4		3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S16T020463		106-66-3		3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020463		105-42-0		4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020463		108-10-1		4-Methyl-2-Pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020463		67-64-1		Acetone	NGS	100	20	180	n/a	n/a	n/a	n/a	2.8	n/a	BL
S16T020463		75-05-8		Acetonitrile	NGS	100	<1.6	280	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020463		98-86-2		Acetophenone	NGS	120	<6.2	25	n/a	n/a	n/a	n/a	6.2	n/a	

N - Named TIC
 B - Blank Contamination
 T - Tentatively Identified Compound
 Q - Qualitative
 J - Estimated
 L - LLS Outside Range
 NA = Not Analyzed, ND = Not Detected
 Y - Comment


Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-A1
 Customer Sample ID: 16-05629-2-A1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020463			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020463			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020463			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020463			71-43-2	Benzene	NGS	110	<1.5	3.5	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T020463			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020463			123-72-8	Buinal	NGS	100	<3.0	4.1	n/a	n/a	n/a	n/a	3.0	n/a	J
S16T020463			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020463			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020463			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020463			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020463			87-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020463			110-82-7	Chlorohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	
S16T020463			124-18-5	Decane	NGS	110	<3.3	5.2	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T020463			84-17-5	Ethanol	NGS	96	13	100	n/a	n/a	n/a	n/a	3.7	n/a	BL
S16T020463			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020463			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020463			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020463			110-54-3	Hexane	NGS	100	<1.3	4.6	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T020463			828-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020463			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020463			75-09-2	Methylene Chloride	NGS	96	5.0	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	L
S16T020463			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020463			98-96-3	Nitrobenzene	NGS	120	<4.7	6.5	n/a	n/a	n/a	n/a	4.7	n/a	J
S16T020463			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020463			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020463			110-96-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020463			100-42-5	Styrene	NGS	110	<2.7	3.1	n/a	n/a	n/a	n/a	2.7	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-A1
 Customer Sample ID: 16-05629-2-A1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020463			127-18-4	Tetrachloroethene	NGS	100	<1.8	8.6	n/a	n/a	n/a	n/a	1.8	n/a	n/a J
S16T020463			108-88-3	Toluene	NGS	110	<2.2	14	n/a	n/a	n/a	n/a	2.2	n/a	n/a
S16T020463			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	n/a
S16T020463			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	110	n/a	n/a	n/a	n/a	1.9	n/a	n/a
S16T020463			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.8	2.4	n/a	n/a	n/a	n/a	1.8	n/a	n/a J
S16T020463			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
S16T020463			123-86-4	n-Butyl acetate	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	n/a
S16T020463			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	n/a
S16T020463			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
S16T020463			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	n/a

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 Y - Comment

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-A2
 Customer Sample ID: 16-05629-2-A2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020451		79-34-5		1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020451		79-00-5		1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020451		75-34-3		1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020451		75-35-4		1,1-Dichloroethane	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020451		107-06-2		1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020451		542-75-6		1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020451		106-46-7		1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020451		123-91-1		1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020451		71-36-3		1-Butanol	NGS	110	<4.3	8.3	n/a	n/a	n/a	n/a	4.3	n/a	JY
S16T020451		111-70-6		1-Heptanol	NGS	120	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	
S16T020451		71-23-8		1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020451		108-47-4		2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020451		1708-29-8		2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020451		78-93-3		2-Butanone	NGS	95	<3.1	7.1	n/a	n/a	n/a	n/a	3.1	n/a	J
S16T020451		4170-30-3		2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020451		110-43-0		2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020451		591-78-6		2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020451		534-22-5		2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020451		107-83-5		2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020451		78-94-4		3-Buten-2-one	NGS	100	<1.9	4.0	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020451		106-35-4		3-Heptanone	NGS	110	<2.7	2.7	n/a	n/a	n/a	n/a	2.7	n/a	J
S16T020451		106-68-3		3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020451		105-42-0		4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020451		108-10-1		4-Methyl-2-Pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020451		87-64-1		Acetone	NGS	100	20	58	n/a	n/a	n/a	n/a	2.8	n/a	BL
S16T020451		75-05-8		Acetonitrile	NGS	100	<1.6	69	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020451		88-86-2		Acetophenone	NGS	120	<6.2	20	n/a	n/a	n/a	n/a	6.2	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-A2
 Customer Sample ID: 16-05629-2-A2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020451			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020451			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020451			107-05-1	Allyl Chloride	NGS	94	<2.5	8.3	n/a	n/a	n/a	n/a	2.5	n/a	J
S16T020451			71-43-2	Benzene	NGS	110	<1.5	3.1	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T020451			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020451			123-72-8	Butanal	NGS	100	<3.0	4.3	n/a	n/a	n/a	n/a	3.0	n/a	J
S16T020451			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020451			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020451			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020451			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020451			87-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020451			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	
S16T020451			124-18-5	Decane	NGS	110	<3.3	5.8	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T020451			84-17-5	Ethanol	NGS	96	13	37	n/a	n/a	n/a	n/a	3.7	n/a	BL
S16T020451			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020451			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020451			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020451			110-54-3	Hexane	NGS	100	<1.3	3.6	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T020451			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020451			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020451			75-09-2	Methylene Chloride	NGS	96	5.0	6.0	n/a	n/a	n/a	n/a	4.1	n/a	BJL
S16T020451			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020451			98-95-3	Nitrobenzene	NGS	120	<4.7	11	n/a	n/a	n/a	n/a	4.7	n/a	J
S16T020451			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020451			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020451			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020451			100-42-5	Styrene	NGS	110	<2.7	6.0	n/a	n/a	n/a	n/a	2.7	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-A2
 Customer Sample ID: 16-05629-2-A2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020451			127-18-4	Tetrachloroethene	NGS	100	<1.8	140	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020451			108-88-3	Toluene	NGS	110	<2.2	6.4	n/a	n/a	n/a	n/a	2.2	n/a	J
S16T020451			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020451			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020451			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020451			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020451			123-86-4	n-Butyl acetate	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020451			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020451			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020451			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-B1
 Customer Sample ID: 16-05629-2-B1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020452		79-34-5		1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020452		79-00-5		1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020452		75-34-3		1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020452		75-35-4		1,1-Dichloroethane	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020452		107-06-2		1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020452		542-75-6		1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020452		106-46-7		1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020452		123-91-1		1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020452		71-36-3		1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	Y
S16T020452		111-70-6		1-Heptanol	NGS	120	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	
S16T020452		71-23-8		1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020452		108-47-4		2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020452		1708-29-8		2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020452		78-93-3		2-Butanone	NGS	95	<3.1	7.5	n/a	n/a	n/a	n/a	3.1	n/a	J
S16T020452		4170-30-3		2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020452		110-43-0		2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020452		591-78-6		2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020452		534-22-5		2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020452		107-83-5		2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020452		78-94-4		3-Buten-2-one	NGS	100	<1.9	5.0	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020452		106-35-4		3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S16T020452		106-68-3		3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020452		105-42-0		4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020452		108-10-1		4-Methyl-2-Pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020452		67-64-1		Acetone	NGS	100	20	54	n/a	n/a	n/a	n/a	2.8	n/a	BL
S16T020452		75-05-8		Acetonitrile	NGS	100	<1.6	74	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020452		98-86-2		Acetophenone	NGS	120	<6.2	30	n/a	n/a	n/a	n/a	6.2	n/a	

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 L - LLS Outside Range
 Y - Comment
 NA = Not Analyzed, ND = Not Detected

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-B1
 Customer Sample ID: 16-05629-2-B1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Dot Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020452			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020452			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020452			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020452			71-43-2	Benzene	NGS	110	<1.5	3.2	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T020452			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020452			123-72-8	Butanal	NGS	100	<3.0	3.6	n/a	n/a	n/a	n/a	3.0	n/a	J
S16T020452			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020452			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020452			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020452			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020452			67-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020452			110-82-7	Cyclohexane	NGS	100	<1.4	15	n/a	n/a	n/a	n/a	1.4	n/a	
S16T020452			124-18-5	Decane	NGS	110	<3.3	10	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T020452			84-17-5	Ethanol	NGS	96	13	15	n/a	n/a	n/a	n/a	3.7	n/a	BJL
S16T020452			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020452			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020452			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020452			110-54-3	Hexane	NGS	100	<1.3	1.6	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T020452			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020452			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020452			75-09-2	Methylene Chloride	NGS	96	5.0	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	L
S16T020452			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020452			98-95-3	Nitrobenzene	NGS	120	<4.7	24	n/a	n/a	n/a	n/a	4.7	n/a	
S16T020452			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020452			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020452			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020452			100-42-5	Styrene	NGS	110	<2.7	6.2	n/a	n/a	n/a	n/a	2.7	n/a	J

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 Y - Comment
 NA = Not Analyzed, ND = Not Detected

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-B1
 Customer Sample ID: 16-05629-2-B1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020452			127-18-4	Tetrachloroethene	NGS	100	<1.8	130	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020452			108-88-3	Toluene	NGS	110	<2.2	4.5	n/a	n/a	n/a	n/a	2.2	n/a	J
S16T020452			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020452			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020452			10061-01-5	dis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020452			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020452			123-86-4	n-Butyl acetate	NGS	100	<2.4	7.9	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T020452			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020452			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020452			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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 L - LLS Outside Range
 Y - Comment
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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-BLANK
 Customer Sample ID: 16-05629-2-BLANK

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020453		79-34-5		1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020453		79-00-5		1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020453		75-34-3		1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020453		75-35-4		1,1-Dichloroethane	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020453		107-06-2		1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020453		542-75-6		1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020453		106-46-7		1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020453		123-91-1		1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020453		71-36-3		1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	Y
S16T020453		111-70-6		1-Heptanol	NGS	120	<8.1	<8.1	n/a	n/a	n/a	n/a	9.1	n/a	
S16T020453		71-23-8		1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020453		108-47-4		2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020453		1706-29-8		2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020453		78-93-3		2-Butanone	NGS	95	<3.1	<3.1	n/a	n/a	n/a	n/a	3.1	n/a	
S16T020453		4170-30-3		2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020453		110-43-0		2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020453		591-78-6		2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020453		534-22-5		2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020453		107-83-5		2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020453		78-94-4		3-Buten-2-one	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020453		106-35-4		3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S16T020453		106-68-3		3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020453		105-42-0		4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020453		108-10-1		4-Methyl-2-Pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020453		67-64-1		Acetone	NGS	100	20	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	L
S16T020453		75-05-8		Acetonitrile	NGS	100	<1.6	110	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020453		98-86-2		Acetophenone	NGS	120	<6.2	<6.2	n/a	n/a	n/a	n/a	6.2	n/a	

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 L - LLS Outside Range
 Y - Comment
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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-BLANK
 Customer Sample ID: 16-05629-2-BLANK

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020453			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020453			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020453			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020453			71-43-2	Benzene	NGS	110	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020453			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020453			123-72-8	Butanal	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020453			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020453			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020453			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020453			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020453			87-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020453			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	
S16T020453			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020453			64-17-5	Ethanol	NGS	96	13	8.5	n/a	n/a	n/a	n/a	3.7	n/a	BUL
S16T020453			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020453			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020453			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020453			110-54-3	Hexane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020453			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020453			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020453			75-09-2	Methylene Chloride	NGS	96	5.0	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	L
S16T020453			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020453			98-95-3	Nitrobenzene	NGS	120	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	
S16T020453			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020453			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020453			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020453			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-BLANK
 Customer Sample ID: 16-05629-2-BLANK

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020453		127-18-4		Tetrachloroethene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020453		108-88-3		Toluene	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020453		79-01-6		Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020453		75-69-4		Trichlorofluoromethane	NGS	95	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020453		10061-01-5		dis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020453		106-42-3		Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020453		123-86-4		n-Butyl acetate	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020453		142-82-5		n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020453		95-47-6		o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020453		10061-02-6		trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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J - Estimated
 L - LLS Outside Range

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 Y - Comment

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-C1
 Customer Sample ID: 16-05629-2-C1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020454		79-34-5		1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020454		79-00-5		1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020454		75-34-3		1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020454		75-35-4		1,1-Dichloroethane	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020454		107-06-2		1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020454		542-75-6		1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020454		106-46-7		1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020454		123-91-1		1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020454		71-36-3		1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	Y
S16T020454		111-70-6		1-Heptanol	NGS	120	<9.1	<8.9	n/a	n/a	n/a	n/a	9.1	n/a	
S16T020454		71-23-8		1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020454		108-47-4		2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020454		1708-29-8		2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020454		78-93-3		2-Butanone	NGS	95	<3.1	7.9	n/a	n/a	n/a	n/a	3.1	n/a	J
S16T020454		4170-30-3		2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020454		110-43-0		2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020454		591-78-6		2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020454		534-22-5		2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020454		107-83-5		2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020454		78-94-4		3-Buten-2-one	NGS	100	<1.9	4.3	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020454		106-35-4		3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S16T020454		106-68-3		3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020454		105-42-0		4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020454		108-10-1		4-Methyl-2-Pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020454		67-64-1		Acetone	NGS	100	20	58	n/a	n/a	n/a	n/a	2.8	n/a	BL
S16T020454		75-05-8		Acetonitrile	NGS	100	<1.6	160	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020454		98-86-2		Acetophenone	NGS	120	<6.2	24	n/a	n/a	n/a	n/a	6.2	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-C1
 Customer Sample ID: 16-05629-2-C1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020454			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020454			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020454			107-05-1	Allyl Chloride	NGS	94	<2.5	2.9	n/a	n/a	n/a	n/a	2.5	n/a	J
S16T020454			71-43-2	Benzene	NGS	110	<1.5	2.9	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T020454			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020454			123-72-8	Butanal	NGS	100	<3.0	3.8	n/a	n/a	n/a	n/a	3.0	n/a	J
S16T020454			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020454			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020454			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020454			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020454			87-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020454			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	
S16T020454			124-18-5	Decane	NGS	110	<3.3	6.9	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T020454			64-17-5	Ethanol	NGS	96	13	33	n/a	n/a	n/a	n/a	3.7	n/a	BL
S16T020454			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020454			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020454			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020454			110-54-3	Hexane	NGS	100	<1.3	2.0	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T020454			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020454			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020454			75-09-2	Methylene Chloride	NGS	96	5.0	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	L
S16T020454			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020454			98-95-3	Nitrobenzene	NGS	120	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	
S16T020454			110-59-8	Pentanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020454			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020454			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020454			100-42-5	Styrene	NGS	110	<2.7	3.8	n/a	n/a	n/a	n/a	2.7	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-C1
 Customer Sample ID: 16-05629-2-C1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020454			127-18-4	Tetrachloroethene	NGS	100	<1.8	120	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020454			108-88-3	Toluene	NGS	110	<2.2	4.6	n/a	n/a	n/a	n/a	2.2	n/a	J
S16T020454			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020454			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020454			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020454			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020454			123-86-4	n-Butyl acetate	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020454			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020454			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020454			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-D1
 Customer Sample ID: 16-05629-2-D1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020455		79-34-5		1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020455		79-00-5		1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020455		75-34-3		1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020455		75-35-4		1,1-Dichloroethane	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020455		107-06-2		1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020455		542-75-6		1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020455		106-46-7		1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	Q
S16T020455		123-91-1		1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020455		71-36-3		1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	Y
S16T020455		111-70-6		1-Heptanol	NGS	120	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	Q
S16T020455		71-23-8		1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020455		108-47-4		2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020455		1708-29-8		2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020455		78-93-3		2-Butanone	NGS	95	<3.1	6.5	n/a	n/a	n/a	n/a	3.1	n/a	J
S16T020455		4170-30-3		2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020455		110-43-0		2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020455		591-78-6		2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020455		534-22-5		2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020455		107-83-5		2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020455		78-94-4		3-Buten-2-one	NGS	100	<1.9	3.8	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020455		106-35-4		3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S16T020455		106-68-3		3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	Q
S16T020455		105-42-0		4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020455		108-10-1		4-Methyl-2-Pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020455		87-64-1		Acetone	NGS	100	20	48	n/a	n/a	n/a	n/a	2.8	n/a	BL
S16T020455		75-05-8		Acetonitrile	NGS	100	<1.6	100	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020455		98-86-2		Acetophenone	NGS	120	<6.2	15	n/a	n/a	n/a	n/a	6.2	n/a	Q

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-D1
 Customer Sample ID: 16-05629-2-D1

Sample#	R	AW	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020455			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1		n/a
S16T020455			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3		n/a
S16T020455			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5		n/a
S16T020455			71-43-2	Benzene	NGS	110	<1.5	2.9	n/a	n/a	n/a	n/a	1.5		n/a J
S16T020455			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2		n/a Q
S16T020455			123-72-8	Butanal	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0		n/a
S16T020455			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1		n/a
S16T020455			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5		n/a
S16T020455			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5		n/a
S16T020455			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6		n/a
S16T020455			67-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8		n/a
S16T020455			110-82-7	Cyclohexane	NGS	100	<1.4	9.0	n/a	n/a	n/a	n/a	1.4		n/a J
S16T020455			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3		n/a Q
S16T020455			64-17-5	Ethanol	NGS	96	13	30	n/a	n/a	n/a	n/a	3.7		n/a BL
S16T020455			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8		n/a
S16T020455			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4		n/a
S16T020455			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6		n/a
S16T020455			110-54-3	Hexane	NGS	100	<1.3	1.4	n/a	n/a	n/a	n/a	1.3		n/a J
S16T020455			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6		n/a
S16T020455			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8		n/a
S16T020455			75-09-2	Methylene Chloride	NGS	96	5.0	<4.1	n/a	n/a	n/a	n/a	4.1		n/a L
S16T020455			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3		n/a LQ
S16T020455			98-95-3	Nitrobenzene	NGS	120	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7		n/a Q
S16T020455			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6		n/a
S16T020455			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8		n/a
S16T020455			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8		n/a
S16T020455			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7		n/a

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-D1
 Customer Sample ID: 16-05629-2-D1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020455		127-18-4		Tetrachloroethene	NGS	100	<1.8	110	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020455		108-88-3		Toluene	NGS	110	<2.2	4.8	n/a	n/a	n/a	n/a	2.2	n/a	J
S16T020455		79-01-6		Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020455		75-69-4		Trichlorofluoromethane	NGS	95	<1.9	2.2	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020455		10061-01-5		cis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020455		106-42-3		Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020455		123-86-4		n-Butyl acetate	NGS	100	<2.4	4.3	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T020455		142-82-5		n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020455		95-47-6		o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020455		10061-02-6		trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

N - Named TIC
 B - Blank Contamination

T - Tentatively Identified Compound
 Q - Qualitative

J - Estimated
 L - LLS Outside Range

NA = Not Analyzed, ND = Not Detected
 Y - Comment

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-E1
 Customer Sample ID: 16-05629-2-E1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR:TDU VOA #2															
S16T020456		79-34-5		1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020456		79-00-5		1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020456		75-34-3		1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020456		75-35-4		1,1-Dichloroethane	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020456		107-06-2		1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020456		542-75-6		1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020456		106-46-7		1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020456		123-91-1		1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020456		71-36-3		1-Butanol	NGS	120	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	Y
S16T020456		111-70-6		1-Heptanol	NGS	120	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	
S16T020456		71-23-8		1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020456		108-47-4		2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020456		1708-29-8		2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020456		78-93-3		2-Butanone	NGS	95	<3.1	3.7	n/a	n/a	n/a	n/a	3.1	n/a	J
S16T020456		4170-30-3		2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020456		110-43-0		2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020456		591-78-6		2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020456		534-22-5		2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020456		107-83-5		2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020456		78-94-4		3-Buten-2-one	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020456		106-35-4		3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S16T020456		106-68-3		3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020456		105-42-0		4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020456		108-10-1		4-Methyl-2-pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020456		57-64-1		Acetone	NGS	100	20	6.7	n/a	n/a	n/a	n/a	2.8	n/a	BJL
S16T020456		75-05-8		Acetonitrile	NGS	100	<1.6	44	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020456		98-86-2		Acetophenone	NGS	120	<6.2	12	n/a	n/a	n/a	n/a	6.2	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-E1
 Customer Sample ID: 16-05629-2-E1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020456			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020456			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020456			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020456			71-43-2	Benzene	NGS	110	<1.5	1.6	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T020456			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020456			123-72-8	Butanal	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020456			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020456			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020456			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020456			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020456			87-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020456			110-82-7	Cyclohexane	NGS	100	<1.4	4.4	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T020456			124-18-5	Decane	NGS	110	<3.3	5.0	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T020456			84-17-5	Ethanol	NGS	96	13	27	n/a	n/a	n/a	n/a	3.7	n/a	BL
S16T020456			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020456			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020456			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020456			110-54-3	Hexane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020456			828-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020456			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020456			75-09-2	Methylene Chloride	NGS	96	5.0	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	L
S16T020456			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020456			98-95-3	Nitrobenzene	NGS	120	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	
S16T020456			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020456			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020456			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020456			100-42-5	Styrene	NGS	110	<2.7	3.0	n/a	n/a	n/a	n/a	2.7	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-E1
 Customer Sample ID: 16-05629-2-E1

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020456			127-18-4	Tetrachloroethene	NGS	100	<1.8	52	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020456			108-88-3	Toluene	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020456			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020456			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020456			10061-01-5	dis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020456			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020456			123-86-4	n-Butyl acetate	NGS	100	<2.4	2.9	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T020456			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020456			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020456			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-EFF-BASE
 Customer Sample ID: 16-05629-2-EFF-BASE

Sample#	R	AF	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020457			79-34-5	1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020457			79-00-5	1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020457			75-34-3	1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020457			75-35-4	1,1-Dichloroethene	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020457			107-06-2	1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020457			542-75-6	1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020457			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020457			123-91-1	1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020457			71-36-3	1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	Y
S16T020457			111-70-6	1-Heptanol	NGS	120	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	
S16T020457			71-23-8	1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020457			108-47-4	2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020457			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020457			78-93-3	2-Butanone	NGS	95	<3.1	4.1	n/a	n/a	n/a	n/a	3.1	n/a	J
S16T020457			4170-30-3	2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020457			110-43-0	2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020457			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020457			534-22-5	2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020457			107-83-5	2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020457			78-94-4	3-Buten-2-one	NGS	100	<1.9	2.2	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020457			106-35-4	3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S16T020457			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020457			105-42-0	4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020457			108-10-1	4-Methyl-2-Pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020457			67-64-1	Acetone	NGS	100	20	26	n/a	n/a	n/a	n/a	2.8	n/a	BL
S16T020457			75-05-8	Acetonitrile	NGS	100	<1.6	20	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020457			98-86-2	Acetophenone	NGS	120	<6.2	14	n/a	n/a	n/a	n/a	6.2	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-EFF-BASE
 Customer Sample ID: 16-05629-2-EFF-BASE

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020457			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020457			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020457			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020457			71-43-2	Benzene	NGS	110	<1.5	2.2	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T020457			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020457			123-72-8	Butanal	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020457			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020457			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020457			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020457			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020457			37-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020457			110-82-7	Cyclohexane	NGS	100	<1.4	21	n/a	n/a	n/a	n/a	1.4	n/a	
S16T020457			124-18-5	Decane	NGS	110	<3.3	8.9	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T020457			64-17-5	Ethanol	NGS	96	13	16	n/a	n/a	n/a	n/a	3.7	n/a	B,L
S16T020457			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020457			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020457			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020457			110-54-3	Hexane	NGS	100	<1.3	1.4	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T020457			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020457			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020457			75-09-2	Methylene Chloride	NGS	96	5.0	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	L
S16T020457			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020457			98-95-3	Nitrobenzene	NGS	120	<4.7	9.8	n/a	n/a	n/a	n/a	4.7	n/a	J
S16T020457			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020457			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020457			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020457			100-42-5	Styrene	NGS	110	<2.7	6.5	n/a	n/a	n/a	n/a	2.7	n/a	J

N - Named TIC
 B - Blank Contamination
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 Q - Qualitative
 J - Estimated
 L - LLS Outside Range
 Y - Comment
 NA = Not Analyzed, ND = Not Detected

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-EFF-BASE
 Customer Sample ID: 16-05629-2-EFF-BASE

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020457			127-18-4	Tetrachloroethene	NGS	100	<1.8	190	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020457			108-88-3	Toluene	NGS	110	<2.2	5.5	n/a	n/a	n/a	n/a	2.2	n/a	J
S16T020457			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020457			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020457			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020457			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020457			123-86-4	n-Butyl acetate	NGS	100	<2.4	13	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020457			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020457			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020457			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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 J - Estimated
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 Y - Comment

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-F1
 Customer Sample ID: 16-05629-2-F1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020458		79-34-5		1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020458		79-00-5		1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020458		75-34-3		1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020458		75-35-4		1,1-Dichloroethane	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020458		107-06-2		1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020458		542-75-6		1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020458		106-46-7		1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020458		123-91-1		1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020458		71-36-3		1-Butanol	NGS	110	<4.3	7.2	n/a	n/a	n/a	n/a	4.3	n/a	JY
S16T020458		111-70-6		1-Heptanol	NGS	120	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	
S16T020458		71-23-8		1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020458		108-47-4		2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020458		1708-29-8		2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020458		78-93-3		2-Butanone	NGS	95	<3.1	<3.1	n/a	n/a	n/a	n/a	3.1	n/a	
S16T020458		4170-30-3		2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020458		110-43-0		2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020458		591-78-6		2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020458		534-22-5		2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020458		107-83-5		2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020458		78-94-4		3-Buten-2-one	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020458		106-35-4		3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S16T020458		106-68-3		3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020458		105-42-0		4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020458		108-10-1		4-Methyl-2-Pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020458		67-64-1		Acetone	NGS	100	20	11	n/a	n/a	n/a	n/a	2.8	n/a	BJL
S16T020458		75-05-8		Acetonitrile	NGS	100	<1.6	36	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020458		98-86-2		Acetophenone	NGS	120	<6.2	9.9	n/a	n/a	n/a	n/a	6.2	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-F1
 Customer Sample ID: 16-05629-2-F1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020458			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020458			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020458			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020458			71-43-2	Benzene	NGS	110	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020458			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020458			123-72-8	Butanal	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020458			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020458			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020458			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020458			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020458			67-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020458			110-82-7	Cyclohexane	NGS	100	<1.4	2.8	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T020458			124-18-5	Decane	NGS	110	<3.3	4.7	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T020458			64-17-5	Ethanol	NGS	96	13	66	n/a	n/a	n/a	n/a	3.7	n/a	BL
S16T020458			141-78-6	Ethyl acetate	NGS	99	<1.8	5.7	n/a	n/a	n/a	n/a	1.8	n/a	J
S16T020458			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020458			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020458			110-54-3	Hexane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020458			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020458			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020458			75-09-2	Methylene Chloride	NGS	96	5.0	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	L
S16T020458			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020458			98-95-3	Nitrobenzene	NGS	120	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	
S16T020458			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020458			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020458			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020458			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	

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 J - Estimated
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 Y - Comment
 NA = Not Analyzed, ND = Not Detected

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-F1
 Customer Sample ID: 16-05629-2-F1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020458			127-18-4	Tetrachloroethene	NGS	100	<1.8	32	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020458			108-88-3	Toluene	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020458			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020458			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	4.5	n/a	n/a	n/a	n/a	1.9	n/a, J	
S16T020458			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020458			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020458			123-86-4	n-Butyl acetate	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020458			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020458			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020458			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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J - Estimated
 L - LLS Outside Range

NA = Not Analyzed, ND = Not Detected
 Y - Comment

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-G1
 Customer Sample ID: 16-05629-2-G1

Sample#	R	AW	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020459			79-34-5	1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020459			79-00-5	1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020459			75-34-3	1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020459			75-35-4	1,1-Dichloroethane	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020459			107-06-2	1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020459			542-75-6	1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020459			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020459			123-91-1	1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020459			71-36-3	1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	Y
S16T020459			111-70-6	1-Heptanol	NGS	120	<8.1	<8.1	n/a	n/a	n/a	n/a	8.1	n/a	
S16T020459			71-23-8	1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020459			108-47-4	2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020459			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020459			78-93-3	2-Butanone	NGS	95	<3.1	<3.1	n/a	n/a	n/a	n/a	3.1	n/a	
S16T020459			4170-30-3	2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020459			110-43-0	2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020459			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020459			534-22-5	2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020459			107-83-5	2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020459			78-94-4	3-Buten-2-one	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020459			106-35-4	3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S16T020459			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020459			105-42-0	4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020459			108-10-1	4-Methyl-2-Pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020459			67-64-1	Acetone	NGS	100	20	11	n/a	n/a	n/a	n/a	2.8	n/a	BJL
S16T020459			75-05-8	Acetonitrile	NGS	100	<1.6	42	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020459			98-86-2	Acetophenone	NGS	120	<6.2	8.1	n/a	n/a	n/a	n/a	6.2	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-G1
 Customer Sample ID: 16-05629-2-G1

Sample#	R	AF	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020459			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020459			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020459			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020459			71-43-2	Benzene	NGS	110	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020459			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020459			123-72-8	Butanal	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020459			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020459			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020459			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020459			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020459			67-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020459			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	
S16T020459			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020459			64-17-5	Ethanol	NGS	96	13	93	n/a	n/a	n/a	n/a	3.7	n/a	BL
S16T020459			141-78-6	Ethyl acetate	NGS	99	<1.8	5.9	n/a	n/a	n/a	n/a	1.8	n/a	J
S16T020459			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020459			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020459			110-54-3	Hexane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020459			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020459			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020459			75-09-2	Methylene Chloride	NGS	96	5.0	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	L
S16T020459			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020459			98-95-3	Nitrobenzene	NGS	120	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	
S16T020459			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020459			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020459			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020459			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-G1
 Customer Sample ID: 16-05629-2-G1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020459			127-18-4	Tetrachloroethene	NGS	100	<1.8	33	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020459			108-88-3	Toluene	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020459			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020459			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	19	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020459			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020459			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020459			123-86-4	n-Butyl acetate	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020459			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020459			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020459			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-H1
 Customer Sample ID: 16-05629-2-H1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020460		79-34-5		1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020460		79-00-5		1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020460		75-34-3		1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020460		75-35-4		1,1-Dichloroethane	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020460		107-06-2		1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020460		542-75-6		1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020460		106-46-7		1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020460		123-91-1		1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020460		71-36-3		1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	Y
S16T020460		111-70-6		1-Heptanol	NGS	120	<8.1	<8.1	n/a	n/a	n/a	n/a	8.1	n/a	
S16T020460		71-23-8		1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020460		108-47-4		2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020460		1708-29-8		2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020460		78-93-3		2-Butanone	NGS	95	<3.1	3.3	n/a	n/a	n/a	n/a	3.1	n/a	J
S16T020460		4170-30-3		2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020460		110-43-0		2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020460		591-78-6		2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020460		534-22-5		2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020460		107-83-5		2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020460		78-94-4		3-Buten-2-one	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020460		106-35-4		3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S16T020460		106-68-3		3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020460		105-42-0		4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020460		108-10-1		4-Methyl-2-Pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020460		67-64-1		Acetone	NGS	100	20	19	n/a	n/a	n/a	n/a	2.8	n/a	BL
S16T020460		75-05-8		Acetonitrile	NGS	100	<1.6	210	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020460		98-86-2		Acetophenone	NGS	120	<6.2	8.5	n/a	n/a	n/a	n/a	6.2	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-H1
 Customer Sample ID: 16-05629-2-H1

Sample#	R	AW	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020460			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020460			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020460			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020460			71-43-2	Benzene	NGS	110	<1.5	6.3	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T020460			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020460			123-72-8	Butanal	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020460			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020460			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020460			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020460			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020460			67-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020460			110-82-7	Cyclohexane	NGS	100	<1.4	8.9	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T020460			124-18-5	Decane	NGS	110	<3.3	6.4	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T020460			64-17-5	Ethanol	NGS	96	13	30	n/a	n/a	n/a	n/a	3.7	n/a	BL
S16T020460			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020460			100-41-4	Ethylbenzene	NGS	110	<2.4	2.4	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T020460			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020460			110-54-3	Hexane	NGS	100	<1.3	6.4	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T020460			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020460			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020460			75-09-2	Methylene Chloride	NGS	96	5.0	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	L
S16T020460			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020460			98-95-3	Nitrobenzene	NGS	120	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	
S16T020460			110-59-8	Pentanitrile	NGS	110	<2.6	3.1	n/a	n/a	n/a	n/a	2.6	n/a	J
S16T020460			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020460			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020460			100-42-5	Styrene	NGS	110	<2.7	6.3	n/a	n/a	n/a	n/a	2.7	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-H1
 Customer Sample ID: 16-05629-2-H1

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020460			127-18-4	Tetrachloroethene	NGS	100	<1.8	17	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020460			108-88-3	Toluene	NGS	110	<2.2	13	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020460			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020460			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	7.8	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020460			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020460			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020460			123-86-4	n-Butyl acetate	NGS	100	<2.4	5.9	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T020460			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020460			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020460			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-H2
 Customer Sample ID: 16-05629-2-H2

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020461			79-34-5	1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020461			79-00-5	1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020461			75-34-3	1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020461			75-35-4	1,1-Dichloroethane	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020461			107-06-2	1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020461			542-75-6	1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020461			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020461			123-91-1	1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020461			71-36-3	1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	Y
S16T020461			111-70-6	1-Heptanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020461			71-23-8	1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020461			108-47-4	2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020461			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020461			78-93-3	2-Butanone	NGS	95	<3.1	<3.1	n/a	n/a	n/a	n/a	3.1	n/a	
S16T020461			4170-30-3	2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020461			110-43-0	2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020461			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020461			534-22-5	2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020461			107-83-5	2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020461			78-94-4	3-Buten-2-one	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020461			106-35-4	3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S16T020461			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020461			105-42-0	4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020461			108-10-1	4-Methyl-2-Pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020461			67-64-1	Acetone	NGS	100	20	13	n/a	n/a	n/a	n/a	2.8	n/a	BL
S16T020461			75-05-8	Acetonitrile	NGS	100	<1.6	81	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020461			98-86-2	Acetophenone	NGS	120	<6.2	9.0	n/a	n/a	n/a	n/a	6.2	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-H2
 Customer Sample ID: 16-05629-2-H2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR:TDU VOA #2															
S16T020461			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020461			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020461			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020461			71-43-2	Benzene	NGS	110	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020461			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020461			123-72-8	Butanal	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020461			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020461			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020461			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020461			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020461			87-86-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020461			110-82-7	Cyclohexane	NGS	100	<1.4	2.3	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T020461			124-18-5	Decane	NGS	110	<3.3	5.6	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T020461			84-17-5	Ethanol	NGS	96	13	95	n/a	n/a	n/a	n/a	3.7	n/a	BL
S16T020461			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020461			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020461			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020461			110-54-3	Hexane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020461			828-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020461			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020461			75-09-2	Methylene Chloride	NGS	96	5.0	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	L
S16T020461			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020461			98-95-3	Nitrobenzene	NGS	120	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	
S16T020461			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020461			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020461			110-96-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020461			100-42-5	Styrene	NGS	110	<2.7	3.9	n/a	n/a	n/a	n/a	2.7	n/a	J

N - Named TIC
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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-H2
 Customer Sample ID: 16-05629-2-H2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020461			127-18-4	Tetrachloroethene	NGS	100	<1.8	29	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020461			108-88-3	Toluene	NGS	110	<2.2	3.2	n/a	n/a	n/a	n/a	2.2	n/a	J
S16T020461			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020461			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	43	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020461			10051-01-5	cis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020461			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020461			123-86-4	n-Butyl acetate	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020461			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020461			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020461			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-IN-BASE
 Customer Sample ID: 16-05629-2-IN-BASE

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020462		79-34-5		1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020462		79-00-5		1,1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020462		75-34-3		1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020462		75-35-4		1,1-Dichloroethane	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020462		107-06-2		1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020462		542-75-6		1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020462		106-46-7		1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020462		123-91-1		1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020462		71-36-3		1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	Y
S16T020462		111-70-6		1-Heptanol	NGS	120	<8.1	<8.1	n/a	n/a	n/a	n/a	9.1	n/a	
S16T020462		71-23-8		1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020462		108-47-4		2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020462		1708-29-8		2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020462		78-93-3		2-Butanone	NGS	95	<3.1	5.4	n/a	n/a	n/a	n/a	3.1	n/a	J
S16T020462		4170-30-3		2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020462		110-43-0		2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020462		591-78-6		2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020462		534-22-5		2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020462		107-83-5		2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020462		78-94-4		3-Buten-2-one	NGS	100	<1.9	3.3	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020462		106-35-4		3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S16T020462		106-68-3		3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020462		105-42-0		4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020462		108-10-1		4-Methyl-2-Pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020462		67-64-1		Acetone	NGS	100	20	41	n/a	n/a	n/a	n/a	2.8	n/a	BL
S16T020462		75-05-8		Acetonitrile	NGS	100	<1.6	5.6	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T020462		98-86-2		Acetophenone	NGS	120	<6.2	13	n/a	n/a	n/a	n/a	6.2	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-IN-BASE
 Customer Sample ID: 16-05629-2-IN-BASE

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR:TDU VOA #2															
S16T020462			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020462			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020462			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020462			71-43-2	Benzene	NGS	110	<1.5	2.6	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T020462			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020462			123-72-8	Butanal	NGS	100	<3.0	4.9	n/a	n/a	n/a	n/a	3.0	n/a	J
S16T020462			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020462			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020462			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020462			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020462			87-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020462			110-82-7	Cyclohexane	NGS	100	<1.4	24	n/a	n/a	n/a	n/a	1.4	n/a	
S16T020462			124-18-5	Decane	NGS	110	<3.3	9.3	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T020462			84-17-5	Ethanol	NGS	96	13	12	n/a	n/a	n/a	n/a	3.7	n/a	B, J, L
S16T020462			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020462			100-41-4	Ethylbenzene	NGS	110	<2.4	2.6	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T020462			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020462			110-54-3	Hexane	NGS	100	<1.3	2.3	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T020462			828-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020462			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020462			75-09-2	Methylene Chloride	NGS	96	5.0	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	L
S16T020462			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020462			98-95-3	Nitrobenzene	NGS	120	<4.7	14	n/a	n/a	n/a	n/a	4.7	n/a	L
S16T020462			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020462			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020462			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020462			100-42-5	Styrene	NGS	110	<2.7	6.6	n/a	n/a	n/a	n/a	2.7	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-IN-BASE
 Customer Sample ID: 16-05629-2-IN-BASE

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020462		127-18-4		Tetrachloroethene	NGS	100	<1.8	7.7	n/a	n/a	n/a	n/a	1.8	n/a	n/a J
S16T020462		108-88-3		Toluene	NGS	110	<2.2	9.3	n/a	n/a	n/a	n/a	2.2	n/a	n/a J
S16T020462		79-01-6		Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	n/a
S16T020462		75-69-4		Trichlorofluoromethane	NGS	95	<1.9	5.2	n/a	n/a	n/a	n/a	1.9	n/a	n/a J
S16T020462		10061-01-5		cis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	n/a
S16T020462		106-42-3		Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
S16T020462		123-86-4		n-Butyl acetate	NGS	100	<2.4	14	n/a	n/a	n/a	n/a	2.4	n/a	n/a
S16T020462		142-82-5		n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	n/a
S16T020462		95-47-6		o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
S16T020462		10061-02-6		trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	n/a

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034

SDG Number:

Customer Sample ID: 16-05629-2-A1

Customer Sample ID: 16-05629-2-A1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020463				Ammonium acetate	631-61-8	9.23	NGS	82	JNT
S16T020463				Ethylene Glycol	107-21-1	13.75	NGS	660	JNT
S16T020463				Formamide	75-12-7	13.90	NGS	52	JNT
S16T020463				Propane, 2-methyl-1-nitro-	625-74-1	16.24	NGS	26	JNT
S16T020463				2(1H)-Pyrimidinone, 5-chloro-4	28567-83-1	20.09	NGS	2.1E+03	JNT
S16T020463				1,1,1,3,5,5,5-Heptamethyltris	1873-88-7	22.07	NGS	30	JNT
S16T020463				Undecane, 4,7-dimethyl-	17301-32-5	22.64	NGS	350	JNT
S16T020463				Decane, 2,4,6-trimethyl-	62108-27-4	22.79	NGS	130	JNT
S16T020463				2,6-Dimethyl-6-trifluoroacetox	61986-67-2	23.16	NGS	36	JNT
S16T020463				Undecane, 2,6-dimethyl-	17301-23-4	23.42	NGS	28	JNT
S16T020463				1-Undecene, 4-methyl-	74630-39-0	23.48	NGS	25	JNT
S16T020463				Undecane	1120-21-4	23.54	NGS	210	JNT
S16T020463				Dodecane	112-40-3	23.64	NGS	120	JNT
S16T020463				2,3-Dimethyldecane	17312-44-6	23.76	NGS	30	JNT
S16T020463				Benzaldehyde, 2,5-bis(trimeth	56114-69-3	23.97	NGS	1.3E+03	JNT
S16T020463				2,6-Dimethyldecane	13150-81-7	25.00	NGS	71	JNT
S16T020463				Acetic acid, trifluoro-, 3,7-d	28745-07-5	25.13	NGS	35	JNT
S16T020463				Ethanol, 2-phenoxy-	122-99-6	25.54	NGS	140	JNT
S16T020463				1,2-Benzisothiazole	272-16-2	26.01	NGS	120	JNT
S16T020463				Tetradecane, 1-iodo-	19218-94-1	26.15	NGS	78	JNT
S16T020463				1-Propene-1-thiol	925-89-3	26.35	NGS	70	JNT
S16T020463				Heptadecane, 2,6-dimethyl-	54105-67-8	26.70	NGS	35	JNT
S16T020463				Unknown-1	-	7.89	NGS	33	

Handwritten signature: JMB

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034

SDG Number:

Customer Sample ID: 16-05629-2-A2

Customer Sample ID: 16-05629-2-A2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020451				Formamide	75-12-7	13.82	NGS	83	JNT
S16T020451				Propanoic acid, 2,2-dimethyl-	75-98-9	16.22	NGS	30	JNT
S16T020451				Cyclotetrasiloxane, octamethyl	556-67-2	20.07	NGS	1.5E+03	JNT
S16T020451				2,2,7,7-Tetramethylcyclohexane	1071-31-4	21.06	NGS	120	JNT
S16T020451				1,1,1,3,5,5,5-Heptafluoroethane	1873-88-7	22.04	NGS	29	JNT
S16T020451				3,3-Dimethylhexane	563-16-6	22.30	NGS	35	JNT
S16T020451				Undecane, 4,7-dimethyl-	17301-32-5	22.62	NGS	250	JNT
S16T020451				Decane, 2,4,6-trimethyl-	62108-27-4	22.77	NGS	100	JNT
S16T020451				Undecane	1120-21-4	23.52	NGS	160	JNT
S16T020451				Dodecane	112-40-3	23.63	NGS	99	JNT
S16T020451				2,3-Dimethyldecane	17312-44-6	23.75	NGS	26	JNT
S16T020451				Benzaldehyde, 2,5-bis(trimethyl-)	56114-69-3	23.96	NGS	870	JNT
S16T020451				2,6-Dimethyldecane	13160-81-7	24.98	NGS	54	JNT
S16T020451				Acetic acid, trifluoro-, 3,7-d	28745-07-5	25.12	NGS	39	JNT
S16T020451				1,2-Benzisothiazole	272-16-2	26.00	NGS	150	JNT
S16T020451				Tetradecane, 1-iodo-	19218-94-1	26.14	NGS	66	JNT
S16T020451				Silane, trimethyl[2-methyl]ene-	97778-15-9	26.33	NGS	47	JNT
S16T020451				Heptadecane, 2,6-dimethyl-	54105-67-8	26.69	NGS	29	JNT
S16T020451			BLNK	Unknown-1	--	7.89	NGS	33	

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 Y - Comment

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-B1
 Customer Sample ID: 16-05629-2-B1

Sample#	R	Alt	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020452				Formamide	75-12-7	13.83	NGS	30	JNT
S16T020452				Propanoic acid, 2,2-dimethyl-	75-98-9	16.23	NGS	43	JNT
S16T020452				Heptane, 2,4-dimethyl-	2213-23-2	17.02	NGS	200	JNT
S16T020452				1-Heptene, 5-methyl-	13151-04-7	17.40	NGS	46	JNT
S16T020452				Cyclotetrasiloxane, octamethyl	556-67-2	20.07	NGS	530	JNT
S16T020452				Octane, 3-ethyl-2,7-dimethyl-	62183-55-5	22.54	NGS	38	JNT
S16T020452				Undecane, 4,7-dimethyl-	17301-32-5	22.63	NGS	430	JNT
S16T020452				Decane, 2,4,6-trimethyl-	62108-27-4	22.78	NGS	160	JNT
S16T020452				2,6-Dimethyl-6-trifluoroacetox	61986-67-2	23.15	NGS	42	JNT
S16T020452				1-Octanol, 2-butyl-	3913-02-8	23.23	NGS	27	JNT
S16T020452				Undecane, 2,6-dimethyl-	17301-23-4	23.42	NGS	41	JNT
S16T020452				1-Undecene, 4-methyl-	74630-39-0	23.46	NGS	27	JNT
S16T020452				Undecane	1120-21-4	23.53	NGS	230	JNT
S16T020452				3,3-Dimethylhexane	563-16-6	23.63	NGS	140	JNT
S16T020452				2,3-Dimethyldecane	17312-44-6	23.75	NGS	36	JNT
S16T020452				Unknown-1	-	23.96	NGS	350	JT
S16T020452				Unknown-2	-	24.38	NGS	29	JT
S16T020452				4-Undecene, 10-methyl-, (E)-	74630-60-7	24.56	NGS	34	JNT
S16T020452				2,6-Dimethyldecane	13150-81-7	24.98	NGS	60	JNT
S16T020452				Acetic acid, trifluoro-, 3,7-d	28745-07-5	25.12	NGS	78	JNT
S16T020452				2-Propenoic acid, octyl ester	2499-59-4	25.71	NGS	32	JNT
S16T020452				1,2-Benzisothiazole	272-16-2	26.00	NGS	120	JNT
S16T020452				Tetradecane, 1-iodo-	19218-94-1	26.14	NGS	49	JNT
S16T020452				Heptadecane, 2,6-dimethyl-	54105-67-8	26.69	NGS	25	JNT
S16T020452				Unknown-1	-	7.89	NGS	33	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034

SDG Number:

Customer Sample ID: 16-05629-2-BLANK

Customer Sample ID: 16-05629-2-BLANK

Sample#	R	Alt	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020453				Phenol	108-95-2	20.09	NGS	38	JNT
S16T020453			BLNK	Unknown-1	-	7.89	NGS	33	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034

SDG Number:

Customer Sample ID: 16-05629-2-C1

Customer Sample ID: 16-05629-2-C1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020454				Nitric oxide	10102-43-9	7.90	NGS	32	JNT
S16T020454				Formamide	75-12-7	13.83	NGS	83	JNT
S16T020454				Hexanal	66-25-1	16.57	NGS	30	JNT
S16T020454				Cyclotetrasiloxane, octamethyl	556-67-2	20.08	NGS	1.1E+03	JNT
S16T020454				2,2,7,7-Tetramethyloctane	1071-31-4	21.08	NGS	58	JNT
S16T020454				3,3-Dimethylhexane	563-16-6	22.31	NGS	27	JNT
S16T020454				Undecane, 4,7-dimethyl-	17301-32-5	22.63	NGS	230	JNT
S16T020454				Decane, 2,4,6-trimethyl-	62108-27-4	22.79	NGS	96	JNT
S16T020454				Undecane, 2,6-dimethyl-	17301-23-4	23.42	NGS	45	JNT
S16T020454				Undecane	1120-21-4	23.53	NGS	150	JNT
S16T020454				Hydroxylamine, O-decyl-	29812-79-1	23.64	NGS	110	JNT
S16T020454				2,3-Dimethyldecane	17312-44-6	23.75	NGS	26	JNT
S16T020454				Benzaldehyde, 2,5-bis(trimethyl)	56114-69-3	23.96	NGS	890	JNT
S16T020454				Tridecane	629-50-5	24.99	NGS	110	JNT
S16T020454				Acetic acid, trifluoro-, 3,7-d	28745-07-5	25.12	NGS	34	JNT
S16T020454				1,2-Benzisothiazole	272-16-2	26.00	NGS	160	JNT
S16T020454				Tetradecane, 1-iodo-	19218-94-1	26.14	NGS	90	JNT
S16T020454				Silane, trimethyl(2-methylene-	97778-15-9	26.34	NGS	50	JNT
S16T020454				Heptadecane, 2,6-dimethyl-	54105-67-8	26.70	NGS	48	JNT
S16T020454			BLNK	Unknown-1	-	7.89	NGS	33	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034

SDG Number:

Customer Sample ID: 16-05629-2-D1

Customer Sample ID: 16-05629-2-D1

Sample#	R	AP	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020455				Formamide	75-12-7	13.83	NGS	93	JNT
S16T020455				Heptane, 2,4-dimethyl-	2213-23-2	17.02	NGS	53	JNT
S16T020455				Cyclotetrasiloxane, octamethyl	556-67-2	20.08	NGS	3.1E+03	JNQJ
S16T020455				Decane, 2,4,6-trimethyl-	62108-27-4	22.31	NGS	39	JNQJ
S16T020455				2,6-Dimethyldecane	13150-81-7	22.64	NGS	48	JNQJ
S16T020455				2-Hexyl-1-octanol	19780-79-1	22.80	NGS	34	JNQJ
S16T020455				cis-9,10-Epoxydocadecan-1-ol	13980-12-6	23.21	NGS	19	JNQJ
S16T020455				Unknown-1	--	23.96	NGS	2.6E+03	JQJ
S16T020455				Cyclohexene, 2-ethenyl-1,3,3-t	5293-90-3	24.22	NGS	30	JNQJ
S16T020455				1H-Indene, 1-(1,5-dimethyl-2-h	54411-95-9	24.38	NGS	44	JNQJ
S16T020455				Cis-1,4-dimethyladamantane	24145-89-9	24.48	NGS	36	JNQJ
S16T020455				Unknown-2	--	24.59	NGS	490	JQJ
S16T020455				Unknown-3	--	24.71	NGS	170	JQJ
S16T020455				Methanamine	100-97-0	25.95	NGS	40	JNQJ
S16T020455				1,2-Benzisothiazole	272-16-2	26.00	NGS	38	JNQJ
S16T020455				3-Oxa-6-thia-2,7-disilaocane,	78921-31-0	26.34	NGS	150	JNQJ
S16T020455				BLNK	--	7.89	NGS	33	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034

SDG Number:

Customer Sample ID: 16-05629-2-E1

Customer Sample ID: 16-05629-2-E1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020456				Silane	7803-62-5	7.89	NGS	110	JNT
S16T020456				Formamide	75-12-7	13.83	NGS	28	JNT
S16T020456				Heptane, 2,4-dimethyl-	2213-23-2	17.03	NGS	76	JNT
S16T020456				Cyclotetrasiloxane, octamethyl	556-67-2	20.09	NGS	240	JNT
S16T020456				Undecane, 4,7-dimethyl-	17301-32-5	22.64	NGS	210	JNT
S16T020456				Decane, 2,4,6-trimethyl-	62108-27-4	22.79	NGS	78	JNT
S16T020456				Undecane, 2,6-dimethyl-	17301-23-4	23.42	NGS	27	JNT
S16T020456				Undecane	1120-21-4	23.54	NGS	130	JNT
S16T020456				Dodecane	112-40-3	23.64	NGS	66	JNT
S16T020456				2,3-Dimethyldecane	17312-44-6	23.76	NGS	26	JNT
S16T020456				Unknown-1	-	23.96	NGS	230	JT
S16T020456				2,6-Dimethyldecane	13150-81-7	24.99	NGS	40	JNT
S16T020456				1,2-Benzisothiazole	272-16-2	26.00	NGS	120	JNT
S16T020456				1-Iodo-2-methylundecane	73105-67-6	26.15	NGS	43	JNT
S16T020456			BLNK	Unknown-1	-	7.89	NGS	33	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-EFF-BASE
 Customer Sample ID: 16-05629-2-EFF-BASE

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020457				Silane	7803-62-5	7.89	NGS	45 JNT	
S16T020457				Formamide	75-12-7	13.83	NGS	65 JNT	
S16T020457				Heptane, 3,4,5-trimethyl-	20278-89-1	16.92	NGS	54 JNT	
S16T020457				Heptane, 2,4-dimethyl-	2213-23-2	17.02	NGS	280 JNT	
S16T020457				1-Heptene, 5-methyl-	13151-04-7	17.40	NGS	67 JNT	
S16T020457				Cyclotetrasiloxane, octamethyl	556-67-2	20.09	NGS	730 JNT	
S16T020457				Undecane, 4,7-dimethyl-	17301-32-5	22.64	NGS	290 JNT	
S16T020457				Decane, 2,4,6-trimethyl-	62108-27-4	22.79	NGS	110 JNT	
S16T020457				2,6-Dimethyl-6-trifluoroacetox	61986-67-2	23.15	NGS	27 JNT	
S16T020457				Undecane, 2,6-dimethyl-	17301-23-4	23.42	NGS	29 JNT	
S16T020457				Undecane	1120-21-4	23.54	NGS	130 JNT	
S16T020457				Dodecane	112-40-3	23.64	NGS	74 JNT	
S16T020457				2,3-Dimethyldecane	17312-44-6	23.76	NGS	25 JNT	
S16T020457				Unknown-1	-	23.96	NGS	300 JT	
S16T020457				2,6-Dimethyldecane	13150-81-7	24.99	NGS	44 JNT	
S16T020457				Acetic acid, trifluoro-, 3,7-d	28745-07-5	25.12	NGS	46 JNT	
S16T020457				1,2-Benzisothiazole	272-16-2	26.00	NGS	130 JNT	
S16T020457				Tetradecane, 1-iodo-	19218-94-1	26.14	NGS	48 JNT	
S16T020457				Heptadecane, 2,6-dimethyl-	54105-67-8	26.70	NGS	25 JNT	
S16T020457			BLNK	Unknown-1	-	7.89	NGS	33	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034

SDG Number:

Customer Sample ID: 16-05629-2-F1

Customer Sample ID: 16-05629-2-F1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020458				Formamide	75-12-7	14.40	NGS	96	JNT
S16T020458				Heptane, 2,4-dimethyl-	2213-23-2	17.02	NGS	55	JNT
S16T020458				Cyclotetrasiloxane, octamethyl	556-67-2	20.09	NGS	190	JNT
S16T020458				Undecane, 4,7-dimethyl-	17301-32-5	22.64	NGS	140	JNT
S16T020458				Decane, 2,4,6-trimethyl-	62108-27-4	22.79	NGS	52	JNT
S16T020458				2,6-Dimethyldecane	13150-81-7	23.42	NGS	21	JNT
S16T020458				Undecane	1120-21-4	23.54	NGS	83	JNT
S16T020458				Hydroxylamine, O-decyl-	29812-79-1	23.64	NGS	51	JNT
S16T020458				Unknown-1	--	23.96	NGS	140	JT
S16T020458				1,2-Benzisothiazole	272-16-2	26.01	NGS	81	JNT
S16T020458				1-Iodo-2-methylundecane	73105-67-6	26.15	NGS	24	JNT
S16T020458			BLNK	Unknown-1	--	7.89	NGS	33	

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 Q - Qualitative

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-G1
 Customer Sample ID: 16-05629-2-G1

Sample#	R	Al#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020459				Cyclotrisiloxane, hexamethyl-	541-05-9	16.78	NGS	40	JNT
S16T020459				Cyclotetrasiloxane, octamethyl	566-67-2	20.08	NGS	530	JNT
S16T020459				3,3-Dimethylhexane	563-16-6	22.31	NGS	28	JNT
S16T020459				Undecane, 4,7-dimethyl-	17301-32-5	22.64	NGS	89	JNT
S16T020459				Decane, 2,4,6-trimethyl-	62108-27-4	22.79	NGS	38	JNT
S16T020459				Undecane, 2,6-dimethyl-	17301-23-4	23.42	NGS	18	JNT
S16T020459				Undecane	1120-21-4	23.54	NGS	58	JNT
S16T020459				Hydroxylamine, O-decyl-	29812-79-1	23.64	NGS	39	JNT
S16T020459				Unknown-1	-	23.96	NGS	450	JT
S16T020459				2,6-Dimethyldecane	13150-81-7	24.99	NGS	42	JNT
S16T020459				1,2-Benzisothiazole	272-16-2	26.00	NGS	26	JNT
S16T020459				1-Iodo-2-methylundecane	73105-67-6	26.14	NGS	28	JNT
S16T020459				1,3-Dioxolane, 2-pentadecyl-	4360-57-0	26.34	NGS	33	JNT
S16T020459			BLNK	Unknown-1	-	7.89	NGS	33	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034

SDG Number:

Customer Sample ID: 16-05629-2-H1

Customer Sample ID: 16-05629-2-H1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020460				Silane	7803-62-5	7.93	NGS	110	JNT
S16T020460				Formamide	75-12-7	13.84	NGS	62	JNT
S16T020460				Heptane, 2,4-dimethyl-	2213-23-2	17.03	NGS	160	JNT
S16T020460				1-Heptene, 5-methyl-	13151-04-7	17.41	NGS	38	JNT
S16T020460				Cyclotetrasiloxane, octamethyl	556-67-2	20.09	NGS	460	JNT
S16T020460				Undecane, 4,7-dimethyl-	17301-32-5	22.64	NGS	210	JNT
S16T020460				Decane, 2,4,6-trimethyl-	62108-27-4	22.79	NGS	75	JNT
S16T020460				Undecane, 2,6-dimethyl-	17301-23-4	23.42	NGS	32	JNT
S16T020460				Undecane	1120-21-4	23.54	NGS	96	JNT
S16T020460				Dodecane	112-40-3	23.64	NGS	52	JNT
S16T020460				Unknown-1	-	23.97	NGS	180	JT
S16T020460				2,6-Dimethyldecane	13150-81-7	24.99	NGS	37	JNT
S16T020460				1,2-Benzisothiazole	272-16-2	26.00	NGS	56	JNT
S16T020460			BLNK	Unknown-1	-	7.89	NGS	33	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034

SDG Number:

Customer Sample ID: 16-05629-2-H2

Customer Sample ID: 16-05629-2-H2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020461				Heptane, 2,4-dimethyl-	2213-23-2	17.03	NGS	46	JNT
S16T020461				Cyclotetrasiloxane, octamethyl	556-67-2	20.09	NGS	230	JNT
S16T020461				Undecane, 4,7-dimethyl-	17301-32-5	22.64	NGS	170	JNT
S16T020461				Decane, 2,4,6-trimethyl-	62108-27-4	22.79	NGS	74	JNT
S16T020461				Undecane, 2,6-dimethyl-	17301-23-4	23.42	NGS	27	JNT
S16T020461				Undecane	1120-21-4	23.54	NGS	86	JNT
S16T020461				Decane, 2,3,5,8-tetramethyl-	192823-15-7	23.65	NGS	40	JNT
S16T020461				Unknown-1	--	23.97	NGS	150	JT
S16T020461				Tetradecane, 1-iodo-	19218-94-1	25.00	NGS	30	JNT
S16T020461				1,2-Benzisothiazole	272-16-2	26.01	NGS	43	JNT
S16T020461			BLNK	Unknown-1	--	7.89	NGS	33	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162034
 SDG Number:
 Customer Sample ID: 16-05629-2-IN-BASE
 Customer Sample ID: 16-05629-2-IN-BASE

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020462				Silane	7803-62-5	7.90	NGS	57	JNT
S16T020462				Ethylene Glycol	107-21-1	13.67	NGS	97	JNT
S16T020462				Formamide	75-12-7	13.85	NGS	47	JNT
S16T020462				Acetic acid, trifluoro-	76-05-1	14.90	NGS	100	JNT
S16T020462				1,3-Dimethylcyclohexane,c&t	591-21-9	16.26	NGS	43	JNT
S16T020462				Hexane, 2,3,5-trimethyl-	1069-53-0	16.92	NGS	54	JNT
S16T020462				Heptane, 2,4-dimethyl-	2213-23-2	17.02	NGS	310	JNT
S16T020462				1-Heptene, 5-methyl-	13151-04-7	17.41	NGS	76	JNT
S16T020462				Cyclotetrasiloxane, octamethyl	556-67-2	20.09	NGS	820	JNT
S16T020462				Cyclohexene, 1-methyl-5-(1-met	1461-27-4	22.20	NGS	29	JNT
S16T020462				Undecane, 4,7-dimethyl-	17301-32-5	22.64	NGS	330	JNT
S16T020462				Decane, 2,4,6-trimethyl-	62108-27-4	22.79	NGS	120	JNT
S16T020462				2,6-Dimethyl-6-trifluoroacetox	61986-67-2	23.16	NGS	27	JNT
S16T020462				Undecane, 2,6-dimethyl-	17301-23-4	23.43	NGS	26	JNT
S16T020462				Undecane	1120-21-4	23.54	NGS	150	JNT
S16T020462				Undecane, 5,7-dimethyl-	17312-83-3	23.65	NGS	76	JNT
S16T020462				Benzaldehyde, 2,5-bis(trimeth	58114-69-3	23.97	NGS	490	JNT
S16T020462				1-Octanol, 3,7-dimethyl-	106-21-8	24.56	NGS	27	JNT
S16T020462				2,6-Dimethyldecane	13150-81-7	25.00	NGS	40	JNT
S16T020462				Acetic acid, trifluoro-, 3,7-d	28745-07-5	25.13	NGS	81	JNT
S16T020462				Unknown-1	--	25.53	NGS	23	JT
S16T020462				Unknown-2	--	25.72	NGS	31	JT
S16T020462				1,2-Benzisothiazole	272-16-2	26.01	NGS	180	JNT
S16T020462				Tetradecane, 1-iodo-	19218-94-1	26.15	NGS	55	JNT
S16T020462				Silane, trimethyl[2-methylene-	97778-15-9	26.35	NGS	44	JNT
S16T020462				1-Iodo-2-methylundecane	73105-67-6	26.71	NGS	27	JNT
S16T020462				BLNK	--	7.89	NGS	33	

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**Cartridge Evaluation
Data Summary Report**

Sample Group: 20162034

SDG Number:

Customer Sample ID: 16-05629-2-IN-BASE

NA = Not Analyzed, ND = Not Detected
Y - Comment

J - Estimated
L - LLS Outside Range

T - Tentatively Identified Compound
Q - Qualitative

N - Named TIC
B - Blank Contamination

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-A1
 Customer Sample ID: 16-05793-2-A1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020464		79-34-5		1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020464		79-00-5		1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020464		75-34-3		1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020464		75-35-4		1,1-Dichloroethane	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020464		107-06-2		1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020464		542-75-6		1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020464		106-46-7		1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020464		123-91-1		1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020464		71-36-3		1-Butanol	NGS	110	<4.3	71	n/a	n/a	n/a	n/a	4.3	n/a	Y
S16T020464		111-70-6		1-Heptanol	NGS	120	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	
S16T020464		71-23-8		1-Propanol	NGS	120	<8.9	19	n/a	n/a	n/a	n/a	8.9	n/a	J
S16T020464		108-47-4		2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020464		1708-29-8		2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020464		78-93-3		2-Butanone	NGS	95	<3.1	9.5	n/a	n/a	n/a	n/a	3.1	n/a	J
S16T020464		4170-30-3		2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020464		110-43-0		2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020464		591-78-6		2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020464		534-22-5		2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020464		107-83-5		2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020464		78-94-4		3-Buten-2-one	NGS	100	<1.9	3.1	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020464		106-35-4		3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S16T020464		106-68-3		3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020464		105-42-0		4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020464		108-10-1		4-Methyl-2-Pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020464		67-64-1		Acetone	NGS	100	20	81	n/a	n/a	n/a	n/a	2.8	n/a	BL
S16T020464		75-05-8		Acetonitrile	NGS	100	<1.6	1.5E+03	n/a	n/a	n/a	n/a	1.6	n/a	E
S16T020464		98-86-2		Acetophenone	NGS	120	<6.2	21	n/a	n/a	n/a	n/a	6.2	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-A1
 Customer Sample ID: 16-05793-2-A1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020464			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	n/a
S16T020464			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	n/a
S16T020464			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	n/a
S16T020464			71-43-2	Benzene	NGS	110	<1.5	2.2	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T020464			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	n/a
S16T020464			123-72-8	Butanal	NGS	100	<3.0	8.0	n/a	n/a	n/a	n/a	3.0	n/a	J
S16T020464			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	n/a
S16T020464			56-23-5	Carbon tetrachloride	NGS	100	<1.5	1.6	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T020464			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	n/a
S16T020464			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	n/a
S16T020464			67-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	n/a
S16T020464			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	n/a
S16T020464			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	n/a
S16T020464			64-17-5	Ethanol	NGS	96	13	97	n/a	n/a	n/a	n/a	3.7	n/a	BL
S16T020464			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	n/a
S16T020464			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	n/a
S16T020464			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	n/a
S16T020464			110-54-3	Hexane	NGS	100	<1.3	2.3	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T020464			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	n/a
S16T020464			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	n/a
S16T020464			75-09-2	Methylene Chloride	NGS	96	5.0	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	L
S16T020464			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020464			98-95-3	Nitrobenzene	NGS	120	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	n/a
S16T020464			110-59-8	Pentanitrile	NGS	110	<2.6	3.5	n/a	n/a	n/a	n/a	2.6	n/a	J
S16T020464			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	n/a
S16T020464			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	n/a
S16T020464			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	n/a

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-A1
 Customer Sample ID: 16-05793-2-A1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020464			127-18-4	Tetrachloroethene	NGS	100	<1.8	5.3	n/a	n/a	n/a	n/a	1.8	n/a	J
S16T020464			108-88-3	Toluene	NGS	110	<2.2	5.8	n/a	n/a	n/a	n/a	2.2	n/a	J
S16T020464			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020464			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	46	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020464			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020464			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020464			123-86-4	n-Butyl acetate	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020464			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020464			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020464			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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 Y - Comment

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-A2
 Customer Sample ID: 16-05793-2-A2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020465		79-34-5		1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020465		79-00-5		1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020465		75-34-3		1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020465		75-35-4		1,1-Dichloroethane	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020465		107-06-2		1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020465		542-75-6		1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020465		106-46-7		1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020465		123-91-1		1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020465		71-36-3		1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	Y
S16T020465		111-70-6		1-Heptanol	NGS	120	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	
S16T020465		71-23-8		1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020465		108-47-4		2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020465		1708-29-8		2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020465		78-93-3		2-Butanone	NGS	95	<3.1	6.3	n/a	n/a	n/a	n/a	3.1	n/a	J
S16T020465		4170-30-3		2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020465		110-43-0		2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020465		591-78-6		2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020465		534-22-5		2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020465		107-83-5		2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020465		78-94-4		3-Buten-2-one	NGS	100	<1.9	2.1	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020465		106-35-4		3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S16T020465		106-68-3		3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020465		105-42-0		4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020465		108-10-1		4-Methyl-2-Pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020465		67-64-1		Acetone	NGS	100	20	23	n/a	n/a	n/a	n/a	2.8	n/a	BL
S16T020465		75-05-8		Acetonitrile	NGS	100	<1.6	140	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020465		98-86-2		Acetophenone	NGS	120	<6.2	19	n/a	n/a	n/a	n/a	6.2	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-A2
 Customer Sample ID: 16-05793-2-A2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020465			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020465			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020465			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020465			71-43-2	Benzene	NGS	110	<1.5	1.9	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T020465			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020465			123-72-8	Butanal	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020465			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020465			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020465			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020465			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020465			67-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020465			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	
S16T020465			124-18-5	Decane	NGS	110	<3.3	3.6	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T020465			64-17-5	Ethanol	NGS	96	13	8.6	n/a	n/a	n/a	n/a	3.7	n/a	BJL
S16T020465			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020465			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020465			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020465			110-54-3	Hexane	NGS	100	<1.3	1.5	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T020465			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020465			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020465			75-09-2	Methylene Chloride	NGS	96	5.0	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	L
S16T020465			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020465			98-95-3	Nitrobenzene	NGS	120	<4.7	7.7	n/a	n/a	n/a	n/a	4.7	n/a	J
S16T020465			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020465			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020465			110-96-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020465			100-42-5	Styrene	NGS	110	<2.7	3.0	n/a	n/a	n/a	n/a	2.7	n/a	J

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 NA = Not Analyzed, ND = Not Detected

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-A2
 Customer Sample ID: 16-05793-2-A2

Sample#	R	AF	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020465			127-18-4	Tetrachloroethene	NGS	100	<1.8	51	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020465			108-88-3	Toluene	NGS	110	<2.2	3.7	n/a	n/a	n/a	n/a	2.2	n/a	J
S16T020465			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020465			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020465			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020465			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020465			123-86-4	n-Butyl acetate	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020465			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020465			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020465			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-B1
 Customer Sample ID: 16-05793-2-B1

Sample#	R	AF	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020466			79-34-5	1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020466			79-00-5	1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020466			75-34-3	1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020466			75-35-4	1,1-Dichloroethane	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020466			107-06-2	1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020466			542-75-6	1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020466			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020466			123-91-1	1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020466			71-36-3	1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	Y
S16T020466			111-70-6	1-Heptanol	NGS	120	<8.1	<8.1	n/a	n/a	n/a	n/a	8.1	n/a	
S16T020466			71-23-8	1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020466			108-47-4	2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020466			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020466			78-93-3	2-Butanone	NGS	95	<3.1	4.8	n/a	n/a	n/a	n/a	3.1	n/a	J
S16T020466			4170-30-3	2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020466			110-43-0	2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020466			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020466			534-22-5	2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020466			107-83-5	2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020466			78-94-4	3-Buten-2-one	NGS	100	<1.9	1.9	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020466			106-35-4	3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S16T020466			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020466			105-42-0	4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020466			108-10-1	4-Methyl-2-Pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020466			67-64-1	Acetone	NGS	100	20	27	n/a	n/a	n/a	n/a	2.8	n/a	BL
S16T020466			75-05-8	Acetonitrile	NGS	100	<1.6	940	n/a	n/a	n/a	n/a	1.6	n/a	E
S16T020466			98-86-2	Acetophenone	NGS	120	<6.2	24	n/a	n/a	n/a	n/a	6.2	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-B1
 Customer Sample ID: 16-05793-2-B1

Sample#	R	AF	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020466			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020466			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020466			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020466			71-43-2	Benzene	NGS	110	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020466			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020466			123-72-8	Butanal	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020466			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020466			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020466			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020466			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020466			67-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020466			110-82-7	Cyclohexane	NGS	100	<1.4	4.4	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T020466			124-18-5	Decane	NGS	110	<3.3	7.6	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T020466			64-17-5	Ethanol	NGS	96	13	21	n/a	n/a	n/a	n/a	3.7	n/a	B,J,L
S16T020466			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020466			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020466			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020466			110-54-3	Hexane	NGS	100	<1.3	1.3	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T020466			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020466			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020466			75-09-2	Methylene Chloride	NGS	96	5.0	4.2	n/a	n/a	n/a	n/a	4.1	n/a	B,J,L
S16T020466			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020466			98-95-3	Nitrobenzene	NGS	120	<4.7	21	n/a	n/a	n/a	n/a	4.7	n/a	
S16T020466			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020466			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020466			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020466			100-42-5	Styrene	NGS	110	<2.7	2.9	n/a	n/a	n/a	n/a	2.7	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-B1
 Customer Sample ID: 16-05793-2-B1

Sample#	R	AF	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020466			127-18-4	Tetrachloroethene	NGS	100	<1.8	53	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020466			108-88-3	Toluene	NGS	110	<2.2	4.0	n/a	n/a	n/a	n/a	2.2	n/a	J
S16T020466			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020466			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020466			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020466			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020466			123-86-4	n-Butyl acetate	NGS	100	<2.4	2.5	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T020466			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020466			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020466			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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 L - LLS Outside Range
 Y - Comment
 NA = Not Analyzed, ND = Not Detected

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-BLANK
 Customer Sample ID: 16-05793-2-BLANK

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020467			79-34-5	1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020467			79-00-5	1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020467			75-34-3	1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020467			75-35-4	1,1-Dichloroethene	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020467			107-06-2	1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020467			542-75-6	1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020467			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020467			123-91-1	1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020467			71-36-3	1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	Y
S16T020467			111-70-6	1-Heptanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	9.1	n/a	
S16T020467			71-23-8	1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020467			108-47-4	2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020467			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020467			78-93-3	2-Butanone	NGS	95	<3.1	<3.1	n/a	n/a	n/a	n/a	3.1	n/a	
S16T020467			4170-30-3	2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020467			110-43-0	2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020467			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020467			534-22-5	2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020467			107-83-5	2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020467			78-94-4	3-Buten-2-one	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020467			106-35-4	3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S16T020467			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020467			105-42-0	4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020467			108-10-1	4-Methyl-2-Pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020467			67-64-1	Acetone	NGS	100	20	4.6	n/a	n/a	n/a	n/a	2.8	n/a	BUJL
S16T020467			75-05-8	Acetonitrile	NGS	100	<1.6	500	n/a	n/a	n/a	n/a	1.6	n/a	E
S16T020467			98-86-2	Acetophenone	NGS	120	<6.2	<6.2	n/a	n/a	n/a	n/a	6.2	n/a	

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 J - Estimated
 L - LLS Outside Range
 NA = Not Analyzed, ND = Not Detected
 Y - Comment

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-BLANK
 Customer Sample ID: 16-05793-2-BLANK

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020467			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020467			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020467			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020467			71-43-2	Benzene	NGS	110	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020467			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020467			123-72-8	Butanal	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020467			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020467			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020467			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020467			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020467			67-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020467			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	
S16T020467			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020467			64-17-5	Ethanol	NGS	96	13	7.4	n/a	n/a	n/a	n/a	3.7	n/a	B,J,L
S16T020467			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020467			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020467			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020467			110-54-3	Hexane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020467			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020467			128-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020467			75-09-2	Methylene Chloride	NGS	96	5.0	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	L
S16T020467			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020467			98-95-3	Nitrobenzene	NGS	120	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	
S16T020467			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020467			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020467			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020467			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	

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 E - Outside Calibration Range
 J - Estimated
 L - LLS Outside Range
 Y - Comment
 NA = Not Analyzed, ND = Not Detected

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-BLANK
 Customer Sample ID: 16-05793-2-BLANK

Sample#	R	AF	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020467			127-18-4	Tetrachloroethene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020467			108-88-3	Toluene	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020467			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020467			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020467			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020467			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020467			123-86-4	n-Butyl acetate	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020467			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020467			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020467			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-D1
 Customer Sample ID: 16-05793-2-D1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020468		79-34-5		1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020468		79-00-5		1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020468		75-34-3		1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020468		75-35-4		1,1-Dichloroethane	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020468		107-06-2		1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020468		542-75-6		1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020468		106-46-7		1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020468		123-91-1		1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020468		71-36-3		1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	Y
S16T020468		111-70-6		1-Heptanol	NGS	120	<8.1	<8.1	n/a	n/a	n/a	n/a	8.1	n/a	
S16T020468		71-23-8		1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020468		108-47-4		2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020468		1708-29-8		2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020468		78-93-3		2-Butanone	NGS	95	<3.1	4.9	n/a	n/a	n/a	n/a	3.1	n/a	J
S16T020468		4170-30-3		2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020468		110-43-0		2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020468		591-78-6		2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020468		534-22-5		2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020468		107-83-5		2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020468		78-94-4		3-Buten-2-one	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020468		106-35-4		3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S16T020468		106-68-3		3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020468		105-42-0		4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020468		108-10-1		4-Methyl-2-pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020468		67-64-1		Acetone	NGS	100	20	23	n/a	n/a	n/a	n/a	2.8	n/a	BL
S16T020468		75-05-8		Acetonitrile	NGS	100	<1.6	160	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020468		98-86-2		Acetophenone	NGS	120	<6.2	20	n/a	n/a	n/a	n/a	6.2	n/a	

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 Y - Comment

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-D1
 Customer Sample ID: 16-05793-2-D1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020468			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020468			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020468			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020468			71-43-2	Benzene	NGS	110	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020468			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020468			123-72-8	Butanal	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020468			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020468			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020468			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020468			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020468			67-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020468			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	
S16T020468			124-18-5	Decane	NGS	110	<3.3	4.5	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T020468			64-17-5	Ethanol	NGS	96	13	46	n/a	n/a	n/a	n/a	3.7	n/a	BL
S16T020468			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020468			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020468			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020468			110-54-3	Hexane	NGS	100	<1.3	1.4	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T020468			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020468			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020468			75-09-2	Methylene Chloride	NGS	96	5.0	4.6	n/a	n/a	n/a	n/a	4.1	n/a	BJL
S16T020468			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020468			98-95-3	Nitrobenzene	NGS	120	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	
S16T020468			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020468			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020468			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020468			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	

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 E - Outside Calibration Range
 N - Named TIC
 B - Blank Contamination

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-D1
 Customer Sample ID: 16-05793-2-D1

Sample#	R	AF	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020468			127-18-4	Tetrachloroethene	NGS	100	<1.8	83	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020468			108-88-3	Toluene	NGS	110	<2.2	3.6	n/a	n/a	n/a	n/a	2.2	n/a	J
S16T020468			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020468			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020468			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020468			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020468			123-86-4	n-Butyl acetate	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020468			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020468			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020468			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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 E - Outside Calibration Range
 J - Estimated
 L - LLS Outside Range
 Y - Comment
 NA = Not Analyzed, ND = Not Detected

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-E1
 Customer Sample ID: 16-05793-2-E1

Sample#	R	AP	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S161020469			79-34-5	1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S161020469			79-00-5	1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S161020469			75-34-3	1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S161020469			75-35-4	1,1-Dichloroethene	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S161020469			107-06-2	1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S161020469			542-75-6	1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S161020469			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S161020469			123-91-1	1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S161020469			71-36-3	1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	Y
S161020469			111-70-6	1-Heptanol	NGS	120	<8.1	<8.1	n/a	n/a	n/a	n/a	8.1	n/a	
S161020469			71-23-8	1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S161020469			108-47-4	2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S161020469			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S161020469			78-93-3	2-Butanone	NGS	95	<3.1	4.1	n/a	n/a	n/a	n/a	3.1	n/a	J
S161020469			4170-30-3	2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S161020469			110-43-0	2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S161020469			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S161020469			534-22-5	2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S161020469			107-83-5	2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S161020469			78-94-4	3-Buten-2-one	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S161020469			106-35-4	3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S161020469			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S161020469			105-42-0	4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S161020469			108-10-1	4-Methyl-2-Pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S161020469			67-64-1	Acetone	NGS	100	20	22	n/a	n/a	n/a	n/a	2.8	n/a	BL
S161020469			75-05-8	Acetonitrile	NGS	100	<1.6	1.1E+03	n/a	n/a	n/a	n/a	1.6	n/a	E
S161020469			98-86-2	Acetophenone	NGS	120	<6.2	16	n/a	n/a	n/a	n/a	6.2	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-E1
 Customer Sample ID: 16-05793-2-E1

Sample#	R	AF	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020469			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020469			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020469			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020469			71-43-2	Benzene	NGS	110	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020469			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020469			123-72-8	Butanal	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020469			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020469			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020469			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020469			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020469			67-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020469			110-82-7	Cyclohexane	NGS	100	<1.4	4.5	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T020469			124-18-5	Decane	NGS	110	<3.3	3.9	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T020469			64-17-5	Ethanol	NGS	96	13	50	n/a	n/a	n/a	n/a	3.7	n/a	BL
S16T020469			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020469			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020469			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020469			110-54-3	Hexane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020469			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020469			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020469			75-09-2	Methylene Chloride	NGS	96	5.0	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	L
S16T020469			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020469			98-95-3	Nitrobenzene	NGS	120	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	
S16T020469			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020469			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020469			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020469			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-E1
 Customer Sample ID: 16-05793-2-E1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020469			127-18-4	Tetrachloroethene	NGS	100	<1.8	58	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020469			108-88-3	Toluene	NGS	110	<2.2	3.4	n/a	n/a	n/a	n/a	2.2	n/a	J
S16T020469			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020469			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020469			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020469			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020469			123-86-4	n-Butyl acetate	NGS	100	<2.4	2.6	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T020469			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020469			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020469			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-EFF-BASE
 Customer Sample ID: 16-05793-2-EFF-BASE

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020470		79-34-5		1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020470		79-00-5		1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020470		75-34-3		1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020470		75-35-4		1,1-Dichloroethane	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020470		107-06-2		1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020470		542-75-6		1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020470		106-46-7		1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020470		123-91-1		1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020470		71-36-3		1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	Y
S16T020470		111-70-6		1-Heptanol	NGS	120	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	
S16T020470		71-23-8		1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020470		108-47-4		2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020470		1708-29-8		2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020470		78-93-3		2-Butanone	NGS	95	<3.1	5.0	n/a	n/a	n/a	n/a	3.1	n/a	J
S16T020470		4170-30-3		2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020470		110-43-0		2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020470		591-78-6		2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020470		534-22-5		2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020470		107-83-5		2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020470		78-94-4		3-Buten-2-one	NGS	100	<1.9	2.5	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020470		106-35-4		3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S16T020470		106-68-3		3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020470		105-42-0		4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020470		108-10-1		4-Methyl-2-pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020470		67-64-1		Acetone	NGS	100	20	20	n/a	n/a	n/a	n/a	2.8	n/a	BL
S16T020470		75-05-8		Acetonitrile	NGS	100	<1.6	40	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020470		98-96-2		Acetophenone	NGS	120	<6.2	21	n/a	n/a	n/a	n/a	6.2	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-EFF-BASE
 Customer Sample ID: 16-05793-2-EFF-BASE

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020470			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020470			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020470			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020470			71-43-2	Benzene	NGS	110	<1.5	2.0	n/a	n/a	n/a	n/a	4.2	n/a	J
S16T020470			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020470			123-72-8	Butanal	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020470			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020470			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020470			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020470			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020470			67-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020470			110-82-7	Cyclohexane	NGS	100	<1.4	6.1	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T020470			124-18-5	Decane	NGS	110	<3.3	8.4	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T020470			64-17-5	Ethanol	NGS	96	13	20	n/a	n/a	n/a	n/a	3.7	n/a	B, J, L
S16T020470			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020470			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020470			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020470			110-54-3	Hexane	NGS	100	<1.3	1.5	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T020470			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020470			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020470			75-09-2	Methylene Chloride	NGS	96	5.0	5.5	n/a	n/a	n/a	n/a	4.1	n/a	B, J, L
S16T020470			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020470			98-95-3	Nitrobenzene	NGS	120	<4.7	9.8	n/a	n/a	n/a	n/a	4.7	n/a	J
S16T020470			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020470			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020470			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020470			100-42-5	Styrene	NGS	110	<2.7	4.0	n/a	n/a	n/a	n/a	2.7	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-EFF-BASE
 Customer Sample ID: 16-05793-2-EFF-BASE

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020470			127-18-4	Tetrachloroethene	NGS	100	<1.8	60	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020470			108-88-3	Toluene	NGS	110	<2.2	4.5	n/a	n/a	n/a	n/a	2.2	n/a	J
S16T020470			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020470			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020470			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020470			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020470			123-86-4	n-Butyl acetate	NGS	100	<2.4	3.6	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T020470			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020470			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020470			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-F1
 Customer Sample ID: 16-05793-2-F1

Sample#	R	AF	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020471			79-34-5	1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020471			79-00-5	1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020471			75-34-3	1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020471			75-35-4	1,1-Dichloroethane	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020471			107-06-2	1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020471			542-75-6	1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020471			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020471			123-91-1	1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020471			71-36-3	1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	Y
S16T020471			111-70-6	1-Heptanol	NGS	120	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	
S16T020471			71-23-8	1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020471			108-47-4	2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020471			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020471			78-93-3	2-Butanone	NGS	95	<3.1	<3.1	n/a	n/a	n/a	n/a	3.1	n/a	
S16T020471			4170-30-3	2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020471			110-43-0	2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020471			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020471			534-22-5	2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020471			107-83-5	2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020471			78-94-4	3-Buten-2-one	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020471			106-35-4	3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S16T020471			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020471			105-42-0	4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020471			108-10-1	4-Methyl-2-pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020471			67-64-1	Acetone	NGS	100	20	8.3	n/a	n/a	n/a	n/a	2.8	n/a	BJL
S16T020471			75-05-8	Acetonitrile	NGS	100	<1.6	94	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020471			98-86-2	Acetophenone	NGS	120	<6.2	11	n/a	n/a	n/a	n/a	6.2	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-F1
 Customer Sample ID: 16-05793-2-F1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020471			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020471			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020471			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020471			71-43-2	Benzene	NGS	110	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020471			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020471			123-72-8	Butanal	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020471			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020471			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020471			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020471			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020471			67-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020471			110-82-7	Cyclohexane	NGS	100	<1.4	2.3	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T020471			124-18-5	Decane	NGS	110	<3.3	3.6	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T020471			64-17-5	Ethanol	NGS	96	13	44	n/a	n/a	n/a	n/a	3.7	n/a	BL
S16T020471			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020471			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020471			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020471			110-54-3	Hexane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020471			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020471			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020471			75-09-2	Methylene Chloride	NGS	96	5.0	28	n/a	n/a	n/a	n/a	4.1	n/a	BL
S16T020471			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020471			98-95-3	Nitrobenzene	NGS	120	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	
S16T020471			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020471			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020471			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020471			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-F1
 Customer Sample ID: 16-05793-2-F1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020471			127-18-4	Tetrachloroethene	NGS	100	<1.8	33	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020471			108-88-3	Toluene	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020471			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020471			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020471			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020471			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020471			123-86-4	n-Butyl acetate	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020471			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020471			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020471			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-G1
 Customer Sample ID: 16-05793-2-G1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020472			79-34-5	1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020472			79-00-5	1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020472			75-34-3	1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020472			75-35-4	1,1-Dichloroethene	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020472			107-06-2	1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020472			542-75-6	1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020472			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020472			123-91-1	1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020472			71-36-3	1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	Y
S16T020472			111-70-6	1-Heptanol	NGS	120	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	
S16T020472			71-23-8	1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020472			108-47-4	2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020472			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020472			78-93-3	2-Butanone	NGS	95	<3.1	<3.1	n/a	n/a	n/a	n/a	3.1	n/a	
S16T020472			4170-30-3	2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020472			110-43-0	2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020472			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020472			534-22-5	2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020472			107-83-5	2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020472			78-94-4	3-Buten-2-one	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020472			106-35-4	3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S16T020472			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020472			105-42-0	4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020472			108-10-1	4-Methyl-2-pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020472			67-64-1	Acetone	NGS	100	20	6.5	n/a	n/a	n/a	n/a	2.8	n/a	B,J,L
S16T020472			75-05-8	Acetonitrile	NGS	100	<1.6	55	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020472			98-86-2	Acetophenone	NGS	120	<6.2	<6.2	n/a	n/a	n/a	n/a	6.2	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-G1
 Customer Sample ID: 16-05793-2-G1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020472			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020472			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020472			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020472			71-43-2	Benzene	NGS	110	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020472			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020472			123-72-8	Butanal	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020472			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020472			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020472			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020472			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020472			67-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020472			110-82-7	Cyclohexane	NGS	100	<1.4	4.3	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T020472			124-18-5	Decane	NGS	110	<3.3	5.3	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T020472			64-17-5	Ethanol	NGS	96	13	47	n/a	n/a	n/a	n/a	3.7	n/a	BL
S16T020472			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020472			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020472			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020472			110-54-3	Hexane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020472			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020472			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020472			75-09-2	Methylene Chloride	NGS	96	5.0	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	L
S16T020472			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020472			98-95-3	Nitrobenzene	NGS	120	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	
S16T020472			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020472			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020472			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020472			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-G1
 Customer Sample ID: 16-05793-2-G1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020472			127-18-4	Tetrachloroethene	NGS	100	<1.8	40	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020472			108-88-3	Toluene	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020472			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020472			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020472			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020472			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020472			123-86-4	n-Butyl acetate	NGS	100	<2.4	2.6	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T020472			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020472			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020472			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-H1
 Customer Sample ID: 16-05793-2-H1

Sample#	R	AF	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020473			79-34-5	1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020473			79-00-5	1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020473			75-34-3	1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020473			75-35-4	1,1-Dichloroethene	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020473			107-06-2	1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020473			542-75-6	1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020473			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020473			123-91-1	1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020473			71-36-3	1-Butanol	NGS	110	<4.3	67	n/a	n/a	n/a	n/a	4.3	n/a	Y
S16T020473			111-70-6	1-Heptanol	NGS	120	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	
S16T020473			71-23-8	1-Propanol	NGS	120	<8.9	26	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020473			108-47-4	2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020473			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020473			78-93-3	2-Butanone	NGS	95	<3.1	5.0	n/a	n/a	n/a	n/a	3.1	n/a	J
S16T020473			4170-30-3	2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020473			110-43-0	2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020473			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020473			534-22-5	2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020473			107-83-5	2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020473			78-94-4	3-Buten-2-one	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020473			106-35-4	3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S16T020473			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020473			105-42-0	4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020473			108-10-1	4-Methyl-2-pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020473			67-64-1	Acetone	NGS	100	20	21	n/a	n/a	n/a	n/a	2.8	n/a	BL
S16T020473			75-05-8	Acetonitrile	NGS	100	<1.6	150	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020473			98-96-2	Acetophenone	NGS	120	<6.2	7.7	n/a	n/a	n/a	n/a	6.2	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-H1
 Customer Sample ID: 16-05793-2-H1

Sample#	R	AF	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VCA #2															
S16T020473			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020473			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020473			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020473			71-43-2	Benzene	NGS	110	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020473			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020473			123-72-8	Butanal	NGS	100	<3.0	6.2	n/a	n/a	n/a	n/a	3.0	n/a	J
S16T020473			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020473			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020473			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020473			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020473			67-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020473			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	
S16T020473			124-18-5	Decane	NGS	110	<3.3	4.1	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T020473			64-17-5	Ethanol	NGS	96	13	87	n/a	n/a	n/a	n/a	3.7	n/a	BL
S16T020473			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020473			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020473			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020473			110-54-3	Hexane	NGS	100	<1.3	1.8	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T020473			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020473			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020473			75-09-2	Methylene Chloride	NGS	96	5.0	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	L
S16T020473			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020473			98-95-3	Nitrobenzene	NGS	120	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	
S16T020473			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020473			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020473			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020473			100-42-5	Styrene	NGS	110	<2.7	3.6	n/a	n/a	n/a	n/a	2.7	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-H1
 Customer Sample ID: 16-05793-2-H1

Sample#	R	AF	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020473			127-18-4	Tetrachloroethene	NGS	100	<1.8	2.6	n/a	n/a	n/a	n/a	1.8	n/a	J
S16T020473			108-88-3	Toluene	NGS	110	<2.2	3.6	n/a	n/a	n/a	n/a	2.2	n/a	J
S16T020473			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020473			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	59	n/a	n/a	n/a	n/a	1.9	n/a	
S16T020473			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020473			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020473			123-86-4	n-Butyl acetate	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020473			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020473			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020473			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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 Y - Comment

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-H2
 Customer Sample ID: 16-05793-2-H2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S161020474			79-34-5	1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S161020474			79-00-5	1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S161020474			75-34-3	1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S161020474			75-35-4	1,1-Dichloroethane	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S161020474			107-06-2	1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S161020474			542-75-6	1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S161020474			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S161020474			123-91-1	1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S161020474			71-36-3	1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	Y
S161020474			111-70-6	1-Heptanol	NGS	120	<8.1	<8.1	n/a	n/a	n/a	n/a	8.1	n/a	
S161020474			71-23-8	1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S161020474			108-47-4	2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S161020474			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S161020474			78-93-3	2-Butanone	NGS	95	<3.1	<3.1	n/a	n/a	n/a	n/a	3.1	n/a	
S161020474			4170-30-3	2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S161020474			110-43-0	2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S161020474			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S161020474			534-22-5	2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S161020474			107-93-5	2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S161020474			78-94-4	3-Buten-2-one	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	
S161020474			106-35-4	3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	
S161020474			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S161020474			105-42-0	4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S161020474			108-10-1	4-Methyl-2-pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S161020474			67-64-1	Acetone	NGS	100	20	4.7	n/a	n/a	n/a	n/a	2.8	n/a	BJL
S161020474			75-05-8	Acetonitrile	NGS	100	<1.6	220	n/a	n/a	n/a	n/a	1.6	n/a	
S161020474			98-86-2	Acetophenone	NGS	120	<6.2	7.6	n/a	n/a	n/a	n/a	6.2	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-H2
 Customer Sample ID: 16-05793-2-H2

Sample#	R	AF	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020474			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020474			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020474			107-05-1	Allyl Chloride	NGS	94	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020474			71-43-2	Benzene	NGS	110	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020474			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020474			123-72-8	Butanal	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020474			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020474			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020474			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020474			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020474			67-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020474			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	
S16T020474			124-18-5	Decane	NGS	110	<3.3	3.9	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T020474			64-17-5	Ethanol	NGS	96	13	43	n/a	n/a	n/a	n/a	3.7	n/a	BL
S16T020474			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020474			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020474			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020474			110-54-3	Hexane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020474			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020474			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020474			75-09-2	Methylene Chloride	NGS	96	5.0	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	L
S16T020474			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020474			98-95-3	Nitrobenzene	NGS	120	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	
S16T020474			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020474			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020474			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020474			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-H2
 Customer Sample ID: 16-05793-2-H2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Crit Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020474			127-18-4	Tetrachloroethene	NGS	100	<1.8	39	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020474			108-88-3	Toluene	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020474			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020474			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	2.4	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020474			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020474			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020474			123-86-4	n-Butyl acetate	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020474			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020474			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020474			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-IN-BASE
 Customer Sample ID: 16-05793-2-IN-BASE

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020475		79-34-5		1,1,2,2-Tetrachloroethane	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	
S16T020475		79-00-5		1,1,2-Trichloroethane	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020475		75-34-3		1,1-Dichloroethane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020475		75-35-4		1,1-Dichloroethane	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020475		107-06-2		1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	
S16T020475		542-75-6		1,3-Dichloropropene (Total)	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020475		106-46-7		1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020475		123-91-1		1,4-Dioxane	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	
S16T020475		71-36-3		1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	Y
S16T020475		111-70-6		1-Heptanol	NGS	120	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	
S16T020475		71-23-8		1-Propanol	NGS	120	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	
S16T020475		108-47-4		2,4-Dimethylpyridine	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	
S16T020475		1708-29-8		2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020475		78-93-3		2-Butanone	NGS	95	<3.1	6.4	n/a	n/a	n/a	n/a	3.1	n/a	J
S16T020475		4170-30-3		2-Butenal	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020475		110-43-0		2-Heptanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020475		591-78-6		2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020475		534-22-5		2-Methylfuran	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	
S16T020475		107-83-5		2-Methylpentane	NGS	n/a	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020475		78-94-4		3-Buten-2-one	NGS	100	<1.9	4.2	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020475		106-35-4		3-Heptanone	NGS	110	<2.7	3.0	n/a	n/a	n/a	n/a	2.7	n/a	J
S16T020475		106-68-3		3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T020475		105-42-0		4-Methyl-2-hexanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020475		108-10-1		4-Methyl-2-pentanone	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	
S16T020475		67-64-1		Acetone	NGS	100	20	44	n/a	n/a	n/a	n/a	2.8	n/a	BL
S16T020475		75-05-8		Acetonitrile	NGS	100	<1.6	38	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020475		98-86-2		Acetophenone	NGS	120	<6.2	18	n/a	n/a	n/a	n/a	6.2	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-IN-BASE
 Customer Sample ID: 16-05793-2-IN-BASE

Sample#	R	AP	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020475			107-13-1	Acrylonitrile	NGS	98	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020475			107-18-6	Allyl Alcohol	NGS	110	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	
S16T020475			107-05-1	Allyl Chloride	NGS	94	<2.5	14	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020475			71-43-2	Benzene	NGS	110	<1.5	3.3	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T020475			100-47-0	Benzonitrile	NGS	100	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	
S16T020475			123-72-8	Butanal	NGS	100	<3.0	5.2	n/a	n/a	n/a	n/a	3.0	n/a	J
S16T020475			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	
S16T020475			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	
S16T020475			108-90-7	Chlorobenzene	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	
S16T020475			75-00-3	Chloroethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020475			67-66-3	Chloroform	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020475			110-82-7	Cyclohexane	NGS	100	<1.4	7.8	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T020475			124-18-5	Decane	NGS	110	<3.3	10	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T020475			64-17-5	Ethanol	NGS	96	13	28	n/a	n/a	n/a	n/a	3.7	n/a	BL
S16T020475			141-78-6	Ethyl acetate	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020475			100-41-4	Ethylbenzene	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T020475			110-00-9	Furan	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020475			110-54-3	Hexane	NGS	100	<1.3	3.2	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T020475			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020475			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020475			75-09-2	Methylene Chloride	NGS	96	5.0	5.1	n/a	n/a	n/a	n/a	4.1	n/a	BJL
S16T020475			91-20-3	Naphthalene	NGS	120	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	L
S16T020475			98-95-3	Nitrobenzene	NGS	120	<4.7	12	n/a	n/a	n/a	n/a	4.7	n/a	
S16T020475			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	
S16T020475			107-12-0	Propanenitrile	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020475			110-86-1	Pyridine	NGS	110	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	
S16T020475			100-42-5	Styrene	NGS	110	<2.7	4.4	n/a	n/a	n/a	n/a	2.7	n/a	J

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-IN-BASE
 Customer Sample ID: 16-05793-2-IN-BASE

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T020475			127-18-4	Tetrachloroethene	NGS	100	<1.8	2.7	n/a	n/a	n/a	n/a	1.8	n/a	J
S16T020475			108-88-3	Toluene	NGS	110	<2.2	9.2	n/a	n/a	n/a	n/a	2.2	n/a	J
S16T020475			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020475			75-69-4	Trichlorofluoromethane	NGS	95	<1.9	5.2	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T020475			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	
S16T020475			106-42-3	Xylene (m & p)	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020475			123-86-4	n-Butyl acetate	NGS	100	<2.4	4.2	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T020475			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	
S16T020475			95-47-6	o-Xylene	NGS	0.0	n/a	0.0	n/a	n/a	n/a	n/a	n/a	n/a	
S16T020475			10061-02-6	trans-1,3-Dichloropropene	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035

SDG Number:

Customer Sample ID: 16-05793-2-A1

Customer Sample ID: 16-05793-2-A1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020464				Methyl isocyanide	593-75-9	5.74	NGS	770 JNT	
S16T020464				Nitric oxide	10102-43-9	7.90	NGS	35 JNT	
S16T020464				2(1H)-Pyrimidinone, 5-chloro-4	28567-83-1	20.09	NGS	2.0E+03 JNT	
S16T020464				Undecane, 4,7-dimethyl-	17301-32-5	22.64	NGS	240 JNT	
S16T020464				Decane, 2,4,6-trimethyl-	62108-27-4	22.79	NGS	92 JNT	
S16T020464				Acetic acid, trifluoro-, 3,7-d	28745-07-5	23.16	NGS	25 JNT	
S16T020464				Undecane, 2,6-dimethyl-	17301-23-4	23.42	NGS	18 JNT	
S16T020464				Undecane	1120-21-4	23.54	NGS	140 JNT	
S16T020464				Dodecane	112-40-3	23.65	NGS	96 JNT	
S16T020464				Benzaldehyde, 2,5-bis(trimethyl-)	56114-69-3	23.97	NGS	1.1E+03 JNT	
S16T020464				2,6-Dimethyldecane	13150-81-7	25.00	NGS	44 JNT	
S16T020464				Methanamine	100-97-0	25.91	NGS	78 JNT	
S16T020464				1,2-Benzisothiazole	272-16-2	28.01	NGS	35 JNT	
S16T020464				1-Iodo-2-methylundecane	73105-67-6	26.15	NGS	42 JNT	
S16T020464				1-Propene-1-thiol	925-89-3	26.35	NGS	67 JNT	
S16T020464				Heptadecane, 2,6-dimethyl-	54105-67-8	26.70	NGS	28 JNT	
S16T020464			BLNK	Unknown-1	-	7.89	NGS	33	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035

SDG Number:

Customer Sample ID: 16-05793-2-A2

Customer Sample ID: 16-05793-2-A2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020465				Silane	7803-62-5	7.88	NGS	80	JNT
S16T020465				Propanoic acid, 2,2-dimethyl-	75-98-9	16.24	NGS	40	JNT
S16T020465				Cyclotetrasiloxane, octamethyl	556-67-2	20.09	NGS	1000	JNT
S16T020465				Undecane, 4,7-dimethyl-	17301-32-5	22.64	NGS	150	JNT
S16T020465				Decane, 2,4,6-trimethyl-	62106-27-4	22.79	NGS	54	JNT
S16T020465				Undecane, 2,6-dimethyl-	17301-23-4	23.42	NGS	18	JNT
S16T020465				Undecane	1120-21-4	23.54	NGS	99	JNT
S16T020465				Undecane, 4-methyl-	2980-69-0	23.64	NGS	63	JNT
S16T020465				Benzaldehyde, 2,5-bis(trimethyl-	56114-89-3	23.97	NGS	690	JNT
S16T020465				2,6-Dimethyldecane	13150-81-7	24.99	NGS	36	JNT
S16T020465				Acetic acid, trifluoro-, 3,7-d	28745-07-5	25.13	NGS	28	JNT
S16T020465				1,2-Benzisothiazole	272-16-2	26.01	NGS	120	JNT
S16T020465				Tetradecane, 1-iodo-	19218-94-1	26.15	NGS	40	JNT
S16T020465				1,3-Dioxolane, 2-pentadecyl-	4360-57-0	26.34	NGS	35	JNT
S16T020465			BLNK	Unknown-1	-	7.89	NGS	33	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035

SDG Number:

Customer Sample ID: 16-05793-2-B1

Customer Sample ID: 16-05793-2-B1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020466				Nitric oxide	10102-43-9	7.89	NGS	34	JNT
S16T020466				Heptane, 2,4-dimethyl-	2213-23-2	17.02	NGS	61	JNT
S16T020466				Cyclotetrasiloxane, octamethyl	556-67-2	20.09	NGS	240	JNT
S16T020466				2,2,7,7-Tetramethyloctane	1071-31-4	21.08	NGS	85	JNT
S16T020466				3,3-Dimethylhexane	563-16-6	22.31	NGS	33	JNT
S16T020466				Undecane, 4,7-dimethyl-	17301-32-5	22.64	NGS	250	JNT
S16T020466				Decane, 2,4,6-trimethyl-	62108-27-4	22.79	NGS	95	JNT
S16T020466				Undecane, 2,6-dimethyl-	17301-23-4	23.42	NGS	32	JNT
S16T020466				Undecane	1120-21-4	23.54	NGS	150	JNT
S16T020466				Dodecane	112-40-3	23.64	NGS	89	JNT
S16T020466				2,3-Dimethyldecane	17312-44-6	23.76	NGS	26	JNT
S16T020466				Unknown-1	-	23.97	NGS	220	JT
S16T020466				1-Octanol, 2-butyl-	3913-02-8	24.56	NGS	26	JNT
S16T020466				2,6-Dimethyldecane	13150-81-7	24.99	NGS	53	JNT
S16T020466				Acetic acid, trifluoro-, 3,7-d	28745-07-5	25.13	NGS	69	JNT
S16T020466				Unknown-2	-	25.72	NGS	31	JT
S16T020466				Methanamine	100-97-0	25.91	NGS	30	JNT
S16T020466				1,2-Benzisothiazole	272-16-2	26.01	NGS	120	JNT
S16T020466				Tetradecane, 1-iodo-	19218-94-1	26.15	NGS	68	JNT
S16T020466				Heptadecane, 2,6-dimethyl-	54105-67-8	26.70	NGS	37	JNT
S16T020466				Unknown-1	-	7.89	NGS	33	

NA = Not Analyzed, ND = Not Detected

Y - Comment

J - Estimated

L - LLS Outside Range

T - Tentatively Identified Compound

E - Outside Calibration Range

N - Named TIC
 B - Blank Contamination

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035

SDG Number:

Customer Sample ID: 16-05793-2-BLANK

Customer Sample ID: 16-05793-2-BLANK

Sample#	R	AI#	QC Type	Analyte	CAS No.	Retention Time (minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020467				Nitric oxide	10102-43-9	7.90	NGS	26	JNT
S16T020467			BLNK	Unknown-1	-	7.89	NGS	33	

N - Named TIC
 B - Blank Contamination

T - Tentatively Identified Compound
 E - Outside Calibration Range

J - Estimated
 L - LLS Outside Range

NA = Not Analyzed, ND = Not Detected
 Y - Comment

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-D1
 Customer Sample ID: 16-05793-2-D1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020468				Silane	7803-62-5	7.90	NGS	51	JNT
S16T020468				Cyclotrisiloxane, hexamethyl-	541-05-9	16.79	NGS	36	JNT
S16T020468				Cyclotetrasiloxane, octamethyl	566-67-2	20.09	NGS	630	JNT
S16T020468				Undecane, 4,7-dimethyl-	17301-32-5	22.64	NGS	170	JNT
S16T020468				Decane, 2,4,6-trimethyl-	62108-27-4	22.79	NGS	66	JNT
S16T020468				Undecane, 2,6-dimethyl-	17301-23-4	23.42	NGS	24	JNT
S16T020468				Undecane	1120-21-4	23.54	NGS	120	JNT
S16T020468				Hydroxylamine, O-decyl-	29812-79-1	23.64	NGS	76	JNT
S16T020468				Benzaldehyde, 2,5-bis(trimethyl-	56114-89-3	23.96	NGS	680	JNT
S16T020468				2,6-Dimethyldecane	13150-81-7	24.99	NGS	53	JNT
S16T020468				Acetic acid, trifluoro-, 3,7-d	28745-07-5	25.13	NGS	28	JNT
S16T020468				1,2-Benzisothiazole	272-16-2	26.01	NGS	150	JNT
S16T020468				Tetradecane, 1-iodo-	19218-94-1	26.14	NGS	82	JNT
S16T020468				Silane, trimethyl[2-methylene-	97778-15-9	26.34	NGS	65	JNT
S16T020468				Heptadecane, 2,6-dimethyl-	54105-67-8	26.70	NGS	40	JNT
S16T020468				BLNK	-	7.89	NGS	33	

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 E - Outside Calibration Range
 J - Estimated
 L - LLS Outside Range
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 Y - Comment

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035

SDG Number:

Customer Sample ID: 16-05793-2-E1

Customer Sample ID: 16-05793-2-E1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020469				Heptane, 2,4-dimethyl-	2213-23-2	17.02	NGS	60	JNT
S16T020469				Cyclotetrasiloxane, octamethyl	556-67-2	20.08	NGS	310	JNT
S16T020469				2,2,7,7-Tetramethyloctane	1071-31-4	21.08	NGS	40	JNT
S16T020469				Undecane, 4,7-dimethyl-	17301-32-5	22.64	NGS	210	JNT
S16T020469				Decane, 2,4,6-trimethyl-	62109-27-4	22.79	NGS	84	JNT
S16T020469				Undecane, 2,6-dimethyl-	17301-23-4	23.42	NGS	28	JNT
S16T020469				Undecane	1120-21-4	23.54	NGS	130	JNT
S16T020469				Hydroxylamine, O-decyl-	29812-79-1	23.64	NGS	78	JNT
S16T020469				Unknown-1	-	23.96	NGS	280	JT
S16T020469				2,6-Dimethyldecane	13150-81-7	24.99	NGS	48	JNT
S16T020469				Methanamine	100-97-0	25.91	NGS	47	JNT
S16T020469				1,2-Benzisothiazole	272-16-2	26.00	NGS	170	JNT
S16T020469				Tetradecane, 1-iodo-	19218-94-1	26.14	NGS	58	JNT
S16T020469				Unknown-2	-	26.34	NGS	33	JT
S16T020469				Heptadecane, 2,6-dimethyl-	54105-67-8	26.70	NGS	31	JNT
S16T020469				Unknown-1	-	7.89	NGS	33	

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 Y - Comment

J - Estimated
 L - LLS Outside Range

T - Tentatively Identified Compound
 E - Outside Calibration Range

N - Named TIC
 B - Blank Contamination

Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035

SDG Number:

Customer Sample ID: 16-05793-2-EFF-BASE
 Customer Sample ID: 16-05793-2-EFF-BASE

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020470				Nitric oxide	10102-43-9	7.88	NGS	32	JNT
S16T020470				Heptane, 2,4-dimethyl-	2213-23-2	17.02	NGS	84	JNT
S16T020470				Cyclotetrasiloxane, octamethyl	556-67-2	20.09	NGS	340	JNT
S16T020470				2,5,6-Trimethyldecane	62108-23-0	21.08	NGS	26	JNT
S16T020470				Undecane, 4,7-dimethyl-	17301-32-5	22.64	NGS	280	JNT
S16T020470				Decane, 2,4,6-trimethyl-	62108-27-4	22.79	NGS	110	JNT
S16T020470				Cyclohexane, 2-propyl-1,1,3-tr	81983-70-2	23.15	NGS	27	JNT
S16T020470				Undecane, 2,6-dimethyl-	17301-23-4	23.42	NGS	36	JNT
S16T020470				Undecane	1120-21-4	23.54	NGS	160	JNT
S16T020470				Hydroxylamine, O-decyl-	29812-79-1	23.64	NGS	100	JNT
S16T020470				Unknown-1	--	23.97	NGS	270	JT
S16T020470				2,6-Dimethyldecane	13150-81-7	24.99	NGS	62	JNT
S16T020470				Acetic acid, trifluoro-, 3,7-d	28745-07-5	25.13	NGS	50	JNT
S16T020470				2-Propenoic acid, octyl ester	2499-59-4	25.72	NGS	27	JNT
S16T020470				1,2-Benzisothiazole	272-16-2	26.01	NGS	130	JNT
S16T020470				Tetradecane, 1-iodo-	19218-94-1	26.15	NGS	74	JNT
S16T020470				Heptadecane, 2,6-dimethyl-	54105-67-8	26.70	NGS	38	JNT
S16T020470			BLNK	Unknown-1	--	7.89	NGS	33	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035
 SDG Number:
 Customer Sample ID: 16-05793-2-F1
 Customer Sample ID: 16-05793-2-F1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU YOA #2									
S16T020471				Silane	7803-62-5	7.89	NGS	100	JNT
S16T020471				Heptane, 2,4-dimethyl-	2213-23-2	17.03	NGS	34	JNT
S16T020471				Cyclotetrasiloxane, octamethyl	556-67-2	20.08	NGS	180	JNT
S16T020471				Undecane, 4,7-dimethyl-	17301-32-5	22.64	NGS	140	JNT
S16T020471				Decane, 2,4,6-trimethyl-	62108-27-4	22.79	NGS	51	JNT
S16T020471				Undecane, 2,6-dimethyl-	17301-23-4	23.42	NGS	22	JNT
S16T020471				Undecane	1120-21-4	23.54	NGS	91	JNT
S16T020471				Hydroxylamine, O-decyl-	29812-79-1	23.64	NGS	53	JNT
S16T020471				Unknown-1	--	23.96	NGS	130	JT
S16T020471				2,6-Dimethyldecane	13150-81-7	24.99	NGS	26	JNT
S16T020471				Methenamine	100-97-0	25.91	NGS	16	JNT
S16T020471				1,2-Benzisothiazole	272-16-2	26.01	NGS	96	JNT
S16T020471				1-Iodo-2-methylundecane	73105-67-6	26.15	NGS	28	JNT
S16T020471			BLNK	Unknown-1	--	7.89	NGS	33	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035

SDG Number:

Customer Sample ID: 16-05793-2-G1

Customer Sample ID: 16-05793-2-G1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020472				Silane	7803-62-5	7.89	NGS	190	JNT
S16T020472				Heptane, 2,4-dimethyl-	2213-23-2	17.02	NGS	80	JNT
S16T020472				Cyclotetrasiloxane, octamethyl	556-67-2	20.08	NGS	520	JNT
S16T020472				Undecane, 4,7-dimethyl-	17301-32-5	22.64	NGS	280	JNT
S16T020472				Decane, 2,4,6-trimethyl-	62108-27-4	22.78	NGS	110	JNT
S16T020472				Acetic acid, trifluoro-, 3,7-d	28745-07-5	23.15	NGS	29	JNT
S16T020472				Undecane, 2,6-dimethyl-	17301-23-4	23.42	NGS	27	JNT
S16T020472				Undecane	1120-21-4	23.53	NGS	150	JNT
S16T020472				Dodecane	112-40-3	23.63	NGS	78	JNT
S16T020472				2,3-Dimethyldecane	17312-44-6	23.75	NGS	27	JNT
S16T020472				Unknown-1	-	23.96	NGS	360	JT
S16T020472				2,6-Dimethyldecane	13150-91-7	24.99	NGS	27	JNT
S16T020472				Methanamine	100-97-0	25.90	NGS	26	JNT
S16T020472			BLNK	Unknown-1	-	7.89	NGS	33	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035

SDG Number:

Customer Sample ID: 16-05793-2-H1

Customer Sample ID: 16-05793-2-H1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020473				Silane	7803-62-5	7.90	NGS	220	JNT
S16T020473				Cyclotetrasiloxane, octamethyl	556-67-2	20.08	NGS	850	JNT
S16T020473				2,2,7,7-Tetramethylcyclohexane	1071-31-4	21.08	NGS	47	JNT
S16T020473				Undecane, 4,7-dimethyl-	17301-32-5	22.64	NGS	130	JNT
S16T020473				Decane, 2,4,6-trimethyl-	62108-27-4	22.79	NGS	56	JNT
S16T020473				Undecane, 2,6-dimethyl-	17301-23-4	23.42	NGS	27	JNT
S16T020473				Undecane	1120-21-4	23.54	NGS	73	JNT
S16T020473				Hydroxylamine, O-decyl-	29812-79-1	23.64	NGS	51	JNT
S16T020473				Benzaldehyde, 2,5-bis(trimethyl-)	56114-69-3	23.96	NGS	390	JNT
S16T020473				2,6-Dimethyldecane	13150-81-7	24.89	NGS	40	JNT
S16T020473				Methenamine	100-97-0	25.90	NGS	110	JNT
S16T020473				1,2-Benzisothiazole	272-16-2	26.00	NGS	66	JNT
S16T020473			BLNK	Unknown-1	-	7.89	NGS	33	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035

SDG Number:

Customer Sample ID: 16-05793-2-H2
 Customer Sample ID: 16-05793-2-H2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020474				Silane	7803-62-5	7.89	NGS	210	JNT
S16T020474				Cyclotrisiloxane, hexamethyl-	541-05-9	16.78	NGS	33	JNT
S16T020474				Cyclotetrasiloxane, octamethyl	556-67-2	20.07	NGS	290	JNT
S16T020474				Undecane, 4,7-dimethyl-	17301-32-5	22.63	NGS	85	JNT
S16T020474				Decane, 2,4,6-trimethyl-	62108-27-4	22.78	NGS	32	JNT
S16T020474				Undecane, 2,6-dimethyl-	17301-23-4	23.42	NGS	22	JNT
S16T020474				Undecane	1120-21-4	23.53	NGS	60	JNT
S16T020474				Hydroxylamine, O-decyl-	29812-79-1	23.63	NGS	49	JNT
S16T020474				Unknown-1	-	23.96	NGS	200	JT
S16T020474				2,6-Dimethyldecane	13150-81-7	24.98	NGS	30	JNT
S16T020474				Methenamine	100-97-0	25.89	NGS	23	JNT
S16T020474				1,2-Benzisothiazole	272-16-2	26.00	NGS	46	JNT
S16T020474			BLNK	Unknown-1	-	7.89	NGS	33	

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Cartridge Evaluation
 Data Summary Report

Sample Group: 20162035

SDG Number:

Customer Sample ID: 16-05793-2-IN-BASE
 Customer Sample ID: 16-05793-2-IN-BASE

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T020475				Silane	7803-62-5	7.87	NGS	74	JNT
S16T020475				Formamide	75-12-7	13.83	NGS	51	JNT
S16T020475				Hexanal	66-25-1	16.57	NGS	25	JNT
S16T020475				Heptane, 2,4-dimethyl-	2213-23-2	17.02	NGS	130	JNT
S16T020475				1-Heptene, 5-methyl-	13151-04-7	17.40	NGS	28	JNT
S16T020475				Cyclotetrasiloxane, octamethyl	556-67-2	20.08	NGS	550	JNT
S16T020475				2,2,7,7-Tetramethylcyclohexane	1071-31-4	21.08	NGS	150	JNT
S16T020475				Heptane, 5-ethyl-2,2,3-trimethyl-	62199-06-8	21.69	NGS	27	JNT
S16T020475				3,3-Dimethylhexane	563-16-6	22.31	NGS	58	JNT
S16T020475				Undecane, 4,7-dimethyl-	17301-32-5	22.64	NGS	290	JNT
S16T020475				Decane, 2,4,6-trimethyl-	62108-27-4	22.79	NGS	120	JNT
S16T020475				Decane, 2,5,9-trimethyl-	62108-22-9	22.87	NGS	27	JNT
S16T020475				2-Hexyl-1-octanol	19780-79-1	23.22	NGS	32	JNT
S16T020475				Undecane, 2,6-dimethyl-	17301-23-4	23.42	NGS	28	JNT
S16T020475				Undecane	1120-21-4	23.54	NGS	140	JNT
S16T020475				Tridecane	629-50-5	23.64	NGS	88	JNT
S16T020475				2,3-Dimethyldecane	17312-44-6	23.76	NGS	26	JNT
S16T020475				Unknown-1	-	23.96	NGS	500	JT
S16T020475				2,6-Dimethyldecane	13150-81-7	24.99	NGS	51	JNT
S16T020475				Acetic acid, trifluoro-, 3,7-d	28745-07-5	25.13	NGS	66	JNT
S16T020475				Unknown-2	-	25.72	NGS	29	JT
S16T020475				1,2-Benzisothiazole	272-16-2	26.00	NGS	160	JNT
S16T020475				Tetradecane, 1-iodo-	19218-94-1	26.15	NGS	65	JNT
S16T020475				Silane, trimethyl(2-methylene-	97778-15-9	26.34	NGS	46	JNT
S16T020475				Heptadecane, 2,6-dimethyl-	54105-67-8	26.70	NGS	29	JNT
S16T020475			BLNK	Unknown-1	-	7.89	NGS	33	

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 Y - Comment

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Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162030
 SDG Number:
 Customer Sample ID: 16-05629-3-A1
 Customer Sample ID: 16-05629-3-A1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020366			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	0.22	n/a	n/a	n/a	n/a	0.18	n/a	J
S16T020366			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<-0.23	n/a	n/a	n/a	n/a	0.23	n/a	
S16T020366			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<-0.43	n/a	n/a	n/a	n/a	0.43	n/a	
S16T020366			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	0.65	n/a	n/a	n/a	n/a	0.27	n/a	J
S16T020366			534-22-5	2-Methylfuran	NGS	n/a	n/a	<-0.23	n/a	n/a	n/a	n/a	0.23	n/a	
S16T020366			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	0.53	n/a	n/a	n/a	n/a	0.34	n/a	J
S16T020366			4229-91-8	2-Propylfuran	NGS	n/a	n/a	<-0.44	n/a	n/a	n/a	n/a	0.44	n/a	
S16T020366			110-00-9	Furan	NGS	n/a	n/a	0.20	n/a	n/a	n/a	n/a	0.090	n/a	J
S16T020366			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	2.2	n/a	n/a	n/a	n/a	0.10	n/a	J

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NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162030
 SDG Number:
 Customer Sample ID: 16-05629-3-A2
 Customer Sample ID: 16-05629-3-A2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020367			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18		n/a
S16T020367			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020367			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43		n/a
S16T020367			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27		n/a
S16T020367			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020367			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	0.42	n/a	n/a	n/a	n/a	0.34		n/a
S16T020367			4229-91-8	2-Propylfuran	NGS	n/a	n/a	<0.44	n/a	n/a	n/a	n/a	0.44		n/a
S16T020367			110-00-9	Furan	NGS	n/a	n/a	0.10	n/a	n/a	n/a	n/a	0.090		n/a
S16T020367			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	0.10	n/a	n/a	n/a	n/a	0.10		n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162030
 SDG Number:
 Customer Sample ID: 16-05629-3-B1
 Customer Sample ID: 16-05629-3-B1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020368			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18		n/a
S16T020368			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020368			825-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43		n/a
S16T020368			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27		n/a
S16T020368			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020368			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	1.5	n/a	n/a	n/a	n/a	0.34		n/a J
S16T020368			4229-91-8	2-Propylfuran	NGS	n/a	n/a	<0.44	n/a	n/a	n/a	n/a	0.44		n/a
S16T020368			110-00-9	Furan	NGS	n/a	n/a	0.17	n/a	n/a	n/a	n/a	0.090		n/a J
S16T020368			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	<0.10	n/a	n/a	n/a	n/a	0.10		n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162030
 SDG Number:
 Customer Sample ID: 16-05629-3-BLANK
 Customer Sample ID: 16-05629-3-BLANK

Sample#	R	AI#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020369			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<-0.18	n/a	n/a	n/a	n/a	0.18		n/a
S16T020369			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<-0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020369			625-96-5	2,5-Dimethylfuran	NGS	n/a	n/a	<-0.43	n/a	n/a	n/a	n/a	0.43		n/a
S16T020369			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	<-0.27	n/a	n/a	n/a	n/a	0.27		n/a
S16T020369			534-22-5	2-Methylfuran	NGS	n/a	n/a	<-0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020369			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	<-0.34	n/a	n/a	n/a	n/a	0.34		n/a
S16T020369			4229-91-8	2-Propylfuran	NGS	n/a	n/a	<-0.44	n/a	n/a	n/a	n/a	0.44		n/a
S16T020369			110-00-9	Furan	NGS	n/a	n/a	0.090	n/a	n/a	n/a	n/a	0.090		n/a, J
S16T020369			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	<-0.10	n/a	n/a	n/a	n/a	0.10		n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162030
 SDG Number:
 Customer Sample ID: 16-05629-3-C1
 Customer Sample ID: 16-05629-3-C1

Sample#	R	AI#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020370			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18		n/a
S16T020370			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020370			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43		n/a
S16T020370			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27		n/a
S16T020370			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020370			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	0.34	n/a	n/a	n/a	n/a	0.34		n/a
S16T020370			4229-91-8	2-Propylfuran	NGS	n/a	n/a	<0.44	n/a	n/a	n/a	n/a	0.44		n/a
S16T020370			110-00-9	Furan	NGS	n/a	n/a	0.14	n/a	n/a	n/a	n/a	0.090		n/a
S16T020370			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	<0.10	n/a	n/a	n/a	n/a	0.10		n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162030
 SDG Number:
 Customer Sample ID: 16-05629-3-D1
 Customer Sample ID: 16-05629-3-D1

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020371			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18		n/a
S16T020371			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020371			825-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43		n/a
S16T020371			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27		n/a
S16T020371			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020371			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	<0.34	n/a	n/a	n/a	n/a	0.34		n/a
S16T020371			4229-91-8	2-Propylfuran	NGS	n/a	n/a	<0.44	n/a	n/a	n/a	n/a	0.44		n/a
S16T020371			110-00-9	Furan	NGS	n/a	n/a	0.18	n/a	n/a	n/a	n/a	0.090		n/a,J
S16T020371			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	<0.10	n/a	n/a	n/a	n/a	0.10		n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162030
 SDG Number:
 Customer Sample ID: 16-05629-3-E1
 Customer Sample ID: 16-05629-3-E1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020372			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18		n/a
S16T020372			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020372			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43		n/a
S16T020372			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27		n/a
S16T020372			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020372			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	<0.34	n/a	n/a	n/a	n/a	0.34		n/a
S16T020372			4229-91-8	2-Propylfuran	NGS	n/a	n/a	0.58	n/a	n/a	n/a	n/a	0.44		n/a J
S16T020372			110-00-9	Furan	NGS	n/a	n/a	0.11	n/a	n/a	n/a	n/a	0.090		n/a J
S16T020372			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	<0.10	n/a	n/a	n/a	n/a	0.10		n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162030
 SDG Number:
 Customer Sample ID: 16-05629-3-EFF-BASE
 Customer Sample ID: 16-05629-3-EFF-BASE

Sample#	R	AI#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020373			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18		n/a
S16T020373			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020373			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43		n/a
S16T020373			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27		n/a
S16T020373			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020373			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	<0.34	n/a	n/a	n/a	n/a	0.34		n/a
S16T020373			4229-91-8	2-Propylfuran	NGS	n/a	n/a	<0.44	n/a	n/a	n/a	n/a	0.44		n/a
S16T020373			110-00-9	Furan	NGS	n/a	n/a	<0.090	n/a	n/a	n/a	n/a	0.090		n/a
S16T020373			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	<0.10	n/a	n/a	n/a	n/a	0.10		n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162030
 SDG Number:
 Customer Sample ID: 16-05629-3-F1
 Customer Sample ID: 16-05629-3-F1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020374			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18		n/a
S16T020374			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020374			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43		n/a
S16T020374			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27		n/a
S16T020374			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020374			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	<0.34	n/a	n/a	n/a	n/a	0.34		n/a
S16T020374			4229-91-8	2-Propylfuran	NGS	n/a	n/a	0.59	n/a	n/a	n/a	n/a	0.44		n/a J
S16T020374			110-00-9	Furan	NGS	n/a	n/a	0.11	n/a	n/a	n/a	n/a	0.090		n/a J
S16T020374			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	<0.10	n/a	n/a	n/a	n/a	0.10		n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162030
 SDG Number:
 Customer Sample ID: 16-05629-3-G1
 Customer Sample ID: 16-05629-3-G1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020375			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18		n/a
S16T020375			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020375			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43		n/a
S16T020375			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27		n/a
S16T020375			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020375			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	<0.34	n/a	n/a	n/a	n/a	0.34		n/a
S16T020375			4229-91-8	2-Propylfuran	NGS	n/a	n/a	0.55	n/a	n/a	n/a	n/a	0.44		n/a
S16T020375			110-00-9	Furan	NGS	n/a	n/a	<0.090	n/a	n/a	n/a	n/a	0.090		n/a
S16T020375			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	<0.10	n/a	n/a	n/a	n/a	0.10		n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162030
 SDG Number:
 Customer Sample ID: 16-05629-3-H1
 Customer Sample ID: 16-05629-3-H1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020376			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18		n/a
S16T020376			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020376			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43		n/a
S16T020376			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27		n/a
S16T020376			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020376			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	<0.34	n/a	n/a	n/a	n/a	0.34		n/a
S16T020376			4229-91-8	2-Propylfuran	NGS	n/a	n/a	0.89	n/a	n/a	n/a	n/a	0.44		n/a
S16T020376			110-00-9	Furan	NGS	n/a	n/a	0.11	n/a	n/a	n/a	n/a	0.090		n/a
S16T020376			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	0.18	n/a	n/a	n/a	n/a	0.10		n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162030
 SDG Number:
 Customer Sample ID: 16-05629-3-H2
 Customer Sample ID: 16-05629-3-H2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020377			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18		n/a
S16T020377			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020377			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43		n/a
S16T020377			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27		n/a
S16T020377			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020377			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	<0.34	n/a	n/a	n/a	n/a	0.34		n/a
S16T020377			4229-91-8	2-Propylfuran	NGS	n/a	n/a	0.72	n/a	n/a	n/a	n/a	0.44		n/a
S16T020377			110-00-9	Furan	NGS	n/a	n/a	<0.090	n/a	n/a	n/a	n/a	0.090		n/a
S16T020377			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	<0.10	n/a	n/a	n/a	n/a	0.10		n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162030
 SDG Number:
 Customer Sample ID: 16-05629-3-IN-BASE
 Customer Sample ID: 16-05629-3-IN-BASE

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020378			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	0.18	n/a	n/a	n/a	n/a	0.18		n/a J
S16T020378			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020378			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43		n/a
S16T020378			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27		n/a
S16T020378			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020378			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	1.7	n/a	n/a	n/a	n/a	0.34		n/a J
S16T020378			4229-91-8	2-Propylfuran	NGS	n/a	n/a	<0.44	n/a	n/a	n/a	n/a	0.44		n/a
S16T020378			110-00-9	Furan	NGS	n/a	n/a	0.090	n/a	n/a	n/a	n/a	0.090		n/a J
S16T020378			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	<0.10	n/a	n/a	n/a	n/a	0.10		n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162031
 SDG Number:
 Customer Sample ID: 16-05793-3-A1
 Customer Sample ID: 16-05793-3-A1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020380			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18	n/a	n/a
S16T020380			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	n/a
S16T020380			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43	n/a	n/a
S16T020380			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	0.32	n/a	n/a	n/a	n/a	0.27	n/a	J
S16T020380			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	n/a
S16T020380			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	0.43	n/a	n/a	n/a	n/a	0.34	n/a	J
S16T020380			4229-91-8	2-Propylfuran	NGS	n/a	n/a	1.0	n/a	n/a	n/a	n/a	0.44	n/a	J
S16T020380			110-00-9	Furan	NGS	n/a	n/a	0.13	n/a	n/a	n/a	n/a	0.090	n/a	J
S16T020380			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	0.11	n/a	n/a	n/a	n/a	0.10	n/a	J

Jan Duff
 8/10/16

NA = Not Analyzed, ND = Not Detected

J - Estimated

**Cartridge Evaluation
 Data Summary of All Results**

Sample Group: 20162031
SDG Number:
Customer Sample ID: 16-05793-3-A2
Customer Sample ID: 16-05793-3-A2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020381			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18	n/a	n/a
S16T020381			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	n/a
S16T020381			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43	n/a	n/a
S16T020381			3777-71-7	2-Hepylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27	n/a	n/a
S16T020381			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	n/a
S16T020381			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	<0.34	n/a	n/a	n/a	n/a	0.34	n/a	n/a
S16T020381			4229-91-8	2-Propylfuran	NGS	n/a	n/a	<0.44	n/a	n/a	n/a	n/a	0.44	n/a	n/a
S16T020381			110-00-9	Furan	NGS	n/a	n/a	0.13	n/a	n/a	n/a	n/a	0.090	n/a	n/a J
S16T020381			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	<0.10	n/a	n/a	n/a	n/a	0.10	n/a	n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162031
 SDG Number:
 Customer Sample ID: 16-05793-3-B1
 Customer Sample ID: 16-05793-3-B1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020382			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18	n/a	n/a
S16T020382			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	n/a
S16T020382			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43	n/a	n/a
S16T020382			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27	n/a	n/a
S16T020382			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	n/a
S16T020382			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	0.42	n/a	n/a	n/a	n/a	0.34	n/a	J
S16T020382			4229-91-8	2-Propylfuran	NGS	n/a	n/a	<0.44	n/a	n/a	n/a	n/a	0.44	n/a	n/a
S16T020382			110-00-9	Furan	NGS	n/a	n/a	0.11	n/a	n/a	n/a	n/a	0.090	n/a	J
S16T020382			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	<0.10	n/a	n/a	n/a	n/a	0.10	n/a	n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated

**Cartridge Evaluation
 Data Summary of All Results**

Sample Group: 20162031
SDG Number:
Customer Sample ID: 16-05793-3-BLANK
Customer Sample ID: 16-05793-3-BLANK

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020383			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18	n/a	n/a
S16T020383			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	n/a
S16T020383			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43	n/a	n/a
S16T020383			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27	n/a	n/a
S16T020383			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	n/a
S16T020383			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	<0.34	n/a	n/a	n/a	n/a	0.34	n/a	n/a
S16T020383			4229-91-8	2-Propylfuran	NGS	n/a	n/a	<0.44	n/a	n/a	n/a	n/a	0.44	n/a	n/a
S16T020383			110-00-9	Furan	NGS	n/a	n/a	<0.090	n/a	n/a	n/a	n/a	0.090	n/a	n/a
S16T020383			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	<0.10	n/a	n/a	n/a	n/a	0.10	n/a	n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162031
 SDG Number:
 Customer Sample ID: 16-05793-3-C1
 Customer Sample ID: 16-05793-3-C1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020384			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18		n/a
S16T020384			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020384			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43		n/a
S16T020384			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27		n/a
S16T020384			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020384			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	<0.34	n/a	n/a	n/a	n/a	0.34		n/a
S16T020384			4229-91-8	2-Propylfuran	NGS	n/a	n/a	<0.44	n/a	n/a	n/a	n/a	0.44		n/a
S16T020384			110-00-9	Furan	NGS	n/a	n/a	0.10	n/a	n/a	n/a	n/a	0.090		n/a,J
S16T020384			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	<0.10	n/a	n/a	n/a	n/a	0.10		n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162031
 SDG Number:
 Customer Sample ID: 16-05793-3-D1
 Customer Sample ID: 16-05793-3-D1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020385			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18		n/a
S16T020385			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020385			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43		n/a
S16T020385			3777-71-7	2-Hepylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27		n/a
S16T020385			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020385			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	0.37	n/a	n/a	n/a	n/a	0.34		n/a,J
S16T020385			4229-91-8	2-Propylfuran	NGS	n/a	n/a	<0.44	n/a	n/a	n/a	n/a	0.44		n/a
S16T020385			110-00-9	Furan	NGS	n/a	n/a	0.11	n/a	n/a	n/a	n/a	0.090		n/a,J
S16T020385			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	<0.10	n/a	n/a	n/a	n/a	0.10		n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162031
 SDG Number:
 Customer Sample ID: 16-05793-3-E1
 Customer Sample ID: 16-05793-3-E1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020386			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18		n/a
S16T020386			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020386			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43		n/a
S16T020386			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27		n/a
S16T020386			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020386			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	0.46	n/a	n/a	n/a	n/a	0.34		n/a J
S16T020386			4229-91-8	2-Propylfuran	NGS	n/a	n/a	0.84	n/a	n/a	n/a	n/a	0.44		n/a J
S16T020386			110-00-9	Furan	NGS	n/a	n/a	0.12	n/a	n/a	n/a	n/a	0.090		n/a J
S16T020386			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	<0.10	n/a	n/a	n/a	n/a	0.10		n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162031
 SDG Number:
 Customer Sample ID: 16-05793-3-EFF-BASE
 Customer Sample ID: 16-05793-3-EFF-BASE

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020387			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18		n/a
S16T020387			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020387			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43		n/a
S16T020387			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27		n/a
S16T020387			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020387			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	0.56	n/a	n/a	n/a	n/a	0.34		n/a J
S16T020387			4229-91-8	2-Propylfuran	NGS	n/a	n/a	<0.44	n/a	n/a	n/a	n/a	0.44		n/a
S16T020387			110-00-9	Furan	NGS	n/a	n/a	0.13	n/a	n/a	n/a	n/a	0.090		n/a J
S16T020387			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	<0.10	n/a	n/a	n/a	n/a	0.10		n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162031
 SDG Number:
 Customer Sample ID: 16-05793-3-F1
 Customer Sample ID: 16-05793-3-F1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020388			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18		n/a
S16T020388			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020388			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43		n/a
S16T020388			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27		n/a
S16T020388			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020388			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	<0.34	n/a	n/a	n/a	n/a	0.34		n/a
S16T020388			4229-91-8	2-Propylfuran	NGS	n/a	n/a	0.47	n/a	n/a	n/a	n/a	0.44		n/a J
S16T020388			110-00-9	Furan	NGS	n/a	n/a	0.10	n/a	n/a	n/a	n/a	0.090		n/a J
S16T020388			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	<0.10	n/a	n/a	n/a	n/a	0.10		n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162031
 SDG Number:
 Customer Sample ID: 16-05793-3-H1
 Customer Sample ID: 16-05793-3-H1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Roc %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020390			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18		n/a
S16T020390			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020390			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43		n/a
S16T020390			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27		n/a
S16T020390			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020390			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	<0.34	n/a	n/a	n/a	n/a	0.34		n/a
S16T020390			4229-91-8	2-Propylfuran	NGS	n/a	n/a	0.73	n/a	n/a	n/a	n/a	0.44		n/a J
S16T020390			110-00-9	Furan	NGS	n/a	n/a	0.12	n/a	n/a	n/a	n/a	0.090		n/a J
S16T020390			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	0.23	n/a	n/a	n/a	n/a	0.10		n/a J

NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162031
 SDG Number:
 Customer Sample ID: 16-05793-3-H2
 Customer Sample ID: 16-05793-3-H2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T020391			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18	n/a	n/a
S16T020391			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	n/a
S16T020391			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43	n/a	n/a
S16T020391			3777-71-7	2-Hepylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27	n/a	n/a
S16T020391			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	n/a
S16T020391			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	<0.34	n/a	n/a	n/a	n/a	0.34	n/a	n/a
S16T020391			4229-91-8	2-Propylfuran	NGS	n/a	n/a	<0.44	n/a	n/a	n/a	n/a	0.44	n/a	n/a
S16T020391			110-00-9	Furan	NGS	n/a	n/a	0.10	n/a	n/a	n/a	n/a	0.090	n/a	J
S16T020391			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	<0.10	n/a	n/a	n/a	n/a	0.10	n/a	n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated

Cartridge Evaluation
 Data Summary of All Results

Sample Group: 20162031
 SDG Number:
 Customer Sample ID: 16-05793-3-IN-BASE
 Customer Sample ID: 16-05793-3-IN-BASE

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans In Vapor Samples by SIM															
S16T020392			1191-99-7	2,3-Dihydrofuran	NGS	n/a	n/a	<0.18	n/a	n/a	n/a	n/a	0.18		n/a
S16T020392			1708-29-8	2,5-Dihydrofuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020392			625-86-5	2,5-Dimethylfuran	NGS	n/a	n/a	<0.43	n/a	n/a	n/a	n/a	0.43		n/a
S16T020392			3777-71-7	2-Heptylfuran	NGS	n/a	n/a	<0.27	n/a	n/a	n/a	n/a	0.27		n/a
S16T020392			534-22-5	2-Methylfuran	NGS	n/a	n/a	<0.23	n/a	n/a	n/a	n/a	0.23		n/a
S16T020392			3777-69-3	2-Pentylfuran	NGS	n/a	n/a	0.99	n/a	n/a	n/a	n/a	0.34		n/a
S16T020392			4229-91-8	2-Propylfuran	NGS	n/a	n/a	0.93	n/a	n/a	n/a	n/a	0.44		n/a
S16T020392			110-00-9	Furan	NGS	n/a	n/a	0.19	n/a	n/a	n/a	n/a	0.090		n/a
S16T020392			109-99-9	Tetrahydrofuran	NGS	n/a	n/a	<0.10	n/a	n/a	n/a	n/a	0.10		n/a

NA = Not Analyzed, ND = Not Detected

J - Estimated



ANALYTICAL REPORT

Report Date: July 21, 2016

Robert (Buddy) Sosa
Washington River Protection So
PO Box 850, MSIN T6-02
Richland, WA 99352

Phone: (509) 373-1262

E-mail: robert_w_sosa@rl.gov

20162026

Workorder: **34-1619685**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020241		Collected: 07/09/2016		
Lab ID: 1619685001	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Dimethylamine	<0.10	NA	NA	0.10
Ethylamine	<0.10	NA	NA	0.10
Methylamine	<0.10	NA	NA	0.10

Sample ID: S16T020242		Collected: 07/09/2016		
Lab ID: 1619685002	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Dimethylamine	<0.10	NA	NA	0.10
Ethylamine	<0.10	NA	NA	0.10
Methylamine	<0.10	NA	NA	0.10

Sample ID: S16T020243		Collected: 07/09/2016		
Lab ID: 1619685003	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Dimethylamine	<0.10	NA	NA	0.10
Ethylamine	<0.10	NA	NA	0.10
Methylamine	<0.10	NA	NA	0.10

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992
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Environmental

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

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Thu, 07/21/16 12:57 PM



ANALYTICAL REPORT

Workorder: **34-1619685**
 Client Project ID: CARTRIDGE EVALUATION
 Purchase Order: 55502 Rel9
 Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020244		Collected: 07/09/2016		
Lab ID: 1619685004	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Dimethylamine	<0.10	NA	NA	0.10
Ethylamine	<0.10	NA	NA	0.10
Methylamine	<0.10	NA	NA	0.10

Sample ID: S16T020245		Collected: 07/09/2016		
Lab ID: 1619685005	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Dimethylamine	<0.10	NA	NA	0.10
Ethylamine	<0.10	NA	NA	0.10
Methylamine	<0.10	NA	NA	0.10

Sample ID: S16T020246		Collected: 07/09/2016		
Lab ID: 1619685006	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Dimethylamine	<0.10	NA	NA	0.10
Ethylamine	<0.10	NA	NA	0.10
Methylamine	<0.10	NA	NA	0.10

Sample ID: S16T020247		Collected: 07/09/2016		
Lab ID: 1619685007	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Dimethylamine	<0.10	NA	NA	0.10
Ethylamine	<0.10	NA	NA	0.10
Methylamine	<0.10	NA	NA	0.10



ANALYTICAL REPORT

Workorder: **34-1619685**
 Client Project ID: CARTRIDGE EVALUATION
 Purchase Order: 55502 Rel9
 Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020248		Collected: 07/09/2016		
Lab ID: 1619685008	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Dimethylamine	<0.10	NA	NA	0.10
Ethylamine	<0.10	NA	NA	0.10
Methylamine	<0.10	NA	NA	0.10

Sample ID: S16T020249		Collected: 07/09/2016		
Lab ID: 1619685009	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Dimethylamine	<0.10	NA	NA	0.10
Ethylamine	<0.10	NA	NA	0.10
Methylamine	<0.10	NA	NA	0.10

Sample ID: S16T020250		Collected: 07/09/2016		
Lab ID: 1619685010	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Dimethylamine	<0.10	NA	NA	0.10
Ethylamine	<0.10	NA	NA	0.10
Methylamine	<0.10	NA	NA	0.10

Sample ID: S16T020251		Collected: 07/09/2016		
Lab ID: 1619685011	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Dimethylamine	<0.10	NA	NA	0.10
Ethylamine	<0.10	NA	NA	0.10
Methylamine	<0.10	NA	NA	0.10



ANALYTICAL REPORT

Workorder: 34-1619685
Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include Dimethylamine, Ethylamine, and Methylamine with results <0.10.

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include Dimethylamine, Ethylamine, and Methylamine with results <0.10.

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include Dimethylamine, Ethylamine, and Methylamine with results <0.10.

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include Dimethylamine, Ethylamine, and Methylamine with results <0.10.



ANALYTICAL REPORT

Workorder: **34-1619685**
 Client Project ID: CARTRIDGE EVALUATION
 Purchase Order: 55502 Rel9
 Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020256		Collected: 07/10/2016		
Lab ID: 1619685016	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Dimethylamine	<0.10	NA	NA	0.10
Ethylamine	<0.10	NA	NA	0.10
Methylamine	<0.10	NA	NA	0.10

Sample ID: S16T020257		Collected: 07/10/2016		
Lab ID: 1619685017	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Dimethylamine	<0.10	NA	NA	0.10
Ethylamine	<0.10	NA	NA	0.10
Methylamine	<0.10	NA	NA	0.10

Sample ID: S16T020258		Collected: 07/10/2016		
Lab ID: 1619685018	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Dimethylamine	<0.10	NA	NA	0.10
Ethylamine	<0.10	NA	NA	0.10
Methylamine	<0.10	NA	NA	0.10

Sample ID: S16T020259		Collected: 07/10/2016		
Lab ID: 1619685019	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Dimethylamine	<0.10	NA	NA	0.10
Ethylamine	<0.10	NA	NA	0.10
Methylamine	<0.10	NA	NA	0.10



ANALYTICAL REPORT

Workorder: **34-1619685**
 Client Project ID: CARTRIDGE EVALUATION
 Purchase Order: 55502 Rel9
 Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020260		Collected: 07/10/2016		
Lab ID: 1619685020	Sampling Location: CARTRIDGE EVALUATION			Received: 07/14/2016
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Dimethylamine	<0.10	NA	NA	0.10
Ethylamine	<0.10	NA	NA	0.10
Methylamine	<0.10	NA	NA	0.10

Sample ID: S16T020261		Collected: 07/10/2016		
Lab ID: 1619685021	Sampling Location: CARTRIDGE EVALUATION			Received: 07/14/2016
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Dimethylamine	<0.10	NA	NA	0.10
Ethylamine	<0.10	NA	NA	0.10
Methylamine	<0.10	NA	NA	0.10

Sample ID: S16T020262		Collected: 07/10/2016		
Lab ID: 1619685022	Sampling Location: CARTRIDGE EVALUATION			Received: 07/14/2016
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Dimethylamine	<0.10	NA	NA	0.10
Ethylamine	<0.10	NA	NA	0.10
Methylamine	<0.10	NA	NA	0.10

Sample ID: S16T020263		Collected: 07/10/2016		
Lab ID: 1619685023	Sampling Location: CARTRIDGE EVALUATION			Received: 07/14/2016
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Dimethylamine	<0.10	NA	NA	0.10
Ethylamine	<0.10	NA	NA	0.10
Methylamine	<0.10	NA	NA	0.10



ANALYTICAL REPORT

Workorder: 34-1619685
Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include Dimethylamine, Ethylamine, and Methylamine with results <0.10.

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include Dimethylamine, Ethylamine, and Methylamine with results <0.10.

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include Dimethylamine, Ethylamine, and Methylamine with results <0.10.

Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Table with 3 columns: Method, Analyst, Peer Review. Row: Amines-VOA Aliphatic VAA-1, /S/ David Teynor, /S/ Thomas Bosch.

Laboratory Contact Information

ALS Environmental
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Salt Lake City, Utah 84123
Phone: (801) 266-7700
Email: alst.lab@ALSGlobal.com
Web: www.alssc.com



ANALYTICAL REPORT

Workorder: **34-1619685**
 Client Project ID: CARTRIDGE EVALUATION
 Purchase Order: 55502 Rel9
 Project Manager: Rand Potter

General Lab Comments

The results provided in this report relate only to the items tested.
 Samples were received in acceptable condition unless otherwise noted.
 Samples have not been blank corrected unless otherwise noted.
 This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

Testing Sector	Accreditation Body (Standard)	Certificate Number	Website
Environmental	ACLASS (DoD ELAP)	ADE-1420	http://www.aiclasscorp.com
	Utah (NELAC)	DATA1	http://health.utah.gov/lab/labimp/
	Nevada	UT00009	http://ndep.nv.gov/bsdw/labservice.htm
	Oklahoma	UT00009	http://www.deq.state.ok.us/CSDnew/
	Iowa	IA# 376	http://www.iowadnr.gov/InsideDNR/RegulatoryWater.aspx
	Florida (TNI)	E871067	http://www.dep.state.fl.us/labs/bars/sas/qa/
	Texas (TNI)	T104704456-11-1	http://www.tceq.texas.gov/field/qa/lab_accred_certif.html
Industrial Hygiene	AIHA-LAP, LLC (ISO 17025 and AIHA-LAP, LLC IHLAP/ELLAP)	101574	http://www.aihaaccreditedlabs.org
Lead Testing:			
CPSC	ACLASS (ISO 17025, CPSC)	ADE-1420	http://www.aiclasscorp.com
Soil, Dust, Paint, Air	AIHA-LAP, LLC (ISO 17025, AIHA-LAP, LLC ELLAP and NLLAP)	101574	http://www.aihaaccreditedlabs.org
Dietary Supplements	ACLASS (ISO 17025)	ADE-1420	http://www.aiclasscorp.com

Definitions

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method/media/instrument sensitivity.
 LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity.
 ND = Not Detected, Testing result not detected above the LOD or LOQ.
 NA = Not Applicable.
 ** No result could be reported, see sample comments for details.
 < This testing result is less than the numerical value.
 () This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.

ALS Environmental certifies this analytical report is in compliance with the Hanford SOW, both technically and for completeness. Release of the data contained in this report has been electronically authorized by the following laboratory representative:

Rand Potter, Project Manager, ALS Environmental



Quality Control Sample Batch Report

Analysis Information

Workorder: 1619685		
Limits: Historical/Performance	Preparation: NA	Analysis: IH Aliphatic Amines
Basis: ALS Laboratory Group	Batch: NA	Batch: ILC/12303 (HBN: 173088)
	Prepared By: NA	Analyzed By: David Teynor

Blank

LMB: 508787
Analyzed: 07/19/2016 00:00
Units: ug/sample

Analyte	Result	MDL	RL
Dimethylamine	ND	NA	0.100
Ethylamine	ND	NA	0.100
Methylamine	ND	NA	0.100

LMB: 508790
Analyzed: 07/19/2016 00:00
Units: ug/sample

Analyte	Result	MDL	RL
Dimethylamine	ND	NA	0.100
Ethylamine	ND	NA	0.100
Methylamine	ND	NA	0.100

Laboratory Control Sample - Laboratory Control Sample Duplicate

LCS: 508788					LCSD: 508789				
Analyzed: 07/19/2016 00:00					Analyzed: 07/19/2016 00:00				
Dilution: 1					Dilution: 1				
Units: ug/sample					Units: ug/sample				

Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits
Dimethylamine	1.86	2.00	93.0	60.4 134.6	1.88	94.0	1.07	0.0 20.0
Ethylamine	1.79	2.00	89.5	40.0 160.0	1.83	91.5	2.21	0.0 20.0
Methylamine	1.65	2.00	82.5	40.0 160.0	1.61	80.5	2.45	0.0 20.0

LCS: 508791					LCSD: 508792				
Analyzed: 07/19/2016 00:00					Analyzed: 07/19/2016 00:00				
Dilution: 1					Dilution: 1				
Units: ug/sample					Units: ug/sample				

Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits
Dimethylamine	2.03	2.00	102	60.4 134.6	2.15	108	5.74	0.0 20.0
Ethylamine	1.75	2.00	87.5	40.0 160.0	1.75	87.5	0.00	0.0 20.0
Methylamine	1.44	2.00	72.0	40.0 160.0	1.44	72.0	0.00	0.0 20.0

QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Analyst	Peer Review
/S/ David Teynor 07/21/2016 09:21	/S/ Thomas Bosch 07/21/2016 12:49

Symbols and Definitions

- * - Analyte above reporting limit or outside of control limits
- ▲ - Sample result is greater than 4 times the spike added
- - Sample and Matrix Duplicate less than 5 times the reporting limit
- ◆ - Result is above the calibration range
- RPD - Relative % Difference (Spike / Spike Duplicate)
- ND - Not Detected (U - Qualifier also flags analyte as not detected)
- NA - Not Applicable
- QC results are not adjusted for moisture correction, where applicable

Pimethylamine, Ethylamine, Methylamine



149/08/12

Assembler		C.O.C. No. 20162026		Page 1 of 3				
N/A		Telephone No. 373-6861		MSIN FAX 372-1878				
Contact/Requestor CARL HOWARD IV		Purchase Order/Charge Code 202003/CE20		Temp. ON ICE				
Sample Origin CARTRIDGE EVALUATION		Logbook/Work Package No. N/A		MS-033				
Project Title CARTRIDGE EVALUATION		Method of Shipment		Bill of Lading/Air Bill No. 7767 3552 1683				
Shipped To (Lab) ALS		Data Turnaround 10 DAYS		Parts and Return No. 41011				
Protocol N/A								
Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis	Preservative		
	S16T020241	VA 7/09/16		XAD-7-NBD	AMINES 16-05629-4-A1	N/A		
	S16T020242	VA 7/09/16		XAD-7-NBD	AMINES 16-05629-4-A2	N/A		
	S16T020243	VA 7/09/16		XAD-7-NBD	AMINES 16-05629-4-B1	N/A		
	S16T020244	VA 7/09/16		XAD-7-NBD	AMINES 16-05629-4-BLANK	N/A		
	S16T020245	VA 7/09/16		XAD-7-NBD	AMINES 16-05629-4-C1	N/A		
	S16T020246	VA 7/09/16		XAD-7-NBD	AMINES 16-05629-4-D1	N/A		
	S16T020247	VA 7/09/16		XAD-7-NBD	AMINES 16-05629-4-E1	N/A		
	S16T020248	VA 7/09/16		XAD-7-NBD	AMINES 16-05629-4-EFF-RAISE	N/A		
	S16T020249	VA 7/09/16		XAD-7-NBD	AMINES 16-05629-4-F	N/A		
	S16T020250	VA 7/09/16		XAD-7-NBD	AMINES 16-05629-4-G	N/A		
<p>POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes) MSDS <input type="radio"/> Yes <input checked="" type="radio"/> No</p> <p>99X-14</p> <p>SPECIAL INSTRUCTIONS Send Results to Carl Howard IV & Greg Moore Carl.Howard@ri.gov and Gregory_S.Moore@ri.gov 90% See SOH for email CONTRACT 55502 RELEASE 9</p>								
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix*
TERESA FORRESTER			7-13-16 0830	Jillie Gadsden			7-13-16 0830	S = Soil DL = Drum Liquids SE = Sediment T = Tissue SO = Solid WI = Wipe SL = Sludge L = Liquid W = Water V = Vegetation O = Oil VA = Vapor A = Air X = Other DS = Drum Solids
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	
WRPS			7-13-16 1400	Jillie Gadsden			7-13-16 1400	
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	
				Jillie Gadsden			7-13-16 1400	
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure, used in process)		Disposed By		Date/Time		
				Jillie Gadsden		07/18/16 12:00		

A-6003-962 (03/05)

Assembler		C.O.C. No. 20162026						
N/A		Page 2 of 3						
CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST								
Contact/Requestor	Telephone No.	MSIN	FAX					
CARL HOWARD IV	373-6861	T6-02	372-1878					
Sample Origin	Purchase Order/Charge Code							
CARTRIDGE EVALUATION	202003/CR20							
Project Title	Ice Chest No.	Temp.						
CARTRIDGE EVALUATION	033	ON ICE						
Shipped To (Lab)	Bill of Lading/Air Bill No.	7767 35521683						
ALS	Parts and Return No.	41011						
Protocol	Data Turnaround							
N/A	10 DAYS							
Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis	Preservative		
	S16T020251	VA	7/09/16	XAD-7-NBD	AMINES 16-05629-4-H1	N/A		
	S16T020252	VA	7/09/16	XAD-7-NBD	AMINES 16-05629-4-H2	N/A		
	S16T020253	VA	7/09/16	XAD-7-NBD	AMINES 16-05629-4-IN-BASE	N/A		
	S16T020254	VA	7/10/16	XAD-7-NBD	AMINES 16-05793-4-A1	N/A		
	S16T020255	VA	7/10/16	XAD-7-NBD	AMINES 16-05793-4-A2	N/A		
	S16T020256	VA	7/10/16	XAD-7-NBD	AMINES 16-05793-4-B1	N/A		
	S16T020257	VA	7/10/16	XAD-7-NBD	AMINES 16-05793-4-BLANK	N/A		
	S16T020258	VA	7/10/16	XAD-7-NBD	AMINES 16-05793-4-C1	N/A		
	S16T020259	VA	7/10/16	XAD-7-NBD	AMINES 16-05793-4-D1	N/A		
	S16T020260	VA	7/10/16	XAD-7-NBD	AMINES 16-05793-4-E1	N/A		
POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes) MSDS <input type="radio"/> Yes <input checked="" type="radio"/> No SPECIAL INSTRUCTIONS Hold Time Send Results to Carl Howard IV & Greg Moore Carl.W.Howard@ri.gov and Gregory.S.Moore@ri.gov see SCW for email CONTRACT 55502 RELEASE 9								
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix*
TERESA FORESTER		Jana Forester	7-13-16	Juli Gadsden	Juli Gadsden	Juli Gadsden	7.13.16	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation VA = Vapor X = Other
WRPS		Juli Gadsden	7.13.16	Juli Gadsden	FEDEX	Juli Gadsden	07-14-16 9:05	
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	
FINAL SAMPLE DISPOSITION Disposal Method (e.g., Return to customer, per lab procedure, used in process) (DOT) CONSUMED Date/Time: 07/18/16 12:00								

A-5003-962 (03/05)

Assembler N/A		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				C.O.C. No. 20162026	Page 3 of 3
Collector JONES	Contact/Requestor CARL HOWARD IV	Telephone No.	373-6861	MSIN	16-02	FAX	372-1878
SAF No. N/A	Sample Origin CARTRIDGE EVALUATION	MSIN	203037C920	Purchase Order/Charge Code			
Project Title CARTRIDGE EVALUATION	Logbook/Work Package No. N/A	Ice Chest No. WIS-033	Temp.	ON ICE			
Shipped To (Lab) AUS	Method of Shipment	Bill of Lading/Air Bill No.	77473552	1683			
Protocol N/A	Data Turnaround 10 DAYS	Parts and Return No.	41011				
Sample No.	Lab ID	* Date	Time	No./Type Container	Sample Analysis	Preservative	
	S15T020261	VA 7/10/16		XAD-7-NBD	AMINES 16-05793-4-EFF-BASE	N/A	
	S15T020262	VA 7/10/16		XAD-7-NBD	AMINES 16-05793-4-F	N/A	
	S15T020263	VA 7/10/16		XAD-7-NBD	AMINES 16-05793-4-G	N/A	
	S15T020264	VA 7/10/16		XAD-7-NBD	AMINES 16-05793-4-H1	N/A	
	S15T020265	VA 7/10/16		XAD-7-NBD	AMINES 16-05793-4-H2	N/A	
	S15T020266	VA 7/10/16		XAD-7-NBD	AMINES 16-05793-4-IN-BASE	N/A	
<p>POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes) MSDS <input type="radio"/> Yes <input checked="" type="radio"/> No</p> <p>SPECIAL INSTRUCTIONS Hold Time Send Results to Carl Howard IV & Greg Moore Carl Howard IV, greg.moores@va.gov, email CONTACT: 55502 RELEASE 9</p>							
Relinquished By TERESA FORRESTER	Print JULIE GARDNER	Sign Teresa Forrester	Date/Time 7-13-16	0830	Received By JULIE GARDNER	Print JULIE GARDNER	Sign JULIE GARDNER
Relinquished By WRPS	Print JULIE GARDNER	Sign JULIE GARDNER	Date/Time 7-13-16	1400	Received By JULIE GARDNER	Print JULIE GARDNER	Sign JULIE GARDNER
Relinquished By	Print	Sign	Date/Time		Received By	Print	Sign
Relinquished By	Print	Sign	Date/Time		Received By	Print	Sign
FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)			Consumed			
	Date/Time			Date/Time			
	07/18/16 12:00			07/18/16 12:00			

A-6003-962 (03/05)



ANALYTICAL REPORT

Report Date: July 19, 2016

Robert (Buddy) Sosa
Washington River Protection So
PO Box 850, MSIN T6-02
Richland, WA 99352

Phone: (509) 373-1262

E-mail: robert_w_sosa@rl.gov
20162025

Workorder: **34-1619684**

Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020215		Collected: 07/09/2016		
Lab ID: 1619684001	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg		Analyzed: 07/18/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
Acetonitrile	<0.010	NA	NA	0.010

Sample ID: S16T020216		Collected: 07/09/2016		
Lab ID: 1619684002	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg		Analyzed: 07/18/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
Acetonitrile	<0.010	NA	NA	0.010

Sample ID: S16T020217		Collected: 07/09/2016		
Lab ID: 1619684003	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg		Analyzed: 07/18/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
Acetonitrile	<0.010	NA	NA	0.010

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992
ALS GROUP USA, CORP. An ALS Limited Company

Environmental

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



ANALYTICAL REPORT

Workorder: 34-1619684
Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: Acetonitrile, <0.010, NA, NA, 0.010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: Acetonitrile, <0.010, NA, NA, 0.010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: Acetonitrile, <0.010, NA, NA, 0.010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: Acetonitrile, <0.010, NA, NA, 0.010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: Acetonitrile, <0.010, NA, NA, 0.010.



ANALYTICAL REPORT

Workorder: **34-1619684**
 Client Project ID: CARTRIDGE EVALUATION
 Purchase Order: 55502 Rel9
 Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020223		Collected: 07/09/2016		
Lab ID: 1619684009	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg		Analyzed: 07/18/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
Acetonitrile	<0.010	NA	NA	0.010

Sample ID: S16T020224		Collected: 07/09/2016		
Lab ID: 1619684010	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
Acetonitrile	<0.010	NA	NA	0.010

Sample ID: S16T020225		Collected: 07/09/2016		
Lab ID: 1619684011	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
Acetonitrile	<0.010	NA	NA	0.010

Sample ID: S16T020226		Collected: 07/09/2016		
Lab ID: 1619684012	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
Acetonitrile	<0.010	NA	NA	0.010

Sample ID: S16T020227		Collected: 07/09/2016		
Lab ID: 1619684013	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
Acetonitrile	<0.010	NA	NA	0.010



ANALYTICAL REPORT

Workorder: 34-1619684
Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: Acetonitrile, <0.010, NA, NA, 0.010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: Acetonitrile, <0.010, NA, NA, 0.010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: Acetonitrile, <0.010, NA, NA, 0.010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: Acetonitrile, <0.010, NA, NA, 0.010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: Acetonitrile, <0.010, NA, NA, 0.010.



ANALYTICAL REPORT

Workorder: 34-1619684
Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: Acetonitrile, <0.010, NA, NA, 0.010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: Acetonitrile, <0.010, NA, NA, 0.010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: Acetonitrile, <0.010, NA, NA, 0.010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: Acetonitrile, 0.010, NA, NA, 0.010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: Acetonitrile, <0.010, NA, NA, 0.010.



ANALYTICAL REPORT

Workorder: **34-1619684**
Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020238		Collected: 07/10/2016		
Lab ID: 1619684024	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
Acetonitrile	0.026	NA	NA	0.010

Sample ID: S16T020239		Collected: 07/10/2016		
Lab ID: 1619684025	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
Acetonitrile	<0.010	NA	NA	0.010

Sample ID: S16T020240		Collected: 07/10/2016		
Lab ID: 1619684026	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg		Analyzed: 07/19/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
Acetonitrile	<0.010	NA	NA	0.010

Report Authorization (iS/ is an electronic signature that complies with 21 CFR Part 11)

Method	Analyst	Peer Review
NIOSH 1606	iS/ Young Hee Yoon 07/18/2016 20:08	iS/ Lyle Edwards 07/19/2016 13:35

Laboratory Contact Information

ALS Environmental
960 W Levoy Drive
Salt Lake City, Utah 84123

Phone: (801) 266-7700
Email: alsit.lab@ALSGlobal.com
Web: www.alssl.com



ANALYTICAL REPORT

Workorder: **34-1619684**
 Client Project ID: CARTRIDGE EVALUATION
 Purchase Order: 55502 Rel9
 Project Manager: Rand Potter

General Lab Comments

The results provided in this report relate only to the items tested.
 Samples were received in acceptable condition unless otherwise noted.
 Samples have not been blank corrected unless otherwise noted.
 This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

Testing Sector	Accreditation Body (Standard)	Certificate Number	Website
Environmental	ACLASS (DoD ELAP)	ADE-1420	http://www.aiclasscorp.com
	Utah (NELAC)	DATA1	http://health.utah.gov/lab/labimp/
	Nevada	UT00009	http://ndep.nv.gov/bsdw/labservice.htm
	Oklahoma	UT00009	http://www.deq.state.ok.us/CSDnew/
	Iowa	IA# 376	http://www.iowadnr.gov/InsideDNR/RegulatoryWater.aspx
	Florida (TNI)	E871067	http://www.dep.state.fl.us/labs/bars/sas/qa/
	Texas (TNI)	T104704456-11-1	http://www.tceq.texas.gov/field/qa/lab_accred_certif.html
Industrial Hygiene	AIHA-LAP, LLC (ISO 17025 and AIHA-LAP, LLC IHLAP/ELLAP)	101574	http://www.aihaaccreditedlabs.org
Lead Testing:			
CPSC	ACLASS (ISO 17025, CPSC)	ADE-1420	http://www.aiclasscorp.com
Soil, Dust, Paint, Air	AIHA-LAP, LLC (ISO 17025, AIHA-LAP, LLC ELLAP and NLLAP)	101574	http://www.aihaaccreditedlabs.org
Dietary Supplements	ACLASS (ISO 17025)	ADE-1420	http://www.aiclasscorp.com

Definitions

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method/media/instrument sensitivity.
 LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity.
 ND = Not Detected, Testing result not detected above the LOD or LOQ.
 NA = Not Applicable.
 ** No result could be reported, see sample comments for details.
 < This testing result is less than the numerical value.
 () This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.

ALS Environmental certifies this analytical report is in compliance with the Hanford SOW, both technically and for completeness. Release of the data contained in this report has been electronically authorized by the following laboratory representative:

Rand Potter, Project Manager, ALS Environmental



Quality Control Sample Batch Report

Analysis Information

Workorder: 1619684		
Limits: Historical/Performance	Preparation: NA	Analysis: IH GC-FID QC
Basis: ALS Laboratory Group	Batch: NA	Batch: IFID/7596 (HBN: 172859)
	Prepared By: NA	Analyzed By: Young Hee Yoon

Blank

MB: 508231 Analyzed: 07/18/2016 00:00 Units: mg/sample			
Analyte	Result	MDL	RL
Acetonitrile	ND	NA	0.0100

MB: 508234 Analyzed: 07/18/2016 00:00 Units: mg/sample			
Analyte	Result	MDL	RL
Acetonitrile	ND	NA	0.0100

Laboratory Control Sample - Laboratory Control Sample Duplicate

LCS: 508232 Analyzed: 07/18/2016 00:00 Dilution: 1 Units: mg/sample					LCSD: 508233 Analyzed: 07/18/2016 00:00 Dilution: 1 Units: mg/sample				
Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
Acetonitrile	0.281	0.281	100	86.6 115.3	0.299	106	6.21	0.0 20.0	

LCS: 508235 Analyzed: 07/18/2016 00:00 Dilution: 1 Units: mg/sample					LCSD: 508236 Analyzed: 07/18/2016 00:00 Dilution: 1 Units: mg/sample				
Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
Acetonitrile	0.241	0.250	96.6	86.6 115.3	0.228	91.3	5.54	0.0 20.0	

QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Analyst	Peer Review
/S/ Young Hee Yoon 07/18/2016 20:08	/S/ Lyle Edwards 07/19/2016 13:35

Symbols and Definitions

- | | |
|---|---|
| <ul style="list-style-type: none"> * - Analyte above reporting limit or outside of control limits ▲ - Sample result is greater than 4 times the spike added ● - Sample and Matrix Duplicate less than 5 times the reporting limit ● - Result is above the calibration range | <ul style="list-style-type: none"> RPD - Relative % Difference (Spike / Spike Duplicate) ND - Not Detected (U - Qualifier also flags analyte as not detected) NA - Not Applicable QC results are not adjusted for moisture correction, where applicable |
|---|---|



1619684

10/1/84

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. No. 20162025
Page 1 of 3

Assembler: N/A

Collector: JONES
SAF No.: N/A

Project Title: CARTRIDGE EVALUATION
Shipped To (Lab): ALS

Protocol: N/A

Contact/Requestor: CARL HOWARD IV
Sample Origin: CARTRIDGE EVALUATION
Logbook/Work Package No.: N/A

Method of Shipment: N/A

Data Turnaround: 10 DAYS

Telephone No. 373-6861 MSIN T6-02 FAX 372-1878
Purchase Order/Charge Code: 23033/0220
Ice Chest No. WTS-023 Temp. ON ISO
Bill of Lading/Air Bill No. 7767 3552 1683
Parts and Return No. 4101

Sample No.	Lab ID	* Date	Time	No./Type Container	Sample Analysis	Preservative
	S16T020215	VA 7/9/16		CHARCOAL TUBE	Acetonitrile 16-05629-5-A1	N/A
	S16T020216	VA 7/9/16		CHARCOAL TUBE	Acetonitrile 16-05629-5-A2	N/A
	S16T020217	VA 7/9/16		CHARCOAL TUBE	Acetonitrile 16-05629-5-B1	N/A
	S16T020218	VA 7/9/16		CHARCOAL TUBE	Acetonitrile 16-05629-5-BLANK	N/A
	S16T020219	VA 7/9/16		CHARCOAL TUBE	Acetonitrile 16-05629-5-C1	N/A
	S16T020220	VA 7/9/16		CHARCOAL TUBE	Acetonitrile 16-05629-5-D1	N/A
	S16T020221	VA 7/9/16		CHARCOAL TUBE	Acetonitrile 16-05629-5-E1	N/A
	S16T020222	VA 7/9/16		CHARCOAL TUBE	Acetonitrile 16-05629-5-EFF-BASE	N/A
	S16T020223	VA 7/9/16		CHARCOAL TUBE	Acetonitrile 16-05629-5-E1 1	N/A
	S16T020224	VA 7/9/16		CHARCOAL TUBE	Acetonitrile 16-05629-5-G1	N/A

POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes) MSDS Yes No
N/A

SPECIAL INSTRUCTIONS
Send Results to Carl Howard IV & Greg Moore
Carl X Howard@rl.gov and Gregory S_Moore@rl.gov
ToF email
REFERENCE # 55502
Reference Contract # 55502

Relinquished By: *Sharent Volden* Sign: *Sharent Volden* Date/Time: 7-13-16 0830
Received By: *Juli Freedom* Sign: *Juli Freedom* Date/Time: 7-13-16 0830
Matrix* DL = Drum Liquids, SE = Sediment, SO = Solid, SL = Sludge, WV = Water, O = Oil, A = Air, DS = Drum Solids, T = Tissue, WI = Wipe, L = Liquid, V = Vegetation, VA = Vapor, X = Other

Relinquished By: *Juli Freedom* Sign: *Juli Freedom* Date/Time: 7-13-16 1400
Received By: *Marianne* Sign: *Marianne* Date/Time: 07-14-16 5:20

Relinquished By: *Sharent Volden* Sign: *Sharent Volden* Date/Time: 7-13-16 1400
Received By: *Marianne* Sign: *Marianne* Date/Time: 07-14-16 5:20

Disposal Method (e.g., Return to customer, per lab procedure, used in process): *Trans N/A gm July 19, 2016 9:30 AM*

All samples containing hazardous materials shall be picked up by requestor and returned to parent container or site of origin.

A-6003-962 (03/05)

Assembler		C.O.C. No.						
N/A		20162025						
Project Title		Page						
CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		2 of 3						
Collector		Telephone No.						
JONES		373-6861						
SAF No.		MSIN						
N/A		16-02 FAX 372-1878						
Project Title		Purchase Order/Charge Code						
CHARTRIDGE EVALUATION		22603/CB20						
Shipped To (Lab)		Ice Chest No.						
ALS		WTS-033						
Method of Shipment		Bill of Lading/Air Bill No.						
N/A		7767 3552 1683						
Data Turnaround		Parts and Return No.						
10 days		4101						
Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis	Preservative		
	S16T020225	VA	7/9/16	CHARCOAL TUBE	Acetonitrile 16-05629-5-H1	N/A		
	S16T020226	VA	7/9/16	CHARCOAL TUBE	Acetonitrile 16-05629-5-H2	N/A		
	S16T020227	VA	7/9/16	CHARCOAL TUBE	Acetonitrile 16-05629-5-IN-BASE	N/A		
	S16T020228	VA	7/10/16	CHARCOAL TUBE	Acetonitrile 16-05793-5-A1	N/A		
	S16T020229	VA	7/10/16	CHARCOAL TUBE	Acetonitrile 16-05793-5-A2	N/A		
	S16T020230	VA	7/10/16	CHARCOAL TUBE	Acetonitrile 16-05793-5-B1	N/A		
	S16T020231	VA	7/10/16	CHARCOAL TUBE	Acetonitrile 16-05793-5-BLANK	N/A		
	S16T020232	VA	7/10/16	CHARCOAL TUBE	Acetonitrile 16-05793-5-C1	N/A		
	S16T020233	VA	7/10/16	CHARCOAL TUBE	Acetonitrile 16-05793-5-D1	N/A		
	S16T020234	VA	7/10/16	CHARCOAL TUBE	Acetonitrile 16-05793-5-E1	N/A		
<p>POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes) MSDS <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Hold Time</p> <p>SPECIAL INSTRUCTIONS Send Results to Carl Howald IV & Greg Meurt Carl & Howald@rl.gov and Gregory_S_McCorbett. gov for email RELEASE 9 Reference Contract # 55502</p>								
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix*
Sharon Holden		L. Udd	7-13-16 0830	Julia Gradstein		Julia Gradstein	7-13-16 0830	S = Soil DL = Drum Liquids SE = Sediment T = Tissue SO = Solid WI = Wipe SL = Sludge L = Liquid W = Water V = Vegetation O = Oil VA = Vapor A = Air X = Other DS = Drum Solids
Relinquished By		Julia Gradstein	7-13-16 1430	Received By		FEDEX		
Relinquished By				Received By		Monique	07-14-16 1405	
Relinquished By				Received By				
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure, used in process)			Disposed By		Date/Time	
					Grant Hen		July 19, 2016 9:30 AM	

All samples containing hazardous materials shall be picked up by requestor and returned to parent container or site of origin.

A-6003-982 (03/05)

Assembler N/A		C.O.C. No. 20162025				
Collector JONES		Page 3 of 3				
Contact/Requestor CARL HOWARD IV		Telephone No. 373-6861				
Sample Origin CHARLOTTE EVALUATION		MISN 16-02				
Logbook/Work Package No. N/A		Purchase Order/Charge Code 2020370260				
Project Title CHARLOTTE EVALUATION		Temp. AN TIE				
Shipped To (Lab) AUS		Bill of Lading/Air Bill No. 776735521683				
Method of Shipment		Parts and Return No. 4101				
Protocol N/A		Data Turnaround 10 DAYS				
Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis	Preservative
	S16T020235	VA	7/10/16	CHARCOAL TUBE	Acetonitrile 16-05793-5-EFF-BASE	N/A
	S16T020236	VA	7/10/16	CHARCOAL TUBE	Acetonitrile 16-05793-5-F1	N/A
	S16T020237	VA	7/10/16	CHARCOAL TUBE	Acetonitrile 16-05793-5-G1	N/A
	S16T020238	VA	7/10/16	CHARCOAL TUBE	Acetonitrile 16-05793-5-H1	N/A
	S16T020239	VA	7/10/16	CHARCOAL TUBE	Acetonitrile 16-05793-5-H2	N/A
	S16T020240	VA	7/10/16	CHARCOAL TUBE	Acetonitrile 16-05793-5-IN-BASE	N/A
POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes) MSDS <input type="radio"/> Yes <input checked="" type="radio"/> No Hold Time						
SPECIAL INSTRUCTIONS Send Results to Carl Howard IV & Greg Moore Carl & Howard@el.gov and Gregory_S_Moore@el.gov for email RELEASE 9 Reference Contract # 55502						
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign
Sharon Walker		M. Walker	7-13-16	Julie Goodwin	Julie Goodwin	7-13-16
Relinquished By	Date/Time	Date/Time	Date/Time	Received By	Date/Time	Date/Time
Julie Goodwin	7/13/16	1400	0830	FEDEX	0830	0830
Relinquished By	Date/Time	Date/Time	Date/Time	Received By	Date/Time	Date/Time
				M. Moore	7-11-16	9:05
Relinquished By	Date/Time	Date/Time	Date/Time	Received By	Date/Time	Date/Time
				M. Moore	7-11-16	9:05
Disposal Method (e.g., Return to customer, per lab procedure, used in process) <u>you pick up from July 19, 2016 9:30 AM</u>						
Disposed By <u>you pick up from July 19, 2016 9:30 AM</u>						
FINAL SAMPLE DISPOSITION						

A-6003-962 (03/05)

**FINAL REPORT ON MERCURY VAPOR TUBES
FOR CARTRIDGE EVALUATION
COLLECTED JULY 9 - 10, 2016**

Document No.: 20162012 Rev. 0

Michael A. Purcell
WAI Hanford Laboratory

Date Published
August 1, 2016



LAB # 184777

Prepared for:



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August 1, 2016
Michael A. Purcell, WHL Project Coordinator

NARRATIVE

**FINAL REPORT ON MERCURY VAPOR TUBES
FOR CARTRIDGE EVALUATION
COLLECTED JULY 9 – 10, 2016**

This final report presents the results of twenty-six mercury vapor tubes received at the 222-S Laboratory from on July 12, 2016, in good condition and with adequate paperwork. The mercury vapor tubes were logged into sample delivery group 20162012.

DISCLAIMERS

- The information contained in this report is intended only for the use of the addressee and should be considered confidential.
- This report shall not be reproduced, except in full, without written approval of the laboratory.
- The results shown in this report pertain only to the actual samples tested.
- These results conform to the requirements specified in the referenced methods/procedures and specifications provided verbally or electronically by the customer. Any deviations or modifications are discussed in the following narrative.
- This report only addresses laboratory activities related to the listed surveys. Requirements or anomalies concerning field sampling are not addressed in this report.

PROCEDURES

Method	Preparation Procedure	Analysis Procedure
Mercury by OSHA ID-140	LA-325-109, Rev. C-3	LA-325-109, Rev. C-3

ANALYTICAL SUMMARY

The vapor tubes were tested for mercury, as specified on the chain of custody. Standard laboratory procedures for digestions and cold vapor atomic absorption for mercury were followed as well as the requirements in WHL-MP-1029, *WHL Industrial Hygiene Quality Assurance Project Plan for 222-S Laboratory* (QAPP). Program specific work authorization instructions have been provided for WRPS IH sample analysis through verbal and electronic communication with the customer point of contact, and are kept as a record by the laboratory. When applicable, any client communication specific to the samples in this report will be included herein. All quality control criteria in the QAPP were met.

The measurement uncertainty was estimated based on the historical behavior of laboratory control standards (LCS). For mercury, the results of 178 LCS determinations indicate a mean recovery of 98% with a standard deviation of 6%. Statistical process control limits for the LCS are 81 – 115%, with no significant bias. The overall estimate of uncertainty is 12%, with coverage factor (k) = 2.

Background levels of mercury or interfering compounds can be present in the sorbent tube media used for collecting vapor samples. OSHA ID-140 recommends that the laboratory determine the average background for each lot of media and subtract it from the sample results prior to reporting. However, per agreement with the client, this background is being determined by the client using blank media submitted as blind samples to the laboratory. Any blank subtraction from the sample results will be performed by the client. The laboratory is using the same media

for QC samples. These QC samples may not match the lot numbers of the samples being submitted and the background for this QC sample media has not been determined. Over the past several years the results from preparation blanks, field blanks, and the vast majority of samples have been below the laboratory's method detection limit, which is an order of magnitude below the reporting limit. In general, the laboratory believes there is no need for background subtraction using the current sample media (Hydrar, SKC 226-17-1A).

For the mercury analysis, the blank results for tube lot numbers 8679, 9473, and 10187 were below the detection limit; therefore, no blank correction was required. All mercury results for this sample group were below the reporting limit of 0.05 µg/sample.

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Attachment 1

DATA SUMMARY REPORT

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DATA SUMMARY REPORT FOR SAMPLE GROUP 20162012

Customer Sample ID	Vapor Tube Portion	Laboratory Sample ID	Analyte	Result Unit	Standard % Recovery	Blank	Result	Reporting Limit
16-05629-6-A1	Total	S16T020476	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05629-6-A1	Resin	S16T020477	Mercury	µg/sample	85.5	<0.0500	<0.0500	0.0500
16-05629-6-A1	Glass Wool	S16T020478	Mercury	µg/sample	85.5	<0.0500	<0.0500	0.0500
16-05629-6-A2	Total	S16T020479	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05629-6-A2	Resin	S16T020480	Mercury	µg/sample	85.5	<0.0500	<0.0500	0.0500
16-05629-6-A2	Glass Wool	S16T020481	Mercury	µg/sample	85.5	<0.0500	<0.0500	0.0500
16-05629-6-B1	Total	S16T020482	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05629-6-B1	Resin	S16T020483	Mercury	µg/sample	85.5	<0.0500	<0.0500	0.0500
16-05629-6-B1	Glass Wool	S16T020484	Mercury	µg/sample	85.5	<0.0500	<0.0500	0.0500
16-05629-6-BLANK	Total	S16T020485	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05629-6-BLANK	Resin	S16T020486	Mercury	µg/sample	85.5	<0.0500	<0.0500	0.0500
16-05629-6-BLANK	Glass Wool	S16T020487	Mercury	µg/sample	85.5	<0.0500	<0.0500	0.0500
16-05629-6-C1	Total	S16T020488	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05629-6-C1	Resin	S16T020489	Mercury	µg/sample	85.5	<0.0500	<0.0500	0.0500
16-05629-6-C1	Glass Wool	S16T020490	Mercury	µg/sample	85.5	<0.0500	<0.0500	0.0500
16-05629-6-D1	Total	S16T020491	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05629-6-D1	Resin	S16T020492	Mercury	µg/sample	85.5	<0.0500	<0.0500	0.0500
16-05629-6-D1	Glass Wool	S16T020493	Mercury	µg/sample	85.5	<0.0500	<0.0500	0.0500
16-05629-6-E1	Total	S16T020494	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05629-6-E1	Resin	S16T020495	Mercury	µg/sample	85.5	<0.0500	<0.0500	0.0500
16-05629-6-E1	Glass Wool	S16T020496	Mercury	µg/sample	85.5	<0.0500	<0.0500	0.0500
16-05629-6-EFF-BASE	Total	S16T020497	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05629-6-EFF-BASE	Resin	S16T020498	Mercury	µg/sample	85.5	<0.0500	<0.0500	0.0500
16-05629-6-EFF-BASE	Glass Wool	S16T020499	Mercury	µg/sample	85.5	<0.0500	<0.0500	0.0500
16-05629-6-F1	Total	S16T020500	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05629-6-F1	Resin	S16T020501	Mercury	µg/sample	85.5	<0.0500	<0.0500	0.0500
16-05629-6-F1	Glass Wool	S16T020502	Mercury	µg/sample	85.5	<0.0500	<0.0500	0.0500
16-05629-6-G1	Total	S16T020503	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05629-6-G1	Resin	S16T020504	Mercury	µg/sample	85.5	<0.0500	<0.0500	0.0500
16-05629-6-G1	Glass Wool	S16T020505	Mercury	µg/sample	85.5	<0.0500	<0.0500	0.0500
16-05629-6-H1	Total	S16T020506	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05629-6-H1	Resin	S16T020507	Mercury	µg/sample	89.3	<0.0500	<0.0500	0.0500
16-05629-6-H1	Glass Wool	S16T020508	Mercury	µg/sample	89.3	<0.0500	<0.0500	0.0500
16-05629-6-H2	Total	S16T020509	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05629-6-H2	Resin	S16T020510	Mercury	µg/sample	89.3	<0.0500	<0.0500	0.0500
16-05629-6-H2	Glass Wool	S16T020511	Mercury	µg/sample	89.3	<0.0500	<0.0500	0.0500
16-05629-6-IN-BASE	Total	S16T020512	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05629-6-IN-BASE	Resin	S16T020513	Mercury	µg/sample	89.3	<0.0500	<0.0500	0.0500
16-05629-6-IN-BASE	Glass Wool	S16T020514	Mercury	µg/sample	89.3	<0.0500	<0.0500	0.0500
16-05793-6-A1	Total	S16T020515	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05793-6-A1	Resin	S16T020516	Mercury	µg/sample	89.3	<0.0500	<0.0500	0.0500
16-05793-6-A1	Glass Wool	S16T020517	Mercury	µg/sample	89.3	<0.0500	<0.0500	0.0500
16-05793-6-A2	Total	S16T020518	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05793-6-A2	Resin	S16T020519	Mercury	µg/sample	89.3	<0.0500	<0.0500	0.0500
16-05793-6-A2	Glass Wool	S16T020520	Mercury	µg/sample	89.3	<0.0500	<0.0500	0.0500
16-05793-6-B1	Total	S16T020521	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05793-6-B1	Resin	S16T020522	Mercury	µg/sample	89.3	<0.0500	<0.0500	0.0500
16-05793-6-B1	Glass Wool	S16T020523	Mercury	µg/sample	89.3	<0.0500	<0.0500	0.0500

DATA SUMMARY REPORT FOR SAMPLE GROUP 20162012

Customer Sample ID	Vapor Tube Portion	Laboratory Sample ID	Analyte	Result Unit	Standard % Recovery	Blank	Result	Reporting Limit
16-05793-6-BLANK	Total	S16T020524	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05793-6-BLANK	Resin	S16T020525	Mercury	µg/sample	89.3	<0.0500	<0.0500	0.0500
16-05793-6-BLANK	Glass Wool	S16T020526	Mercury	µg/sample	89.3	<0.0500	<0.0500	0.0500
16-05793-6-C1	Total	S16T020527	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05793-6-C1	Resin	S16T020528	Mercury	µg/sample	89.3	<0.0500	<0.0500	0.0500
16-05793-6-C1	Glass Wool	S16T020529	Mercury	µg/sample	89.3	<0.0500	<0.0500	0.0500
16-05793-6-D1	Total	S16T020530	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05793-6-D1	Resin	S16T020531	Mercury	µg/sample	89.3	<0.0500	<0.0500	0.0500
16-05793-6-D1	Glass Wool	S16T020532	Mercury	µg/sample	89.3	<0.0500	<0.0500	0.0500
16-05793-6-E1	Total	S16T020533	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05793-6-E1	Resin	S16T020534	Mercury	µg/sample	89.3	<0.0500	<0.0500	0.0500
16-05793-6-E1	Glass Wool	S16T020535	Mercury	µg/sample	89.3	<0.0500	<0.0500	0.0500
16-05793-6-EFF-BASE	Total	S16T020536	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05793-6-EFF-BASE	Resin	S16T020537	Mercury	µg/sample	89.6	<0.0500	<0.0500	0.0500
16-05793-6-EFF-BASE	Glass Wool	S16T020538	Mercury	µg/sample	89.6	<0.0500	<0.0500	0.0500
16-05793-6-F1	Total	S16T020539	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05793-6-F1	Resin	S16T020540	Mercury	µg/sample	89.6	<0.0500	<0.0500	0.0500
16-05793-6-F1	Glass Wool	S16T020541	Mercury	µg/sample	89.6	<0.0500	<0.0500	0.0500
16-05793-6-G1	Total	S16T020542	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05793-6-G1	Resin	S16T020543	Mercury	µg/sample	89.6	<0.0500	<0.0500	0.0500
16-05793-6-G1	Glass Wool	S16T020544	Mercury	µg/sample	89.6	<0.0500	<0.0500	0.0500
16-05793-6-H1	Total	S16T020545	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05793-6-H1	Resin	S16T020546	Mercury	µg/sample	89.6	<0.0500	<0.0500	0.0500
16-05793-6-H1	Glass Wool	S16T020547	Mercury	µg/sample	89.6	<0.0500	<0.0500	0.0500
16-05793-6-H2	Total	S16T020548	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05793-6-H2	Resin	S16T020549	Mercury	µg/sample	89.6	<0.0500	<0.0500	0.0500
16-05793-6-H2	Glass Wool	S16T020550	Mercury	µg/sample	89.6	<0.0500	<0.0500	0.0500
16-05793-6-IN-BASE	Total	S16T020551	Mercury	µg/sample	n/a	<0.0500	<0.0500	0.0500
16-05793-6-IN-BASE	Resin	S16T020552	Mercury	µg/sample	89.6	<0.0500	<0.0500	0.0500
16-05793-6-IN-BASE	Glass Wool	S16T020553	Mercury	µg/sample	89.6	<0.0500	<0.0500	0.0500

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Attachment 2

ANALYSIS DATE REPORT

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ANALYSIS DATE REPORT FOR SAMPLE GROUP 20162012

Laboratory Sample ID	Customer Sample ID	Method	Preparation Date	Analysis Date
S16T020477	16-05629-6-A1	Mercury	07/21/2016 07:30	07/21/2016 10:43
S16T020478	16-05629-6-A1	Mercury	07/21/2016 07:30	07/21/2016 10:45
S16T020480	16-05629-6-A2	Mercury	07/21/2016 07:30	07/21/2016 10:47
S16T020481	16-05629-6-A2	Mercury	07/21/2016 07:30	07/21/2016 10:48
S16T020483	16-05629-6-B1	Mercury	07/21/2016 07:30	07/21/2016 10:50
S16T020484	16-05629-6-B1	Mercury	07/21/2016 07:30	07/21/2016 10:51
S16T020486	16-05629-6-BLANK	Mercury	07/21/2016 07:30	07/21/2016 10:56
S16T020487	16-05629-6-BLANK	Mercury	07/21/2016 07:30	07/21/2016 10:58
S16T020489	16-05629-6-C1	Mercury	07/21/2016 07:30	07/21/2016 10:59
S16T020490	16-05629-6-C1	Mercury	07/21/2016 07:30	07/21/2016 11:01
S16T020492	16-05629-6-D1	Mercury	07/21/2016 07:30	07/21/2016 11:02
S16T020493	16-05629-6-D1	Mercury	07/21/2016 07:30	07/21/2016 11:04
S16T020495	16-05629-6-E1	Mercury	07/21/2016 07:30	07/21/2016 11:06
S16T020496	16-05629-6-E1	Mercury	07/21/2016 07:30	07/21/2016 11:07
S16T020498	16-05629-6-EFF-BASE	Mercury	07/21/2016 07:30	07/21/2016 11:09
S16T020499	16-05629-6-EFF-BASE	Mercury	07/21/2016 07:30	07/21/2016 11:10
S16T020501	16-05629-6-F1	Mercury	07/21/2016 07:30	07/21/2016 11:15
S16T020502	16-05629-6-F1	Mercury	07/21/2016 07:30	07/21/2016 11:17
S16T020504	16-05629-6-G1	Mercury	07/21/2016 07:30	07/21/2016 11:19
S16T020505	16-05629-6-G1	Mercury	07/21/2016 07:30	07/21/2016 11:20
S16T020507	16-05629-6-H1	Mercury	07/21/2016 07:30	07/21/2016 13:35
S16T020508	16-05629-6-H1	Mercury	07/21/2016 07:30	07/21/2016 13:37
S16T020510	16-05629-6-H2	Mercury	07/21/2016 07:30	07/21/2016 13:42
S16T020511	16-05629-6-H2	Mercury	07/21/2016 07:30	07/21/2016 13:43
S16T020513	16-05629-6-IN-BASE	Mercury	07/21/2016 07:30	07/21/2016 13:45
S16T020514	16-05629-6-IN-BASE	Mercury	07/21/2016 07:30	07/21/2016 13:50
S16T020516	16-05793-6-A1	Mercury	07/21/2016 07:30	07/21/2016 13:51
S16T020517	16-05793-6-A1	Mercury	07/21/2016 07:30	07/21/2016 13:53
S16T020519	16-05793-6-A2	Mercury	07/21/2016 07:30	07/21/2016 13:54
S16T020520	16-05793-6-A2	Mercury	07/21/2016 07:30	07/21/2016 13:56
S16T020522	16-05793-6-B1	Mercury	07/21/2016 07:30	07/21/2016 13:57
S16T020523	16-05793-6-B1	Mercury	07/21/2016 07:30	07/21/2016 13:59
S16T020525	16-05793-6-BLANK	Mercury	07/21/2016 07:30	07/21/2016 14:08
S16T020526	16-05793-6-BLANK	Mercury	07/21/2016 07:30	07/21/2016 14:09
S16T020528	16-05793-6-C1	Mercury	07/21/2016 07:30	07/21/2016 14:11
S16T020529	16-05793-6-C1	Mercury	07/21/2016 07:30	07/21/2016 14:12
S16T020531	16-05793-6-D1	Mercury	07/21/2016 07:30	07/21/2016 14:14
S16T020532	16-05793-6-D1	Mercury	07/21/2016 07:30	07/21/2016 14:15
S16T020534	16-05793-6-E1	Mercury	07/21/2016 07:30	07/21/2016 14:17
S16T020535	16-05793-6-E1	Mercury	07/21/2016 07:30	07/21/2016 14:19
S16T020537	16-05793-6-EFF-BASE	Mercury	07/21/2016 16:00	07/22/2016 11:27
S16T020538	16-05793-6-EFF-BASE	Mercury	07/21/2016 16:00	07/22/2016 11:29
S16T020540	16-05793-6-F1	Mercury	07/21/2016 16:00	07/22/2016 11:30
S16T020541	16-05793-6-F1	Mercury	07/21/2016 16:00	07/22/2016 11:32
S16T020543	16-05793-6-G1	Mercury	07/21/2016 16:00	07/22/2016 11:33
S16T020544	16-05793-6-G1	Mercury	07/21/2016 16:00	07/22/2016 11:35

ANALYSIS DATE REPORT FOR SAMPLE GROUP 20162012

Laboratory Sample ID	Customer Sample ID	Method	Preparation Date	Analysis Date
S16T020546	16-05793-6-H1	Mercury	07/21/2016 16:00	07/22/2016 11:40
S16T020547	16-05793-6-H1	Mercury	07/21/2016 16:00	07/22/2016 11:42
S16T020549	16-05793-6-H2	Mercury	07/21/2016 16:00	07/22/2016 11:43
S16T020550	16-05793-6-H2	Mercury	07/21/2016 16:00	07/22/2016 11:45
S16T020552	16-05793-6-IN-BASE	Mercury	07/21/2016 16:00	07/22/2016 11:46
S16T020553	16-05793-6-IN-BASE	Mercury	07/21/2016 16:00	07/22/2016 11:48

20162012 Rev. 0

Attachment 3

RECEIPT PAPERWORK

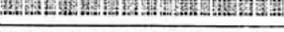
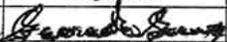
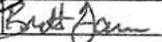
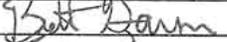
10 of 17

C.207

222-S		SAMPLE RECEIPT AND CHAIN OF CUSTODY VERIFICATION CHECKLIST			ATS-LO-090-101 Rev DG-1
Date Samples Received: <u>7/12/16</u>		Total Number of Samples: <u>311</u>		Group #: <u>20162012-Hg</u>	
Sample Custodian: <u>Sharon Holden</u>		IH Technician: <u>[Signature]</u> <u>7-12-16</u>			
Sample Custodian to Complete:					
Action	Yes	No	N/A	Comments	
RSR provided?			<input checked="" type="checkbox"/>		
Verify GKI is complete			<input checked="" type="checkbox"/>	<input type="checkbox"/> In Project File	
Received from an alpha facility?		<input checked="" type="checkbox"/>		<input type="checkbox"/> Contact PC for approval to release	
Check that outer custody seal is intact, if present			<input checked="" type="checkbox"/>		
Record cooler temperature in centigrade, as appropriate	<u>2.14</u>			<input type="checkbox"/> Check if no cooler and/or no ice	
Samples are intact and in good condition	<input checked="" type="checkbox"/>			If No, provide comments below	
RSA/COC provided and complete containing the following information?					
• Client name and client sample number	<input checked="" type="checkbox"/>				
• Date and time of sampling	<input checked="" type="checkbox"/>				
• Sampling location or origin	<input checked="" type="checkbox"/>				
• Container type, size, and number	<input checked="" type="checkbox"/>				
• Preservatives (if used) noted on the COC/RSA and sample bottles			<input checked="" type="checkbox"/>		
• Analysis request is clear	<input checked="" type="checkbox"/>				
• Signature of persons relinquishing and receiving samples	<input checked="" type="checkbox"/>				
• Date and/or time of sample custody exchange	<input checked="" type="checkbox"/>				
Verify that sample numbers on containers match the COC and/or RSA	<input checked="" type="checkbox"/>				
Samples stored properly (e.g., refrigeration)	<input checked="" type="checkbox"/>				
Notify the PC immediately if any problems are noted. Any "No" checked boxes require PC resolution. For WRPS samples, the initials block below is completed by the responsible WRPS PC.					
Samples acceptable for release? <u>YOS</u>		PC/SC Initials <u>SLU</u>		Date <u>7-12-16</u>	
If No, comment on communication and resolution:		<u>CSH</u>		<u>7/12/16</u>	
<u>WRPS - Ship - 182</u>					
<u>- Run - 77</u>					
<u>WHL - NH₃ - 26</u>					
<u>Hg - 26</u>					
Number of IH Samples Received: <u>acetonitrile - 26</u>					
Aldehyde Screen: <u>26</u>	Amines: <u>26</u>	Ammonia: <u>26</u>	Aromatic HC: _____	Asbestos: _____	
Beryllium: _____	Be-Bulk: _____	Be-Filter: _____	Be-Wipe: _____	1,3-Butadiene: <u>52</u>	
Formaldehyde: _____	Furans: <u>26</u>	Mercury: <u>26</u>	Methanol: _____	Nitrosamines: <u>26</u>	
Nitrous Oxide: _____	Pyridines: <u>26</u>	SVOA: <u>26</u>	VOA: <u>25</u>	Other-IH: _____	

SWIHD - Chain of Custody

INDUSTRIAL HYGIENE CHAIN OF CUSTODY AND LABORATORY REQUEST

Contractor: Washington River Protection Solutions			Date Sampled: 07/09/2016		
CACN: 202003		COA: CB20	Survey No.: 16-05629 - Respirator Cartridge Testing SY Farm		
Contact Name: Jones, Parker L		Phone: (509)373-4966		Turnaround: N/A	
Return Report To: Caldwell, Joyce A			MSIN: R1-06	Phone: (509)376-0737	
Laboratory Log No.	Sample ID/Type/Description	Required Analysis			
	16-05629-3-EFF-BASE / TDU (Tenax) 	Furans 2046436			
	16-05629-3-F1 / TDU (Tenax) 	Furans 2045376			
	16-05629-3-G1 / TDU (Tenax) 	Furans 2047118			
	16-05629-3-H1 / TDU (Tenax) 	Furans 204600Z			
	16-05629-3-H2 / TDU (Tenax) 	Furans 2046319			
	16-05629-3-IN-BASE / TDU (Tenax) 	Furans 2046137			
516T020476	16-05629-6-A1 / Hydrar (SKC 226-17-1A) 516T020477  0478	Hg-Elemental			
516T020479	16-05629-6-A2 / Hydrar (SKC 226-17-1A) 516T020480  0481	Hg-Elemental			
Special Instructions:					
	Signature	Printed Name	Location	Date	Time
Delivered to Storage:		Gerrado Saena	2709/H109	7-9-16	0625
Retrieved from Storage:		BRETT GARNER		7-12-16	0900
	Signature	Printed Name	Date	Time	
Relinquished By:		BRETT GARNER	7-12-16	0925	
Received By:		Leslie DIAZ	7/12/16	9:25	
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Additional Comments:					

SWIHD - Chain of Custody

INDUSTRIAL HYGIENE CHAIN OF CUSTODY AND LABORATORY REQUEST



Contractor: Washington River Protection Solutions			Date Sampled: 07/09/2016		
CACN: 202003		COA: CB20		Survey No.: 16-05629 - Respirator Cartridge Testing SY Farm	
Contact Name: Jones, Parker L			Phone: (509)373-4966		Turnaround: N/A
Return Report To: Caldwell, Joyce A			MSIN: R1-06		Phone: (509)376-0737
Laboratory Log No.	Sample ID/Type/Description	Required Analysis			
SI6T020482	16-05629-6-B1 / Hydrar (SKC 226-17-1A) ✓ SI6T020483 0484	Hg-Elemental			
SI6T020485	16-05629-6-BLANK / Hydrar (SKC 226-17-1A) ✓ SI6T020486 0487	Hg-Elemental			
SI6T020488	16-05629-6-C1 / Hydrar (SKC 226-17-1A) ✓ SI6T020489 0490	Hg-Elemental			
SI6T020491	16-05629-6-D1 / Hydrar (SKC 226-17-1A) ✓ SI6T020492 0493	Hg-Elemental			
SI6T020494	16-05629-6-E1 / Hydrar (SKC 226-17-1A) ✓ SI6T020495 0496	Hg-Elemental			
SI6T020497	16-05629-6-EFF-BASE / Hydrar (SKC 226-17-1A) ✓ SI6T020498 0499	Hg-Elemental			
SI6T020500	16-05629-6-F1 / Hydrar (SKC 226-17-1A) ✓ SI6T020501 0502	Hg-Elemental			
SI6T020503	16-05629-6-G1 / Hydrar (SKC 226-17-1A) ✓ SI6T020504 0505	Hg-Elemental			
Special Instructions:					
	Signature	Printed Name	Location	Date	Time
Delivered to Storage:	<i>James Sweeney</i>	Gerrardo Sweeney	2704/H104	7-9-16	0625
Retrieved from Storage:	<i>Brett Garner</i>	BRETT GARNER		7-12-16	0900
	Signature	Printed Name	Date	Time	
Relinquished By:	<i>Brett Garner</i>	BRETT GARNER	7-12-16	0925	
Received By:	<i>Sharon L. Holden</i>	Sharon L. Holden	7-12-16	0925	
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Additional Comments:					

SWIHD - Chain of Custody

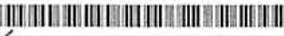
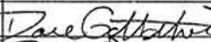
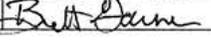
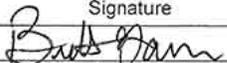
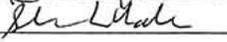
INDUSTRIAL HYGIENE CHAIN OF CUSTODY AND LABORATORY REQUEST



Contractor: Washington River Protection Solutions			Date Sampled: 07/09/2016		
CACN: 202003		COA: CB20	Survey No.: 16-05629 - Respirator Cartridge Testing SY Farm		
Contact Name: Jones, Parker L		Phone: (509)373-4966	Turnaround: N/A		
Return Report To: Caldwell, Joyce A			MSIN: R1-06	Phone: (509)376-0737	
Laboratory Log No.	Sample ID/Type/Description	Required Analysis			
516T020506	16-05629-6-H1 / Hydrar (SKC 226-17-1A) ✓ 516T020507 0508	Hg-Elemental			
516T020509	16-05629-6-H2 / Hydrar (SKC 226-17-1A) ✓ 516T020510 0511	Hg-Elemental			
516T020512	16-05629-6-IN-BASE / Hydrar (SKC 226-17-1A) ✓ 516T020513 0514	Hg-Elemental			
	16-05629-7-A1 / CISA (SKC 226-29) ✓	NH3			
	16-05629-7-A2 / CISA (SKC 226-29) ✓	NH3			
	16-05629-7-B1 / CISA (SKC 226-29) ✓	NH3			
	16-05629-7-BLANK / CISA (SKC 226-29) ✓	NH3			
	16-05629-7-C1 / CISA (SKC 226-29) ✓	NH3			
Special Instructions:					
	Signature	Printed Name	Location	Date	Time
Delivered to Storage:	<i>[Signature]</i>	Gerrardo Sacuz	2704/H104	7-9-16	0625
Retrieved from Storage:	<i>[Signature]</i>	BRETT GARNER		7-12-16	0900
	Signature	Printed Name	Date	Time	
Relinquished By:	<i>[Signature]</i>	BRETT GARNER	7-12-16	0921	
Received By:	<i>[Signature]</i>	Sharon L Kolden	7-12-16	0925	
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Additional Comments:					

SWIHD - Chain of Custody

INDUSTRIAL HYGIENE CHAIN OF CUSTODY AND LABORATORY REQUEST

Contractor: Washington River Protection Solutions			Date Sampled: 7-10-16		
CACN: 202063		COA: CB26	Survey No.: 16-05793 - Respirator Cartridge Testing SY Farm		
Contact Name: Jones, Parker L		Phone: (509)373-4966	Turnaround: N/A		
Return Report To: Caldwell, Joyce A			MSIN: R1-06	Phone: (509)376-0737	
Laboratory Log No.	Sample ID/Type/Description	Required Analysis			
	16-05793-3-EFF-BASE / TDU (Tenax) ✓ 	Furans 2047131			
	16-05793-3-F1 / TDU (Tenax) ✓ 	Furans 2046465			
	16-05793-3-G1 / TDU (Tenax) ✓ 	Furans 2047283			
	16-05793-3-H1 / TDU (Tenax) ✓ 	Furans 2047549			
	16-05793-3-H2 / TDU (Tenax) ✓ 	Furans 2046046			
	16-05793-3-IN-BASE / TDU (Tenax) ✓ 	Furans 2047542			
S16T020519	16-05793-6-A1 / Hydrar (SKC 226-17-1A) ✓  S16T020514 0517	Hg-Elemental			
S16T020518	16-05793-6-A2 / Hydrar (SKC 226-17-1A) ✓  S16T0519 0520	Hg-Elemental			
Special Instructions:					
	Signature	Printed Name	Location	Date	Time
Delivered to Storage:		DAVE GOTTSCHEK	2704 #11/04	7/10/16	0355
Retrieved from Storage:		BRETT GARNER		7-12-16	0649
	Signature	Printed Name	Date	Time	
Relinquished By:		BRETT GARNER	7-12-16	0925	
Received By:		Sharon L Holder	7-12-16	0925	
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Additional Comments:					

SWIHD - Chain of Custody

INDUSTRIAL HYGIENE CHAIN OF CUSTODY AND LABORATORY REQUEST

Contractor: Washington River Protection Solutions			Date Sampled: 7/10/16		
CACN: 202003		COA: CB20	Survey No.: 16-05793 - Respirator Cartridge Testing SY Farm		
Contact Name: Jones, Parker L		Phone: (509)373-4966		Turnaround: N/A	
Return Report To: Caldwell, Joyce A			MSIN: R1-06	Phone: (509)376-0737	
Laboratory Log No.	Sample ID/Type/Description	Required Analysis			
S16T020521	16-05793-6-B1 / Hydrar (SKC 226-17-1A) S16T020522 0523	Hg-Elemental			
S16T020524	16-05793-6-BLANK / Hydrar (SKC 226-17-1A) S16T020525 0526	Hg-Elemental			
S16T020527	16-05793-6-C1 / Hydrar (SKC 226-17-1A) S16T020528 0529	Hg-Elemental			
S16T020530	16-05793-6-D1 / Hydrar (SKC 226-17-1A) S16T020531 0532	Hg-Elemental			
S16T020533	16-05793-6-E1 / Hydrar (SKC 226-17-1A) S16T020534 0535	Hg-Elemental			
S16T020536	16-05793-6-EFF-BASE / Hydrar (SKC 226-17-1A) S16T020537 0538	Hg-Elemental			
S16T020539	16-05793-6-F1 / Hydrar (SKC 226-17-1A) S16T020540 0541	Hg-Elemental			
S16T020542	16-05793-6-G1 / Hydrar (SKC 226-17-1A) S16T020543 0544	Hg-Elemental			
Special Instructions:					
	Signature	Printed Name	Location	Date	Time
Delivered to Storage:	<i>[Signature]</i>	Donna Galt	2704 #4104	7/10/16	0855
Retrieved from Storage:	<i>[Signature]</i>	BRETT GARNER		7-12-16	0715
	Signature	Printed Name	Date	Time	
Relinquished By:	<i>[Signature]</i>	BRETT GARNER	7-12-16	0925	
Received By:	<i>[Signature]</i>	TERESA FORRESTER	7-12-16	0925	
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Additional Comments:					

SWIHD - Chain of Custody

INDUSTRIAL HYGIENE CHAIN OF CUSTODY AND LABORATORY REQUEST

Contractor: Washington River Protection Solutions			Date Sampled: 7/10/16		
CACN: 202003		COA: CB20	Survey No.: 16-05793 - Respirator Cartridge Testing SY Farm		
Contact Name: Jones, Parker L		Phone: (509)373-4966		Turnaround: N/A	
Return Report To: Caldwell, Joyce A			MSIN: R1-06	Phone: (509)376-0737	
Laboratory Log No.	Sample ID/Type/Description	Required Analysis			
SI6T020545	16-05793-6-H1 / Hydrar (SKC 226-17-1A) SI6T020546 0547	Hg-Elemental			
SI6T020548	16-05793-6-H2 / Hydrar (SKC 226-17-1A) SI6T020549 0550	Hg-Elemental			
SI6T020551	16-05793-6-IN-BASE / Hydrar (SKC 226-17-1A) SI6T020552 0553	Hg-Elemental			
	16-05793-7-A1 / CISA (SKC 226-29)	NH3			
	16-05793-7-A2 / CISA (SKC 226-29)	NH3			
	16-05793-7-B1 / CISA (SKC 226-29)	NH3			
	16-05793-7-BLANK / CISA (SKC 226-29)	NH3			
	16-05793-7-C1 / CISA (SKC 226-29)	NH3			
Special Instructions:					
	Signature	Printed Name	Location	Date	Time
Delivered to Storage:	<i>David Gotschick</i>	DAVID GOTSCHICK	2704 #H104	7/10/16	0355
Retrieved from Storage:	<i>Brett Garver</i>	BRETT GARVER		7-12-16	0715
	Signature	Printed Name	Date	Time	
Relinquished By:	<i>Brett Garver</i>	BRETT GARVER	7-12-16	0925	
Received By:	<i>Teresa Forrester</i>	TERESA FORRESTER	7-12-16	0925	
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Additional Comments:					

**FINAL REPORT ON AMMONIA VAPOR TUBES
FOR CARTRIDGE EVALUATION
COLLECTED JULY 9 – 10, 2016**

Document No.: 20162011 Rev. 0

Michael A. Purcell
WAI Hanford Laboratory

Date Published
August 3, 2016



Prepared for:

Prepared by:

LAB # 184777



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1955 Jadwin Ave, Suite 330
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509-373-3240


August 3, 2016
Michael A. Purcell, WHL Project Coordinator

NARRATIVE

**FINAL REPORT ON AMMONIA VAPOR TUBES
FOR CARTRIDGE EVALUATION
COLLECTED JULY 9 - 10, 2016**

This final report presents the results of twenty-six ammonia vapor tubes received at the 222-S Laboratory on July 12, 2016, in good condition and with adequate paperwork. The samples were logged into sample delivery group 20162011.

DISCLAIMERS

- The information contained in this report is intended only for the use of the addressee and should be considered confidential.
- This report shall not be reproduced, except in full, without written approval of the laboratory.
- The results shown in this report pertain only to the actual samples tested.
- These results conform to the requirements specified in the referenced methods/procedures and specifications provided verbally or electronically by the customer. Any deviations or modifications are discussed in the following narrative.
- This report only addresses laboratory activities related to the listed surveys. Requirements or anomalies concerning field sampling are not addressed in this report.

PROCEDURES

Method	Preparation Procedure	Analysis Procedure
Ammonia by OSHA ID-188	LA-533-117, Rev. 3-1	LA-503-157, Rev. 2-5

ANALYTICAL SUMMARY

The vapor tubes were tested for ammonia, as specified on the chain of custody. Standard laboratory procedures for ion chromatography were followed as well as the requirements in WHL-MP-1029, *WHL Industrial Hygiene Quality Assurance Project Plan for 222-S Laboratory (QAPP)*. Program specific work authorization instructions have been provided for WRPS IH sample analysis through verbal and electronic communication with the customer point of contact, and are kept as a record by the laboratory. When applicable, any client communication specific to the samples in this report will be included herein. All quality control criteria in the QAPP were met.

The measurement uncertainty was estimated based on the historical behavior of laboratory control samples (LCS). The results of 373 LCS determinations indicate a mean recovery of 98% with a standard deviation of 3.3%. Statistical process control limits for the LCS are 88 - 107%, with no significant bias. The overall estimate of uncertainty is 6.7%, with coverage factor (k) = 2.

Due to background levels of ammonium (or interfering compounds) that are typically present in the media used in the sorbent tubes for collecting the vapor samples, positive results are obtained for the preparation blank. Laboratories typically correct the LCS and all field samples for these background levels, when detected. However, per agreement with the customer, no blank subtraction was performed. The client-requested reporting limit is 10 µg per sample, which makes the analysis of additional blanks and subsequent blank subtraction unnecessary. It is the

laboratory's opinion that including the media contribution, which is well below the client's requested reporting limit, provides results that are more conservative than when blank subtractions are performed. All the ammonia results for sample group 20162011 were below the reporting limit of 10 µg per sample, except for samples 16-05629-7-A1, 16-05793-7-A1, and 16-05793-7-H1. For these samples, the total result includes the contribution from the back resin portion even though the back resin portion result is lower than the reporting limit (see Attachment 1).

20162011 Rev. 0

Attachment 1

DATA SUMMARY REPORT

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DATA SUMMARY REPORT FOR SAMPLE GROUP 20162011

Customer Sample ID	Vapor Tube Portion	Laboratory Sample ID	Analyte	Result Unit	Standard % Recovery	Blank	Result	Reporting Limit
16-05629-7-A1	Total	S16T020076	Ammonia	ug/sample	n/a	<10.0	24.6	10.0
16-05629-7-A1	Front Resin	S16T020077	Ammonia	ug/sample	94.5	<10.0	24.0	10.0
16-05629-7-A1	Back Resin	S16T020078	Ammonia	ug/sample	94.5	<10.0	<10.0	10.0
16-05629-7-A2	Total	S16T020079	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05629-7-A2	Front Resin	S16T020080	Ammonia	ug/sample	94.5	<10.0	<10.0	10.0
16-05629-7-A2	Back Resin	S16T020081	Ammonia	ug/sample	94.5	<10.0	<10.0	10.0
16-05629-7-B1	Total	S16T020084	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05629-7-B1	Front Resin	S16T020086	Ammonia	ug/sample	94.5	<10.0	<10.0	10.0
16-05629-7-B1	Back Resin	S16T020087	Ammonia	ug/sample	94.5	<10.0	<10.0	10.0
16-05629-7-BLANK	Total	S16T020090	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05629-7-BLANK	Front Resin	S16T020091	Ammonia	ug/sample	94.5	<10.0	<10.0	10.0
16-05629-7-BLANK	Back Resin	S16T020092	Ammonia	ug/sample	94.5	<10.0	<10.0	10.0
16-05629-7-C1	Total	S16T020104	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05629-7-C1	Front Resin	S16T020112	Ammonia	ug/sample	94.5	<10.0	<10.0	10.0
16-05629-7-C1	Back Resin	S16T020113	Ammonia	ug/sample	94.5	<10.0	<10.0	10.0
16-05629-7-D1	Total	S16T020154	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05629-7-D1	Front Resin	S16T020155	Ammonia	ug/sample	94.5	<10.0	<10.0	10.0
16-05629-7-D1	Back Resin	S16T020156	Ammonia	ug/sample	94.5	<10.0	<10.0	10.0
16-05629-7-E1	Total	S16T020157	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05629-7-E1	Front Resin	S16T020158	Ammonia	ug/sample	94.5	<10.0	<10.0	10.0
16-05629-7-E1	Back Resin	S16T020159	Ammonia	ug/sample	94.5	<10.0	<10.0	10.0
16-05629-7-EFF-BASE	Total	S16T020160	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05629-7-EFF-BASE	Front Resin	S16T020161	Ammonia	ug/sample	94.5	<10.0	<10.0	10.0
16-05629-7-EFF-BASE	Back Resin	S16T020162	Ammonia	ug/sample	94.5	<10.0	<10.0	10.0
16-05629-7-F1	Total	S16T020319	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05629-7-F1	Front Resin	S16T020320	Ammonia	ug/sample	94.5	<10.0	<10.0	10.0
16-05629-7-F1	Back Resin	S16T020321	Ammonia	ug/sample	94.5	<10.0	<10.0	10.0
16-05629-7-G1	Total	S16T020322	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05629-7-G1	Front Resin	S16T020323	Ammonia	ug/sample	94.5	<10.0	<10.0	10.0
16-05629-7-G1	Back Resin	S16T020324	Ammonia	ug/sample	94.5	<10.0	<10.0	10.0
16-05629-7-H1	Total	S16T020325	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05629-7-H1	Front Resin	S16T020326	Ammonia	ug/sample	96.4	<10.0	<10.0	10.0
16-05629-7-H1	Back Resin	S16T020327	Ammonia	ug/sample	96.4	<10.0	<10.0	10.0
16-05629-7-H2	Total	S16T020328	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05629-7-H2	Front Resin	S16T020329	Ammonia	ug/sample	96.4	<10.0	<10.0	10.0
16-05629-7-H2	Back Resin	S16T020330	Ammonia	ug/sample	96.4	<10.0	<10.0	10.0
116-05629-7-IN-BASE	Total	S16T020331	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
116-05629-7-IN-BASE	Front Resin	S16T020332	Ammonia	ug/sample	96.4	<10.0	<10.0	10.0
116-05629-7-IN-BASE	Back Resin	S16T020333	Ammonia	ug/sample	96.4	<10.0	<10.0	10.0
16-05793-7-A1	Total	S16T020360	Ammonia	ug/sample	n/a	<10.0	30.5	10.0
16-05793-7-A1	Front Resin	S16T020361	Ammonia	ug/sample	96.4	<10.0	29.8	10.0
16-05793-7-A1	Back Resin	S16T020362	Ammonia	ug/sample	96.4	<10.0	<10.0	10.0
16-05793-7-A2	Total	S16T020363	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05793-7-A2	Front Resin	S16T020364	Ammonia	ug/sample	96.4	<10.0	<10.0	10.0
16-05793-7-A2	Back Resin	S16T020365	Ammonia	ug/sample	96.4	<10.0	<10.0	10.0
16-05793-7-B1	Total	S16T020379	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05793-7-B1	Front Resin	S16T020393	Ammonia	ug/sample	96.4	<10.0	<10.0	10.0
16-05793-7-B1	Back Resin	S16T020394	Ammonia	ug/sample	96.4	<10.0	<10.0	10.0

DATA SUMMARY REPORT FOR SAMPLE GROUP 20162011

Customer Sample ID	Vapor Tube Portion	Laboratory Sample ID	Analyte	Result Unit	Standard % Recovery	Blank	Result	Reporting Limit
16-05793-7-BLANK	Total	S16T020395	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05793-7-BLANK	Front Resin	S16T020396	Ammonia	ug/sample	96.4	<10.0	<10.0	10.0
16-05793-7-BLANK	Back Resin	S16T020397	Ammonia	ug/sample	96.4	<10.0	<10.0	10.0
16-05793-7-C1	Total	S16T020398	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05793-7-C1	Front Resin	S16T020399	Ammonia	ug/sample	96.4	<10.0	<10.0	10.0
16-05793-7-C1	Back Resin	S16T020400	Ammonia	ug/sample	96.4	<10.0	<10.0	10.0
16-05793-7-D1	Total	S16T020401	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05793-7-D1	Front Resin	S16T020402	Ammonia	ug/sample	96.4	<10.0	<10.0	10.0
16-05793-7-D1	Back Resin	S16T020403	Ammonia	ug/sample	96.4	<10.0	<10.0	10.0
16-05793-7-E1	Total	S16T020404	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05793-7-E1	Front Resin	S16T020405	Ammonia	ug/sample	88.5	<10.0	<10.0	10.0
16-05793-7-E1	Back Resin	S16T020406	Ammonia	ug/sample	88.5	<10.0	<10.0	10.0
16-05793-7-EFF-BASE	Total	S16T020407	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05793-7-EFF-BASE	Front Resin	S16T020408	Ammonia	ug/sample	88.5	<10.0	<10.0	10.0
16-05793-7-EFF-BASE	Back Resin	S16T020409	Ammonia	ug/sample	88.5	<10.0	<10.0	10.0
16-05793-7-F1	Total	S16T020410	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05793-7-F1	Front Resin	S16T020411	Ammonia	ug/sample	88.5	<10.0	<10.0	10.0
16-05793-7-F1	Back Resin	S16T020412	Ammonia	ug/sample	88.5	<10.0	<10.0	10.0
16-05793-7-G1	Total	S16T020413	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05793-7-G1	Front Resin	S16T020416	Ammonia	ug/sample	88.5	<10.0	<10.0	10.0
16-05793-7-G1	Back Resin	S16T020419	Ammonia	ug/sample	88.5	<10.0	<10.0	10.0
16-05793-7-H1	Total	S16T020429	Ammonia	ug/sample	n/a	<10.0	31.2	10.0
16-05793-7-H1	Front Resin	S16T020430	Ammonia	ug/sample	88.5	<10.0	30.7	10.0
16-05793-7-H1	Back Resin	S16T020431	Ammonia	ug/sample	88.5	<10.0	<10.0	10.0
16-05793-7-H2	Total	S16T020432	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05793-7-H2	Front Resin	S16T020433	Ammonia	ug/sample	88.5	<10.0	<10.0	10.0
16-05793-7-H2	Back Resin	S16T020434	Ammonia	ug/sample	88.5	<10.0	<10.0	10.0
16-05793-7-IN-BASE	Total	S16T020435	Ammonia	ug/sample	n/a	<10.0	<10.0	10.0
16-05793-7-IN-BASE	Front Resin	S16T020436	Ammonia	ug/sample	88.5	<10.0	<10.0	10.0
16-05793-7-IN-BASE	Back Resin	S16T020437	Ammonia	ug/sample	88.5	<10.0	<10.0	10.0

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Attachment 2

ANALYSIS DATE REPORT

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ANALYSIS DATE REPORT FOR SAMPLE GROUP 20162011

Laboratory Sample ID	Customer Sample ID	Method	Preparation Date	Analysis Date
S16T020077	16-05629-7-A1	Ammonia	07/21/2016 18:00	07/22/2016 13:29
S16T020078	16-05629-7-A1	Ammonia	07/21/2016 18:00	07/22/2016 13:52
S16T020080	16-05629-7-A2	Ammonia	07/21/2016 18:00	07/22/2016 14:15
S16T020081	16-05629-7-A2	Ammonia	07/21/2016 18:00	07/22/2016 14:38
S16T020086	16-05629-7-B1	Ammonia	07/21/2016 18:00	07/22/2016 15:01
S16T020087	16-05629-7-B1	Ammonia	07/21/2016 18:00	07/22/2016 15:24
S16T020091	16-05629-7-BLANK	Ammonia	07/21/2016 18:00	07/22/2016 16:57
S16T020092	16-05629-7-BLANK	Ammonia	07/21/2016 18:00	07/22/2016 17:20
S16T020112	16-05629-7-C1	Ammonia	07/21/2016 18:00	07/22/2016 17:43
S16T020113	16-05629-7-C1	Ammonia	07/21/2016 18:00	07/22/2016 18:06
S16T020155	16-05629-7-D1	Ammonia	07/21/2016 18:00	07/22/2016 18:30
S16T020156	16-05629-7-D1	Ammonia	07/21/2016 18:00	07/22/2016 18:53
S16T020158	16-05629-7-E1	Ammonia	07/21/2016 18:00	07/22/2016 19:16
S16T020159	16-05629-7-E1	Ammonia	07/21/2016 18:00	07/22/2016 19:39
S16T020161	16-05629-7-EFF-BASE	Ammonia	07/21/2016 18:00	07/22/2016 20:02
S16T020162	16-05629-7-EFF-BASE	Ammonia	07/21/2016 18:00	07/22/2016 20:25
S16T020320	16-05629-7-F1	Ammonia	07/21/2016 18:00	07/22/2016 21:58
S16T020321	16-05629-7-F1	Ammonia	07/21/2016 18:00	07/22/2016 22:21
S16T020323	16-05629-7-G1	Ammonia	07/21/2016 18:00	07/22/2016 22:44
S16T020324	16-05629-7-G1	Ammonia	07/21/2016 18:00	07/22/2016 23:07
S16T020326	16-05629-7-H1	Ammonia	07/21/2016 18:00	07/23/2016 02:12
S16T020327	16-05629-7-H1	Ammonia	07/21/2016 18:00	07/23/2016 02:36
S16T020329	16-05629-7-H2	Ammonia	07/21/2016 18:00	07/23/2016 02:59
S16T020330	16-05629-7-H2	Ammonia	07/21/2016 18:00	07/23/2016 03:22
S16T020332	116-05629-7-IN-BASE	Ammonia	07/21/2016 18:00	07/23/2016 03:45
S16T020333	116-05629-7-IN-BASE	Ammonia	07/21/2016 18:00	07/23/2016 04:08
S16T020361	16-05793-7-A1	Ammonia	07/21/2016 18:00	07/23/2016 05:41
S16T020362	16-05793-7-A1	Ammonia	07/21/2016 18:00	07/23/2016 06:04
S16T020364	16-05793-7-A2	Ammonia	07/21/2016 18:00	07/23/2016 06:27
S16T020365	16-05793-7-A2	Ammonia	07/21/2016 18:00	07/23/2016 06:50
S16T020393	16-05793-7-B1	Ammonia	07/21/2016 18:00	07/23/2016 07:13
S16T020394	16-05793-7-B1	Ammonia	07/21/2016 18:00	07/23/2016 07:37
S16T020396	16-05793-7-BLANK	Ammonia	07/21/2016 18:00	07/23/2016 08:00
S16T020397	16-05793-7-BLANK	Ammonia	07/21/2016 18:00	07/23/2016 08:23
S16T020399	16-05793-7-C1	Ammonia	07/21/2016 18:00	07/23/2016 08:46
S16T020400	16-05793-7-C1	Ammonia	07/21/2016 18:00	07/23/2016 09:09
S16T020402	16-05793-7-D1	Ammonia	07/21/2016 18:00	07/23/2016 10:42
S16T020403	16-05793-7-D1	Ammonia	07/21/2016 18:00	07/23/2016 11:05
S16T020405	16-05793-7-E1	Ammonia	07/22/2016 13:00	07/23/2016 02:13
S16T020406	16-05793-7-E1	Ammonia	07/22/2016 13:00	07/23/2016 02:30
S16T020408	16-05793-7-EFF-BASE	Ammonia	07/22/2016 13:00	07/23/2016 02:47
S16T020409	16-05793-7-EFF-BASE	Ammonia	07/22/2016 13:00	07/23/2016 03:03
S16T020411	16-05793-7-F1	Ammonia	07/22/2016 13:00	07/23/2016 03:20
S16T020412	16-05793-7-F1	Ammonia	07/22/2016 13:00	07/23/2016 03:37
S16T020416	16-05793-7-G1	Ammonia	07/22/2016 13:00	07/23/2016 04:45
S16T020419	16-05793-7-G1	Ammonia	07/22/2016 13:00	07/23/2016 05:02

ANALYSIS DATE REPORT FOR SAMPLE GROUP 20162011

Laboratory Sample ID	Customer Sample ID	Method	Preparation Date	Analysis Date
S16T020430	16-05793-7-H1	Ammonia	07/22/2016 13:00	07/23/2016 05:19
S16T020431	16-05793-7-H1	Ammonia	07/22/2016 13:00	07/23/2016 05:35
S16T020433	16-05793-7-H2	Ammonia	07/22/2016 13:00	07/23/2016 05:52
S16T020434	16-05793-7-H2	Ammonia	07/22/2016 13:00	07/23/2016 06:09
S16T020436	16-05793-7-IN-BASE	Ammonia	07/22/2016 13:00	07/23/2016 06:26
S16T020437	16-05793-7-IN-BASE	Ammonia	07/22/2016 13:00	07/23/2016 06:43

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Attachment 3

RECEIPT PAPERWORK

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222-S	SAMPLE RECEIPT AND CHAIN OF CUSTODY VERIFICATION CHECKLIST			ATS-LO-090-101 Rev <u>DG-1</u>
Date Samples Received: <u>7/12/16</u>		Total Number of Samples: <u>311</u>		Group #: <u>20162011-NH3</u>
Sample Custodian: <u>Sharon Holden</u>		IH Technician: <u>[Signature]</u> <u>7-12-16</u>		
Sample Custodian to Complete:				
Action	Yes	No	N/A	Comments
RSR provided?			<input checked="" type="checkbox"/>	
Verify GKI is complete			<input checked="" type="checkbox"/>	<input type="checkbox"/> In Project File
Received from an alpha facility?		<input checked="" type="checkbox"/>		<input type="checkbox"/> Contact PC for approval to release
Check that outer custody seal is intact, if present			<input checked="" type="checkbox"/>	
Record cooler temperature in centigrade, as appropriate	<u>2.14</u>			<input type="checkbox"/> Check if no cooler and/or no ice
Samples are intact and in good condition	<input checked="" type="checkbox"/>			If No, provide comments below
RSA/COC provided and complete containing the following information?				
• Client name and client sample number	<input checked="" type="checkbox"/>			
• Date and time of sampling	<input checked="" type="checkbox"/>			
• Sampling location or origin	<input checked="" type="checkbox"/>			
• Container type, size, and number	<input checked="" type="checkbox"/>			
• Preservatives (if used) noted on the COC/RSA and sample bottles			<input checked="" type="checkbox"/>	
• Analysis request is clear	<input checked="" type="checkbox"/>			
• Signature of persons relinquishing and receiving samples	<input checked="" type="checkbox"/>			
• Date and/or time of sample custody exchange	<input checked="" type="checkbox"/>			
Verify that sample numbers on containers match the COC and/or RSA	<input checked="" type="checkbox"/>			
Samples stored properly (e.g., refrigeration)	<input checked="" type="checkbox"/>			
Notify the PC immediately if any problems are noted. Any "No" checked boxes require PC resolution. For WRPS samples, the initials block below is completed by the responsible WRPS PC.				
Samples acceptable for release? <u>YOS</u>		PC/SC Initials <u>SLM</u>	Date <u>7-12-16</u>	
If No, comment on communication and resolution:		<u>CWF</u>	<u>7/12/16</u>	
<u>WRPS - Ship - 182</u>				
<u>- Pur - 77</u>				
<u>WHL - NH3 - 26</u>				
<u>Hg - 26</u>				
Number of IH Samples Received: <u>acetone/nitrite - 26</u>				
Aldehyde Screen: <u>26</u>	Amines: <u>26</u>	Ammonia: <u>26</u>	Aromatic HC: _____	Asbestos: _____
Beryllium: _____	Be-Bulk: _____	Be-Filter: _____	Be-Wipe: _____	1,3-Butadiene: <u>52</u>
Formaldehyde: _____	Furans: <u>26</u>	Mercury: <u>26</u>	Methanol: _____	Nitrosamines: <u>26</u>
Nitrous Oxide: _____	Pyridines: <u>26</u>	SVOA: <u>26</u>	VOA: <u>25</u>	Other-IH: _____

SWIHD - Chain of Custody

INDUSTRIAL HYGIENE CHAIN OF CUSTODY AND LABORATORY REQUEST

Contractor: Washington River Protection Solutions			Date Sampled: 07/09/2016		
CACN: 262003		COA: CB20	Survey No.: 16-05629 - Respirator Cartridge Testing SY Farm		
Contact Name: Jones, Parker L		Phone: (509)373-4966	Turnaround: N/A		
Return Report To: Caldwell, Joyce A			MSIN: R1-06	Phone: (509)376-0737	
Laboratory Log No.	Sample ID/Type/Description	Required Analysis			
	✓ 16-05629-6-H1 / Hydrar (SKC 226-17-1A) ✓ 	Hg-Elemental			
	✓ 16-05629-6-H2 / Hydrar (SKC 226-17-1A) ✓ 	Hg-Elemental			
	✓ 16-05629-6-IN-BASE / Hydrar (SKC 226-17-1A) ✓ 	Hg-Elemental			
516T020076	✓ 16-05629-7-A1 / CISA (SKC 226-29) ✓ S16T020077 0078	NH3			
516T020079	✓ 16-05629-7-A2 / CISA (SKC 226-29) ✓ S16T020080 0081	NH3			
516T020084	✓ 16-05629-7-B1 / CISA (SKC 226-29) ✓ S16T020086 0087	NH3			
516T020090	✓ 16-05629-7-BLANK / CISA (SKC 226-29) ✓ S16T020091 0092	NH3			
516T020104	✓ 16-05629-7-C1 / CISA (SKC 226-29) ✓ S16T0200112 0113	NH3			
Special Instructions:					
	Signature	Printed Name	Location	Date	Time
Delivered to Storage:		Gerrardo Saenz	2704/H104	7-9-16	0625
Retrieved from Storage:		BRETT GARNER		7-12-16	0900
	Signature	Printed Name	Date	Time	
Relinquished By:		BRETT GARNER	7-12-16	0921	
Received By:		Sharon L Holden	7-12-16	0925	
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Additional Comments:					

SWIHD - Chain of Custody

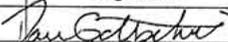
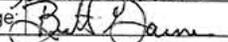
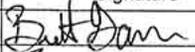
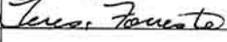
INDUSTRIAL HYGIENE CHAIN OF CUSTODY AND LABORATORY REQUEST



Contractor: Washington River Protection Solutions			Date Sampled: 07/09/2016		
CACN: 202003		COA: CB20	Survey No.: 16-05629 - Respirator Cartridge Testing SY Farm		
Contact Name: Jones, Parker L		Phone: (509)373-4966	Turnaround: N/A		
Return Report To: Caldwell, Joyce A			MSIN: R1-06	Phone: (509)376-0737	
Laboratory Log No.	Sample ID/Type/Description	Required Analysis			
S16T020154	16-05629-7-D1 / CISA (SKC 226-29) ✓ S16T020155 0156	NH3			
S16T020157	16-05629-7-E1 / CISA (SKC 226-29) ✓ S16T020158 0159	NH3			
S16T020160	16-05629-7-EFF-BASE / CISA (SKC 226-29) ✓ S16T020161 0162	NH3			
S16T020319	16-05629-7-F1 / CISA (SKC 226-29) ✓ S16T020320 0321	NH3			
S16T020322	16-05629-7-G1 / CISA (SKC 226-29) ✓ S16T020323 0324	NH3			
S16T020325	16-05629-7-H1 / CISA (SKC 226-29) ✓ S16T020326 0327	NH3			
S16T020328	16-05629-7-H2 / CISA (SKC 226-29) ✓ S16T020329 0330	NH3			
S16T020331	16-05629-7-IN-BASE / CISA (SKC 226-29) ✓ S16T020332 0333	NH3			
Special Instructions:					
	Signature	Printed Name	Location	Date	Time
Delivered to Storage:	<i>[Signature]</i>	Gerrardo Seanez	2704/H104	7-9-16	0625
Retrieved from Storage:	<i>[Signature]</i>	BRETT GARNER		7-12-16	0900
	Signature	Printed Name	Date	Time	
Relinquished By:	<i>[Signature]</i>	BRETT Garner	7-12-16	0925	
Received By:	<i>[Signature]</i>	Sharon L Holder	7-12-16	0925	
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Additional Comments:					

SWIHD - Chain of Custody

INDUSTRIAL HYGIENE CHAIN OF CUSTODY AND LABORATORY REQUEST

Contractor: Washington River Protection Solutions		Date Sampled: 7/10/16	
CACN: 202003	COA: CB20	Survey No.: 16-05793 - Respirator Cartridge Testing SY Farm	
Contact Name: Jones, Parker L	Phone: (509)373-4966	Turnaround: N/A	
Return Report To: Caldwell, Joyce A		MSIN: R1-06	Phone: (509)376-0737
Laboratory Log No.	Sample ID/Type/Description	Required Analysis	
	✓ 16-05793-6-H1 / Hydrar (SKC 226-17-1A) 	Hg-Elemental	
	✓ 16-05793-6-H2 / Hydrar (SKC 226-17-1A) 	Hg-Elemental	
	✓ 16-05793-6-IN-BASE / Hydrar (SKC 226-17-1A) 	Hg-Elemental	
516T020360	✓ 16-05793-7-A1 / CISA (SKC 226-29)  516T020361 0362	NH3	
516T020363	✓ 16-05793-7-A2 / CISA (SKC 226-29)  516T020364 0365	NH3	
516T020379	✓ 16-05793-7-B1 / CISA (SKC 226-29)  516T020393 0394	NH3	
516T020395	✓ 16-05793-7-BLANK / CISA (SKC 226-29)  516T020396 0397	NH3	
516T020398	✓ 16-05793-7-C1 / CISA (SKC 226-29)  516T020399 0400	NH3	
Special Instructions:			
	Signature	Printed Name	Location
Delivered to Storage:		DAVE GOTTSCHEK	2704 #H104
Retrieved from Storage:		BRETT GARNER	7-12-16
	Date	Time	
Delivered to Storage:	7/10/16	0355	
Retrieved from Storage:	7-12-16	0715	
	Signature	Printed Name	Date
Relinquished By:		BRETT GARNER	7-12-16
Received By:		TERESA FORRESTER	7-12-16
Relinquished By:			
Received By:			
Relinquished By:			
Received By:			
Additional Comments:			

SWIHD - Chain of Custody

INDUSTRIAL HYGIENE CHAIN OF CUSTODY AND LABORATORY REQUEST ★

Contractor: Washington River Protection Solutions			Date Sampled: 7-10-16		
CACN: 202003		COA: CB20	Survey No.: 16-05793 - Respirator Cartridge Testing SY Farm		
Contact Name: Jones, Parker L		Phone: (509)373-4966	Turnaround: N/A		
Return Report To: Caldwell, Joyce A			MSIN: R1-06	Phone: (509)376-0737	
Laboratory Log No.	Sample ID/Type/Description	Required Analysis			
S16T020401	16-05793-7-D1 / CISA (SKC 226-29) S16T020402 S16T020403	NH3			
S16T020404	16-05793-7-E1 / CISA (SKC 226-29) S16T020405 0406	NH3			
S16T020407	16-05793-7-EFF-BASE / CISA (SKC 226-29) S16T020408 0409	NH3			
S16T020410	16-05793-7-F1 / CISA (SKC 226-29) S16T020411 0412	NH3			
S16T020413	16-05793-7-G1 / CISA (SKC 226-29) S16T020416 0419	NH3			
S16T020429	16-05793-7-H1 / CISA (SKC 226-29) S16T020430 0431	NH3			
S16T020432	16-05793-7-H2 / CISA (SKC 226-29) S16T020433 0434	NH3			
S16T020435	16-05793-7-IN-BASE / CISA (SKC 226-29) S16T020436 0437	NH3			
Special Instructions:					
	Signature	Printed Name	Location	Date	Time
Delivered to Storage:	<i>[Signature]</i>	Paul Gotschick	2704 #4104	7/10/16	0335
Retrieved from Storage:	<i>[Signature]</i>	BRETT GARNER		7-12-16	0718
	Signature	Printed Name	Date	Time	
Relinquished By:	<i>[Signature]</i>	BRETT GARNER	7-12-16	0925	
Received By:	<i>[Signature]</i>	Leslie Ditz	7/12/16	9:25	
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Additional Comments:					



ANALYTICAL REPORT

Report Date: July 19, 2016

Robert (Buddy) Sosa
Washington River Protection So
PO Box 850, MSIN T6-02
Richland, WA 99352

Phone: (509) 373-1262

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20162027

Workorder: **34-1619687**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020267	Collected: 07/09/2016
Lab ID: 1619687001	Received: 07/14/2016
Sampling Location: CARTRIDGE EVALUATION	

Method: EPA TO-11A	Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)	Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided		

Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Formaldehyde	0.32	NA	NA	0.050
Acetaldehyde	0.29	NA	NA	0.050
Acetone	0.89	NA	NA	0.050
Acrolein	<0.050	NA	NA	0.050
Propionaldehyde	<0.050	NA	NA	0.050
Crotonaldehyde	<0.050	NA	NA	0.050
Butyraldehyde	0.10	NA	NA	0.050
Benzaldehyde	<0.050	NA	NA	0.050
Isovaleraldehyde	<0.050	NA	NA	0.050
Valeraldehyde	<0.050	NA	NA	0.050
m-Tolualdehyde	<0.050	NA	NA	0.050
p-Tolualdehyde	<0.050	NA	NA	0.050
o-Tolualdehyde	<0.050	NA	NA	0.050
Hexanal	<0.050	NA	NA	0.050
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050

Sample ID: S16T020268	Collected: 07/09/2016
Lab ID: 1619687002	Received: 07/14/2016
Sampling Location: CARTRIDGE EVALUATION	

Method: EPA TO-11A	Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)	Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided		

Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Formaldehyde	0.093	NA	NA	0.050
Acetaldehyde	0.24	NA	NA	0.050

Results Continued on Next Page

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ANALYTICAL REPORT

Workorder: 34-1619687
Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include Acetone, Acrolein, Propionaldehyde, Crotonaldehyde, Butyraldehyde, Benzaldehyde, Isovaleraldehyde, Valeraldehyde, m-Tolualdehyde, p-Tolualdehyde, o-Tolualdehyde, Hexanal, 2,5-Dimethylbenzaldehyde.

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include Formaldehyde, Acetaldehyde, Acetone, Acrolein, Propionaldehyde, Crotonaldehyde, Butyraldehyde, Benzaldehyde, Isovaleraldehyde, Valeraldehyde, m-Tolualdehyde, p-Tolualdehyde, o-Tolualdehyde, Hexanal, 2,5-Dimethylbenzaldehyde.



ANALYTICAL REPORT

Workorder: **34-1619687**
 Client Project ID: CARTRIDGE EVALUATION
 Purchase Order: 55502 Rel9
 Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020270		Collected: 07/09/2016		
Lab ID: 1619687004		Received: 07/14/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Formaldehyde	<0.050	NA	NA	0.050
Acetaldehyde	<0.050	NA	NA	0.050
Acetone	0.38	NA	NA	0.050
Acrolein	<0.050	NA	NA	0.050
Propionaldehyde	<0.050	NA	NA	0.050
Crotonaldehyde	<0.050	NA	NA	0.050
Butyraldehyde	<0.050	NA	NA	0.050
Benzaldehyde	<0.050	NA	NA	0.050
Isovaleraldehyde	<0.050	NA	NA	0.050
Valeraldehyde	<0.050	NA	NA	0.050
m-Tolualdehyde	<0.050	NA	NA	0.050
p-Tolualdehyde	<0.050	NA	NA	0.050
o-Tolualdehyde	<0.050	NA	NA	0.050
Hexanal	<0.050	NA	NA	0.050
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050

Sample ID: S16T020271		Collected: 07/09/2016		
Lab ID: 1619687005		Received: 07/14/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Formaldehyde	0.088	NA	NA	0.050
Acetaldehyde	0.33	NA	NA	0.050
Acetone	0.17	NA	NA	0.050
Acrolein	<0.050	NA	NA	0.050
Propionaldehyde	<0.050	NA	NA	0.050
Crotonaldehyde	<0.050	NA	NA	0.050
Butyraldehyde	<0.050	NA	NA	0.050
Benzaldehyde	<0.050	NA	NA	0.050
Isovaleraldehyde	<0.050	NA	NA	0.050
Valeraldehyde	<0.050	NA	NA	0.050
m-Tolualdehyde	<0.050	NA	NA	0.050
p-Tolualdehyde	<0.050	NA	NA	0.050
o-Tolualdehyde	<0.050	NA	NA	0.050
Hexanal	<0.050	NA	NA	0.050

Results Continued on Next Page



ANALYTICAL REPORT

Workorder: **34-1619687**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020271		Collected: 07/09/2016	
Lab ID: 1619687005	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm) RL (ug/sample)
2,5-Dimethylbenzaldehyde	<0.050	NA	NA 0.050

Sample ID: S16T020272		Collected: 07/09/2016	
Lab ID: 1619687006	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm) RL (ug/sample)
Formaldehyde	0.058	NA	NA 0.050
Acetaldehyde	0.27	NA	NA 0.050
Acetone	0.30	NA	NA 0.050
Acrolein	<0.050	NA	NA 0.050
Propionaldehyde	<0.050	NA	NA 0.050
Crotonaldehyde	<0.050	NA	NA 0.050
Butyraldehyde	<0.050	NA	NA 0.050
Benzaldehyde	<0.050	NA	NA 0.050
Isovaleraldehyde	<0.050	NA	NA 0.050
Valeraldehyde	<0.050	NA	NA 0.050
m-Tolualdehyde	<0.050	NA	NA 0.050
p-Tolualdehyde	<0.050	NA	NA 0.050
o-Tolualdehyde	<0.050	NA	NA 0.050
Hexanal	<0.050	NA	NA 0.050
2,5-Dimethylbenzaldehyde	<0.050	NA	NA 0.050

Sample ID: S16T020273		Collected: 07/09/2016	
Lab ID: 1619687007	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm) RL (ug/sample)
Formaldehyde	0.050	NA	NA 0.050
Acetaldehyde	0.18	NA	NA 0.050
Acetone	0.16	NA	NA 0.050
Acrolein	<0.050	NA	NA 0.050
Propionaldehyde	<0.050	NA	NA 0.050

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ANALYTICAL REPORT

Workorder: **34-1619687**
 Client Project ID: CARTRIDGE EVALUATION
 Purchase Order: 55502 Rel9
 Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020273		Collected: 07/09/2016	
Lab ID: 1619687007		Received: 07/14/2016	
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)
Crotonaldehyde	<0.050	NA	NA
Butyraldehyde	<0.050	NA	NA
Benzaldehyde	<0.050	NA	NA
Isovaleraldehyde	<0.050	NA	NA
Valeraldehyde	<0.050	NA	NA
m-Tolualdehyde	<0.050	NA	NA
p-Tolualdehyde	<0.050	NA	NA
o-Tolualdehyde	<0.050	NA	NA
Hexanal	<0.050	NA	NA
2,5-Dimethylbenzaldehyde	<0.050	NA	NA

Sample ID: S16T020274		Collected: 07/09/2016	
Lab ID: 1619687008		Received: 07/14/2016	
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)
Formaldehyde	0.064	NA	NA
Acetaldehyde	0.11	NA	NA
Acetone	0.23	NA	NA
Acrolein	<0.050	NA	NA
Propionaldehyde	<0.050	NA	NA
Crotonaldehyde	<0.050	NA	NA
Butyraldehyde	<0.050	NA	NA
Benzaldehyde	<0.050	NA	NA
Isovaleraldehyde	<0.050	NA	NA
Valeraldehyde	<0.050	NA	NA
m-Tolualdehyde	<0.050	NA	NA
p-Tolualdehyde	<0.050	NA	NA
o-Tolualdehyde	<0.050	NA	NA
Hexanal	<0.050	NA	NA
2,5-Dimethylbenzaldehyde	<0.050	NA	NA



ANALYTICAL REPORT

Workorder: 34-1619687
Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include Formaldehyde, Acetaldehyde, Acetone, Acrolein, Propionaldehyde, Crotonaldehyde, Butyraldehyde, Benzaldehyde, Isovaleraldehyde, Valeraldehyde, m-Tolualdehyde, p-Tolualdehyde, o-Tolualdehyde, Hexanal, 2,5-Dimethylbenzaldehyde.

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include Formaldehyde, Acetaldehyde, Acetone, Acrolein, Propionaldehyde, Crotonaldehyde, Butyraldehyde, Benzaldehyde, Isovaleraldehyde, Valeraldehyde, m-Tolualdehyde, p-Tolualdehyde, o-Tolualdehyde, Hexanal.

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ANALYTICAL REPORT

Workorder: 34-1619687
Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m^3), Result (ppm), RL (ug/sample). Row 1: 2,5-Dimethylbenzaldehyde, <0.050, NA, NA, 0.050.

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m^3), Result (ppm), RL (ug/sample). Rows include Formaldehyde (0.18), Acetaldehyde (0.11), Acetone (0.70), Acrolein (<0.050), Propionaldehyde (<0.050), Crotonaldehyde (<0.050), Butyraldehyde (<0.050), Benzaldehyde (<0.050), Isovaleraldehyde (<0.050), Valeraldehyde (<0.050), m-Tolualdehyde (<0.050), p-Tolualdehyde (<0.050), o-Tolualdehyde (<0.050), Hexanal (<0.050), 2,5-Dimethylbenzaldehyde (<0.050).

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m^3), Result (ppm), RL (ug/sample). Rows include Formaldehyde (<0.050), Acetaldehyde (0.11), Acetone (<0.050), Acrolein (<0.050), Propionaldehyde (<0.050).

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ANALYTICAL REPORT

Workorder: **34-1619687**
Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020278		Collected: 07/09/2016	
Lab ID: 1619687012		Received: 07/14/2016	
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)
Crotonaldehyde	<0.050	NA	NA
Butyraldehyde	<0.050	NA	NA
Benzaldehyde	<0.050	NA	NA
Isovaleraldehyde	<0.050	NA	NA
Valeraldehyde	<0.050	NA	NA
m-Tolualdehyde	<0.050	NA	NA
p-Tolualdehyde	<0.050	NA	NA
o-Tolualdehyde	<0.050	NA	NA
Hexanal	<0.050	NA	NA
2,5-Dimethylbenzaldehyde	<0.050	NA	NA

Sample ID: S16T020279		Collected: 07/09/2016	
Lab ID: 1619687013		Received: 07/14/2016	
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)
Formaldehyde	0.12	NA	NA
Acetaldehyde	0.13	NA	NA
Acetone	0.25	NA	NA
Acrolein	<0.050	NA	NA
Propionaldehyde	<0.050	NA	NA
Crotonaldehyde	<0.050	NA	NA
Butyraldehyde	<0.050	NA	NA
Benzaldehyde	<0.050	NA	NA
Isovaleraldehyde	<0.050	NA	NA
Valeraldehyde	<0.050	NA	NA
m-Tolualdehyde	<0.050	NA	NA
p-Tolualdehyde	<0.050	NA	NA
o-Tolualdehyde	<0.050	NA	NA
Hexanal	0.076	NA	NA
2,5-Dimethylbenzaldehyde	<0.050	NA	NA



ANALYTICAL REPORT

Workorder: 34-1619687

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020280		Collected: 07/10/2016	
Lab ID: 1619687014		Received: 07/14/2016	
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm) RL (ug/sample)
Formaldehyde	0.12	NA	NA 0.050
Acetaldehyde	0.17	NA	NA 0.050
Acetone	0.55	NA	NA 0.050
Acrolein	<0.050	NA	NA 0.050
Propionaldehyde	<0.050	NA	NA 0.050
Crotonaldehyde	<0.050	NA	NA 0.050
Butyraldehyde	0.074	NA	NA 0.050
Benzaldehyde	<0.050	NA	NA 0.050
Isovaleraldehyde	<0.050	NA	NA 0.050
Valeraldehyde	<0.050	NA	NA 0.050
m-Tolualdehyde	<0.050	NA	NA 0.050
p-Tolualdehyde	<0.050	NA	NA 0.050
o-Tolualdehyde	<0.050	NA	NA 0.050
Hexanal	<0.050	NA	NA 0.050
2,5-Dimethylbenzaldehyde	<0.050	NA	NA 0.050

Sample ID: S16T020281		Collected: 07/10/2016	
Lab ID: 1619687015		Received: 07/14/2016	
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm) RL (ug/sample)
Formaldehyde	0.060	NA	NA 0.050
Acetaldehyde	0.11	NA	NA 0.050
Acetone	0.16	NA	NA 0.050
Acrolein	<0.050	NA	NA 0.050
Propionaldehyde	<0.050	NA	NA 0.050
Crotonaldehyde	<0.050	NA	NA 0.050
Butyraldehyde	<0.050	NA	NA 0.050
Benzaldehyde	<0.050	NA	NA 0.050
Isovaleraldehyde	<0.050	NA	NA 0.050
Valeraldehyde	<0.050	NA	NA 0.050
m-Tolualdehyde	<0.050	NA	NA 0.050
p-Tolualdehyde	<0.050	NA	NA 0.050
o-Tolualdehyde	<0.050	NA	NA 0.050
Hexanal	<0.050	NA	NA 0.050

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ANALYTICAL REPORT

Workorder: **34-1619687**
 Client Project ID: CARTRIDGE EVALUATION
 Purchase Order: 55502 Rel9
 Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020281		Collected: 07/10/2016	
Lab ID: 1619687015	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm) RL (ug/sample)
2,5-Dimethylbenzaldehyde	<0.050	NA	NA 0.050

Sample ID: S16T020282		Collected: 07/10/2016	
Lab ID: 1619687016	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm) RL (ug/sample)
Formaldehyde	0.052	NA	NA 0.050
Acetaldehyde	0.16	NA	NA 0.050
Acetone	<0.050	NA	NA 0.050
Acrolein	<0.050	NA	NA 0.050
Propionaldehyde	<0.050	NA	NA 0.050
Crotonaldehyde	<0.050	NA	NA 0.050
Butyraldehyde	<0.050	NA	NA 0.050
Benzaldehyde	<0.050	NA	NA 0.050
Isovaleraldehyde	<0.050	NA	NA 0.050
Valeraldehyde	<0.050	NA	NA 0.050
m-Tolualdehyde	<0.050	NA	NA 0.050
p-Tolualdehyde	<0.050	NA	NA 0.050
o-Tolualdehyde	<0.050	NA	NA 0.050
Hexanal	<0.050	NA	NA 0.050
2,5-Dimethylbenzaldehyde	<0.050	NA	NA 0.050

Sample ID: S16T020283		Collected: 07/10/2016	
Lab ID: 1619687017	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm) RL (ug/sample)
Formaldehyde	0.093	NA	NA 0.050
Acetaldehyde	<0.050	NA	NA 0.050
Acetone	<0.050	NA	NA 0.050
Acrolein	<0.050	NA	NA 0.050
Propionaldehyde	<0.050	NA	NA 0.050

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ANALYTICAL REPORT

Workorder: 34-1619687
Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include Crotonaldehyde, Butyraldehyde, Benzaldehyde, Isovaleraldehyde, Valeraldehyde, m-Tolualdehyde, p-Tolualdehyde, o-Tolualdehyde, Hexanal, and 2,5-Dimethylbenzaldehyde.

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include Formaldehyde, Acetaldehyde, Acetone, Acrolein, Propionaldehyde, Crotonaldehyde, Butyraldehyde, Benzaldehyde, Isovaleraldehyde, Valeraldehyde, m-Tolualdehyde, p-Tolualdehyde, o-Tolualdehyde, Hexanal, and 2,5-Dimethylbenzaldehyde.



ANALYTICAL REPORT

Workorder: **34-1619687**
 Client Project ID: CARTRIDGE EVALUATION
 Purchase Order: 55502 Rel9
 Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020285	Collected: 07/10/2016			
Lab ID: 1619687019	Received: 07/14/2016			
Method: EPA TO-11A	Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)			
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Formaldehyde	<0.050	NA	NA	0.050
Acetaldehyde	0.14	NA	NA	0.050
Acetone	<0.050	NA	NA	0.050
Acrolein	<0.050	NA	NA	0.050
Propionaldehyde	<0.050	NA	NA	0.050
Crotonaldehyde	<0.050	NA	NA	0.050
Butyraldehyde	<0.050	NA	NA	0.050
Benzaldehyde	<0.050	NA	NA	0.050
Isovaleraldehyde	<0.050	NA	NA	0.050
Valeraldehyde	<0.050	NA	NA	0.050
m-Tolualdehyde	<0.050	NA	NA	0.050
p-Tolualdehyde	<0.050	NA	NA	0.050
o-Tolualdehyde	<0.050	NA	NA	0.050
Hexanal	<0.050	NA	NA	0.050
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050

Sample ID: S16T020286	Collected: 07/10/2016			
Lab ID: 1619687020	Received: 07/14/2016			
Method: EPA TO-11A	Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)			
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Formaldehyde	<0.050	NA	NA	0.050
Acetaldehyde	0.17	NA	NA	0.050
Acetone	0.071	NA	NA	0.050
Acrolein	<0.050	NA	NA	0.050
Propionaldehyde	<0.050	NA	NA	0.050
Crotonaldehyde	<0.050	NA	NA	0.050
Butyraldehyde	<0.050	NA	NA	0.050
Benzaldehyde	<0.050	NA	NA	0.050
Isovaleraldehyde	<0.050	NA	NA	0.050
Valeraldehyde	<0.050	NA	NA	0.050
m-Tolualdehyde	<0.050	NA	NA	0.050
p-Tolualdehyde	<0.050	NA	NA	0.050
o-Tolualdehyde	<0.050	NA	NA	0.050
Hexanal	<0.050	NA	NA	0.050

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ANALYTICAL REPORT

Workorder: **34-1619687**
 Client Project ID: CARTRIDGE EVALUATION
 Purchase Order: 55502 Rel9
 Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020286	Collected: 07/10/2016			
Lab ID: 1619687020	Received: 07/14/2016			
Sampling Location: CARTRIDGE EVALUATION				
Method: EPA TO-11A	Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)			
Analyzed: 07/15/2016				
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050

Sample ID: S16T020287	Collected: 07/10/2016			
Lab ID: 1619687021	Received: 07/14/2016			
Sampling Location: CARTRIDGE EVALUATION				
Method: EPA TO-11A	Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)			
Analyzed: 07/15/2016				
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Formaldehyde	0.053	NA	NA	0.050
Acetaldehyde	0.10	NA	NA	0.050
Acetone	<0.050	NA	NA	0.050
Acrolein	<0.050	NA	NA	0.050
Propionaldehyde	<0.050	NA	NA	0.050
Crotonaldehyde	<0.050	NA	NA	0.050
Butyraldehyde	<0.050	NA	NA	0.050
Benzaldehyde	<0.050	NA	NA	0.050
Isovaleraldehyde	<0.050	NA	NA	0.050
Valeraldehyde	<0.050	NA	NA	0.050
m-Tolualdehyde	<0.050	NA	NA	0.050
p-Tolualdehyde	<0.050	NA	NA	0.050
o-Tolualdehyde	<0.050	NA	NA	0.050
Hexanal	<0.050	NA	NA	0.050
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050

Sample ID: S16T020288	Collected: 07/10/2016			
Lab ID: 1619687022	Received: 07/14/2016			
Sampling Location: CARTRIDGE EVALUATION				
Method: EPA TO-11A	Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)			
Analyzed: 07/15/2016				
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Formaldehyde	<0.050	NA	NA	0.050
Acetaldehyde	0.11	NA	NA	0.050
Acetone	<0.050	NA	NA	0.050
Acrolein	<0.050	NA	NA	0.050
Propionaldehyde	<0.050	NA	NA	0.050

Results Continued on Next Page



ANALYTICAL REPORT

Workorder: **34-1619687**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020288		Collected: 07/10/2016	
Lab ID: 1619687022		Received: 07/14/2016	
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)
Crotonaldehyde	<0.050	NA	NA
Butyraldehyde	<0.050	NA	NA
Benzaldehyde	<0.050	NA	NA
Isovaleraldehyde	<0.050	NA	NA
Valeraldehyde	<0.050	NA	NA
m-Tolualdehyde	<0.050	NA	NA
p-Tolualdehyde	<0.050	NA	NA
o-Tolualdehyde	<0.050	NA	NA
Hexanal	<0.050	NA	NA
2,5-Dimethylbenzaldehyde	<0.050	NA	NA

Sample ID: S16T020289		Collected: 07/10/2016	
Lab ID: 1619687023		Received: 07/14/2016	
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)
Formaldehyde	<0.050	NA	NA
Acetaldehyde	0.091	NA	NA
Acetone	0.064	NA	NA
Acrolein	<0.050	NA	NA
Propionaldehyde	<0.050	NA	NA
Crotonaldehyde	<0.050	NA	NA
Butyraldehyde	<0.050	NA	NA
Benzaldehyde	<0.050	NA	NA
Isovaleraldehyde	<0.050	NA	NA
Valeraldehyde	<0.050	NA	NA
m-Tolualdehyde	<0.050	NA	NA
p-Tolualdehyde	<0.050	NA	NA
o-Tolualdehyde	<0.050	NA	NA
Hexanal	<0.050	NA	NA
2,5-Dimethylbenzaldehyde	<0.050	NA	NA



ANALYTICAL REPORT

Workorder: **34-1619687**
 Client Project ID: CARTRIDGE EVALUATION
 Purchase Order: 55502 Rel9
 Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020290		Collected: 07/10/2016	
Lab ID: 1619687024		Received: 07/14/2016	
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm) RL (ug/sample)
Formaldehyde	0.090	NA	NA 0.050
Acetaldehyde	0.11	NA	NA 0.050
Acetone	0.42	NA	NA 0.050
Acrolein	<0.050	NA	NA 0.050
Propionaldehyde	<0.050	NA	NA 0.050
Crotonaldehyde	<0.050	NA	NA 0.050
Butyraldehyde	0.062	NA	NA 0.050
Benzaldehyde	<0.050	NA	NA 0.050
Isovaleraldehyde	<0.050	NA	NA 0.050
Valeraldehyde	<0.050	NA	NA 0.050
m-Tolualdehyde	<0.050	NA	NA 0.050
p-Tolualdehyde	<0.050	NA	NA 0.050
o-Tolualdehyde	<0.050	NA	NA 0.050
Hexanal	<0.050	NA	NA 0.050
2,5-Dimethylbenzaldehyde	<0.050	NA	NA 0.050

Sample ID: S16T020291		Collected: 07/10/2016	
Lab ID: 1619687025		Received: 07/14/2016	
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm) RL (ug/sample)
Formaldehyde	<0.050	NA	NA 0.050
Acetaldehyde	0.082	NA	NA 0.050
Acetone	<0.050	NA	NA 0.050
Acrolein	<0.050	NA	NA 0.050
Propionaldehyde	<0.050	NA	NA 0.050
Crotonaldehyde	<0.050	NA	NA 0.050
Butyraldehyde	<0.050	NA	NA 0.050
Benzaldehyde	<0.050	NA	NA 0.050
Isovaleraldehyde	<0.050	NA	NA 0.050
Valeraldehyde	<0.050	NA	NA 0.050
m-Tolualdehyde	<0.050	NA	NA 0.050
p-Tolualdehyde	<0.050	NA	NA 0.050
o-Tolualdehyde	<0.050	NA	NA 0.050
Hexanal	<0.050	NA	NA 0.050

Results Continued on Next Page



ANALYTICAL REPORT

Workorder: **34-1619687**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020291		Collected: 07/10/2016		
Lab ID: 1619687025		Received: 07/14/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Analyzed: 07/15/2016				
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050

Sample ID: S16T020292		Collected: 07/10/2016		
Lab ID: 1619687026		Received: 07/14/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Analyzed: 07/15/2016				
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Formaldehyde	0.099	NA	NA	0.050
Acetaldehyde	0.14	NA	NA	0.050
Acetone	0.090	NA	NA	0.050
Acrolein	<0.050	NA	NA	0.050
Propionaldehyde	<0.050	NA	NA	0.050
Crotonaldehyde	<0.050	NA	NA	0.050
Butyraldehyde	<0.050	NA	NA	0.050
Benzaldehyde	<0.050	NA	NA	0.050
Isovaleraldehyde	<0.050	NA	NA	0.050
Valeraldehyde	<0.050	NA	NA	0.050
m-Tolualdehyde	<0.050	NA	NA	0.050
p-Tolualdehyde	<0.050	NA	NA	0.050
o-Tolualdehyde	<0.050	NA	NA	0.050
Hexanal	0.17	NA	NA	0.050
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050

Comments

Quality Control: EPA TO-11A - (HBN: 172902)

LMB used to media correct LCS/LCSD and field samples for Acetone only.

Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Method	Analyst	Peer Review
EPA TO-11A	/S/ David Teynor 07/18/2016 11:33	/S/ Lyle Edwards 07/19/2016 10:45

Laboratory Contact Information

ALS Environmental
960 W Levoe Drive
Salt Lake City, Utah 84123

Phone: (801) 266-7700
Email: alsst.lab@ALSGlobal.com
Web: www.alsl.com



ANALYTICAL REPORT

Workorder: 34-1619687
Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

General Lab Comments

The results provided in this report relate only to the items tested.
Samples were received in acceptable condition unless otherwise noted.
Samples have not been blank corrected unless otherwise noted.
This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

Table with 4 columns: Testing Sector, Accreditation Body (Standard), Certificate Number, Website. Rows include Environmental, Industrial Hygiene, Lead Testing (CPSC, Soil, Dust, Paint, Air), and Dietary Supplements.

Definitions

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method/media/instrument sensitivity.
LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity.
ND = Not Detected, Testing result not detected above the LOD or LOQ.
NA = Not Applicable.
** No result could be reported, see sample comments for details.
< This testing result is less than the numerical value.
() This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.

ALS Environmental certifies this analytical report is in compliance with the Hanford SOW, both technically and for completeness. Release of the data contained in this report has been electronically authorized by the following laboratory representative:

Rand Potter, Project Manager, ALS Environmental



Quality Control Sample Batch Report

Analysis Information

Workorder: 1619687

Limits: Historical/Performance
Basis: ALS Laboratory Group

Preparation: NA
Batch: NA
Prepared By: NA

Analysis: EPA TO-11A
Batch: ILC/12274 (HBN: 172902)
Analyzed By: David Teynor

Blank

LMB: 508333			
Analyzed: 07/15/2016 00:00			
Units: ug/sample			
Analyte	Result	MDL	RL
Formaldehyde	ND	NA	0.0500
Acetaldehyde	ND	NA	0.0500
Acetone	0.203	NA	0.0500
Acrolein	ND	NA	0.0500
Propionaldehyde	ND	NA	0.0500
Crotonaldehyde	ND	NA	0.0500
Butyraldehyde	ND	NA	0.0500
Benzaldehyde	ND	NA	0.0500
Isovaleraldehyde	ND	NA	0.0500
Valeraldehyde	ND	NA	0.0500
m-Tolualdehyde	ND	NA	0.0500
p-Tolualdehyde	ND	NA	0.0500
o-Tolualdehyde	ND	NA	0.0500
Hexanal	ND	NA	0.0500
2,5-Dimethylbenzaldehyde	ND	NA	0.0500

LMB: 508336			
Analyzed: 07/15/2016 00:00			
Units: ug/sample			
Analyte	Result	MDL	RL
Formaldehyde	ND	NA	0.0500
Acetaldehyde	ND	NA	0.0500
Acetone	0.217	NA	0.0500
Acrolein	ND	NA	0.0500
Propionaldehyde	ND	NA	0.0500
Crotonaldehyde	ND	NA	0.0500
Butyraldehyde	ND	NA	0.0500
Benzaldehyde	ND	NA	0.0500
Isovaleraldehyde	ND	NA	0.0500
Valeraldehyde	ND	NA	0.0500
m-Tolualdehyde	ND	NA	0.0500
p-Tolualdehyde	ND	NA	0.0500
o-Tolualdehyde	ND	NA	0.0500
Hexanal	ND	NA	0.0500
2,5-Dimethylbenzaldehyde	ND	NA	0.0500



Quality Control Sample Batch Report

Analysis Information

Workorder: 1619687

Limits: Historical/Performance
Basis: ALS Laboratory Group

Preparation: NA
Batch: NA
Prepared By: NA

Analysis: EPA TO-11A
Batch: ILC/12274 (HBN: 172902)
Analyzed By: David Teynor

Laboratory Control Sample - Laboratory Control Sample Duplicate

LCS: 508334 Analyzed: 07/15/2016 00:00 Dilution: 1 Units: ug/sample					LCSD: 508335 Analyzed: 07/15/2016 00:00 Dilution: 1 Units: ug/sample				
Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
Formaldehyde	2.95	3.00	98.3	87.8 116.8	2.95	98.3	0.00	0.0 20.0	
Acetaldehyde	2.97	3.00	99.0	94.7 110.5	2.95	98.3	0.676	0.0 20.0	
Acetone	2.82	3.00	93.9	69.2 119.9	2.83	94.2	0.354	0.0 20.0	
Acrolein	2.88	3.00	96.0	83.5 120.2	2.86	95.3	0.697	0.0 20.0	
Propionaldehyde	3.08	3.00	103	92.2 117.2	3.08	103	0.00	0.0 20.0	
Crotonaldehyde	3.00	3.00	100	93.1 114.8	2.95	98.3	1.68	0.0 20.0	
Butyraldehyde	3.05	3.00	102	86.6 120.8	2.97	99.0	2.66	0.0 20.0	
Benzaldehyde	3.03	3.00	101	96.0 112.3	2.98	99.3	1.66	0.0 20.0	
Isovaleraldehyde	3.16	3.00	105	95.4 121.6	3.11	104	1.59	0.0 20.0	
Valeraldehyde	2.96	3.00	98.7	85.3 120.4	2.97	99.0	0.337	0.0 20.0	
m-Tolualdehyde	3.21	3.00	107	80.9 118.6	3.06	102	4.78	0.0 20.0	
p-Tolualdehyde	2.70	3.00	90.0	83.5 122.2	2.77	92.3	2.56	0.0 20.0	
o-Tolualdehyde	2.96	3.00	98.7	91.6 111.4	2.97	99.0	0.337	0.0 20.0	
Hexanal	3.05	3.00	102	85.4 127.6	3.11	104	1.95	0.0 20.0	
2,5-Dimethylbenzaldehyde	3.12	3.00	104	99.6 118.7	3.22	107	3.15	0.0 20.0	

LCS: 508337 Analyzed: 07/15/2016 00:00 Dilution: 1 Units: ug/sample					LCSD: 508338 Analyzed: 07/15/2016 00:00 Dilution: 1 Units: ug/sample				
Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
Formaldehyde	2.95	3.00	98.3	87.8 116.8	2.97	99.0	0.676	0.0 20.0	
Acetaldehyde	2.97	3.00	99.0	94.7 110.5	3.01	100	1.34	0.0 20.0	
Acetone	2.81	3.00	93.6	69.2 119.9	2.85	94.9	1.41	0.0 20.0	
Acrolein	2.87	3.00	95.7	83.5 120.2	2.88	96.0	0.348	0.0 20.0	
Propionaldehyde	3.09	3.00	103	92.2 117.2	3.13	104	1.29	0.0 20.0	
Crotonaldehyde	2.96	3.00	98.7	93.1 114.8	2.94	98.0	0.678	0.0 20.0	
Butyraldehyde	3.03	3.00	101	86.6 120.8	3.07	102	1.31	0.0 20.0	
Benzaldehyde	3.05	3.00	102	96.0 112.3	3.03	101	0.658	0.0 20.0	
Isovaleraldehyde	3.17	3.00	106	95.4 121.6	3.22	107	1.56	0.0 20.0	
Valeraldehyde	3.07	3.00	102	85.3 120.4	3.05	102	0.654	0.0 20.0	
m-Tolualdehyde	3.16	3.00	105	80.9 118.6	3.25	108	2.81	0.0 20.0	
p-Tolualdehyde	2.74	3.00	91.3	83.5 122.2	2.66	88.7	2.96	0.0 20.0	
o-Tolualdehyde	3.00	3.00	100	91.6 111.4	3.14	105	4.56	0.0 20.0	
Hexanal	3.33	3.00	111	85.4 127.6	3.37	112	1.19	0.0 20.0	
2,5-Dimethylbenzaldehyde	3.21	3.00	107	99.6 118.7	3.26	109	1.55	0.0 20.0	

Comments

LMB used to media correct LCS/LCSD and field samples for Acetone only.



Quality Control Sample Batch Report

Analysis Information

Workorder: **1619687**

Limits: Historical/Performance
Basis: ALS Laboratory Group

Preparation: NA
Batch: NA
Prepared By: NA

Analysis: EPA TO-11A
Batch: ILC/12274 (HBN: 172902)
Analyzed By: David Teynor

QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Analyst	Peer Review
/S/ David Teynor 07/18/2016 11:33	/S/ Lyle Edwards 07/19/2016 10:45

Symbols and Definitions

- * - Analyte above reporting limit or outside of control limits
- ▲ - Sample result is greater than 4 times the spike added
- - Sample and Matrix Duplicate less than 5 times the reporting limit
- - Result is above the calibration range

RPD - Relative % Difference (Spike / Spike Duplicate)
ND - Not Detected (U - Qualifier also flags analyte as not detected)
NA - Not Applicable
QC results are not adjusted for moisture correction, where applicable

14/487

1619687

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. No. 20162027
Page 1 of 3

Telephone No. 773-6861
MSIN # 26-05 FAX 372-1878

Sample Origin: 203037020
Purchase Order/Change Code: 203037020

Temp. ON Ice

ICD Chest No. WTS-033

Bill of Lading/Air Bill No. 776735521683

Perfs and Return No. 41011

Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis	Preservative
	S16T020267	VA 7/9/16		SILICA GEL	Aldehyde 16-05629-8-A1	25C or low
	S16T020268	VA 7/9/16		SILICA GEL	Aldehyde 16-05629-8-A2	25C or low
	S16T020269	VA 7/9/16		SILICA GEL	Aldehyde 16-05629-8-B1	25C or low
	S16T020270	VA 7/9/16		SILICA GEL	Aldehyde 16-05629-8-BLANK	25C or low
	S16T020271	VA 7/9/16		SILICA GEL	Aldehyde 16-05629-8-C1	25C or low
	S16T020272	VA 7/9/16		SILICA GEL	Aldehyde 16-05629-8-D1	25C or low
	S16T020273	VA 7/9/16		SILICA GEL	Aldehyde 16-05629-8-E1	25C or low
	S16T020274	VA 7/9/16		SILICA GEL	Aldehyde 16-05629-8-EFF-BASE	25C or low
	S16T020275	VA 7/9/16		SILICA GEL	Aldehyde 16-05629-8-F1	25C or low
	S16T020276	VA 7/9/16		SILICA GEL	Aldehyde 16-05629-8-G1	25C or low

MSDS Yes No

POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes)

SPECIAL INSTRUCTIONS
Send Results to Carl Howald IV & Greg Moore
Carl.W.Howald@epa.gov and
Gregory.S.Moore@epa.gov see SOW for email

Release #
Reference Contract # 55502
NIOSH 2015 ROD

Hold Time

Received By	Print	Sign	Date/Time	Matrix*
Relinquished By	Julie Greeshan	Julie Greeshan	7-13-16 0830	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids
Relinquished By	Michelle Moore	Michelle Moore	07-14-16 9:05	DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation VA = Vapor X = Other
Relinquished By				

Disposal Method (e.g., Return to customer, per lab procedure used in process)

Disposed By: DOT
Consumed

Date/Time: 07/15/16 14:00

All samples containing hazardous materials shall be picked up by requestor and returned to parent container or site of origin.

C.O.C. No. 20162027
Page 2 of 3

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Telephone No. 373-6861 MSN 16-05 FAX 372-1878
 Contact/Requestor CARL HOWARD IV
 Purchase Order/Charge Code 202003/CR20
 Sample Origin EVALUATION
 SAF No. N/A
 Logbook/Work Package No. N/A
 Project Title EVALUATION
 Method of Shipment N/A
 Shipped To (Lab) ALS
 Protocol N/A
 Date Turnaround 10 DAYS
 Ice Chest No. ON ICE
 Bill of Lading/AF Bill No. 7767 3552 1683
 Parts and Return No. 41011

Sample No.	Lab ID	Date	Time	No./Type Container	Sample/Analysis	Preservative
	S16T020277	VA 7/9/16		SILICA GEL	Aldehyde 16-05623-8-H1	25C or Low
	S16T020278	VA 7/9/16		SILICA GEL	Aldehyde 16-05623-8-H2	25C or Low
	S16T020279	VA 7/9/16		SILICA GEL	Aldehyde 16-05623-8-IN-BASE	25C or Low
	S16T020280	VA 7/10/16		SILICA GEL	Aldehyde 16-05793-8-A1	25C or Low
	S16T020281	VA 7/10/16		SILICA GEL	Aldehyde 16-05793-8-A2	25C or Low
	S16T020282	VA 7/10/16		SILICA GEL	Aldehyde 16-05793-8-B1	25C or Low
	S16T020283	VA 7/10/16		SILICA GEL	Aldehyde 16-05793-8-BLANK	25C or Low
	S16T020284	VA 7/10/16		SILICA GEL	Aldehyde 16-05793-8-C1	25C or Low
	S16T020285	VA 7/10/16		SILICA GEL	Aldehyde 16-05793-8-D1	25C or Low
	S16T020286	VA 7/10/16		SILICA GEL	Aldehyde 16-05793-8-E1	25C or Low

POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes) MSDS Yes No
 EPA 20-11A

SPECIAL INSTRUCTIONS
 Send Results to Carl Howard IV & Greg Moore
 Carl.W.Howard@va.gov and
 Gregory_S_Moore@va.gov see SOW for email

Release # Contract # 55502
 NIOSH 2016 M02

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Sharon L. Holton	Sharon L. Holton	Sharon L. Holton	7-13-16 08:30	Carl W. Howard	Carl W. Howard	Carl W. Howard	7-13-16 08:30
WRPS	WRPS	Jillie Cochran	7-13-16 1400	FEDEX	FEDEX	FEDEX	

Relinquished By: Received By: Date/Time: Sign: Date/Time: Mark:

Relinquished By: Received By: Date/Time: Sign: Date/Time: Mark:

Relinquished By: Received By: Date/Time: Sign: Date/Time: Mark:

Disposal Method (e.g., Return to customer, per lab procedure, used in process) **DOT**
 Disposed By: **CONSUMED**
 Date/Time: 07/19/16 14:00

A-8003-982 (03/05)



ANALYTICAL REPORT

Report Date: July 18, 2016

Robert (Buddy) Sosa
Washington River Protection So
PO Box 850, MSIN T6-02
Richland, WA 99352

Phone: (509) 373-1262

E-mail: robert_w_sosa@rl.gov
20162024

Workorder: 34-1619682

Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020163		Collected: 07/09/2016		
Lab ID: 1619682001	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020164		Collected: 07/09/2016		
Lab ID: 1619682002	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020165		Collected: 07/09/2016		
Lab ID: 1619682003	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020166		Collected: 07/09/2016		
Lab ID: 1619682004	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

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Mon, 07/18/16 8:12 AM



ANALYTICAL REPORT

Workorder: 34-1619682
Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: 1,3-Butadiene, <0.0010, NA, NA, 0.0010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: 1,3-Butadiene, <0.0010, NA, NA, 0.0010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: 1,3-Butadiene, <0.0010, NA, NA, 0.0010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: 1,3-Butadiene, <0.0010, NA, NA, 0.0010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: 1,3-Butadiene, <0.0010, NA, NA, 0.0010.



ANALYTICAL REPORT

Workorder: **34-1619682**
 Client Project ID: CARTRIDGE EVALUATION
 Purchase Order: 55502 Rel9
 Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020172		Collected: 07/09/2016		
Lab ID: 1619682010	Sampling Location: CARTRIDGE EVALUATION			Received: 07/14/2016
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020173		Collected: 07/09/2016		
Lab ID: 1619682011	Sampling Location: CARTRIDGE EVALUATION			Received: 07/14/2016
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020174		Collected: 07/09/2016		
Lab ID: 1619682012	Sampling Location: CARTRIDGE EVALUATION			Received: 07/14/2016
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020175		Collected: 07/09/2016		
Lab ID: 1619682013	Sampling Location: CARTRIDGE EVALUATION			Received: 07/14/2016
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020176		Collected: 07/09/2016		
Lab ID: 1619682014	Sampling Location: CARTRIDGE EVALUATION			Received: 07/14/2016
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010



ANALYTICAL REPORT

Workorder: 34-1619682
Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: 1,3-Butadiene, <0.0010, NA, NA, 0.0010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: 1,3-Butadiene, <0.0010, NA, NA, 0.0010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: 1,3-Butadiene, <0.0010, NA, NA, 0.0010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: 1,3-Butadiene, <0.0010, NA, NA, 0.0010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: 1,3-Butadiene, <0.0010, NA, NA, 0.0010.



ANALYTICAL REPORT

Workorder: **34-1619682**
Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020182		Collected: 07/09/2016		
Lab ID: 1619682020	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020183		Collected: 07/09/2016		
Lab ID: 1619682021	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020184		Collected: 07/09/2016		
Lab ID: 1619682022	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020185		Collected: 07/09/2016		
Lab ID: 1619682023	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020186		Collected: 07/09/2016		
Lab ID: 1619682024	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010



ANALYTICAL REPORT

Workorder: **34-1619682**
 Client Project ID: CARTRIDGE EVALUATION
 Purchase Order: 55502 Rel9
 Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020187		Collected: 07/09/2016		
Lab ID: 1619682025	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020188		Collected: 07/09/2016		
Lab ID: 1619682026	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020189		Collected: 07/10/2016		
Lab ID: 1619682027	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020190		Collected: 07/10/2016		
Lab ID: 1619682028	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020191		Collected: 07/10/2016		
Lab ID: 1619682029	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010



ANALYTICAL REPORT

Workorder: 34-1619682
Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: 1,3-Butadiene, <0.0010, NA, NA, 0.0010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: 1,3-Butadiene, <0.0010, NA, NA, 0.0010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: 1,3-Butadiene, <0.0010, NA, NA, 0.0010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: 1,3-Butadiene, <0.0010, NA, NA, 0.0010.

Table with 5 columns: Analyte, Result (mg/sample), Result (mg/m³), Result (ppm), RL (mg/sample). Row 1: 1,3-Butadiene, <0.0010, NA, NA, 0.0010.



ANALYTICAL REPORT

Workorder: **34-1619682**
 Client Project ID: CARTRIDGE EVALUATION
 Purchase Order: 55502 Rel9
 Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020197		Collected: 07/10/2016		
Lab ID: 1619682035	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020198		Collected: 07/10/2016		
Lab ID: 1619682036	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020199		Collected: 07/10/2016		
Lab ID: 1619682037	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020200		Collected: 07/10/2016		
Lab ID: 1619682038	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020201		Collected: 07/10/2016		
Lab ID: 1619682039	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010



ANALYTICAL REPORT

Workorder: **34-1619682**
 Client Project ID: CARTRIDGE EVALUATION
 Purchase Order: 55502 Rel9
 Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020202		Collected: 07/10/2016		
Lab ID: 1619682040	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020203		Collected: 07/10/2016		
Lab ID: 1619682041	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020204		Collected: 07/10/2016		
Lab ID: 1619682042	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020205		Collected: 07/10/2016		
Lab ID: 1619682043	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020206		Collected: 07/10/2016		
Lab ID: 1619682044	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010



ANALYTICAL REPORT

Workorder: **34-1619682**
Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020207		Collected: 07/10/2016		
Lab ID: 1619682045	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020208		Collected: 07/10/2016		
Lab ID: 1619682046	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020209		Collected: 07/10/2016		
Lab ID: 1619682047	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020210		Collected: 07/10/2016		
Lab ID: 1619682048	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020211		Collected: 07/10/2016		
Lab ID: 1619682049	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010



ANALYTICAL REPORT

Workorder: **34-1619682**
 Client Project ID: CARTRIDGE EVALUATION
 Purchase Order: 55502 Rel9
 Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020212		Collected: 07/10/2016		
Lab ID: 1619682050	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020213		Collected: 07/10/2016		
Lab ID: 1619682051	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T020214		Collected: 07/10/2016		
Lab ID: 1619682052	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		Analyzed: 07/15/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m ³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Method	Analyst	Peer Review
NIOSH 1024	/S/ Fred Rejali 07/16/2016 12:07	/S/ Thomas J. Masoian 07/18/2016 08:06

Laboratory Contact Information

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ANALYTICAL REPORT

Workorder: **34-1619682**
 Client Project ID: CARTRIDGE EVALUATION
 Purchase Order: 55502 Rel9
 Project Manager: Rand Potter

General Lab Comments

The results provided in this report relate only to the items tested.
 Samples were received in acceptable condition unless otherwise noted.
 Samples have not been blank corrected unless otherwise noted.
 This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

Testing Sector	Accreditation Body (Standard)	Certificate Number	Website
Environmental	ACLASS (DoD ELAP)	ADE-1420	http://www.aiclasscorp.com
	Utah (NELAC)	DATA1	http://health.utah.gov/lab/labimp/
	Nevada	UT00009	http://ndep.nv.gov/bsdwlabservice.htm
	Oklahoma	UT00009	http://www.deq.state.ok.us/CSDnew/
	Iowa	IA# 376	http://www.iowadnr.gov/InsideDNR/RegulatoryWater.aspx
	Florida (TNI)	E871067	http://www.dep.state.fl.us/labs/bars/sas/qa/
	Texas (TNI)	T104704456-11-1	http://www.tceq.texas.gov/field/qa/lab_accred_certif.html
Industrial Hygiene	AIHA-LAP, LLC (ISO 17025 and AIHA-LAP, LLC IHLAP/ELLAP)	101574	http://www.aihaaccreditedlabs.org
Lead Testing:			
CPSC	ACLASS (ISO 17025, CPSC)	ADE-1420	http://www.aiclasscorp.com
Soil, Dust, Paint, Air	AIHA-LAP, LLC (ISO 17025, AIHA-LAP, LLC ELLAP and NLLAP)	101574	http://www.aihaaccreditedlabs.org
Dietary Supplements	ACLASS (ISO 17025)	ADE-1420	http://www.aiclasscorp.com

Definitions

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method/media/instrument sensitivity.
 LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity.
 ND = Not Detected, Testing result not detected above the LOD or LOQ.
 NA = Not Applicable.
 ** No result could be reported, see sample comments for details.
 < This testing result is less than the numerical value.
 () This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.

ALS Environmental certifies this analytical report is in compliance with the Hanford SOW, both technically and for completeness. Release of the data contained in this report has been electronically authorized by the following laboratory representative:

Rand Potter, Project Manager, ALS Environmental



Quality Control Sample Batch Report

Analysis Information

Workorder: 1619682		
Limits: Historical/Performance	Preparation: NA	Analysis: NIOSH 1024
Basis: ALS Laboratory Group	Batch: NA	Batch: IFID/7597 (HBN: 172937)
	Prepared By: NA	Analyzed By: Fred Rejali

Blank

MB: 508425			
Analyzed: 07/15/2016 00:00			
Units: mg/sample			

Analyte	Result	MDL	RL
1,3-Butadiene	ND	NA	0.00100

MB: 508460			
Analyzed: 07/15/2016 00:00			
Units: mg/sample			

Analyte	Result	MDL	RL
1,3-Butadiene	ND	NA	0.00100

MB: 508463			
Analyzed: 07/15/2016 00:00			
Units: mg/sample			

Analyte	Result	MDL	RL
1,3-Butadiene	ND	NA	0.00100

Laboratory Control Sample - Laboratory Control Sample Duplicate

LCS: 508426					LCSD: 508427				
Analyzed: 07/15/2016 00:00					Analyzed: 07/15/2016 00:00				
Dilution: 1					Dilution: 1				
Units: mg/sample					Units: mg/sample				

Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits
1,3-Butadiene	0.0304	0.0308	98.6	78.0 117.6	0.0314	102	3.40	0.0 20.0

LCS: 508461					LCSD: 508462				
Analyzed: 07/15/2016 00:00					Analyzed: 07/15/2016 00:00				
Dilution: 1					Dilution: 1				
Units: mg/sample					Units: mg/sample				

Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits
1,3-Butadiene	0.0313	0.0308	102	78.0 117.6	0.0318	103	1.58	0.0 20.0

LCS: 508464					LCSD: 508465				
Analyzed: 07/15/2016 00:00					Analyzed: 07/15/2016 00:00				
Dilution: 1					Dilution: 1				
Units: mg/sample					Units: mg/sample				

Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits
1,3-Butadiene	0.0290	0.0308	94.2	78.0 117.6	0.0297	96.5	2.39	0.0 20.0



Quality Control Sample Batch Report

Analysis Information

Workorder: 1619682

Limits: Historical/Performance
Basis: ALS Laboratory Group

Preparation: NA
Batch: NA
Prepared By: NA

Analysis: NIOSH 1024
Batch: IFID/7597 (HBN: 172937)
Analyzed By: Fred Rejali

QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Analyst	Peer Review
/S/ Fred Rejali 07/16/2016 12:07	/S/ Thomas J. Masoian 07/18/2016 08:06

Symbols and Definitions

- * - Analyte above reporting limit or outside of control limits
- ▲ - Sample result is greater than 4 times the spike added
- - Sample and Matrix Duplicate less than 5 times the reporting limit
- - Result is above the calibration range

- RPD - Relative % Difference (Spike / Spike Duplicate)
- ND - Not Detected (U - Qualifier also flags analyte as not detected)
- NA - Not Applicable
- QC results are not adjusted for moisture correction, where applicable



1619682

Assembler N/A

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. No. 20162024
 Page 1 of 6

Telephone No. 373-6861 MSIN T6-05 FAX 372-1878
 Contact/Requestor CARL HOWARD IV

Sample Origin CHARCOAL TUBE
 Project Title CARTRIDGE EVALUATION
 SAF No. N/A
 Logbook/Work Package No. N/A
 Ice Chest No. 1,175-033 temp. ON ICE
 Method of Shipment Bill of Lading/Air Bill No. 7767 3552 1683
 Data Turnaround 10 DAYS
 Parts and Return No. 41011

Sample No.	Lab ID	Date	Time	No. Type Container	Sample Analysis	Preservative
	S16T020163	VA 7/09/16		CHARCOAL TUBE	1,3-Butadiene 16-05629-9-A-A1	CHILL -4C
	S16T020164	VA 7/09/16		CHARCOAL TUBE	1,3-Butadiene 16-05629-9-A-A2	CHILL -4C
	S16T020165	VA 7/09/16		CHARCOAL TUBE	1,3-Butadiene 16-05629-9-A-B1	CHILL -4C
	S16T020166	VA 7/09/16		CHARCOAL TUBE	1,3-Butadiene 16-05629-9-A-BLANK	CHILL -4C
	S16T020167	VA 7/09/16		CHARCOAL TUBE	1,3-Butadiene 16-05629-9-A-C1	CHILL -4C
	S16T020168	VA 7/09/16		CHARCOAL TUBE	1,3-Butadiene 16-05629-9-A-D1	CHILL -4C
	S16T020169	VA 7/09/16		CHARCOAL TUBE	1,3-Butadiene 16-05629-9-A-E1	CHILL -4C
	S16T020170	VA 7/09/16		CHARCOAL TUBE	1,3-Butadiene 16-05629-9-A-F1	CHILL -4C
	S16T020171	VA 7/09/16		CHARCOAL TUBE	1,3-Butadiene 16-05629-9-A-G1	CHILL -4C
	S16T020172	VA 7/09/16		CHARCOAL TUBE	1,3-Butadiene 16-05629-9-A-H1	CHILL -4C

POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes) MSDS Yes No

SPECIAL INSTRUCTIONS
 Send Results to Carl W Howard IV,
 Carl W Howard@rl.gov, and Greg Moore,
 Gregory_S.Moore@rl.gov see SO# for email
 Reference Contract # 55502
 NIOSH 1024 CHILL BELOW -4 C

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix*
TERESA FORRESTER			7-13-16 0838	RECEIVED			7-13-16 0830	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids
RE ROGERS			1400	FEDEX				DL = Drum Liquids T = Tissue VM = Wipe L = Liquid V = Vegetation VA = Vapor X = Other
Relinquished By			7-13-16	Received By			07-14-16 9:00	
Relinquished By				Received By				

Disposal Method (e.g., Return to customer, per lab procedure used in process)

Disposed By Fred Rajah

Date/Time 7/15/16 2300

All samples containing hazardous materials shall be picked up by requestor and returned to parent container or site of origin.

Assembler		C.O.C. No.				
N/A		20162024				
Collector		Page				
JONES		2 of 6				
SAF No.		Telephone No.				
N/A		373-6861				
Project Title		MSIN				
CARTRIDGE EVALUATION		T6-05				
Shipped To (Lab)		Purchase Order/Charge Code				
ALS		202003/CS20				
Protocol		Temp.				
N/A		ON ICE				
Contact/Requestor		Ice Chest No.				
CARL HOWARD IV		083				
Sample Origin		Bill of Lading/Air Bill No.				
CARTRIDGE EVALUATION		7767 3552 1683				
Logbook/Work Package No.		Parts and Return No.				
N/A		4104				
Method of Shipment		Sample Analysis				
N/A		CHILL -4C				
Data Turnaround		CHILL -4C				
16 DMS		CHILL -4C				
Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis	Preservative
	S16T020173	VA 7/09/16		1,3-Butadiene 16-05629-9-B-H2		CHILL -4C
	S16T020174	VA 7/09/16		CHARCOAL TUBE		CHILL -4C
	S16T020175	VA 7/09/16		CHARCOAL TUBE		CHILL -4C
	S16T020176	VA 7/09/16		CHARCOAL TUBE		CHILL -4C
	S16T020177	VA 7/09/16		CHARCOAL TUBE		CHILL -4C
	S16T020178	VA 7/09/16		CHARCOAL TUBE		CHILL -4C
	S16T020179	VA 7/09/16		CHARCOAL TUBE		CHILL -4C
	S16T020180	VA 7/09/16		CHARCOAL TUBE		CHILL -4C
	S16T020181	VA 7/09/16		CHARCOAL TUBE		CHILL -4C
	S16T020182	VA 7/09/16		CHARCOAL TUBE		CHILL -4C

POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes)		MSDS		Yes <input checked="" type="radio"/> No <input type="radio"/>	
SPECIAL INSTRUCTIONS					
Send Results to Carl W Howard IV, Carl W Howard@ri.gov, and Greg Moore, Gregory_S_Moore@ri.gov see SOM for email					
Reference Contract # 55502					
NIOSH 1024 CHILL BELOW -4 C					

Relinquished By	Print	Sign	Date/Time	Received By	Sign	Date/Time	Matrix*
TERESA FORRESTER			7-13-16 0830	RE KOSKES		7-13-16 0830	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids
REL-REGIONS			7-13-16 1400	FEDEX			DL = Drum Liquids T = Tissue WM = Wipe L = Liquid V = Vegetation VA = Vapor X = Other
Relinquished By				Montano		07-14-16 900	
Relinquished By							

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure (used in process))	Date/Time
	Fred Rejali	7/15/16 2300

All samples containing hazardous materials shall be picked up by requestor and returned to parent container or site of origin.

Assembler		C.O.C. No. 20162024						
N/A		Page 3 of 6						
CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST								
Collector	MSIN	Telephone No.	FAX					
JONES	373-6861	CARL HOWARD IV	372-1878					
SAP No.	Sample Origin	Purchase Order/Charge Code						
N/A	CHARTRIDGE EVALUATION	2026037CB20						
Project Title	Logbook/Work Package No.	Ice Chest No.	Temp.					
CHARTRIDGE EVALUATION	N/A	633-033	ONN TCC					
Shipped To (Lab)	Method of Shipment	Bill of Lading/Air Bill No.						
ALS		7767 3552 1683						
Protocol	Data Turnaround	Parts and Return No.						
N/A	10 CANS	41011						
Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis	Preservative		
	S16T020183	VA	7/09/16		1,3-Butadiene 16-05629-9-B-H1	CHILL -4C		
	S16T020184	VA	7/09/16		1,3-Butadiene 16-05629-9-B-H2	CHILL -4C		
	S16T020185	VA	7/09/16		1,3-Butadiene 16-05629-9-EFF-A-BASE	CHILL -4C		
	S16T020186	VA	7/09/16		1,3-Butadiene 16-05629-9-EFF-B-BASE	CHILL -4C		
	S16T020187	VA	7/09/16		1,3-Butadiene 16-05629-9-IN-A-BASE	CHILL -4C		
	S16T020188	VA	7/09/16		1,3-Butadiene 16-05629-9-IN-B-BASE	CHILL -4C		
	S16T020189	VA	7/10/16		1,3-Butadiene 16-05793-9-A-A1	CHILL -4C		
	S16T020190	VA	7/10/16		1,3-Butadiene 16-05793-9-A-A2	CHILL -4C		
	S16T020191	VA	7/10/16		1,3-Butadiene 16-05793-9-A-B1	CHILL -4C		
	S16T020192	VA	7/10/16		1,3-Butadiene 16-05793-9-A-BLANK	CHILL -4C		
POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes) MSDS <input type="radio"/> Yes <input checked="" type="radio"/> No								
SPECIAL INSTRUCTIONS Send Results to Carl W Howald IV, Carl W Howald@ri.gov, and Greg Moore, Gregory_S_Moore@ri.gov see SON for email Reference Contract # 55502 Reference # 1024 NIOSH 1024 CHILL BELOW -4 C								
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix*
TERESA FORRESTER			7-13-16 0830	RECEIVED BY			7-13-16 0830	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water VA = Vapor DS = Drum Solids
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix*
WRPS			1400	FEDEX				T = Tissue WM = Wipe L = Liquid V = Vegetation O = Oil A = Air X = Other
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix*
				Walden			07-04-16 9:50	DL = Drum Liquids VA = Vapor X = Other
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix*
								DL = Drum Liquids VA = Vapor X = Other
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure, used in process)		Disposed By		Date/Time		
				Fred Rejab		7/15/16 2300		

A-6003-962 (03/05)

Assembler		C.O.C. No. 20162024						
N/A		Page 4 of 6						
Contact/Requestor CARL HOWARD IV		Telephone No. 373-6861						
Sample Origin SACRIFICE EVALUATION		Purchase Order/Charge Code 202003/CR20						
Logbook/Work Package No. N/A		Temp. ON ICE						
Method of Shipment N/A		Ice Chest No. 083						
Data Turnaround 15 BMS		Bill of Lading/Air Bill No. 7707 3352 1683						
MSDS		Parts and Return No. 4101						
Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis	Preservative		
	S16T020193	VA	7/10/16	CHARCOAL TUBE	1,3-Butadiene 16-05793-9-A-C1	CHILL -4C		
	S16T020194	VA	7/10/16	CHARCOAL TUBE	1,3-Butadiene 16-05793-9-A-D1	CHILL -4C		
	S16T020195	VA	7/10/16	CHARCOAL TUBE	1,3-Butadiene 16-05793-9-A-E1	CHILL -4C		
	S16T020196	VA	7/10/16	CHARCOAL TUBE	1,3-Butadiene 16-05793-9-A-F1	CHILL -4C		
	S16T020197	VA	7/10/16	CHARCOAL TUBE	1,3-Butadiene 16-05793-9-A-G1	CHILL -4C		
	S16T020198	VA	7/10/16	CHARCOAL TUBE	1,3-Butadiene 16-05793-9-A-H1	CHILL -4C		
	S16T020199	VA	7/10/16	CHARCOAL TUBE	1,3-Butadiene 16-05793-9-A-R2	CHILL -4C		
	S16T020200	VA	7/10/16	CHARCOAL TUBE	1,3-Butadiene 16-05793-9-B-A1	CHILL -4C		
	S16T020201	VA	7/10/16	CHARCOAL TUBE	1,3-Butadiene 16-05793-9-B-A2	CHILL -4C		
	S16T020202	VA	7/10/16	CHARCOAL TUBE	1,3-Butadiene 16-05793-9-B-B1	CHILL -4C		
POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes) MSDS <input type="radio"/> Yes <input checked="" type="radio"/> No								
SPECIAL INSTRUCTIONS Send Results to Carl W. Howald IV, Carl W. Howald@ri.gov, and Greg Moore, Gregory_S.Moore@ri.gov see SOM for email. Reference Contract # 55502 NIOSH 1024 CHILL BELOW -4 C								
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix*
Sharon Holden	7-13-16	0830	0830	RE ROGERS	7-13-16	0830	0830	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water VA = Vapor DS = Drum Solids
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix*
WGPS	7-13-16	1400	1400	Marlene	07-14-16	2:00	2:00	DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation VA = Vapor A = Air X = Other
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix*
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure used in process)		Disposed By		Date/Time		
				Fred Rejai		7/15/16 2300		

All samples containing hazardous materials shall be picked up by requestor and returned to parent container or site of origin. A-6003-962 (03/05)

Assembler		C.O.C. No. 20162024				
N/A		Page 5 of 6				
Contact/Requestor CARL HOWARD IV		Telephone No. 373-6861	MSIN FAX 372-1878			
Sample Origin CARTRIDGE EVALUATION		Purchase Order/Charge Code 202003/CR20				
Project Title CARTRIDGE EVALUATION		Temp. ON ICE				
Shipped To (Lab) ASB		Ice Chest No. WIS-083				
Method of Shipment		Bill of Lading/Air Bill No. 7767 3552 1683				
Data Turnaround 10 DAYS		Parts and Return No. 4101				
Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis	Preservative
	S16T020203	VA 7/10/16		CHARCOAL TUBE	1,3-Butadiene 16-05793-9-B-BLANK *	CHILL -4C
	S16T020204	VA 7/10/16		CHARCOAL TUBE	1,3-Butadiene 16-05793-9-B-C1	CHILL -4C
	S16T020205	VA 7/10/16		CHARCOAL TUBE	1,3-Butadiene 16-05793-9-B-D1	CHILL -4C
	S16T020206	VA 7/10/16		CHARCOAL TUBE	1,3-Butadiene 16-05793-9-B-E1	CHILL -4C
	S16T020207	VA 7/10/16		CHARCOAL TUBE	1,3-Butadiene 16-05793-9-B-F1	CHILL -4C
	S16T020208	VA 7/10/16		CHARCOAL TUBE	1,3-Butadiene 16-05793-9-B-G1	CHILL -4C
	S16T020209	VA 7/10/16		CHARCOAL TUBE	1,3-Butadiene 16-05793-9-B-H1	CHILL -4C
	S16T020210	VA 7/10/16		CHARCOAL TUBE	1,3-Butadiene 16-05793-9-B-H2	CHILL -4C
	S16T020211	VA 7/10/16		CHARCOAL TUBE	1,3-Butadiene 16-05793-9-EFF-A-BASE	CHILL -4C
	S16T020212	VA 7/10/16		CHARCOAL TUBE	1,3-Butadiene 16-05793-9-EFF-B-BASE	CHILL -4C
<p>POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes) MSDS <input type="radio"/> Yes <input checked="" type="radio"/> No</p> <p>SPECIAL INSTRUCTIONS Send Results to Carl W Howard IV, Carl W.Howard@i.gov, and Greg Moore, Gregory_S_Moore@i.gov see SO# for email Reference Contract # 55502 RELEASE 9 NIOSH 1024 CHILL BELOW -4 C</p>						
Relinquished By	Print	Sign	Date/Time	Received By	Print	Date/Time
Sharon Holden			7-13-16 0830	RE BOGGS		7-13-16 0830
WZFS			7-13-16 1400		FEDEX	
Relinquished By				Received By		
				Markand Marjama		07-14-16 9:25
Relinquished By				Received By		
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure used in process)		Disposed By		Date/Time
				Fred Rejab		7/15/16 2300

A-6003-962 (03/05)



ANALYTICAL REPORT

Report Date: July 25, 2016

Robert (Buddy) Sosa
Washington River Protection So
PO Box 850, MSIN T6-02
Richland, WA 99352

Phone: (509) 373-1262

E-mail: robert_w_sosa@rl.gov
20162029

Workorder: **34-1619676**

Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020334		Collected: 07/09/2016		
Lab ID: 1619676001	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg		Analyzed: 07/22/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.20	NA	NA	0.20
2,4-Dimethylpyridine	<0.20	NA	NA	0.20

Sample ID: S16T020335		Collected: 07/09/2016		
Lab ID: 1619676002	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg		Analyzed: 07/22/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.20	NA	NA	0.20
2,4-Dimethylpyridine	<0.20	NA	NA	0.20

Sample ID: S16T020336		Collected: 07/09/2016		
Lab ID: 1619676003	Sampling Location: CARTRIDGE EVALUATION		Received: 07/14/2016	
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg		Analyzed: 07/22/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.20	NA	NA	0.20
2,4-Dimethylpyridine	<0.20	NA	NA	0.20

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992
ALS GROUP USA, CORP. An ALS Limited Company

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www.alsglobal.com

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ANALYTICAL REPORT

Workorder: 34-1619676
Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include sample ID S16T020337, Lab ID 1619676004, Method NIOSH 1613 Mod., Media SKC 226-01, Charcoal Tube 100/50mg, and results for Pyridine and 2,4-Dimethylpyridine.

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include sample ID S16T020338, Lab ID 1619676005, Method NIOSH 1613 Mod., Media SKC 226-01, Charcoal Tube 100/50mg, and results for Pyridine and 2,4-Dimethylpyridine.

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include sample ID S16T020339, Lab ID 1619676006, Method NIOSH 1613 Mod., Media SKC 226-01, Charcoal Tube 100/50mg, and results for Pyridine and 2,4-Dimethylpyridine.

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include sample ID S16T020340, Lab ID 1619676007, Method NIOSH 1613 Mod., Media SKC 226-01, Charcoal Tube 100/50mg, and results for Pyridine and 2,4-Dimethylpyridine.



ANALYTICAL REPORT

Workorder: **34-1619676**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020341		Collected: 07/09/2016	
Lab ID: 1619676008		Received: 07/14/2016	
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm) RL (ug/sample)
Pyridine	<0.20	NA	NA 0.20
2,4-Dimethylpyridine	<0.20	NA	NA 0.20

Sample ID: S16T020342		Collected: 07/09/2016	
Lab ID: 1619676009		Received: 07/14/2016	
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm) RL (ug/sample)
Pyridine	<0.20	NA	NA 0.20
2,4-Dimethylpyridine	<0.20	NA	NA 0.20

Sample ID: S16T020343		Collected: 07/09/2016	
Lab ID: 1619676010		Received: 07/14/2016	
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm) RL (ug/sample)
Pyridine	<0.20	NA	NA 0.20
2,4-Dimethylpyridine	<0.20	NA	NA 0.20

Sample ID: S16T020344		Collected: 07/09/2016	
Lab ID: 1619676011		Received: 07/14/2016	
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm) RL (ug/sample)
Pyridine	<0.20	NA	NA 0.20
2,4-Dimethylpyridine	<0.20	NA	NA 0.20



ANALYTICAL REPORT

Workorder: **34-1619676**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020345	Collected: 07/09/2016			
Lab ID: 1619676012	Received: 07/14/2016			
Sampling Location: CARTRIDGE EVALUATION				
Method: NIOSH 1613 Mod.	Media: SKC 226-01, Charcoal Tube 100/50mg			
Analyzed: 07/22/2016				
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.20	NA	NA	0.20
2,4-Dimethylpyridine	<0.20	NA	NA	0.20

Sample ID: S16T020346	Collected: 07/09/2016			
Lab ID: 1619676013	Received: 07/14/2016			
Sampling Location: CARTRIDGE EVALUATION				
Method: NIOSH 1613 Mod.	Media: SKC 226-01, Charcoal Tube 100/50mg			
Analyzed: 07/22/2016				
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.20	NA	NA	0.20
2,4-Dimethylpyridine	<0.20	NA	NA	0.20

Sample ID: S16T020347	Collected: 07/10/2016			
Lab ID: 1619676014	Received: 07/14/2016			
Sampling Location: CARTRIDGE EVALUATION				
Method: NIOSH 1613 Mod.	Media: SKC 226-01, Charcoal Tube 100/50mg			
Analyzed: 07/22/2016				
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.20	NA	NA	0.20
2,4-Dimethylpyridine	<0.20	NA	NA	0.20

Sample ID: S16T020348	Collected: 07/10/2016			
Lab ID: 1619676015	Received: 07/14/2016			
Sampling Location: CARTRIDGE EVALUATION				
Method: NIOSH 1613 Mod.	Media: SKC 226-01, Charcoal Tube 100/50mg			
Analyzed: 07/22/2016				
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.20	NA	NA	0.20
2,4-Dimethylpyridine	<0.20	NA	NA	0.20



ANALYTICAL REPORT

Workorder: 34-1619676
Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include sample ID S16T020349, Lab ID 1619676016, Method NIOSH 1613 Mod., Media SKC 226-01, Charcoal Tube 100/50mg, and analytes Pyridine and 2,4-Dimethylpyridine.

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include sample ID S16T020350, Lab ID 1619676017, Method NIOSH 1613 Mod., Media SKC 226-01, Charcoal Tube 100/50mg, and analytes Pyridine and 2,4-Dimethylpyridine.

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include sample ID S16T020351, Lab ID 1619676018, Method NIOSH 1613 Mod., Media SKC 226-01, Charcoal Tube 100/50mg, and analytes Pyridine and 2,4-Dimethylpyridine.

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include sample ID S16T020352, Lab ID 1619676019, Method NIOSH 1613 Mod., Media SKC 226-01, Charcoal Tube 100/50mg, and analytes Pyridine and 2,4-Dimethylpyridine.



ANALYTICAL REPORT

Workorder: 34-1619676
Client Project ID: CARTRIDGE EVALUATION
Purchase Order: 55502 Rel9
Project Manager: Rand Potter

Analytical Results

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include sample ID S16T020353, Lab ID 1619676020, Method NIOSH 1613 Mod., Media SKC 226-01, Charcoal Tube 100/50mg, and results for Pyridine and 2,4-Dimethylpyridine.

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include sample ID S16T020354, Lab ID 1619676021, Method NIOSH 1613 Mod., Media SKC 226-01, Charcoal Tube 100/50mg, and results for Pyridine and 2,4-Dimethylpyridine.

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include sample ID S16T020355, Lab ID 1619676022, Method NIOSH 1613 Mod., Media SKC 226-01, Charcoal Tube 100/50mg, and results for Pyridine and 2,4-Dimethylpyridine.

Table with 5 columns: Analyte, Result (ug/sample), Result (mg/m³), Result (ppm), RL (ug/sample). Rows include sample ID S16T020356, Lab ID 1619676023, Method NIOSH 1613 Mod., Media SKC 226-01, Charcoal Tube 100/50mg, and results for Pyridine and 2,4-Dimethylpyridine.



ANALYTICAL REPORT

Workorder: **34-1619676**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

Analytical Results

Sample ID: S16T020357	Collected: 07/10/2016			
Lab ID: 1619676024	Received: 07/14/2016			
Sampling Location: CARTRIDGE EVALUATION				
Method: NIOSH 1613 Mod.	Media: SKC 226-01, Charcoal Tube 100/50mg			
Analyzed: 07/22/2016				
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.20	NA	NA	0.20
2,4-Dimethylpyridine	<0.20	NA	NA	0.20

Sample ID: S16T020358	Collected: 07/10/2016			
Lab ID: 1619676025	Received: 07/14/2016			
Sampling Location: CARTRIDGE EVALUATION				
Method: NIOSH 1613 Mod.	Media: SKC 226-01, Charcoal Tube 100/50mg			
Analyzed: 07/22/2016				
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.20	NA	NA	0.20
2,4-Dimethylpyridine	<0.20	NA	NA	0.20

Sample ID: S16T020359	Collected: 07/10/2016			
Lab ID: 1619676026	Received: 07/14/2016			
Sampling Location: CARTRIDGE EVALUATION				
Method: NIOSH 1613 Mod.	Media: SKC 226-01, Charcoal Tube 100/50mg			
Analyzed: 07/22/2016				
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m ³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.20	NA	NA	0.20
2,4-Dimethylpyridine	<0.20	NA	NA	0.20

Comments

Quality Control: NIOSH 1613 Mod. - (HBN: 172923)

The referenced method has not been validated for 2,4-dimethylpyridine. Additionally, studies regarding media collection efficiency, sample storage stability, analyte retention capability, and/or analyte desorption efficiency have not been performed.

2,4-dimethylpyridine recovered slightly low in LCS 508391 and LCSD 508392 at 50.3% and 49.4%, respectively.

Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Method	Analyst	Peer Review
NIOSH 1613 Mod.	/S/ Emilie Pratt 07/25/2016 10:09	/S/ Thomas J. Masoian 07/25/2016 10:50

Laboratory Contact Information

ALS Environmental
960 W Levoy Drive
Salt Lake City, Utah 84123

Phone: (801) 266-7700
Email: alsst.lab@ALSGlobal.com
Web: www.alslc.com



ANALYTICAL REPORT

Workorder: **34-1619676**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

General Lab Comments

The results provided in this report relate only to the items tested.
Samples were received in acceptable condition unless otherwise noted.
Samples have not been blank corrected unless otherwise noted.
This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

Testing Sector	Accreditation Body (Standard)	Certificate Number	Website
Environmental	AClass (DoD ELAP)	ADE-1420	http://www.aiclasscorp.com
	Utah (NELAC)	DATA 1	http://health.utah.gov/lab/labimp/
	Nevada	UT00009	http://ndep.nv.gov/bsdwl/abservice.htm
	Oklahoma	UT00009	http://www.deq.state.ok.us/CSDnew/
	Iowa	IA# 376	http://www.iowadnr.gov/insideDNR/RegulatoryWater.aspx
	Florida (TNI)	E871067	http://www.dep.state.fl.us/labs/bars/sas/qa/
	Texas (TNI)	T 104704456-11-1	http://www.tceq.texas.gov/field/qa/lab_accred_certif.html
Industrial Hygiene	AIHA-LAP, LLC (ISO 17025 and AIHA-LAP, LLC IHLAP/ELLAP)	101574	http://www.aihaaccreditedlabs.org
Lead Testing:			
CPSC	AClass (ISO 17025, CPSC)	ADE-1420	http://www.aiclasscorp.com
Soil, Dust, Paint, Air	AIHA-LAP, LLC (ISO 17025, AIHA-LAP, LLC ELLAP and NLLAP)	101574	http://www.aihaaccreditedlabs.org
Dietary Supplements	AClass (ISO 17025)	ADE-1420	http://www.aiclasscorp.com

Definitions

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method/media/instrument sensitivity.

LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity.

ND = Not Detected, Testing result not detected above the LOD or LOQ.

NA = Not Applicable.

** No result could be reported, see sample comments for details.

< This testing result is less than the numerical value.

() This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.

ALS Environmental certifies this analytical report is in compliance with the Hanford SOW, both technically and for completeness. Release of the data contained in this report has been electronically authorized by the following laboratory representative:

Rand Potter, Project Manager, ALS Environmental



Quality Control Sample Batch Report

Analysis Information

Workorder: 1619676

Limits: Historical/Performance
Basis: ALS Laboratory Group

Preparation: NA
Batch: NA
Prepared By: NA

Analysis: NIOSH 1613 Mod.
Batch: ISVO/3063 (HBN: 172923)
Analyzed By: Emilie Pratt

Blank

LMB: 508390
Analyzed: 07/22/2016 00:00
Units: ug/sample

Analyte	Result	MDL	RL
Pyridine	ND	NA	0.200
2,4-Dimethylpyridine	ND	NA	0.200

LMB: 508393
Analyzed: 07/22/2016 00:00
Units: ug/sample

Analyte	Result	MDL	RL
Pyridine	ND	NA	0.200
2,4-Dimethylpyridine	ND	NA	0.200

Laboratory Control Sample - Laboratory Control Sample Duplicate

LCS: 508391 Analyzed: 07/22/2016 00:00 Dilution: 1 Units: ug/sample					LCSD: 508392 Analyzed: 07/22/2016 00:00 Dilution: 1 Units: ug/sample				
Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
Pyridine	1.29	2.00	64.4	61.8 141.1	1.26	63.1	2.04	0.0 22.1	
2,4-Dimethylpyridine	0.995	1.98*	50.3	51.7 130.6	0.979*	49.4	1.62	0.0 22.2	

LCS: 508394 Analyzed: 07/22/2016 00:00 Dilution: 1 Units: ug/sample					LCSD: 508395 Analyzed: 07/22/2016 00:00 Dilution: 1 Units: ug/sample				
Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
Pyridine	1.68	2.00	84.3	61.8 141.1	1.79	89.9	6.38	0.0 22.1	
2,4-Dimethylpyridine	1.34	1.98	67.5	51.7 130.6	1.42	71.7	5.95	0.0 22.2	

Comments

The referenced method has not been validated for 2,4-dimethylpyridine. Additionally, studies regarding media collection efficiency, sample storage stability, analyte retention capability, and/or analyte desorption efficiency have not been performed.
2,4-dimethylpyridine recovered slightly low in LCS 508391 and LCSD 508392 at 50.3% and 49.4%, respectively.

QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Analyst	Peer Review
/S/ Emilie Pratt 07/25/2016 10:09	/S/ Thomas J. Masoian 07/25/2016 10:50

Symbols and Definitions

- * - Analyte above reporting limit or outside of control limits
- ▲ - Sample result is greater than 4 times the spike added
- - Sample and Matrix Duplicate less than 5 times the reporting limit
- - Result is above the calibration range

- RPD - Relative % Difference (Spike / Spike Duplicate)
- ND - Not Detected (U - Qualifier also flags analyte as not detected)
- NA - Not Applicable
- QC results are not adjusted for moisture correction, where applicable



1619676

10/1/16

C.O.C. No. 20162029

Page 1 of 3

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Assembler: N/A
 Collector: JONES
 SAF No.:
 Project Title: CHARLIZE EVALUATION
 Shipped To (Lab): A&S
 Protocol: N/A

Telephone No.: 3713-8961
 MSIN: T6-05
 FAX: 372-1878

Purchase Order/Charge Code: 202003/020
 Log Sheet No.: 033
 Temp.: ON ICE

Bill of Lading/AF Bill No.: 776735521683
 Parts and Return No.: 41011

Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis	Preservative
1	S16T020334	VA 7/9/16		CHARCOAL TUBE	Pyridines 16-05623-10-H1	N/A
2	S16T020335	VA 7/9/16		CHARCOAL TUBE	Pyridines 16-05623-10-A2	N/A
3	S16T020336	VA 7/9/16		CHARCOAL TUBE	Pyridines 16-05623-10-B1	N/A
4	S16T020337	VA 7/9/16		CHARCOAL TUBE	Pyridines 16-05623-10-BLANK	N/A
5	S16T020338	VA 7/9/16		CHARCOAL TUBE	Pyridines 16-05623-10-D1	N/A
6	S16T020339	VA 7/9/16		CHARCOAL TUBE	Pyridines 16-05623-10-E1	N/A
7	S16T020340	VA 7/9/16		CHARCOAL TUBE	Pyridines 16-05623-10-F1	N/A
8	S16T020341	VA 7/9/16		CHARCOAL TUBE	Pyridines 16-05623-10-G1	N/A
9	S16T020342	VA 7/9/16		CHARCOAL TUBE	Pyridines 16-05623-10-H1	N/A
10	S16T020343	VA 7/9/16		CHARCOAL TUBE	Pyridines 16-05623-10-I1	N/A

POSSIBLE SAMPLE HAZARD/REMARKS (List all known wastes) MSDS Yes No

SPECIAL INSTRUCTIONS
 Send Results to Carl Rowald IV & Greg Moore
 Carl K Rowald: carl.k.rowald@va.gov and
 Gregory S. Moore: greg.s.moore@va.gov see SOW for email

Reference Contract # 55102

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
TERESA FORESTER			7-13-16 0830	JULIE FORESTER			7-13-16 0830
WRPS			7-13-16 1400				

Matrix:
 S = Soil DL = Drum Liquids
 SE = Sediment T = Tissue
 SO = Solid WI = Wipe
 SL = Sludge L = Liquid
 W = Water V = Vegetation
 O = Oil VA = Vapor
 A = Air X = Other
 DS = Drum Solids

Relinquished By: _____ Date/Time: _____

Disposal Method (e.g., Return to customer, per lab procedure, used in process)

Disposited By: *Emilie P. Pratt* Date/Time: 7/21/16 2030

All samples containing hazardous materials shall be picked up by requestor and returned to parent container or site of origin. A-6003-962 (03/05)

Assembler		C.O.C. No. 20162029					
N/A		Page 2 of 3					
CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST							
Collector	MSIN	Telephone No.	Preservative				
JONES		373-6961	N/A				
SAF No.	Sample Origin	Purchase Order/Charge Code	N/A				
N/A	CHARCOAL TUBE	202037C20	N/A				
Project Title	Logbook Work Package No.	Temp.	N/A				
CHARCOAL EVALUATION	N/A	WTS-033	N/A				
Shipped To (Lab)	Method of Shipment	Bill of Lading/AVI Bill No.	N/A				
ALS	Data Turnaround	7767 3521683	N/A				
Protocol	No./Type Combiner	Perts and Return No.	N/A				
N/A	10 BAYS	41011	N/A				
Sample No.	Lab ID	Date	Time	Sample Analysis	Preservative		
11	S16T020344	VA	7/9/16	Pyridines 16-05623-10-A1	N/A		
12	S16T020345	VA	7/9/16	Pyridines 16-05623-10-A2	N/A		
13	S16T020346	VA	7/9/16	Pyridines 16-05623-10-IN-BASE	N/A		
14	S16T020347	VA	7/10/16	Pyridines 16-05793-10-A1	N/A		
15	S16T020348	VA	7/10/16	Pyridines 16-05793-10-A2	N/A		
16	S16T020349	VA	7/10/16	Pyridines 16-05793-10-B1	N/A		
17	S16T020350	VA	7/10/16	Pyridines 16-05793-10-BLANK	N/A		
18	S16T020351	VA	7/10/16	Pyridines 16-05793-10-C1	N/A		
19	S16T020352	VA	7/10/16	Pyridines 16-05793-10-D1	N/A		
20	S16T020353	VA	7/10/16	Pyridines 16-05793-10-E1	N/A		
<p>POSSIBLE SAMPLE HAZARD/REMARKS (List all known wastes) MSDS <input type="radio"/> Yes <input checked="" type="radio"/> No</p> <p>SPECIAL INSTRUCTIONS Send Results to Carl Rowald IV & Greg Moore Carl N Rowald@rl.gov and Greg@7_S_Moore@rl.gov see SOW for email</p>							
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
TERESA FORESTER		Teresa Forester	7-13-16 0830	JULIE GUDRIAN		JULIE GUDRIAN	7-13-16 0830
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
WRPS		WRPS	7-13-16 1400	FEDEX		FEDEX	07-14-16 0900
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
				MARIANNE SCHROCK		MARIANNE SCHROCK	07-14-16 0900
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
				EMILIE P		EMILIE P	7/21/16 2030
<p>Disposal Method (e.g., Return to customer, per lab procedure, send in process)</p>							
<p>FINAL SAMPLE DISPOSITION</p>							

A-6003-962 (03/05)

Assembler		C.O.C. No.						
N/A		20162029						
Collector		Page						
Jones		3 of 3						
Project Title		MSIN						
CHARCOAL ANALYSIS		TE-05 FAX 372-1878						
Shipped To (Lab)		Purchase Order/Charge Code						
N/A		202007020						
Method of Shipment		Ice Chest No.						
N/A		N/A						
Data Turnaround		Bill of Lading/Air Bill No.						
10 DAYS		76735521683						
Preservative		Parts and Return No.						
N/A		4101						
Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis	Preservative		
21	S167020354	VA	7/10/16	CHARCOAL TUBE	Pyridines 16-05793-10-EFF-BASE /	N/A		
22	S167020355	VA	7/10/16	CHARCOAL TUBE	Pyridines 16-05793-10-F1 /	N/A		
23	S167020356	VA	7/10/16	CHARCOAL TUBE	Pyridines 16-05793-10-G1 /	N/A		
24	S167020357	VA	7/10/16	CHARCOAL TUBE	Pyridines 16-05793-10-H1 /	N/A		
25	S167020358	VA	7/10/16	CHARCOAL TUBE	Pyridines 16-05793-10-E2 /	N/A		
26	S167020359	VA	7/10/16	CHARCOAL TUBE	Pyridines 16-05793-10-DI-BASE /	N/A		
<p>POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes) MSDS <input type="radio"/> Yes <input checked="" type="radio"/> No</p> <p>SPECIAL INSTRUCTIONS Send results to Carl Rowald IV & Greg Moore Carl W Rowald@r1.gov and Gregory_S_Moore@r1.gov see SOW for email RELEASE 9 Reference Contract # 55502</p>								
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix*
Sharon Holden	Sharon Holden	7-13-16	0830	Julie Greider	Julie Greider	7-13-16	0830	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water VA = Vapor DS = Drum Solids
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix*
WRPS	WRPS	7-13-16	1400	Marianne Schmitt	Marianne Schmitt	07-14-16	0830	DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation O = Oil A = Air X = Other
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix*
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure, used in process)		Disposed By		Date/Time		
				Eva-Lee Pratt		7/21/16 2030		

All samples containing hazardous materials shall be picked up by requestor and returned to parent container or site of origin. A-6005-962 (03/05)



Carl Howald IV

08/03/16

Washington River Protection Solutions, LLC
 P.O. Box 850 MSIN H6-16
 Richland, WA 99352

Contract No.: 55503 R5

Project: Cartridge Evaluation

Subject: Nitrosamines Analysis Report, Group Number 20162028, Revision 1.

Enclosed is the final report for group 20162028 number analyzed for Nitrosamines using NIOSH 2522-Modified. This group number 20162028 has been assigned a Columbia Basin Analytical Laboratories login order number of W607029. This report consists of a summary report of the samples, a laboratory report of each nitrosamine, a single quality control report for the analysis batch, and a copy of the chain of custody.

General Set Comments

Columbia Basin Analytical Laboratories received 26 samples on 07/13/16 to be tested for Nitrosamines. The samples were analyzed in accordance with NIOSH 2522-Modified for N-Nitrosodimethylamine, N-Nitrosomethylethylamine, N-Nitrosodiethylamine, N-Nitrosodi-n-propylamine, N-Nitrosodi-n-butylamine, N-Nitrosopiperidine, N-Nitrosopyrrolidine, and N-Nitrosomorpholine. All results have been corrected for desorption efficiency and measurable levels in the blanks.

Revision is due to client's request to add the MRL results to the summary page. No data were impacted.

Positive Results

There were detectable nitrosamines concentrations above the reporting limit in the samples.

16-05629-11-A1	W607029-01	N-Nitrosodimethylamine	0.229	µg/tube
16-05793-11-A1	W607029-14	N-Nitrosodimethylamine	0.238	µg/tube
16-05793-11-H1	W607029-24	N-Nitrosodimethylamine	0.319	µg/tube

Recovery Failures in the ICV, CCV's, LCS, RL and MRL

There were no recovery failures in the: ICV, CCV, LCS, LCSD, RL and MRL .

RSD Failures in the LCS and LCSD's

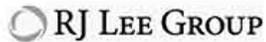
There were no RSD failures between the laboratory control samples.

Measurable Blank Values

There were no measurable analytes in the blank samples.

Calibration Curves

The calibration curves for the Nitrosamines had an R-value that was 0.997 or better, over a range of 5.0 ng/mL to 200 ng/mL.



General Lab Comments

The results provided in this report relate only to the items tested. Samples were received in acceptable conditions unless otherwise noted in the comments above. Samples have not been field blank corrected unless otherwise noted in the general set comments above. This test report shall not be reproduced, except in full, without written approval of Columbia Basin Analytical Laboratories.

I certify that this analytical report is in compliance with the Hanford SOW, both technically and for completeness. Release of the data contained in this hard copy report has been authorized by the Laboratory Director or a designee as verified by the following signature.

A handwritten signature in black ink, appearing to read 'DeNomy Dage', written over a horizontal line.

07/27/16

Scientist II DeNomy Dage

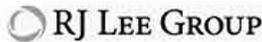
This report has been reviewed and approved by the following individual:

A handwritten signature in black ink, appearing to read 'Fernanda Pincheira', written over a horizontal line.

08/03/16

Scientist I Fernanda Pincheira

If you have any questions, please feel free to contact DeNomy Dage at ddage@rjlg.com or at 509-545-4989.



Carl Howald IV
 Washington River Protection
 Solutions, LLC
 P.O. Box 850 MSIN H6-16
 Richland, WA 99352
 Client Project:
 Cartridge Evaluation

Laboratory Report
 NIOSH 2522
 Air/Emissions on GC/TEA Analyzer
 Summary Table

RJ Lee Group No.: W607029
 Samples Received: 07/13/16
 Report Date: 08/03/16
 COC No.: 20162028
 Extraction Date: 7/20/2016

Client Sample ID	Sample Identification RJLG ID	Sampling Date	Analysis Date	Analyte	Concentration ug/tube	MRL	Qualifiers
16-05629-11-A1 S16T020293	W607029-01	07/09/16	07/20/16	N-Nitrosodimethylamine	0.229	0.021	
		07/09/16	07/21/16	N-Nitrosodimethylamine	<0.022	0.022	
		07/09/16	07/20/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/09/16	07/21/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosodiethylamine	<0.020	0.020	
		07/09/16	07/21/16	N-Nitrosodiethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		07/09/16	07/21/16	N-Nitrosodi-n-propylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		07/09/16	07/21/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		07/09/16	07/21/16	N-Nitrosopiperidine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosopiperidine	<0.020	0.020	
		07/09/16	07/21/16	N-Nitrosopyrrolidine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosopyrrolidine	<0.019	0.019	
16-05629-11-A2 S16T020294	W607029-02	07/09/16	07/20/16	N-Nitrosodimethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosodiethylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopiperidine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopyrrolidine	<0.019	0.019	
		07/09/16	07/20/16	N-Nitrosomorpholine	<0.020	0.020	

Report Qualifiers:

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D = Analyte analyzed in a dilution

E = Report concentration was above the instrument calibration range

J = Analyte detected below quantitation limits, concentration is estimated

P = Library spectrum match, rsl >90% w RT match

R = RPD (relative percent difference) outside accepted recovery limits

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N/A = Not Applicable

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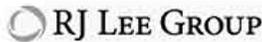
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ND = Not Detected



Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration µg/tube	MRL	Qualifiers
Client Sample ID	RJLG ID						
16-05629-11-B1 S16T020295	W607029-03	07/09/16	07/20/16	N-Nitrosodimethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosodiethylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopiperidine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopyrrolidine	<0.019	0.019	
		07/09/16	07/20/16	N-Nitrosomorpholine	<0.020	0.020	
16-05629-11-BLANK S16T020296	W607029-04	07/09/16	07/20/16	N-Nitrosodimethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosodiethylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopiperidine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopyrrolidine	<0.019	0.019	
		07/09/16	07/20/16	N-Nitrosomorpholine	<0.020	0.020	
16-05629-11-C1 S16T020297	W607029-05	07/09/16	07/20/16	N-Nitrosodimethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosodiethylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopiperidine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopyrrolidine	<0.019	0.019	
		07/09/16	07/20/16	N-Nitrosomorpholine	<0.020	0.020	
16-05629-11-D1 S16T020298	W607029-06	07/09/16	07/20/16	N-Nitrosodimethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosodiethylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopiperidine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopyrrolidine	<0.019	0.019	
		07/09/16	07/20/16	N-Nitrosomorpholine	<0.020	0.020	

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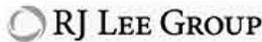
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Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration µg/tube	MRL	Qualifiers
Client Sample ID	RJLG ID						
16-05629-11-EI S16T020299	W607029-07	07/09/16	07/20/16	N-Nitrosodimethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosodiethylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopiperidine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopyrrolidine	<0.019	0.019	
		07/09/16	07/20/16	N-Nitrosomorpholine	<0.020	0.020	
16-05629-11-EFF-BASE S16T020300	W607029-08	07/09/16	07/20/16	N-Nitrosodimethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosodiethylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopiperidine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopyrrolidine	<0.019	0.019	
		07/09/16	07/20/16	N-Nitrosomorpholine	<0.020	0.020	
16-05629-11-FI S16T020301	W607029-09	07/09/16	07/20/16	N-Nitrosodimethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosodiethylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopiperidine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopyrrolidine	<0.019	0.019	
		07/09/16	07/20/16	N-Nitrosomorpholine	<0.020	0.020	
16-05629-11-G1 S16T020302	W607029-10	07/09/16	07/20/16	N-Nitrosodimethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosodiethylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopiperidine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopyrrolidine	<0.019	0.019	
		07/09/16	07/20/16	N-Nitrosomorpholine	<0.020	0.020	

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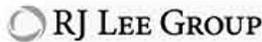
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Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration µg/tube	MRL	Qualifiers
Client Sample ID	RJLG ID						
16-05629-11-H1 S16T020303	W607029-11	07/09/16	07/20/16	N-Nitrosodimethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosodiethylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopiperidine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopyrrolidine	<0.019	0.019	
		07/09/16	07/20/16	N-Nitrosomorpholine	<0.020	0.020	
16-05629-11-H2 S16T020304	W607029-12	07/09/16	07/20/16	N-Nitrosodimethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosodiethylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopiperidine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopyrrolidine	<0.019	0.019	
		07/09/16	07/20/16	N-Nitrosomorpholine	<0.020	0.020	
16-05629-11-IN-BASE S16T020305	W607029-13	07/09/16	07/20/16	N-Nitrosodimethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/09/16	07/20/16	N-Nitrosodiethylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopiperidine	<0.020	0.020	
		07/09/16	07/20/16	N-Nitrosopyrrolidine	<0.019	0.019	
		07/09/16	07/20/16	N-Nitrosomorpholine	<0.020	0.020	
16-05793-11-A1 S16T020306	W607029-14	07/10/16	07/21/16	N-Nitrosodimethylamine	<0.022	0.022	
		07/10/16	07/20/16	N-Nitrosodimethylamine	0.238	0.021	
		07/10/16	07/20/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/10/16	07/20/16	N-Nitrosodiethylamine	<0.020	0.020	
		07/10/16	07/21/16	N-Nitrosodiethylamine	<0.021	0.021	
		07/10/16	07/20/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		07/10/16	07/21/16	N-Nitrosodi-n-propylamine	<0.021	0.021	

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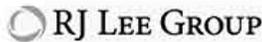
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Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration µg/tube	MRL	Qualifiers
Client Sample ID	RJLG ID						
16-05793-11-A1 S16T020306	W607029-14	07/10/16	07/20/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		07/10/16	07/21/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		07/10/16	07/20/16	N-Nitrosopiperidine	<0.020	0.020	
		07/10/16	07/21/16	N-Nitrosopiperidine	<0.021	0.021	
		07/10/16	07/20/16	N-Nitrosopyrrolidine	<0.019	0.019	
		07/10/16	07/21/16	N-Nitrosopyrrolidine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosomorpholine	<0.019	0.019	
		07/10/16	07/20/16	N-Nitrosomorpholine	<0.020	0.020	
16-05793-11-A2 S16T020307	W607029-15	07/10/16	07/20/16	N-Nitrosodimethylamine	<0.021	0.021	
		07/10/16	07/20/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/10/16	07/20/16	N-Nitrosodiethylamine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosopiperidine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosopyrrolidine	<0.019	0.019	
		07/10/16	07/20/16	N-Nitrosomorpholine	<0.020	0.020	
16-05793-11-B1 S16T020308	W607029-16	07/10/16	07/20/16	N-Nitrosodimethylamine	<0.021	0.021	
		07/10/16	07/20/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/10/16	07/20/16	N-Nitrosodiethylamine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosopiperidine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosopyrrolidine	<0.019	0.019	
		07/10/16	07/20/16	N-Nitrosomorpholine	<0.020	0.020	
16-05793-11-BLANK S16T020309	W607029-17	07/10/16	07/20/16	N-Nitrosodimethylamine	<0.021	0.021	
		07/10/16	07/20/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/10/16	07/20/16	N-Nitrosodiethylamine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosopiperidine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosopyrrolidine	<0.019	0.019	
		07/10/16	07/20/16	N-Nitrosomorpholine	<0.020	0.020	

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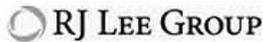
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Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration µg/tube	MRL	Qualifiers
Client Sample ID	RJLG ID						
16-05793-11-C1 S16T020310	W607029-18	07/10/16	07/20/16	N-Nitrosodimethylamine	<0.021	0.021	
		07/10/16	07/20/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/10/16	07/20/16	N-Nitrosodiethylamine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosopiperidine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosopyrrolidine	<0.019	0.019	
		07/10/16	07/20/16	N-Nitrosomorpholine	<0.020	0.020	
16-05793-11-D1 S16T020311	W607029-19	07/10/16	07/20/16	N-Nitrosodimethylamine	<0.021	0.021	
		07/10/16	07/20/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/10/16	07/20/16	N-Nitrosodiethylamine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosopiperidine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosopyrrolidine	<0.019	0.019	
		07/10/16	07/20/16	N-Nitrosomorpholine	<0.020	0.020	
16-05793-11-E1 S16T020312	W607029-20	07/10/16	07/20/16	N-Nitrosodimethylamine	<0.021	0.021	
		07/10/16	07/20/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/10/16	07/20/16	N-Nitrosodiethylamine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosopiperidine	<0.020	0.020	
		07/10/16	07/20/16	N-Nitrosopyrrolidine	<0.019	0.019	
		07/10/16	07/20/16	N-Nitrosomorpholine	<0.020	0.020	
16-05793-11-EFF-BASE S16T020313	W607029-21	07/10/16	07/21/16	N-Nitrosodimethylamine	<0.022	0.022	
		07/10/16	07/21/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosodiethylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosodi-n-propylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosopiperidine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosopyrrolidine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosomorpholine	<0.019	0.019	

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E = Report concentration was above the instrument calibration range

J = Analyte detected below quantitation limits, concentration is estimated

P = Library spectrum match, rsl >80% w/ RT match

R = RPD (relative percent difference) outside accepted recovery limits

U = Analyte analyzed but not detected

N/A = Not Applicable

B = Analyte detected in the associated blank

d = Data that exceeds the RSD criteria set by the SOP

H = Holding times for preparation or analysis exceeded

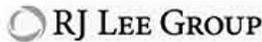
I = Sample condition at receipt out of compliance with method defined conditions

Q = Result out of method specific acceptance QC criteria

S = Spike Recovery outside accepted recovery limits

Z = Not ELAP accredited analyte

ND = Not Detected



Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration µg/tube	MRL	Qualifiers
Client Sample ID	RJLG ID						
16-05793-11-F1 S16T020314	W607029-22	07/10/16	07/21/16	N-Nitrosodimethylamine	<0.022	0.022	
		07/10/16	07/21/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosodiethylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosodi-n-propylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosopiperidine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosopyrrolidine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosomorpholine	<0.019	0.019	
16-05793-11-G1 S16T020315	W607029-23	07/10/16	07/21/16	N-Nitrosodimethylamine	<0.022	0.022	
		07/10/16	07/21/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosodiethylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosodi-n-propylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosopiperidine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosopyrrolidine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosomorpholine	<0.019	0.019	
16-05793-11-H1 S16T020316	W607029-24	07/10/16	07/21/16	N-Nitrosodimethylamine	<0.022	0.022	
		07/10/16	07/21/16	N-Nitrosodimethylamine	0.319	0.022	
		07/10/16	07/21/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosodiethylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosodiethylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosodi-n-propylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosodi-n-propylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosopiperidine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosopiperidine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosopyrrolidine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosopyrrolidine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosomorpholine	<0.019	0.019	
		07/10/16	07/21/16	N-Nitrosomorpholine	<0.019	0.019	

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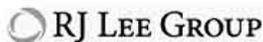
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S = Spike Recovery outside accepted recovery limits

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Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration µg/tube	MRL	Qualifiers
Client Sample ID	RJLG ID						
16-05793-11-H2 S16T020317	W607029-25	07/10/16	07/21/16	N-Nitrosodimethylamine	<0.022	0.022	
		07/10/16	07/21/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosodiethylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosodi-n-propylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosopiperidine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosopyrrolidine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosomorpholine	<0.019	0.019	
16-05793-11-IN-BASE S16T020318	W607029-26	07/10/16	07/21/16	N-Nitrosodimethylamine	<0.022	0.022	
		07/10/16	07/21/16	N-Nitrosomethylethylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosodiethylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosodi-n-propylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosopiperidine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosopyrrolidine	<0.021	0.021	
		07/10/16	07/21/16	N-Nitrosomorpholine	<0.019	0.019	

Report Qualifiers:

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E = Report concentration was above the instrument calibration range

J = Analyte detected below quantitation limits, concentration is estimated

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Washington River Protection
Solutions, LLC
P.O. Box 850 MSIN H6-16
Richland, WA 99352

Quality Control

NIOSH 2522

RJ Lee Group No.: W607029
Samples Received: 07/13/16
Report Date: 08/03/16
COC No.: 20162028
Extraction Date: 7/20/2016 9:1

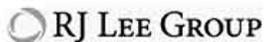
Client Project:
Cartridge Evaluation

Analyte	CAS No.	Sample ID	Analyzed Date	Expected µg/tube	Result µg/tube	DE	DE Corrected	REC %	RSD %	Qualifier
N-Nitrosodiethylamine	55-18-5	LCS-1	07/20/16	0.200	0.193	0.99	0.196	98.0	1.96	
N-Nitrosodiethylamine	55-18-5	LCS-1	07/21/16	0.200	0.183	0.95	0.192	96.2	3.34	
N-Nitrosodimethylamine	62-75-9	LCS-1	07/20/16	0.200	0.189	0.97	0.194	96.8	2.74	
N-Nitrosodimethylamine	62-75-9	LCS-1	07/21/16	0.200	0.174	0.90	0.193	96.2	3.25	
N-Nitrosodi-n-butylamine	924-16-3	LCS-1	07/20/16	0.200	0.190	0.98	0.193	96.5	3.04	
N-Nitrosodi-n-butylamine	924-16-3	LCS-1	07/21/16	0.200	0.188	0.97	0.194	96.7	2.92	
N-Nitrosodi-n-propylamine	621-64-7	LCS-1	07/20/16	0.200	0.195	0.98	0.198	99.1	0.943	
N-Nitrosodi-n-propylamine	621-64-7	LCS-1	07/21/16	0.200	0.183	0.95	0.192	96.0	3.61	
N-Nitrosomethylethylamine	10595-95-6	LCS-1	07/20/16	0.200	0.188	0.96	0.195	97.1	2.55	
N-Nitrosomethylethylamine	10595-95-6	LCS-1	07/21/16	0.200	0.181	0.94	0.193	96.1	3.44	
N-Nitrosomorpholine	59-89-2	LCS-1	07/20/16	0.200	0.194	0.99	0.195	97.3	3.32	
N-Nitrosomorpholine	59-89-2	LCS-1	07/21/16	0.200	0.201	1.03	0.195	97.3	2.30	
N-Nitrosopiperidine	100-75-4	LCS-1	07/20/16	0.200	0.196	1.00	0.197	98.4	1.93	
N-Nitrosopiperidine	100-75-4	LCS-1	07/21/16	0.200	0.182	0.94	0.194	96.6	2.93	
N-Nitrosopyrrolidine	930-55-2	LCS-1	07/20/16	0.200	0.208	1.05	0.199	99.1	1.18	
N-Nitrosopyrrolidine	930-55-2	LCS-1	07/21/16	0.200	0.178	0.94	0.189	94.2	5.09	
N-Nitrosodiethylamine	55-18-5	LCS-2	07/20/16	0.200	0.201	0.99	0.204	102	1.96	
N-Nitrosodiethylamine	55-18-5	LCS-2	07/21/16	0.200	0.193	0.95	0.203	101	3.34	
N-Nitrosodimethylamine	62-75-9	LCS-2	07/20/16	0.200	0.198	0.97	0.203	101	2.74	
N-Nitrosodimethylamine	62-75-9	LCS-2	07/21/16	0.200	0.184	0.90	0.204	102	3.25	
N-Nitrosodi-n-butylamine	924-16-3	LCS-2	07/20/16	0.200	0.202	0.98	0.205	102	3.04	
N-Nitrosodi-n-butylamine	924-16-3	LCS-2	07/21/16	0.200	0.198	0.97	0.204	102	2.92	
N-Nitrosodi-n-propylamine	621-64-7	LCS-2	07/20/16	0.200	0.199	0.98	0.202	101	0.943	
N-Nitrosodi-n-propylamine	621-64-7	LCS-2	07/21/16	0.200	0.196	0.95	0.206	103	3.61	
N-Nitrosomethylethylamine	10595-95-6	LCS-2	07/20/16	0.200	0.197	0.96	0.204	102	2.55	
N-Nitrosomethylethylamine	10595-95-6	LCS-2	07/21/16	0.200	0.193	0.94	0.205	103	3.44	
N-Nitrosomorpholine	59-89-2	LCS-2	07/20/16	0.200	0.207	0.99	0.208	104	3.32	
N-Nitrosomorpholine	59-89-2	LCS-2	07/21/16	0.200	0.210	1.03	0.203	101	2.30	
N-Nitrosopiperidine	100-75-4	LCS-2	07/20/16	0.200	0.204	1.00	0.205	102	1.93	
N-Nitrosopiperidine	100-75-4	LCS-2	07/21/16	0.200	0.191	0.94	0.203	102	2.93	
N-Nitrosopyrrolidine	930-55-2	LCS-2	07/20/16	0.200	0.212	1.05	0.203	101	1.18	
N-Nitrosopyrrolidine	930-55-2	LCS-2	07/21/16	0.200	0.196	0.94	0.208	104	5.09	
N-Nitrosodiethylamine	55-18-5	LCS-3	07/20/16	0.200	0.198	0.99	0.201	100	1.96	
N-Nitrosodiethylamine	55-18-5	LCS-3	07/21/16	0.200	0.195	0.95	0.205	102	3.34	
N-Nitrosodimethylamine	62-75-9	LCS-3	07/20/16	0.200	0.198	0.97	0.203	102	2.74	

Columbia Basin Analytical Laboratories | 2710 North 20th Avenue, Pasco WA 93301 | 509.545.4989

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Analyte	CAS No.	Sample ID	Analyzed Date	Expected µg/tube	Result µg/tube	DE	DE Corrected	REC %	RSD %	Qualifier
N-Nitrosodimethylamine	62-75-9	LCS-3	07/21/16	0.200	0.184	0.90	0.204	102	3.25	
N-Nitrosodi-n-butylamine	924-16-3	LCS-3	07/20/16	0.200	0.200	0.98	0.203	101	3.04	
N-Nitrosodi-n-butylamine	924-16-3	LCS-3	07/21/16	0.200	0.196	0.97	0.202	101	2.92	
N-Nitrosodi-n-propylamine	621-64-7	LCS-3	07/20/16	0.200	0.197	0.98	0.200	99.9	0.943	
N-Nitrosodi-n-propylamine	621-64-7	LCS-3	07/21/16	0.200	0.192	0.95	0.202	101	3.61	
N-Nitrosomethylethylamine	10595-95-6	LCS-3	07/20/16	0.200	0.196	0.96	0.203	101	2.55	
N-Nitrosomethylethylamine	10595-95-6	LCS-3	07/21/16	0.200	0.190	0.94	0.202	101	3.44	
N-Nitrosomorpholine	59-89-2	LCS-3	07/20/16	0.200	0.197	0.99	0.198	99.0	3.32	
N-Nitrosomorpholine	59-89-2	LCS-3	07/21/16	0.200	0.209	1.03	0.202	101	2.30	
N-Nitrosopiperidine	100-75-4	LCS-3	07/20/16	0.200	0.198	1.00	0.199	99.4	1.93	
N-Nitrosopiperidine	100-75-4	LCS-3	07/21/16	0.200	0.191	0.94	0.203	102	2.93	
N-Nitrosopyrrolidine	930-55-2	LCS-3	07/20/16	0.200	0.208	1.05	0.199	99.5	1.18	
N-Nitrosopyrrolidine	930-55-2	LCS-3	07/21/16	0.200	0.193	0.94	0.204	102	5.09	
N-Nitrosodiethylamine	55-18-5	MB	07/20/16		0.00	0.99	0.00			
N-Nitrosodiethylamine	55-18-5	MB	07/21/16		0.00	0.95	0.00			
N-Nitrosodimethylamine	62-75-9	MB	07/20/16		0.00	0.97	0.00			
N-Nitrosodimethylamine	62-75-9	MB	07/21/16		0.00	0.90	0.00			
N-Nitrosodi-n-butylamine	924-16-3	MB	07/20/16		0.00	0.98	0.00			
N-Nitrosodi-n-butylamine	924-16-3	MB	07/21/16		0.00	0.97	0.00			
N-Nitrosodi-n-propylamine	621-64-7	MB	07/20/16		0.00	0.98	0.00			
N-Nitrosodi-n-propylamine	621-64-7	MB	07/21/16		0.00	0.95	0.00			
N-Nitrosomethylethylamine	10595-95-6	MB	07/20/16		0.00	0.96	0.00			
N-Nitrosomethylethylamine	10595-95-6	MB	07/21/16		0.00	0.94	0.00			
N-Nitrosomorpholine	59-89-2	MB	07/20/16		0.00	0.99	0.00			
N-Nitrosomorpholine	59-89-2	MB	07/21/16		0.00	1.03	0.00			
N-Nitrosopiperidine	100-75-4	MB	07/20/16		0.00	1.00	0.00			
N-Nitrosopiperidine	100-75-4	MB	07/21/16		0.00	0.94	0.00			
N-Nitrosopyrrolidine	930-55-2	MB	07/20/16		0.00	1.05	0.00			
N-Nitrosopyrrolidine	930-55-2	MB	07/21/16		0.00	0.94	0.00			
N-Nitrosodiethylamine	55-18-5	MRL	07/20/16	0.020	0.024	0.99	0.024	122		
N-Nitrosodiethylamine	55-18-5	MRL	07/21/16	0.020	0.025	0.95	0.026	130		
N-Nitrosodimethylamine	62-75-9	MRL	07/20/16	0.020	0.021	0.97	0.022	112		
N-Nitrosodimethylamine	62-75-9	MRL	07/21/16	0.020	0.023	0.90	0.026	128		
N-Nitrosodi-n-butylamine	924-16-3	MRL	07/20/16	0.020	0.023	0.98	0.023	113		
N-Nitrosodi-n-butylamine	924-16-3	MRL	07/21/16	0.020	0.023	0.97	0.024	121		
N-Nitrosodi-n-propylamine	621-64-7	MRL	07/20/16	0.020	0.022	0.98	0.022	111		
N-Nitrosodi-n-propylamine	621-64-7	MRL	07/21/16	0.020	0.026	0.95	0.027	135		
N-Nitrosomethylethylamine	10595-95-6	MRL	07/20/16	0.020	0.022	0.96	0.023	113		
N-Nitrosomethylethylamine	10595-95-6	MRL	07/21/16	0.020	0.022	0.94	0.023	115		
N-Nitrosomorpholine	59-89-2	MRL	07/20/16	0.020	0.020	0.99	0.020	101		
N-Nitrosomorpholine	59-89-2	MRL	07/21/16	0.020	0.025	1.03	0.024	120		
N-Nitrosopiperidine	100-75-4	MRL	07/20/16	0.020	0.025	1.00	0.025	123		



Analyte	CAS No.	Sample ID	Analyzed Date	Expected µg/tube	Result µg/tube	DE	DE Corrected	REC %	RSD %	Qualifier
N-Nitrosopiperidine	100-75-4	MRL	07/21/16	0.020	0.025	0.94	0.027	135		
N-Nitrosopyrrolidine	930-55-2	MRL	07/20/16	0.020	0.024	1.05	0.023	117		
N-Nitrosopyrrolidine	930-55-2	MRL	07/21/16	0.020	0.025	0.94	0.026	132		

Report Qualifiers:

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Z = Not ELAP accredited analyte

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W607029

Assembler		N/A		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				C.O.C. No.		20162028
Collector		JONES						Page 1 of 3		
SAF No.		N/A		Contact/Requestor		CARL HOWALD IV		Telephone No.		373-6861
Project Title		CARTRIDGE EVALUATION		Sample Origin		CARTRIDGE EVALUATION		Purchase Order/Charge Code		MSIN 16-05 FAX 372-1878
Shipped To (Lab)		CBAL		Logbook/Work Package No.		N/A		Ice Chest No.		Temp.
Protocol		N/A		Method of Shipment		Data Turnaround		Bill of Lading/Air Bill No.		Parts and Return No.
Sample No.		Lab ID	Date	Time	No./Type Container	Sample Analysis		Preservative		
	S16T020293	VA	7/9/16		Thermosorb-N	Nitrosamines 16-05629-11-A1		N/A		
	S16T020294	VA	7/9/16		Thermosorb-N	Nitrosamines 16-05629-11-A2		N/A		
	S16T020295	VA	7/9/16		Thermosorb-N	Nitrosamines 16-05629-11-B1		N/A		
	S16T020296	VA	7/9/16		Thermosorb-N	Nitrosamines 16-05629-11-BLANK		N/A		
	S16T020297	VA	7/9/16		Thermosorb-N	Nitrosamines 16-05629-11-C1		N/A		
	S16T020298	VA	7/9/16		Thermosorb-N	Nitrosamines 16-05629-11-D1		N/A		
	S16T020299	VA	7/9/16		Thermosorb-N	Nitrosamines 16-05629-11-E1		N/A		
	S16T020300	VA	7/9/16		Thermosorb-N	Nitrosamines 16-05629-11-EFF-BASE		N/A		
	S16T020301	VA	7/9/16		Thermosorb-N	Nitrosamines 16-05629-11-F1		N/A		
	S16T020302	VA	7/9/16		Thermosorb-N	Nitrosamines 16-05629-11-G1		N/A		
POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes) MSDS <input type="radio"/> Yes <input checked="" type="radio"/> No										
SPECIAL INSTRUCTIONS Send Results to Carl Howald IV & Greg Moore Carl Howald IV: howaldc@va.gov Gregory S. Moore: gsmoore@va.gov see SOW for email CONTRACT 55503										
HOLD TIME										
Relinquished By		Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix*	
Relinquished By		Sharon L. Wallen	[Signature]	7/13/16 0830	Received By	[Signature]	[Signature]	7/13/16 0830	S = Soil DL = Drum Liquids SE = Sediment T = Tissue SO = Solid WI = Wipe SL = Sludge L = Liquid W = Water V = Vegetation O = Oil VA = Vapor A = Air X = Other DS = Drum Solids	
Relinquished By		Re Rogers	[Signature]	7-13-16 11:30	Received By	C. LOPEZ	[Signature]	7/13/16 1130		
Relinquished By				Date/Time	Received By			Date/Time		
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer per lab procedure, used in process)				Consumed		Disposed By		Date/Time
								JP NLL		07/29/16 15:35

All samples containing hazardous materials shall be picked up by requestor and returned to parent container or site of origin.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. No. 20162028
Page 2 of 3

Assembler	N/A	Contact/Requestor	CARL HOWALD IV	Telephone No.	373-6861	MSIN	16-05	FAX	372-1878
Collector	JONES	Sample Origin	CARTRIDGE EVALUATION	Purchase Order/Charge Code	202003/CS20				
SAF No.	N/A	Logbook/Work Package No.	N/A	Ice Chest No.		Temp.			
Project Title	CARTRIDGE EVALUATION	Method of Shipment	10 DAYS	Bill of Lading/Air Bill No.					
Shipped To (Lab)	GERL	Data Turnaround		Parts and Return No.					
Protocol	N/A								

Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis	Preservative
	S16T020303	VA	7/9/16	Thermosorb-N	Nitrosamines 16-05629-11-H1	N/A
	S16T020304	VA	7/9/16	Thermosorb-N	Nitrosamines 16-05629-11-H2	N/A
	S16T020305	VA	7/9/16	Thermosorb-N	Nitrosamines 16-05629-11-IN-BASE	N/A
	S16T020306	VA	7/10/16	Thermosorb-N	Nitrosamines 16-05793-11-A1	N/A
	S16T020307	VA	7/10/16	Thermosorb-N	Nitrosamines 16-05793-11-A2	N/A
	S16T020308	VA	7/10/16	Thermosorb-N	Nitrosamines 16-05793-11-B1	N/A
	S16T020309	VA	7/10/16	Thermosorb-N	Nitrosamines 16-05793-11-C1	N/A
	S16T020310	VA	7/10/16	Thermosorb-N	Nitrosamines 16-05793-11-D1	N/A
	S16T020311	VA	7/10/16	Thermosorb-N	Nitrosamines 16-05793-11-E1	N/A
	S16T020312	VA	7/10/16	Thermosorb-N	Nitrosamines 16-05793-11-E1	N/A

POSSIBLE SAMPLE HAZARDOUS/REMARKS (List all known wastes) MSDS Yes No

SPECIAL INSTRUCTIONS

Send Results to Carl Howald IV & Greg Moore
Send N/A Results to Greg Moore
Send N/A Results to Greg Moore
Gregory_Moore@del1.gov see SOW for email

CONTRACT 55503

RELEASE 5

Relinquished By	Print Sign	Date/Time	Received By	Print Sign	Date/Time	Matrix*
Sharon Liddon	Sharon Liddon	7-13-16 0830	RE ROSS	RE ROSS	7-13-16 0830	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids
Relinquished By	Print Sign	Date/Time	Received By	Print Sign	Date/Time	Matrix*
RE ROSS	RE ROSS	7-13-16 1130	C. Lopez	C. Lopez	7-13-16 1130	DL = Drum Liquids T = Tissue WL = Wipe L = Liquid V = Vapor VA = Vegetation X = Other
Relinquished By	Date/Time	Received By	Date/Time	Disposed By	Date/Time	
				RE ROSS	7-13-16 1535	

Disposal Method (e.g., Return to customer, per lab procedure, used in process) **CONSUMED**

All samples containing hazardous materials shall be picked up by requestor and returned to parent container or site of origin.

Disposed By: RE ROSS

Date/Time: 7/13/16 15:35

A-6003-962 (03/05)

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST							C.O.C. No. 20162028	
							Page	3 of 3
Assembler	N/A							
Collector	Contact/Requestor CARL HOWARD IV						Telephone No. 373-6861 MSIN 16-05 FAX 372-1878	
SAF No.	N/A						Purchase Order/Charge Code 202003/CS20	
Project Title	CARTRIDGE EVALUATION						Ice Chest No. Temp.	
Shipped To (Lab)	N/A						Bill of Lading/Air Bill No.	
Protocol	Data Turnaround 10 DAYS						Parts and Return No.	
Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis	Preservative		
	S16T020313	VA 7/10/16		Nitrosorb-N	Nitrosamines 16-05793-11-BFF-BASE	N/A		
	S16T020314	VA 7/10/16		Nitrosorb-N	Nitrosamines 16-05793-11-F1	N/A		
	S16T020315	VA 7/10/16		Nitrosorb-N	Nitrosamines 16-05793-11-G1	N/A		
	S16T020316	VA 7/10/16		Nitrosorb-N	Nitrosamines 16-05793-11-H1	N/A		
	S16T020317	VA 7/10/16		Nitrosorb-N	Nitrosamines 16-05793-11-H2	N/A		
	S16T020318	VA 7/10/16		Nitrosorb-N	Nitrosamines 16-05793-11-IN-BASE	N/A		
POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes)				MSDS <input type="radio"/> Yes <input checked="" type="radio"/> No		SPECIAL INSTRUCTIONS		
				Send Results to Carl Howard IV & Greg Moore Carl Howard IV Gregory_S_Moore@iil.gov see SOW for email CONTRACT 55503 RELEASE 5		Hold Time		
Relinquished By	Print Sign	Date/Time	Received By	Print Sign	Date/Time	Matrix*		
Sharon L Holder	<i>Sharon L Holder</i>	7/13/16 0830	Received By	<i>Greg Moore</i>	7-13-16 0830	S = Soil DL = Drum Liquids SE = Sediment T = Tissue SO = Solid WI = Wipe SL = Sludge L = Liquid W = Water V = Vegetation O = Oil VA = Vapor A = Air X = Other DS = Drum Solids		
Relinquished By	Print Sign	Date/Time	Received By	Print Sign	Date/Time			
ReFogues	<i>ReFogues</i>	7-13-16 11:30	Received By	<i>C. Lopez</i>	7-13-16 1130			
Relinquished By	Print Sign	Date/Time	Received By	Print Sign	Date/Time			
Relinquished By	Print Sign	Date/Time	Received By	Print Sign	Date/Time			
FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)					Disposed By		
	CONSUMED					<i>FP will</i>		
						Date/Time	07/25/16 15:35	

All samples containing hazardous materials shall be picked up by requestor and returned to parent container or site of origin.

A-6003-962 (03/05)

Appendix D

Data Reduction Steps

Appendix D

Data Reduction Steps

1. Only chemicals in the current COPC list were included in the calculated data. Nitrous oxide and methanol were not measured in the study. Any other missing COPCs were analyzed as “Tentatively Identified Compounds.”
2. The COPCs are ranked in the order of their COPC number. Within the data section for each COPC, data are ranked in the order of survey (1 and 2). Within every survey, data are ranked in the order of inlet and outlet and following the time sequence.
3. Except for mercury, COPC concentrations were converted into parts per million using their molecular weights and corresponding flow rates as shown in the following equation:

$$C = 24.45 M r/v$$

where C is the concentration of COPC in ppmv; r is the analytical result with unit of $\mu\text{g}/\text{sample}$ (if the analytical result unit is expressed in mg/sample , the value of C needs to be multiplied by 1000; if the analytical result unit is in ng/sample the value of C needs to be divided by 1000); V is the collected volume in 2 hours expressed in liters; M is the molecular weight of COPC with unit of g/mol . When the ratio between concentration and the corresponding OEL is larger than 10%, the fraction is shown in red.

An example calculation using the above equation is given as follows: for sample 16-001-AP-IN-006A, the ammonia concentration for the 2-hour inlet in Survey 1 was $1.01\text{E}+03 \mu\text{g}/\text{sample}$. The collected volume in 2 hours was 23.40 L, and the molecular weight for ammonia is 17.03 g/mol . Therefore, the concentration of ammonia for this sample was calculated to be 61.97 ppm, and it is about 247% of the corresponding OEL for ammonia, which is 25 ppm.

4. The analytical Detection limit (DL)—or reporting limit in some cases—for every COPC was obtained from the raw analytical data. Here, the average flow rate was used to calculate the approximate analytical detection limit in percentage of OEL for each COPC. Because the flow rates vary the calculated concentrations were different for each point, even though some of the results are under the detection limit in the original reading. The last column in the tables below indicate if the original readings were under the detection limit or not.
5. For some of the COPCs, such as benzene, only Survey 2 data were available.
6. For ammonia and mercury, only the results obtained from using method of total vapor of ammonia and mercury were used.
7. For furan, results from furan category instead of VOC (or VOA) were used. For acetonitrile, results from VOC (or VOA) category were used.

8. For N-Nitrosodimethylamine (NDMA) and other nitrosamines, data values above analytical detection limits for the same time and position were added together because the original sample was diluted into three samples for measurement. This same rule applies to 1, 3-Butadiene. The results in the plots and tables reflect the results.

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL?	Approx. DL (%OEL)
1	Ammonia	2	5629-A1	1.42E+00	2.50E+01	5.693%		2.350%
1	Ammonia	16	5629-H1	6.08E-01	2.50E+01	2.431%	YES	2.350%
1	Ammonia	2	5629-A2	6.11E-01	2.50E+01	2.444%	YES	2.350%
1	Ammonia	4	5629-B1	6.06E-01	2.50E+01	2.423%	YES	2.350%
1	Ammonia	6	5629-C1	6.08E-01	2.50E+01	2.432%	YES	2.350%
1	Ammonia	8	5629-D1	6.19E-01	2.50E+01	2.477%	YES	2.350%
1	Ammonia	10	5629-E1	5.99E-01	2.50E+01	2.396%	YES	2.350%
1	Ammonia	12	5629-F1	6.13E-01	2.50E+01	2.453%	YES	2.350%
1	Ammonia	14	5629-G1	5.94E-01	2.50E+01	2.378%	YES	2.350%
1	Ammonia	16	5629-H2	6.03E-01	2.50E+01	2.411%	YES	2.350%
1	Ammonia	2	5793-A1	1.84E+00	2.50E+01	7.352%		2.350%
1	Ammonia	16	5793-H1	1.86E+00	2.50E+01	7.449%		2.350%
1	Ammonia	2	5793-A2	6.14E-01	2.50E+01	2.458%	YES	2.350%
1	Ammonia	4	5793-B1	5.92E-01	2.50E+01	2.368%	YES	2.350%
1	Ammonia	6	5793-C1	5.89E-01	2.50E+01	2.355%	YES	2.350%
1	Ammonia	8	5793-D1	5.90E-01	2.50E+01	2.359%	YES	2.350%
1	Ammonia	10	5793-E1	6.01E-01	2.50E+01	2.405%	YES	2.350%
1	Ammonia	12	5793-F1	6.03E-01	2.50E+01	2.410%	YES	2.350%
1	Ammonia	14	5793-G1	6.00E-01	2.50E+01	2.401%	YES	2.350%
1	Ammonia	16	5793-H2	5.95E-01	2.50E+01	2.381%	YES	2.350%
3	Mercury	2	5629-A1	2.05E-04	3.05E-03	6.729%	YES	6.600%
3	Mercury	16	5629-H1	2.04E-04	3.05E-03	6.697%	YES	6.600%
3	Mercury	2	5629-A2	2.00E-04	3.05E-03	6.557%	YES	6.600%
3	Mercury	4	5629-B1	1.98E-04	3.05E-03	6.503%	YES	6.600%
3	Mercury	6	5629-C1	1.98E-04	3.05E-03	6.491%	YES	6.600%
3	Mercury	8	5629-D1	2.00E-04	3.05E-03	6.570%	YES	6.600%
3	Mercury	10	5629-E1	2.03E-04	3.05E-03	6.662%	YES	6.600%
3	Mercury	12	5629-F1	2.07E-04	3.05E-03	6.795%	YES	6.600%
3	Mercury	14	5629-G1	2.03E-04	3.05E-03	6.647%	YES	6.600%
3	Mercury	16	5629-H2	2.04E-04	3.05E-03	6.682%	YES	6.600%
3	Mercury	2	5793-A1	2.07E-04	3.05E-03	6.808%	YES	6.600%
3	Mercury	16	5793-H1	2.02E-04	3.05E-03	6.626%	YES	6.600%
3	Mercury	2	5793-A2	2.05E-04	3.05E-03	6.722%	YES	6.600%
3	Mercury	4	5793-B1	2.03E-04	3.05E-03	6.669%	YES	6.600%
3	Mercury	6	5793-C1	2.03E-04	3.05E-03	6.645%	YES	6.600%
3	Mercury	8	5793-D1	2.04E-04	3.05E-03	6.703%	YES	6.600%
3	Mercury	10	5793-E1	2.08E-04	3.05E-03	6.824%	YES	6.600%
3	Mercury	12	5793-F1	2.04E-04	3.05E-03	6.706%	YES	6.600%
3	Mercury	14	5793-G1	2.06E-04	3.05E-03	6.776%	YES	6.600%
3	Mercury	16	5793-H2	1.93E-04	3.05E-03	6.317%	YES	6.600%
4	1,3-Butadiene	2	5629-A1	1.96E-02	1.00E+00	1.957%	YES	1.900%
4	1,3-Butadiene	16	5629-H1	1.92E-02	1.00E+00	1.921%	YES	1.900%
4	1,3-Butadiene	2	5629-A2	1.89E-02	1.00E+00	1.891%	YES	1.900%
4	1,3-Butadiene	4	5629-B1	1.84E-02	1.00E+00	1.836%	YES	1.900%
4	1,3-Butadiene	6	5629-C1	1.84E-02	1.00E+00	1.843%	YES	1.900%
4	1,3-Butadiene	8	5629-D1	1.89E-02	1.00E+00	1.891%	YES	1.900%
4	1,3-Butadiene	10	5629-E1	1.89E-02	1.00E+00	1.892%	YES	1.900%
4	1,3-Butadiene	12	5629-F1	1.94E-02	1.00E+00	1.940%	YES	1.900%
4	1,3-Butadiene	14	5629-G1	1.92E-02	1.00E+00	1.918%	YES	1.900%
4	1,3-Butadiene	16	5629-H2	1.91E-02	1.00E+00	1.914%	YES	1.900%
4	1,3-Butadiene	2	5793-A1	1.93E-02	1.00E+00	1.931%	YES	1.900%
4	1,3-Butadiene	16	5793-H1	1.90E-02	1.00E+00	1.896%	YES	1.900%
4	1,3-Butadiene	2	5793-A2	1.96E-02	1.00E+00	1.965%	YES	1.900%
4	1,3-Butadiene	4	5793-B1	1.87E-02	1.00E+00	1.871%	YES	1.900%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL?	Approx. DL (%OEL)
4	1,3-Butadiene	6	5793-C1	1.87E-02	1.00E+00	1.873%	YES	1.900%
4	1,3-Butadiene	8	5793-D1	1.89E-02	1.00E+00	1.893%	YES	1.900%
4	1,3-Butadiene	10	5793-E1	1.89E-02	1.00E+00	1.888%	YES	1.900%
4	1,3-Butadiene	12	5793-F1	1.90E-02	1.00E+00	1.896%	YES	1.900%
4	1,3-Butadiene	14	5793-G1	1.90E-02	1.00E+00	1.903%	YES	1.900%
4	1,3-Butadiene	16	5793-H2	1.83E-02	1.00E+00	1.834%	YES	1.900%
5	Benzene	2	5629-A1	2.51E-04	5.00E-01	0.050%		0.024%
5	Benzene	16	5629-H1	5.12E-04	5.00E-01	0.102%		0.024%
5	Benzene	2	5629-A2	2.65E-04	5.00E-01	0.053%		0.024%
5	Benzene	4	5629-B1	2.66E-04	5.00E-01	0.053%		0.024%
5	Benzene	6	5629-C1	2.40E-04	5.00E-01	0.048%		0.024%
5	Benzene	8	5629-D1	2.42E-04	5.00E-01	0.048%		0.024%
5	Benzene	10	5629-E1	1.27E-04	5.00E-01	0.025%	YES	0.024%
5	Benzene	12	5629-F1	1.20E-04	5.00E-01	0.024%	YES	0.024%
5	Benzene	14	5629-G1	1.18E-04	5.00E-01	0.024%	YES	0.024%
5	Benzene	16	5629-H2	1.17E-04	5.00E-01	0.023%	YES	0.024%
5	Benzene	2	5793-A1	1.76E-04	5.00E-01	0.035%		0.024%
5	Benzene	16	5793-H1	1.20E-04	5.00E-01	0.024%	YES	0.024%
5	Benzene	2	5793-A2	1.70E-04	5.00E-01	0.034%		0.024%
5	Benzene	4	5793-B1	1.24E-04	5.00E-01	0.025%	YES	0.024%
5	Benzene	8	5793-D1	1.23E-04	5.00E-01	0.025%	YES	0.024%
5	Benzene	10	5793-E1	1.25E-04	5.00E-01	0.025%	YES	0.024%
5	Benzene	12	5793-F1	1.20E-04	5.00E-01	0.024%	YES	0.024%
5	Benzene	14	5793-G1	1.22E-04	5.00E-01	0.024%	YES	0.024%
5	Benzene	16	5793-H2	1.16E-04	5.00E-01	0.023%	YES	0.024%
6	Biphenyl	16	5629-H1	8.19E-05	2.00E-01	0.041%	YES	0.044%
6	Biphenyl	2	5629-A2	7.96E-05	2.00E-01	0.040%	YES	0.044%
6	Biphenyl	4	5629-B1	8.11E-05	2.00E-01	0.041%	YES	0.044%
6	Biphenyl	6	5629-C1	8.01E-05	2.00E-01	0.040%	YES	0.044%
6	Biphenyl	8	5629-D1	8.23E-05	2.00E-01	0.041%	YES	0.044%
6	Biphenyl	10	5629-E1	8.07E-05	2.00E-01	0.040%	YES	0.044%
6	Biphenyl	12	5629-F1	8.15E-05	2.00E-01	0.041%	YES	0.044%
6	Biphenyl	16	5629-H2	8.01E-05	2.00E-01	0.040%	YES	0.044%
6	Biphenyl	2	5793-A1	8.93E-05	2.00E-01	0.045%	YES	0.044%
6	Biphenyl	16	5793-H1	8.04E-05	2.00E-01	0.040%	YES	0.044%
6	Biphenyl	2	5793-A2	8.25E-05	2.00E-01	0.041%	YES	0.044%
6	Biphenyl	4	5793-B1	8.09E-05	2.00E-01	0.040%	YES	0.044%
6	Biphenyl	6	5793-C1	8.10E-05	2.00E-01	0.041%	YES	0.044%
6	Biphenyl	10	5793-E1	8.41E-05	2.00E-01	0.042%	YES	0.044%
6	Biphenyl	12	5793-F1	7.99E-05	2.00E-01	0.040%	YES	0.044%
6	Biphenyl	14	5793-G1	8.13E-05	2.00E-01	0.041%	YES	0.044%
7	1-Butanol	2	5629-A1	7.48E-03	2.00E+01	0.037%		0.002%
7	1-Butanol	16	5629-H1	3.68E-04	2.00E+01	0.002%	YES	0.002%
7	1-Butanol	2	5629-A2	7.48E-04	2.00E+01	0.004%		0.002%
7	1-Butanol	4	5629-B1	3.77E-04	2.00E+01	0.002%	YES	0.002%
7	1-Butanol	6	5629-C1	3.75E-04	2.00E+01	0.002%	YES	0.002%
7	1-Butanol	8	5629-D1	3.78E-04	2.00E+01	0.002%	YES	0.002%
7	1-Butanol	10	5629-E1	3.60E-04	2.00E+01	0.002%	YES	0.002%
7	1-Butanol	12	5629-F1	6.09E-04	2.00E+01	0.003%		0.002%
7	1-Butanol	14	5629-G1	3.56E-04	2.00E+01	0.002%	YES	0.002%
7	1-Butanol	16	5629-H2	3.53E-04	2.00E+01	0.002%	YES	0.002%
7	1-Butanol	2	5793-A1	6.00E-03	2.00E+01	0.030%		0.002%
7	1-Butanol	16	5793-H1	5.65E-03	2.00E+01	0.028%		0.002%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL?	Approx. DL (%OEL)
7	1-Butanol	2	5793-A2	4.05E-04	2.00E+01	0.002%	YES	0.002%
7	1-Butanol	4	5793-B1	3.75E-04	2.00E+01	0.002%	YES	0.002%
7	1-Butanol	8	5793-D1	3.71E-04	2.00E+01	0.002%	YES	0.002%
7	1-Butanol	10	5793-E1	3.77E-04	2.00E+01	0.002%	YES	0.002%
7	1-Butanol	12	5793-F1	3.61E-04	2.00E+01	0.002%	YES	0.002%
7	1-Butanol	14	5793-G1	3.68E-04	2.00E+01	0.002%	YES	0.002%
7	1-Butanol	16	5793-H2	3.50E-04	2.00E+01	0.002%	YES	0.002%
9	2-Hexanone	2	5629-A1	1.40E-04	5.00E+00	0.003%		0.002%
9	2-Hexanone	16	5629-H1	1.59E-04	5.00E+00	0.003%		0.002%
9	2-Hexanone	2	5629-A2	1.67E-04	5.00E+00	0.003%		0.002%
9	2-Hexanone	4	5629-B1	1.62E-04	5.00E+00	0.003%		0.002%
9	2-Hexanone	6	5629-C1	1.61E-04	5.00E+00	0.003%		0.002%
9	2-Hexanone	8	5629-D1	1.62E-04	5.00E+00	0.003%		0.002%
9	2-Hexanone	10	5629-E1	1.55E-04	5.00E+00	0.003%		0.002%
9	2-Hexanone	12	5629-F1	1.56E-04	5.00E+00	0.003%		0.002%
9	2-Hexanone	14	5629-G1	1.53E-04	5.00E+00	0.003%		0.002%
9	2-Hexanone	16	5629-H2	1.52E-04	5.00E+00	0.003%		0.002%
9	2-Hexanone	2	5793-A1	1.56E-04	5.00E+00	0.003%		0.002%
9	2-Hexanone	16	5793-H1	1.56E-04	5.00E+00	0.003%		0.002%
9	2-Hexanone	2	5793-A2	1.74E-04	5.00E+00	0.003%		0.002%
9	2-Hexanone	4	5793-B1	1.61E-04	5.00E+00	0.003%		0.002%
9	2-Hexanone	8	5793-D1	1.60E-04	5.00E+00	0.003%		0.002%
9	2-Hexanone	10	5793-E1	1.62E-04	5.00E+00	0.003%		0.002%
9	2-Hexanone	12	5793-F1	1.56E-04	5.00E+00	0.003%		0.002%
9	2-Hexanone	14	5793-G1	1.58E-04	5.00E+00	0.003%		0.002%
9	2-Hexanone	16	5793-H2	1.50E-04	5.00E+00	0.003%		0.002%
11	4-Methyl-2-hexanone	2	5629-A1	1.27E-04	5.00E-01	0.025%	YES	0.028%
11	4-Methyl-2-hexanone	16	5629-H1	1.45E-04	5.00E-01	0.029%	YES	0.028%
11	4-Methyl-2-hexanone	2	5629-A2	1.52E-04	5.00E-01	0.030%	YES	0.028%
11	4-Methyl-2-hexanone	4	5629-B1	1.48E-04	5.00E-01	0.030%	YES	0.028%
11	4-Methyl-2-hexanone	6	5629-C1	1.47E-04	5.00E-01	0.029%	YES	0.028%
11	4-Methyl-2-hexanone	8	5629-D1	1.48E-04	5.00E-01	0.030%	YES	0.028%
11	4-Methyl-2-hexanone	10	5629-E1	1.41E-04	5.00E-01	0.028%	YES	0.028%
11	4-Methyl-2-hexanone	12	5629-F1	1.43E-04	5.00E-01	0.029%	YES	0.028%
11	4-Methyl-2-hexanone	14	5629-G1	1.40E-04	5.00E-01	0.028%	YES	0.028%
11	4-Methyl-2-hexanone	16	5629-H2	1.39E-04	5.00E-01	0.028%	YES	0.028%
11	4-Methyl-2-hexanone	2	5793-A1	1.43E-04	5.00E-01	0.029%	YES	0.028%
11	4-Methyl-2-hexanone	16	5793-H1	1.42E-04	5.00E-01	0.028%	YES	0.028%
11	4-Methyl-2-hexanone	2	5793-A2	1.59E-04	5.00E-01	0.032%	YES	0.028%
11	4-Methyl-2-hexanone	4	5793-B1	1.47E-04	5.00E-01	0.029%	YES	0.028%
11	4-Methyl-2-hexanone	8	5793-D1	1.46E-04	5.00E-01	0.029%	YES	0.028%
11	4-Methyl-2-hexanone	10	5793-E1	1.48E-04	5.00E-01	0.030%	YES	0.028%
11	4-Methyl-2-hexanone	12	5793-F1	1.42E-04	5.00E-01	0.028%	YES	0.028%
11	4-Methyl-2-hexanone	14	5793-G1	1.44E-04	5.00E-01	0.029%	YES	0.028%
11	4-Methyl-2-hexanone	16	5793-H2	1.37E-04	5.00E-01	0.027%	YES	0.028%
13	3-Buten-2-one	2	5629-A1	3.67E-04	2.00E-01	0.184%		0.082%
13	3-Buten-2-one	16	5629-H1	1.72E-04	2.00E-01	0.086%	YES	0.082%
13	3-Buten-2-one	2	5629-A2	3.81E-04	2.00E-01	0.191%		0.082%
13	3-Buten-2-one	4	5629-B1	4.64E-04	2.00E-01	0.232%		0.082%
13	3-Buten-2-one	6	5629-C1	3.96E-04	2.00E-01	0.198%		0.082%
13	3-Buten-2-one	8	5629-D1	3.53E-04	2.00E-01	0.176%		0.082%
13	3-Buten-2-one	10	5629-E1	1.68E-04	2.00E-01	0.084%	YES	0.082%
13	3-Buten-2-one	12	5629-F1	1.70E-04	2.00E-01	0.085%	YES	0.082%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL?	Approx. DL (%OEL)
13	3-Buten-2-one	14	5629-G1	1.66E-04	2.00E-01	0.083%	YES	0.082%
13	3-Buten-2-one	16	5629-H2	1.65E-04	2.00E-01	0.083%	YES	0.082%
13	3-Buten-2-one	2	5793-A1	2.77E-04	2.00E-01	0.139%		0.082%
13	3-Buten-2-one	16	5793-H1	1.69E-04	2.00E-01	0.085%	YES	0.082%
13	3-Buten-2-one	2	5793-A2	2.09E-04	2.00E-01	0.105%		0.082%
13	3-Buten-2-one	4	5793-B1	1.75E-04	2.00E-01	0.088%	YES	0.082%
13	3-Buten-2-one	8	5793-D1	1.74E-04	2.00E-01	0.087%	YES	0.082%
13	3-Buten-2-one	10	5793-E1	1.76E-04	2.00E-01	0.088%	YES	0.082%
13	3-Buten-2-one	12	5793-F1	1.69E-04	2.00E-01	0.084%	YES	0.082%
13	3-Buten-2-one	14	5793-G1	1.72E-04	2.00E-01	0.086%	YES	0.082%
13	3-Buten-2-one	16	5793-H2	1.63E-04	2.00E-01	0.082%	YES	0.082%
14	Formaldehyde	2	5629-A1	1.05E-02	3.00E-01	3.500%		0.575%
14	Formaldehyde	16	5629-H1	6.20E-03	3.00E-01	2.068%		0.575%
14	Formaldehyde	2	5629-A2	3.22E-03	3.00E-01	1.074%		0.575%
14	Formaldehyde	4	5629-B1	5.15E-03	3.00E-01	1.718%		0.575%
14	Formaldehyde	6	5629-C1	3.03E-03	3.00E-01	1.011%		0.575%
14	Formaldehyde	8	5629-D1	2.04E-03	3.00E-01	0.679%		0.575%
14	Formaldehyde	10	5629-E1	1.70E-03	3.00E-01	0.566%	YES	0.575%
14	Formaldehyde	12	5629-F1	1.74E-03	3.00E-01	0.580%	YES	0.575%
14	Formaldehyde	14	5629-G1	1.96E-03	3.00E-01	0.652%	YES	0.575%
14	Formaldehyde	16	5629-H2	1.71E-03	3.00E-01	0.570%	YES	0.575%
14	Formaldehyde	2	5793-A1	4.10E-03	3.00E-01	1.367%		0.575%
14	Formaldehyde	16	5793-H1	3.05E-03	3.00E-01	1.015%		0.575%
14	Formaldehyde	2	5793-A2	2.09E-03	3.00E-01	0.697%		0.575%
14	Formaldehyde	4	5793-B1	1.75E-03	3.00E-01	0.582%	YES	0.575%
14	Formaldehyde	6	5793-C1	1.70E-03	3.00E-01	0.568%	YES	0.575%
14	Formaldehyde	8	5793-D1	1.67E-03	3.00E-01	0.557%	YES	0.575%
14	Formaldehyde	10	5793-E1	1.70E-03	3.00E-01	0.568%	YES	0.575%
14	Formaldehyde	12	5793-F1	1.71E-03	3.00E-01	0.570%	YES	0.575%
14	Formaldehyde	14	5793-G1	1.70E-03	3.00E-01	0.567%	YES	0.575%
14	Formaldehyde	16	5793-H2	1.69E-03	3.00E-01	0.563%	YES	0.575%
15	Acetaldehyde	2	5629-A1	6.49E-03	2.50E+01	0.026%		0.005%
15	Acetaldehyde	16	5629-H1	2.58E-03	2.50E+01	0.010%		0.005%
15	Acetaldehyde	2	5629-A2	5.67E-03	2.50E+01	0.023%		0.005%
15	Acetaldehyde	4	5629-B1	6.79E-03	2.50E+01	0.027%		0.005%
15	Acetaldehyde	6	5629-C1	7.76E-03	2.50E+01	0.031%		0.005%
15	Acetaldehyde	8	5629-D1	6.46E-03	2.50E+01	0.026%		0.005%
15	Acetaldehyde	10	5629-E1	4.17E-03	2.50E+01	0.017%		0.005%
15	Acetaldehyde	12	5629-F1	2.84E-03	2.50E+01	0.011%		0.005%
15	Acetaldehyde	14	5629-G1	2.76E-03	2.50E+01	0.011%		0.005%
15	Acetaldehyde	16	5629-H2	2.56E-03	2.50E+01	0.010%		0.005%
15	Acetaldehyde	2	5793-A1	3.96E-03	2.50E+01	0.016%		0.005%
15	Acetaldehyde	16	5793-H1	2.54E-03	2.50E+01	0.010%		0.005%
15	Acetaldehyde	2	5793-A2	2.61E-03	2.50E+01	0.010%		0.005%
15	Acetaldehyde	4	5793-B1	3.66E-03	2.50E+01	0.015%		0.005%
15	Acetaldehyde	6	5793-C1	3.41E-03	2.50E+01	0.014%		0.005%
15	Acetaldehyde	8	5793-D1	3.19E-03	2.50E+01	0.013%		0.005%
15	Acetaldehyde	10	5793-E1	3.95E-03	2.50E+01	0.016%		0.005%
15	Acetaldehyde	12	5793-F1	2.56E-03	2.50E+01	0.010%		0.005%
15	Acetaldehyde	14	5793-G1	2.11E-03	2.50E+01	0.008%		0.005%
15	Acetaldehyde	16	5793-H2	1.89E-03	2.50E+01	0.008%		0.005%
16	Butanal	2	5629-A1	3.18E-04	2.50E+01	0.001%		0.001%
16	Butanal	16	5629-H1	2.64E-04	2.50E+01	0.001%	YES	0.001%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL?	Approx. DL (%OEL)
16	Butanal	2	5629-A2	3.98E-04	2.50E+01	0.002%		0.001%
16	Butanal	4	5629-B1	3.24E-04	2.50E+01	0.001%		0.001%
16	Butanal	6	5629-C1	3.40E-04	2.50E+01	0.001%		0.001%
16	Butanal	8	5629-D1	2.71E-04	2.50E+01	0.001%	YES	0.001%
16	Butanal	10	5629-E1	2.58E-04	2.50E+01	0.001%	YES	0.001%
16	Butanal	12	5629-F1	2.61E-04	2.50E+01	0.001%	YES	0.001%
16	Butanal	14	5629-G1	2.55E-04	2.50E+01	0.001%	YES	0.001%
16	Butanal	16	5629-H2	2.53E-04	2.50E+01	0.001%	YES	0.001%
16	Butanal	2	5793-A1	6.95E-04	2.50E+01	0.003%		0.001%
16	Butanal	16	5793-H1	5.37E-04	2.50E+01	0.002%		0.001%
16	Butanal	2	5793-A2	2.90E-04	2.50E+01	0.001%	YES	0.001%
16	Butanal	4	5793-B1	2.69E-04	2.50E+01	0.001%	YES	0.001%
16	Butanal	8	5793-D1	2.66E-04	2.50E+01	0.001%	YES	0.001%
16	Butanal	10	5793-E1	2.70E-04	2.50E+01	0.001%	YES	0.001%
16	Butanal	12	5793-F1	2.59E-04	2.50E+01	0.001%	YES	0.001%
16	Butanal	14	5793-G1	2.64E-04	2.50E+01	0.001%	YES	0.001%
16	Butanal	16	5793-H2	2.51E-04	2.50E+01	0.001%	YES	0.001%
19	Furan	2	5629-A1	1.74E-05	1.00E-03	1.743%		0.830%
19	Furan	16	5629-H1	9.68E-06	1.00E-03	0.968%		0.830%
19	Furan	2	5629-A2	8.91E-06	1.00E-03	0.891%		0.830%
19	Furan	4	5629-B1	1.49E-05	1.00E-03	1.494%		0.830%
19	Furan	6	5629-C1	1.23E-05	1.00E-03	1.234%		0.830%
19	Furan	8	5629-D1	1.58E-05	1.00E-03	1.582%		0.830%
19	Furan	10	5629-E1	9.50E-06	1.00E-03	0.950%		0.830%
19	Furan	12	5629-F1	9.52E-06	1.00E-03	0.952%		0.830%
19	Furan	14	5629-G1	7.83E-06	1.00E-03	0.783%	YES	0.830%
19	Furan	16	5629-H2	7.79E-06	1.00E-03	0.779%	YES	0.830%
19	Furan	2	5793-A1	1.25E-05	1.00E-03	1.254%		0.830%
19	Furan	16	5793-H1	1.06E-05	1.00E-03	1.058%		0.830%
19	Furan	2	5793-A2	1.32E-05	1.00E-03	1.321%		0.830%
19	Furan	4	5793-B1	1.04E-05	1.00E-03	1.044%		0.830%
19	Furan	6	5793-C1	9.50E-06	1.00E-03	0.950%		0.830%
19	Furan	8	5793-D1	1.04E-05	1.00E-03	1.039%		0.830%
19	Furan	10	5793-E1	1.12E-05	1.00E-03	1.117%		0.830%
19	Furan	12	5793-F1	9.14E-06	1.00E-03	0.914%		0.830%
19	Furan	16	5793-H2	8.82E-06	1.00E-03	0.882%		0.830%
20	2,3-Dihydrofuran	2	5629-A1	2.48E-05	1.00E-03	2.479%		1.630%
20	2,3-Dihydrofuran	16	5629-H1	1.60E-05	1.00E-03	1.597%	YES	1.630%
20	2,3-Dihydrofuran	2	5629-A2	1.72E-05	1.00E-03	1.716%	YES	1.630%
20	2,3-Dihydrofuran	4	5629-B1	1.64E-05	1.00E-03	1.635%	YES	1.630%
20	2,3-Dihydrofuran	6	5629-C1	1.78E-05	1.00E-03	1.782%	YES	1.630%
20	2,3-Dihydrofuran	8	5629-D1	1.61E-05	1.00E-03	1.610%	YES	1.630%
20	2,3-Dihydrofuran	10	5629-E1	1.66E-05	1.00E-03	1.661%	YES	1.630%
20	2,3-Dihydrofuran	12	5629-F1	1.72E-05	1.00E-03	1.716%	YES	1.630%
20	2,3-Dihydrofuran	14	5629-G1	1.69E-05	1.00E-03	1.688%	YES	1.630%
20	2,3-Dihydrofuran	16	5629-H2	1.86E-05	1.00E-03	1.862%	YES	1.630%
20	2,3-Dihydrofuran	2	5793-A1	1.58E-05	1.00E-03	1.578%	YES	1.630%
20	2,3-Dihydrofuran	16	5793-H1	1.81E-05	1.00E-03	1.811%	YES	1.630%
20	2,3-Dihydrofuran	2	5793-A2	1.56E-05	1.00E-03	1.562%	YES	1.630%
20	2,3-Dihydrofuran	4	5793-B1	1.67E-05	1.00E-03	1.669%	YES	1.630%
20	2,3-Dihydrofuran	6	5793-C1	1.57E-05	1.00E-03	1.574%	YES	1.630%
20	2,3-Dihydrofuran	8	5793-D1	1.60E-05	1.00E-03	1.603%	YES	1.630%
20	2,3-Dihydrofuran	10	5793-E1	1.58E-05	1.00E-03	1.581%	YES	1.630%
20	2,3-Dihydrofuran	12	5793-F1	1.57E-05	1.00E-03	1.573%	YES	1.630%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL?	Approx. DL (%OEL)
20	2,3-Dihydrofuran	16	5793-H2	1.58E-05	1.00E-03	1.583%	YES	1.630%
21	2,5-Dihydrofuran	2	5629-A1	1.97E-05	1.00E-03	1.966%	YES	2.060%
21	2,5-Dihydrofuran	16	5629-H1	1.96E-05	1.00E-03	1.964%	YES	2.060%
21	2,5-Dihydrofuran	2	5629-A2	2.19E-05	1.00E-03	2.192%	YES	2.060%
21	2,5-Dihydrofuran	4	5629-B1	2.09E-05	1.00E-03	2.089%	YES	2.060%
21	2,5-Dihydrofuran	6	5629-C1	2.16E-05	1.00E-03	2.157%	YES	2.060%
21	2,5-Dihydrofuran	8	5629-D1	2.06E-05	1.00E-03	2.057%	YES	2.060%
21	2,5-Dihydrofuran	10	5629-E1	2.12E-05	1.00E-03	2.123%	YES	2.060%
21	2,5-Dihydrofuran	12	5629-F1	2.19E-05	1.00E-03	2.192%	YES	2.060%
21	2,5-Dihydrofuran	14	5629-G1	2.16E-05	1.00E-03	2.157%	YES	2.060%
21	2,5-Dihydrofuran	16	5629-H2	2.01E-05	1.00E-03	2.009%	YES	2.060%
21	2,5-Dihydrofuran	2	5793-A1	2.00E-05	1.00E-03	1.996%	YES	2.060%
21	2,5-Dihydrofuran	16	5793-H1	2.02E-05	1.00E-03	2.016%	YES	2.060%
21	2,5-Dihydrofuran	2	5793-A2	1.98E-05	1.00E-03	1.984%	YES	2.060%
21	2,5-Dihydrofuran	4	5793-B1	2.02E-05	1.00E-03	2.020%	YES	2.060%
21	2,5-Dihydrofuran	6	5793-C1	2.01E-05	1.00E-03	2.011%	YES	2.060%
21	2,5-Dihydrofuran	8	5793-D1	2.05E-05	1.00E-03	2.048%	YES	2.060%
21	2,5-Dihydrofuran	10	5793-E1	2.02E-05	1.00E-03	2.020%	YES	2.060%
21	2,5-Dihydrofuran	12	5793-F1	2.01E-05	1.00E-03	2.010%	YES	2.060%
21	2,5-Dihydrofuran	16	5793-H2	2.02E-05	1.00E-03	2.023%	YES	2.060%
22	2-Methylfuran	2	5629-A1	1.68E-05	1.00E-03	1.679%	YES	1.81%
22	2-Methylfuran	16	5629-H1	1.74E-05	1.00E-03	1.742%	YES	1.81%
22	2-Methylfuran	2	5629-A2	2.44E-05	1.00E-03	2.441%	YES	1.81%
22	2-Methylfuran	4	5629-B1	1.66E-05	1.00E-03	1.662%	YES	1.81%
22	2-Methylfuran	6	5629-C1	1.84E-05	1.00E-03	1.841%	YES	1.81%
22	2-Methylfuran	8	5629-D1	1.76E-05	1.00E-03	1.756%	YES	1.81%
22	2-Methylfuran	10	5629-E1	1.81E-05	1.00E-03	1.812%	YES	1.81%
22	2-Methylfuran	12	5629-F1	1.87E-05	1.00E-03	1.871%	YES	1.81%
22	2-Methylfuran	14	5629-G1	1.84E-05	1.00E-03	1.841%	YES	1.81%
22	2-Methylfuran	16	5629-H2	1.72E-05	1.00E-03	1.715%	YES	1.81%
22	2-Methylfuran	2	5793-A1	1.66E-05	1.00E-03	1.662%	YES	1.81%
22	2-Methylfuran	16	5793-H1	1.69E-05	1.00E-03	1.694%	YES	1.81%
22	2-Methylfuran	2	5793-A2	1.93E-05	1.00E-03	1.926%	YES	1.81%
22	2-Methylfuran	4	5793-B1	1.72E-05	1.00E-03	1.724%	YES	1.81%
22	2-Methylfuran	6	5793-C1	1.72E-05	1.00E-03	1.717%	YES	1.81%
22	2-Methylfuran	8	5793-D1	1.75E-05	1.00E-03	1.748%	YES	1.81%
22	2-Methylfuran	10	5793-E1	1.72E-05	1.00E-03	1.724%	YES	1.81%
22	2-Methylfuran	12	5793-F1	1.72E-05	1.00E-03	1.716%	YES	1.81%
22	2-Methylfuran	16	5793-H2	1.73E-05	1.00E-03	1.727%	YES	1.81%
23	2,5-Dimethylfuran	2	5629-A1	2.68E-05	1.00E-03	2.681%	YES	2.80%
23	2,5-Dimethylfuran	16	5629-H1	2.78E-05	1.00E-03	2.781%	YES	2.80%
23	2,5-Dimethylfuran	2	5629-A2	2.99E-05	1.00E-03	2.988%	YES	2.80%
23	2,5-Dimethylfuran	4	5629-B1	2.85E-05	1.00E-03	2.848%	YES	2.80%
23	2,5-Dimethylfuran	6	5629-C1	2.94E-05	1.00E-03	2.940%	YES	2.80%
23	2,5-Dimethylfuran	8	5629-D1	2.80E-05	1.00E-03	2.804%	YES	2.80%
23	2,5-Dimethylfuran	10	5629-E1	2.89E-05	1.00E-03	2.893%	YES	2.80%
23	2,5-Dimethylfuran	12	5629-F1	2.99E-05	1.00E-03	2.988%	YES	2.80%
23	2,5-Dimethylfuran	14	5629-G1	2.94E-05	1.00E-03	2.940%	YES	2.80%
23	2,5-Dimethylfuran	16	5629-H2	2.74E-05	1.00E-03	2.739%	YES	2.80%
23	2,5-Dimethylfuran	2	5793-A1	2.72E-05	1.00E-03	2.721%	YES	2.80%
23	2,5-Dimethylfuran	16	5793-H1	2.75E-05	1.00E-03	2.748%	YES	2.80%
23	2,5-Dimethylfuran	2	5793-A2	2.70E-05	1.00E-03	2.704%	YES	2.80%
23	2,5-Dimethylfuran	4	5793-B1	2.75E-05	1.00E-03	2.754%	YES	2.80%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL?	Approx. DL (%OEL)
23	2,5-Dimethylfuran	6	5793-C1	2.74E-05	1.00E-03	2.741%	YES	2.80%
23	2,5-Dimethylfuran	8	5793-D1	2.79E-05	1.00E-03	2.791%	YES	2.80%
23	2,5-Dimethylfuran	10	5793-E1	2.75E-05	1.00E-03	2.754%	YES	2.80%
23	2,5-Dimethylfuran	12	5793-F1	2.74E-05	1.00E-03	2.740%	YES	2.80%
23	2,5-Dimethylfuran	16	5793-H2	2.76E-05	1.00E-03	2.758%	YES	2.80%
27	2-Pentylfuran	2	5629-A1	1.69E-05	1.00E-03	1.691%		1.52%
27	2-Pentylfuran	16	5629-H1	1.48E-05	1.00E-03	1.485%	YES	1.52%
27	2-Pentylfuran	2	5629-A2	1.84E-05	1.00E-03	1.843%		1.52%
27	2-Pentylfuran	4	5629-B1	6.49E-05	1.00E-03	6.494%		1.52%
27	2-Pentylfuran	6	5629-C1	1.48E-05	1.00E-03	1.476%		1.52%
27	2-Pentylfuran	8	5629-D1	1.47E-05	1.00E-03	1.472%	YES	1.52%
27	2-Pentylfuran	10	5629-E1	1.45E-05	1.00E-03	1.447%	YES	1.52%
27	2-Pentylfuran	12	5629-F1	1.45E-05	1.00E-03	1.449%	YES	1.52%
27	2-Pentylfuran	14	5629-G1	1.46E-05	1.00E-03	1.457%	YES	1.52%
27	2-Pentylfuran	16	5629-H2	1.45E-05	1.00E-03	1.449%	YES	1.52%
27	2-Pentylfuran	2	5793-A1	2.22E-05	1.00E-03	2.222%		1.52%
27	2-Pentylfuran	16	5793-H1	1.48E-05	1.00E-03	1.476%	YES	1.52%
27	2-Pentylfuran	2	5793-A2	1.70E-05	1.00E-03	1.702%	YES	1.52%
27	2-Pentylfuran	4	5793-B1	1.96E-05	1.00E-03	1.963%		1.52%
27	2-Pentylfuran	6	5793-C1	1.59E-05	1.00E-03	1.591%	YES	1.52%
27	2-Pentylfuran	8	5793-D1	1.72E-05	1.00E-03	1.720%		1.52%
27	2-Pentylfuran	10	5793-E1	2.11E-05	1.00E-03	2.109%		1.52%
27	2-Pentylfuran	12	5793-F1	1.53E-05	1.00E-03	1.530%	YES	1.52%
27	2-Pentylfuran	16	5793-H2	1.48E-05	1.00E-03	1.476%	YES	1.52%
28	2-Heptylfuran	2	5629-A1	2.32E-05	1.00E-03	2.319%		1.06%
28	2-Heptylfuran	16	5629-H1	1.05E-05	1.00E-03	1.047%	YES	1.06%
28	2-Heptylfuran	2	5629-A2	1.17E-05	1.00E-03	1.165%	YES	1.06%
28	2-Heptylfuran	4	5629-B1	1.34E-05	1.00E-03	1.340%	YES	1.06%
28	2-Heptylfuran	6	5629-C1	1.27E-05	1.00E-03	1.265%	YES	1.06%
28	2-Heptylfuran	8	5629-D1	1.02E-05	1.00E-03	1.018%	YES	1.06%
28	2-Heptylfuran	10	5629-E1	1.05E-05	1.00E-03	1.050%	YES	1.06%
28	2-Heptylfuran	12	5629-F1	1.08E-05	1.00E-03	1.085%	YES	1.06%
28	2-Heptylfuran	14	5629-G1	1.07E-05	1.00E-03	1.067%	YES	1.06%
28	2-Heptylfuran	16	5629-H2	9.94E-06	1.00E-03	0.994%	YES	1.06%
28	2-Heptylfuran	2	5793-A1	9.88E-06	1.00E-03	0.988%		1.06%
28	2-Heptylfuran	16	5793-H1	1.37E-05	1.00E-03	1.367%	YES	1.06%
28	2-Heptylfuran	2	5793-A2	1.05E-05	1.00E-03	1.054%	YES	1.06%
28	2-Heptylfuran	4	5793-B1	1.48E-05	1.00E-03	1.481%	YES	1.06%
28	2-Heptylfuran	6	5793-C1	1.05E-05	1.00E-03	1.049%	YES	1.06%
28	2-Heptylfuran	8	5793-D1	1.20E-05	1.00E-03	1.201%	YES	1.06%
28	2-Heptylfuran	10	5793-E1	1.00E-05	1.00E-03	1.000%	YES	1.06%
28	2-Heptylfuran	12	5793-F1	9.95E-06	1.00E-03	0.995%	YES	1.06%
28	2-Heptylfuran	16	5793-H2	1.04E-05	1.00E-03	1.038%	YES	1.06%
29	2-Propylfuran	2	5629-A1	2.37E-05	1.00E-03	2.369%	YES	2.47%
29	2-Propylfuran	16	5629-H1	4.84E-05	1.00E-03	4.842%		2.47%
29	2-Propylfuran	2	5629-A2	2.42E-05	1.00E-03	2.422%	YES	2.47%
29	2-Propylfuran	4	5629-B1	2.39E-05	1.00E-03	2.390%	YES	2.47%
29	2-Propylfuran	6	5629-C1	2.40E-05	1.00E-03	2.397%	YES	2.47%
29	2-Propylfuran	8	5629-D1	2.39E-05	1.00E-03	2.390%	YES	2.47%
29	2-Propylfuran	10	5629-E1	3.10E-05	1.00E-03	3.096%		2.47%
29	2-Propylfuran	12	5629-F1	3.15E-05	1.00E-03	3.154%		2.47%
29	2-Propylfuran	14	5629-G1	2.96E-05	1.00E-03	2.957%		2.47%
29	2-Propylfuran	16	5629-H2	3.85E-05	1.00E-03	3.849%		2.47%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL?	Approx. DL (%OEL)
29	2-Propylfuran	2	5793-A1	5.96E-05	1.00E-03	5.960%		2.47%
29	2-Propylfuran	16	5793-H1	3.98E-05	1.00E-03	3.977%		2.47%
29	2-Propylfuran	2	5793-A2	2.76E-05	1.00E-03	2.764%	YES	2.47%
29	2-Propylfuran	4	5793-B1	2.58E-05	1.00E-03	2.580%	YES	2.47%
29	2-Propylfuran	6	5793-C1	2.58E-05	1.00E-03	2.583%	YES	2.47%
29	2-Propylfuran	8	5793-D1	2.57E-05	1.00E-03	2.567%	YES	2.47%
29	2-Propylfuran	10	5793-E1	4.83E-05	1.00E-03	4.833%		2.47%
29	2-Propylfuran	12	5793-F1	2.65E-05	1.00E-03	2.655%		2.47%
29	2-Propylfuran	16	5793-H2	2.40E-05	1.00E-03	2.397%	YES	2.47%
33	Diethylphthalate	16	5629-H1	7.96E-05	5.50E-01	0.014%	YES	0.015%
33	Diethylphthalate	2	5629-A2	7.73E-05	5.50E-01	0.014%	YES	0.015%
33	Diethylphthalate	4	5629-B1	7.87E-05	5.50E-01	0.014%	YES	0.015%
33	Diethylphthalate	6	5629-C1	7.78E-05	5.50E-01	0.014%	YES	0.015%
33	Diethylphthalate	8	5629-D1	8.00E-05	5.50E-01	0.015%	YES	0.015%
33	Diethylphthalate	10	5629-E1	7.84E-05	5.50E-01	0.014%	YES	0.015%
33	Diethylphthalate	12	5629-F1	7.92E-05	5.50E-01	0.014%	YES	0.015%
33	Diethylphthalate	16	5629-H2	7.78E-05	5.50E-01	0.014%	YES	0.015%
33	Diethylphthalate	2	5793-A1	8.67E-05	5.50E-01	0.016%	YES	0.015%
33	Diethylphthalate	16	5793-H1	7.81E-05	5.50E-01	0.014%	YES	0.015%
33	Diethylphthalate	2	5793-A2	8.01E-05	5.50E-01	0.015%	YES	0.015%
33	Diethylphthalate	4	5793-B1	7.86E-05	5.50E-01	0.014%	YES	0.015%
33	Diethylphthalate	6	5793-C1	7.87E-05	5.50E-01	0.014%	YES	0.015%
33	Diethylphthalate	10	5793-E1	8.17E-05	5.50E-01	0.015%	YES	0.015%
33	Diethylphthalate	12	5793-F1	7.76E-05	5.50E-01	0.014%	YES	0.015%
33	Diethylphthalate	14	5793-G1	7.90E-05	5.50E-01	0.014%	YES	0.015%
34	Acetonitrile	2	5629-A1	3.82E-02	2.00E+01	0.191%		0.001%
34	Acetonitrile	16	5629-H1	3.25E-02	2.00E+01	0.162%		0.001%
34	Acetonitrile	2	5629-A2	1.12E-02	2.00E+01	0.056%		0.001%
34	Acetonitrile	4	5629-B1	1.17E-02	2.00E+01	0.059%		0.001%
34	Acetonitrile	6	5629-C1	2.52E-02	2.00E+01	0.126%		0.001%
34	Acetonitrile	8	5629-D1	1.59E-02	2.00E+01	0.079%		0.001%
34	Acetonitrile	10	5629-E1	6.66E-03	2.00E+01	0.033%		0.001%
34	Acetonitrile	12	5629-F1	5.50E-03	2.00E+01	0.027%		0.001%
34	Acetonitrile	14	5629-G1	6.28E-03	2.00E+01	0.031%		0.001%
34	Acetonitrile	16	5629-H2	1.20E-02	2.00E+01	0.060%		0.001%
34	Acetonitrile	2	5793-A1	2.29E-01	2.00E+01	1.145%		0.001%
34	Acetonitrile	16	5793-H1	2.28E-02	2.00E+01	0.114%		0.001%
34	Acetonitrile	2	5793-A2	2.38E-02	2.00E+01	0.119%		0.001%
34	Acetonitrile	4	5793-B1	1.48E-01	2.00E+01	0.741%		0.001%
34	Acetonitrile	8	5793-D1	2.50E-02	2.00E+01	0.125%		0.001%
34	Acetonitrile	10	5793-E1	1.74E-01	2.00E+01	0.871%		0.001%
34	Acetonitrile	12	5793-F1	1.43E-02	2.00E+01	0.071%		0.001%
34	Acetonitrile	14	5793-G1	8.49E-03	2.00E+01	0.042%		0.001%
34	Acetonitrile	16	5793-H2	3.23E-02	2.00E+01	0.162%		0.001%
35	Propanenitrile	2	5629-A1	1.83E-04	6.00E+00	0.003%	YES	0.003%
35	Propanenitrile	16	5629-H1	2.08E-04	6.00E+00	0.003%	YES	0.003%
35	Propanenitrile	2	5629-A2	2.18E-04	6.00E+00	0.004%	YES	0.003%
35	Propanenitrile	4	5629-B1	2.12E-04	6.00E+00	0.004%	YES	0.003%
35	Propanenitrile	6	5629-C1	2.11E-04	6.00E+00	0.004%	YES	0.003%
35	Propanenitrile	8	5629-D1	2.13E-04	6.00E+00	0.004%	YES	0.003%
35	Propanenitrile	10	5629-E1	2.03E-04	6.00E+00	0.003%	YES	0.003%
35	Propanenitrile	12	5629-F1	2.05E-04	6.00E+00	0.003%	YES	0.003%
35	Propanenitrile	14	5629-G1	2.01E-04	6.00E+00	0.003%	YES	0.003%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL?	Approx. DL (%OEL)
35	Propanenitrile	16	5629-H2	1.99E-04	6.00E+00	0.003%	YES	0.003%
35	Propanenitrile	2	5793-A1	2.05E-04	6.00E+00	0.003%	YES	0.003%
35	Propanenitrile	16	5793-H1	2.04E-04	6.00E+00	0.003%	YES	0.003%
35	Propanenitrile	2	5793-A2	2.28E-04	6.00E+00	0.004%	YES	0.003%
35	Propanenitrile	4	5793-B1	2.11E-04	6.00E+00	0.004%	YES	0.003%
35	Propanenitrile	8	5793-D1	2.09E-04	6.00E+00	0.003%	YES	0.003%
35	Propanenitrile	10	5793-E1	2.12E-04	6.00E+00	0.004%	YES	0.003%
35	Propanenitrile	12	5793-F1	2.04E-04	6.00E+00	0.003%	YES	0.003%
35	Propanenitrile	14	5793-G1	2.07E-04	6.00E+00	0.003%	YES	0.003%
35	Propanenitrile	16	5793-H2	1.97E-04	6.00E+00	0.003%	YES	0.003%
36	Butanenitrile	2	5629-A1	1.70E-04	8.00E+00	0.002%	YES	0.002%
36	Butanenitrile	16	5629-H1	1.93E-04	8.00E+00	0.002%	YES	0.002%
36	Butanenitrile	2	5629-A2	2.03E-04	8.00E+00	0.003%	YES	0.002%
36	Butanenitrile	4	5629-B1	1.97E-04	8.00E+00	0.002%	YES	0.002%
36	Butanenitrile	6	5629-C1	1.96E-04	8.00E+00	0.002%	YES	0.002%
36	Butanenitrile	8	5629-D1	1.98E-04	8.00E+00	0.002%	YES	0.002%
36	Butanenitrile	10	5629-E1	1.89E-04	8.00E+00	0.002%	YES	0.002%
36	Butanenitrile	12	5629-F1	1.90E-04	8.00E+00	0.002%	YES	0.002%
36	Butanenitrile	14	5629-G1	1.86E-04	8.00E+00	0.002%	YES	0.002%
36	Butanenitrile	16	5629-H2	1.85E-04	8.00E+00	0.002%	YES	0.002%
36	Butanenitrile	2	5793-A1	1.90E-04	8.00E+00	0.002%	YES	0.002%
36	Butanenitrile	16	5793-H1	1.90E-04	8.00E+00	0.002%	YES	0.002%
36	Butanenitrile	2	5793-A2	2.12E-04	8.00E+00	0.003%	YES	0.002%
36	Butanenitrile	4	5793-B1	1.97E-04	8.00E+00	0.002%	YES	0.002%
36	Butanenitrile	8	5793-D1	1.95E-04	8.00E+00	0.002%	YES	0.002%
36	Butanenitrile	10	5793-E1	1.98E-04	8.00E+00	0.002%	YES	0.002%
36	Butanenitrile	12	5793-F1	1.89E-04	8.00E+00	0.002%	YES	0.002%
36	Butanenitrile	14	5793-G1	1.93E-04	8.00E+00	0.002%	YES	0.002%
36	Butanenitrile	16	5793-H2	1.83E-04	8.00E+00	0.002%	YES	0.002%
37	Pentanenitrile	2	5629-A1	1.75E-04	6.00E+00	0.003%	YES	0.003%
37	Pentanenitrile	16	5629-H1	2.37E-04	6.00E+00	0.004%		0.003%
37	Pentanenitrile	2	5629-A2	2.09E-04	6.00E+00	0.003%	YES	0.003%
37	Pentanenitrile	4	5629-B1	2.03E-04	6.00E+00	0.003%	YES	0.003%
37	Pentanenitrile	6	5629-C1	2.02E-04	6.00E+00	0.003%	YES	0.003%
37	Pentanenitrile	8	5629-D1	2.04E-04	6.00E+00	0.003%	YES	0.003%
37	Pentanenitrile	10	5629-E1	1.94E-04	6.00E+00	0.003%	YES	0.003%
37	Pentanenitrile	12	5629-F1	1.96E-04	6.00E+00	0.003%	YES	0.003%
37	Pentanenitrile	14	5629-G1	1.92E-04	6.00E+00	0.003%	YES	0.003%
37	Pentanenitrile	16	5629-H2	1.91E-04	6.00E+00	0.003%	YES	0.003%
37	Pentanenitrile	2	5793-A1	2.64E-04	6.00E+00	0.004%		0.003%
37	Pentanenitrile	16	5793-H1	1.95E-04	6.00E+00	0.003%	YES	0.003%
37	Pentanenitrile	2	5793-A2	2.18E-04	6.00E+00	0.004%	YES	0.003%
37	Pentanenitrile	4	5793-B1	2.02E-04	6.00E+00	0.003%	YES	0.003%
37	Pentanenitrile	8	5793-D1	2.00E-04	6.00E+00	0.003%	YES	0.003%
37	Pentanenitrile	10	5793-E1	2.03E-04	6.00E+00	0.003%	YES	0.003%
37	Pentanenitrile	12	5793-F1	1.95E-04	6.00E+00	0.003%	YES	0.003%
37	Pentanenitrile	14	5793-G1	1.98E-04	6.00E+00	0.003%	YES	0.003%
37	Pentanenitrile	16	5793-H2	1.89E-04	6.00E+00	0.003%	YES	0.003%
38	Hexanenitrile	2	5629-A1	1.50E-04	6.00E+00	0.002%	YES	0.003%
38	Hexanenitrile	16	5629-H1	1.70E-04	6.00E+00	0.003%	YES	0.003%
38	Hexanenitrile	2	5629-A2	1.79E-04	6.00E+00	0.003%	YES	0.003%
38	Hexanenitrile	4	5629-B1	1.74E-04	6.00E+00	0.003%	YES	0.003%
38	Hexanenitrile	6	5629-C1	1.73E-04	6.00E+00	0.003%	YES	0.003%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL?	Approx. DL (%OEL)
38	Hexanenitrile	8	5629-D1	1.74E-04	6.00E+00	0.003%	YES	0.003%
38	Hexanenitrile	10	5629-E1	1.66E-04	6.00E+00	0.003%	YES	0.003%
38	Hexanenitrile	12	5629-F1	1.68E-04	6.00E+00	0.003%	YES	0.003%
38	Hexanenitrile	14	5629-G1	1.64E-04	6.00E+00	0.003%	YES	0.003%
38	Hexanenitrile	16	5629-H2	1.63E-04	6.00E+00	0.003%	YES	0.003%
38	Hexanenitrile	2	5793-A1	1.68E-04	6.00E+00	0.003%	YES	0.003%
38	Hexanenitrile	16	5793-H1	1.67E-04	6.00E+00	0.003%	YES	0.003%
38	Hexanenitrile	2	5793-A2	1.87E-04	6.00E+00	0.003%	YES	0.003%
38	Hexanenitrile	4	5793-B1	1.73E-04	6.00E+00	0.003%	YES	0.003%
38	Hexanenitrile	8	5793-D1	1.71E-04	6.00E+00	0.003%	YES	0.003%
38	Hexanenitrile	10	5793-E1	1.74E-04	6.00E+00	0.003%	YES	0.003%
38	Hexanenitrile	12	5793-F1	1.67E-04	6.00E+00	0.003%	YES	0.003%
38	Hexanenitrile	14	5793-G1	1.70E-04	6.00E+00	0.003%	YES	0.003%
38	Hexanenitrile	16	5793-H2	1.60E-04	6.00E+00	0.003%	YES	0.003%
42	Ethylamine	2	5629-A1	4.49E-03	5.00E+00	0.090%	YES	0.090%
42	Ethylamine	16	5629-H1	4.54E-03	5.00E+00	0.091%	YES	0.090%
42	Ethylamine	2	5629-A2	4.36E-03	5.00E+00	0.087%	YES	0.090%
42	Ethylamine	4	5629-B1	4.13E-03	5.00E+00	0.083%	YES	0.090%
42	Ethylamine	6	5629-C1	4.36E-03	5.00E+00	0.087%	YES	0.090%
42	Ethylamine	8	5629-D1	4.53E-03	5.00E+00	0.091%	YES	0.090%
42	Ethylamine	10	5629-E1	4.70E-03	5.00E+00	0.094%	YES	0.090%
42	Ethylamine	12	5629-F1	4.52E-03	5.00E+00	0.090%	YES	0.090%
42	Ethylamine	14	5629-G1	4.58E-03	5.00E+00	0.092%	YES	0.090%
42	Ethylamine	16	5629-H2	4.59E-03	5.00E+00	0.092%	YES	0.090%
42	Ethylamine	2	5793-A1	4.56E-03	5.00E+00	0.091%	YES	0.090%
42	Ethylamine	16	5793-H1	4.48E-03	5.00E+00	0.090%	YES	0.090%
42	Ethylamine	2	5793-A2	4.49E-03	5.00E+00	0.090%	YES	0.090%
42	Ethylamine	4	5793-B1	4.41E-03	5.00E+00	0.088%	YES	0.090%
42	Ethylamine	6	5793-C1	4.36E-03	5.00E+00	0.087%	YES	0.090%
42	Ethylamine	8	5793-D1	4.39E-03	5.00E+00	0.088%	YES	0.090%
42	Ethylamine	10	5793-E1	4.55E-03	5.00E+00	0.091%	YES	0.090%
42	Ethylamine	12	5793-F1	4.62E-03	5.00E+00	0.092%	YES	0.090%
42	Ethylamine	14	5793-G1	4.53E-03	5.00E+00	0.091%	YES	0.090%
42	Ethylamine	16	5793-H2	4.52E-03	5.00E+00	0.090%	YES	0.090%
43	N-Nitrosodimethylamine	2	5629-A1	3.21E-04	3.00E-04	107.116%		10.00%
43	N-Nitrosodimethylamine	16	5629-H1	2.83E-05	3.00E-04	9.438%	YES	10.00%
43	N-Nitrosodimethylamine	2	5629-A2	2.90E-05	3.00E-04	9.675%	YES	10.00%
43	N-Nitrosodimethylamine	4	5629-B1	2.90E-05	3.00E-04	9.651%	YES	10.00%
43	N-Nitrosodimethylamine	6	5629-C1	2.89E-05	3.00E-04	9.626%	YES	10.00%
43	N-Nitrosodimethylamine	8	5629-D1	2.90E-05	3.00E-04	9.675%	YES	10.00%
43	N-Nitrosodimethylamine	10	5629-E1	2.92E-05	3.00E-04	9.748%	YES	10.00%
43	N-Nitrosodimethylamine	12	5629-F1	2.93E-05	3.00E-04	9.773%	YES	10.00%
43	N-Nitrosodimethylamine	14	5629-G1	2.92E-05	3.00E-04	9.724%	YES	10.00%
43	N-Nitrosodimethylamine	16	5629-H2	2.92E-05	3.00E-04	9.724%	YES	10.00%
43	N-Nitrosodimethylamine	2	5793-A1	3.30E-04	3.00E-04	110.160%		10.00%
43	N-Nitrosodimethylamine	16	5793-H1	4.25E-04	3.00E-04	141.627%		10.00%
43	N-Nitrosodimethylamine	2	5793-A2	3.06E-05	3.00E-04	10.184%	YES	10.00%
43	N-Nitrosodimethylamine	4	5793-B1	2.89E-05	3.00E-04	9.626%	YES	10.00%
43	N-Nitrosodimethylamine	6	5793-C1	2.89E-05	3.00E-04	9.626%	YES	10.00%
43	N-Nitrosodimethylamine	8	5793-D1	2.89E-05	3.00E-04	9.626%	YES	10.00%
43	N-Nitrosodimethylamine	10	5793-E1	2.90E-05	3.00E-04	9.651%	YES	10.00%
43	N-Nitrosodimethylamine	12	5793-F1	3.00E-05	3.00E-04	9.985%	YES	10.00%
43	N-Nitrosodimethylamine	14	5793-G1	3.07E-05	3.00E-04	10.238%	YES	10.00%
43	N-Nitrosodimethylamine	16	5793-H2	3.05E-05	3.00E-04	10.161%	YES	10.00%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL?	Approx. DL (%OEL)
44	N-Nitrosodiethylamine	2	5629-A1	2.09E-05	1.00E-04	20.865%	YES	20.900%
44	N-Nitrosodiethylamine	16	5629-H1	1.96E-05	1.00E-04	19.558%	YES	20.900%
44	N-Nitrosodiethylamine	2	5629-A2	2.00E-05	1.00E-04	20.049%	YES	20.900%
44	N-Nitrosodiethylamine	4	5629-B1	2.00E-05	1.00E-04	19.999%	YES	20.900%
44	N-Nitrosodiethylamine	6	5629-C1	1.99E-05	1.00E-04	19.949%	YES	20.900%
44	N-Nitrosodiethylamine	8	5629-D1	2.00E-05	1.00E-04	20.049%	YES	20.900%
44	N-Nitrosodiethylamine	10	5629-E1	2.02E-05	1.00E-04	20.201%	YES	20.900%
44	N-Nitrosodiethylamine	12	5629-F1	2.03E-05	1.00E-04	20.252%	YES	20.900%
44	N-Nitrosodiethylamine	14	5629-G1	2.02E-05	1.00E-04	20.150%	YES	20.900%
44	N-Nitrosodiethylamine	16	5629-H2	2.02E-05	1.00E-04	20.150%	YES	20.900%
44	N-Nitrosodiethylamine	2	5793-A1	2.06E-05	1.00E-04	20.646%	YES	20.900%
44	N-Nitrosodiethylamine	16	5793-H1	2.03E-05	1.00E-04	20.287%	YES	20.900%
44	N-Nitrosodiethylamine	2	5793-A2	2.11E-05	1.00E-04	21.104%	YES	20.900%
44	N-Nitrosodiethylamine	4	5793-B1	1.99E-05	1.00E-04	19.949%	YES	20.900%
44	N-Nitrosodiethylamine	6	5793-C1	1.99E-05	1.00E-04	19.949%	YES	20.900%
44	N-Nitrosodiethylamine	8	5793-D1	1.99E-05	1.00E-04	19.949%	YES	20.900%
44	N-Nitrosodiethylamine	10	5793-E1	2.00E-05	1.00E-04	19.999%	YES	20.900%
44	N-Nitrosodiethylamine	14	5793-F1	2.07E-05	1.00E-04	20.739%	YES	20.900%
44	N-Nitrosodiethylamine	12	5793-G1	2.13E-05	1.00E-04	21.265%	YES	20.900%
44	N-Nitrosodiethylamine	16	5793-H2	2.11E-05	1.00E-04	21.104%	YES	20.900%
45	N-Nitrosomethylethylamine	2	5629-A1	2.48E-05	3.00E-04	8.257%	YES	8.200%
45	N-Nitrosomethylethylamine	16	5629-H1	2.38E-05	3.00E-04	7.933%	YES	8.200%
45	N-Nitrosomethylethylamine	2	5629-A2	2.44E-05	3.00E-04	8.132%	YES	8.200%
45	N-Nitrosomethylethylamine	4	5629-B1	2.43E-05	3.00E-04	8.112%	YES	8.200%
45	N-Nitrosomethylethylamine	6	5629-C1	2.43E-05	3.00E-04	8.092%	YES	8.200%
45	N-Nitrosomethylethylamine	8	5629-D1	2.44E-05	3.00E-04	8.132%	YES	8.200%
45	N-Nitrosomethylethylamine	10	5629-E1	2.46E-05	3.00E-04	8.194%	YES	8.200%
45	N-Nitrosomethylethylamine	12	5629-F1	2.46E-05	3.00E-04	8.215%	YES	8.200%
45	N-Nitrosomethylethylamine	14	5629-G1	2.45E-05	3.00E-04	8.173%	YES	8.200%
45	N-Nitrosomethylethylamine	16	5629-H2	2.45E-05	3.00E-04	8.173%	YES	8.200%
45	N-Nitrosomethylethylamine	2	5793-A1	2.45E-05	3.00E-04	8.170%	YES	8.200%
45	N-Nitrosomethylethylamine	16	5793-H1	2.35E-05	3.00E-04	7.837%	YES	8.200%
45	N-Nitrosomethylethylamine	2	5793-A2	2.57E-05	3.00E-04	8.560%	YES	8.200%
45	N-Nitrosomethylethylamine	4	5793-B1	2.43E-05	3.00E-04	8.092%	YES	8.200%
45	N-Nitrosomethylethylamine	6	5793-C1	2.43E-05	3.00E-04	8.092%	YES	8.200%
45	N-Nitrosomethylethylamine	8	5793-D1	2.43E-05	3.00E-04	8.092%	YES	8.200%
45	N-Nitrosomethylethylamine	10	5793-E1	2.43E-05	3.00E-04	8.112%	YES	8.200%
45	N-Nitrosomethylethylamine	12	5793-F1	2.40E-05	3.00E-04	8.012%	YES	8.200%
45	N-Nitrosomethylethylamine	14	5793-G1	2.46E-05	3.00E-04	8.215%	YES	8.200%
45	N-Nitrosomethylethylamine	16	5793-H2	2.45E-05	3.00E-04	8.153%	YES	8.200%
46	N-Nitrosomorpholine	2	5629-A1	1.79E-05	6.00E-04	2.984%	YES	3.100%
46	N-Nitrosomorpholine	16	5629-H1	1.72E-05	6.00E-04	2.867%	YES	3.100%
46	N-Nitrosomorpholine	2	5629-A2	1.76E-05	6.00E-04	2.939%	YES	3.100%
46	N-Nitrosomorpholine	4	5629-B1	1.76E-05	6.00E-04	2.932%	YES	3.100%
46	N-Nitrosomorpholine	6	5629-C1	1.75E-05	6.00E-04	2.924%	YES	3.100%
46	N-Nitrosomorpholine	8	5629-D1	1.76E-05	6.00E-04	2.939%	YES	3.100%
46	N-Nitrosomorpholine	10	5629-E1	1.78E-05	6.00E-04	2.961%	YES	3.100%
46	N-Nitrosomorpholine	12	5629-F1	1.78E-05	6.00E-04	2.969%	YES	3.100%
46	N-Nitrosomorpholine	14	5629-G1	1.77E-05	6.00E-04	2.954%	YES	3.100%
46	N-Nitrosomorpholine	16	5629-H2	1.77E-05	6.00E-04	2.954%	YES	3.100%
46	N-Nitrosomorpholine	2	5793-A1	1.77E-05	6.00E-04	2.953%	YES	3.100%
46	N-Nitrosomorpholine	16	5793-H1	1.61E-05	6.00E-04	2.691%	YES	3.100%
46	N-Nitrosomorpholine	2	5793-A2	1.86E-05	6.00E-04	3.094%	YES	3.100%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL?	Approx. DL (%OEL)
46	N-Nitrosomorpholine	4	5793-B1	1.75E-05	6.00E-04	2.924%	YES	3.100%
46	N-Nitrosomorpholine	6	5793-C1	1.75E-05	6.00E-04	2.924%	YES	3.100%
46	N-Nitrosomorpholine	8	5793-D1	1.75E-05	6.00E-04	2.924%	YES	3.100%
46	N-Nitrosomorpholine	10	5793-E1	1.76E-05	6.00E-04	2.932%	YES	3.100%
46	N-Nitrosomorpholine	12	5793-F1	1.65E-05	6.00E-04	2.751%	YES	3.100%
46	N-Nitrosomorpholine	14	5793-G1	1.69E-05	6.00E-04	2.821%	YES	3.100%
46	N-Nitrosomorpholine	16	5793-H2	1.68E-05	6.00E-04	2.799%	YES	3.100%
47	Tributyl phosphate	16	5629-H1	1.42E-04	2.00E-01	0.071%	YES	0.074%
47	Tributyl phosphate	2	5629-A2	1.38E-04	2.00E-01	0.069%	YES	0.074%
47	Tributyl phosphate	4	5629-B1	1.41E-04	2.00E-01	0.070%	YES	0.074%
47	Tributyl phosphate	6	5629-C1	1.39E-04	2.00E-01	0.070%	YES	0.074%
47	Tributyl phosphate	8	5629-D1	1.43E-04	2.00E-01	0.072%	YES	0.074%
47	Tributyl phosphate	10	5629-E1	1.40E-04	2.00E-01	0.070%	YES	0.074%
47	Tributyl phosphate	12	5629-F1	1.42E-04	2.00E-01	0.071%	YES	0.074%
47	Tributyl phosphate	16	5629-H2	1.39E-04	2.00E-01	0.070%	YES	0.074%
47	Tributyl phosphate	2	5793-A1	1.55E-04	2.00E-01	0.078%	YES	0.074%
47	Tributyl phosphate	16	5793-H1	1.40E-04	2.00E-01	0.070%	YES	0.074%
47	Tributyl phosphate	2	5793-A2	1.43E-04	2.00E-01	0.072%	YES	0.074%
47	Tributyl phosphate	4	5793-B1	1.41E-04	2.00E-01	0.070%	YES	0.074%
47	Tributyl phosphate	6	5793-C1	1.41E-04	2.00E-01	0.070%	YES	0.074%
47	Tributyl phosphate	10	5793-E1	1.46E-04	2.00E-01	0.073%	YES	0.074%
47	Tributyl phosphate	12	5793-F1	1.39E-04	2.00E-01	0.069%	YES	0.074%
47	Tributyl phosphate	14	5793-G1	1.41E-04	2.00E-01	0.071%	YES	0.074%
48	Dibutyl butylphosphonate	16	5629-H1	7.32E-05	7.00E-03	1.046%	YES	1.06%
48	Dibutyl butylphosphonate	2	5629-A2	7.24E-05	7.00E-03	1.034%	YES	1.06%
48	Dibutyl butylphosphonate	4	5629-B1	7.15E-05	7.00E-03	1.022%	YES	1.06%
48	Dibutyl butylphosphonate	6	5629-C1	7.35E-05	7.00E-03	1.051%	YES	1.06%
48	Dibutyl butylphosphonate	8	5629-D1	7.21E-05	7.00E-03	1.029%	YES	1.06%
48	Dibutyl butylphosphonate	10	5629-E1	7.28E-05	7.00E-03	1.040%	YES	1.06%
48	Dibutyl butylphosphonate	16	5629-H2	7.15E-05	7.00E-03	1.022%	YES	1.06%
48	Dibutyl butylphosphonate	2	5793-A1	7.97E-05	7.00E-03	1.139%	YES	1.06%
48	Dibutyl butylphosphonate	16	5793-H1	7.19E-05	7.00E-03	1.027%	YES	1.06%
48	Dibutyl butylphosphonate	2	5793-A2	7.37E-05	7.00E-03	1.053%	YES	1.06%
48	Dibutyl butylphosphonate	4	5793-B1	7.23E-05	7.00E-03	1.032%	YES	1.06%
48	Dibutyl butylphosphonate	6	5793-C1	7.24E-05	7.00E-03	1.034%	YES	1.06%
48	Dibutyl butylphosphonate	10	5793-E1	7.52E-05	7.00E-03	1.074%	YES	1.06%
48	Dibutyl butylphosphonate	12	5793-F1	7.14E-05	7.00E-03	1.020%	YES	1.06%
48	Dibutyl butylphosphonate	14	5793-G1	7.26E-05	7.00E-03	1.038%	YES	1.06%
51	Pyridine	2	5629-A1	1.98E-04	1.00E+00	0.020%	YES	0.050%
51	Pyridine	16	5629-H1	2.25E-04	1.00E+00	0.022%	YES	0.050%
51	Pyridine	2	5629-A2	2.36E-04	1.00E+00	0.024%	YES	0.050%
51	Pyridine	4	5629-B1	2.30E-04	1.00E+00	0.023%	YES	0.050%
51	Pyridine	6	5629-C1	2.29E-04	1.00E+00	0.023%	YES	0.050%
51	Pyridine	8	5629-D1	2.30E-04	1.00E+00	0.023%	YES	0.050%
51	Pyridine	10	5629-E1	2.20E-04	1.00E+00	0.022%	YES	0.050%
51	Pyridine	12	5629-F1	2.22E-04	1.00E+00	0.022%	YES	0.050%
51	Pyridine	14	5629-G1	2.17E-04	1.00E+00	0.022%	YES	0.050%
51	Pyridine	16	5629-H2	2.16E-04	1.00E+00	0.022%	YES	0.050%
51	Pyridine	2	5793-A1	2.22E-04	1.00E+00	0.022%	YES	0.050%
51	Pyridine	16	5793-H1	2.21E-04	1.00E+00	0.022%	YES	0.050%
51	Pyridine	2	5793-A2	2.47E-04	1.00E+00	0.025%	YES	0.050%
51	Pyridine	4	5793-B1	2.29E-04	1.00E+00	0.023%	YES	0.050%
51	Pyridine	8	5793-D1	2.27E-04	1.00E+00	0.023%	YES	0.050%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL?	Approx. DL (%OEL)
51	Pyridine	10	5793-E1	2.30E-04	1.00E+00	0.023%	YES	0.050%
51	Pyridine	12	5793-F1	2.21E-04	1.00E+00	0.022%	YES	0.050%
51	Pyridine	14	5793-G1	2.24E-04	1.00E+00	0.022%	YES	0.050%
51	Pyridine	16	5793-H2	2.13E-04	1.00E+00	0.021%	YES	0.050%
52	2,4-Dimethylpyridine	2	5629-A1	2.14E-04	5.00E-01	0.043%	YES	0.074%
52	2,4-Dimethylpyridine	16	5629-H1	2.43E-04	5.00E-01	0.049%	YES	0.074%
52	2,4-Dimethylpyridine	2	5629-A2	2.56E-04	5.00E-01	0.051%	YES	0.074%
52	2,4-Dimethylpyridine	4	5629-B1	2.49E-04	5.00E-01	0.050%	YES	0.074%
52	2,4-Dimethylpyridine	6	5629-C1	2.47E-04	5.00E-01	0.049%	YES	0.074%
52	2,4-Dimethylpyridine	8	5629-D1	2.49E-04	5.00E-01	0.050%	YES	0.074%
52	2,4-Dimethylpyridine	10	5629-E1	2.38E-04	5.00E-01	0.048%	YES	0.074%
52	2,4-Dimethylpyridine	12	5629-F1	2.40E-04	5.00E-01	0.048%	YES	0.074%
52	2,4-Dimethylpyridine	14	5629-G1	2.35E-04	5.00E-01	0.047%	YES	0.074%
52	2,4-Dimethylpyridine	16	5629-H2	2.33E-04	5.00E-01	0.047%	YES	0.074%
52	2,4-Dimethylpyridine	2	5793-A1	2.40E-04	5.00E-01	0.048%	YES	0.074%
52	2,4-Dimethylpyridine	16	5793-H1	2.39E-04	5.00E-01	0.048%	YES	0.074%
52	2,4-Dimethylpyridine	2	5793-A2	2.67E-04	5.00E-01	0.053%	YES	0.074%
52	2,4-Dimethylpyridine	4	5793-B1	2.47E-04	5.00E-01	0.049%	YES	0.074%
52	2,4-Dimethylpyridine	8	5793-D1	2.45E-04	5.00E-01	0.049%	YES	0.074%
52	2,4-Dimethylpyridine	10	5793-E1	2.49E-04	5.00E-01	0.050%	YES	0.074%
52	2,4-Dimethylpyridine	12	5793-F1	2.38E-04	5.00E-01	0.048%	YES	0.074%
52	2,4-Dimethylpyridine	14	5793-G1	2.42E-04	5.00E-01	0.048%	YES	0.074%
52	2,4-Dimethylpyridine	16	5793-H2	2.31E-04	5.00E-01	0.046%	YES	0.074%

Appendix E

Plots of Other COPCs with Significant (2-10% of OEL) Detected Values

Appendix E

Plots of Other COPCs with Significant (2-10% of OEL) Detected Values

Ammonia (see Figure E.1) – The detection limit (DL) for ammonia corresponds to approximately 2.4% of the OEL; (0.6 ppm). All of the respirator cartridge outlet measurements were below analytical DLs. Three of the four respirator inlet measurements were above DLs but were less than 10 % of the OEL. The inlet measurements for Respirator Cartridge #2 were the highest value at 7.5% of the OEL.

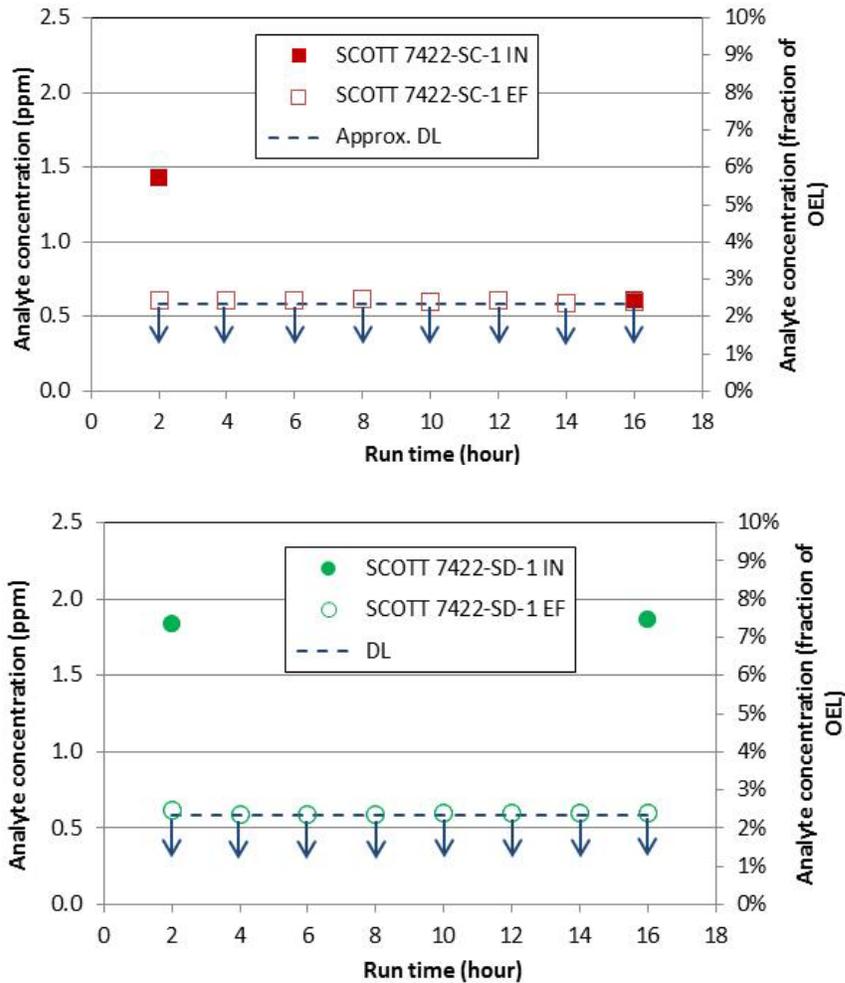


Figure E.1. Plot of Measured Ammonia Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (cartridge #1 = SCOTT 7422-SC1 and cartridge #2 = SCOTT 7422-SD1). Data points noted with ↓ indicates measurement <DL.

The first inlet concentration measured for Respirator Cartridge #1 was 5.7% OEL, and the second, after 16 hours, was below the DL, which could either indicate a change in inlet concentration or an error in the latter measurement. No evidence of breakthrough was observed for ammonia.

Formaldehyde (see Figure E.2) – The DL for formaldehyde corresponds to approximately 0.60% of its OEL. All inlet and outlet values measured between the two respirator cartridges were less than 10% of the OEL—specifically less than 4%. The first inlet values for both respirator cartridges were the highest of all of the measurements (3.5% and 1.4% of the OEL, respectively). These inlet measurements were lower at the end of each campaign (2.1% and 1.0% of OEL, respectively).

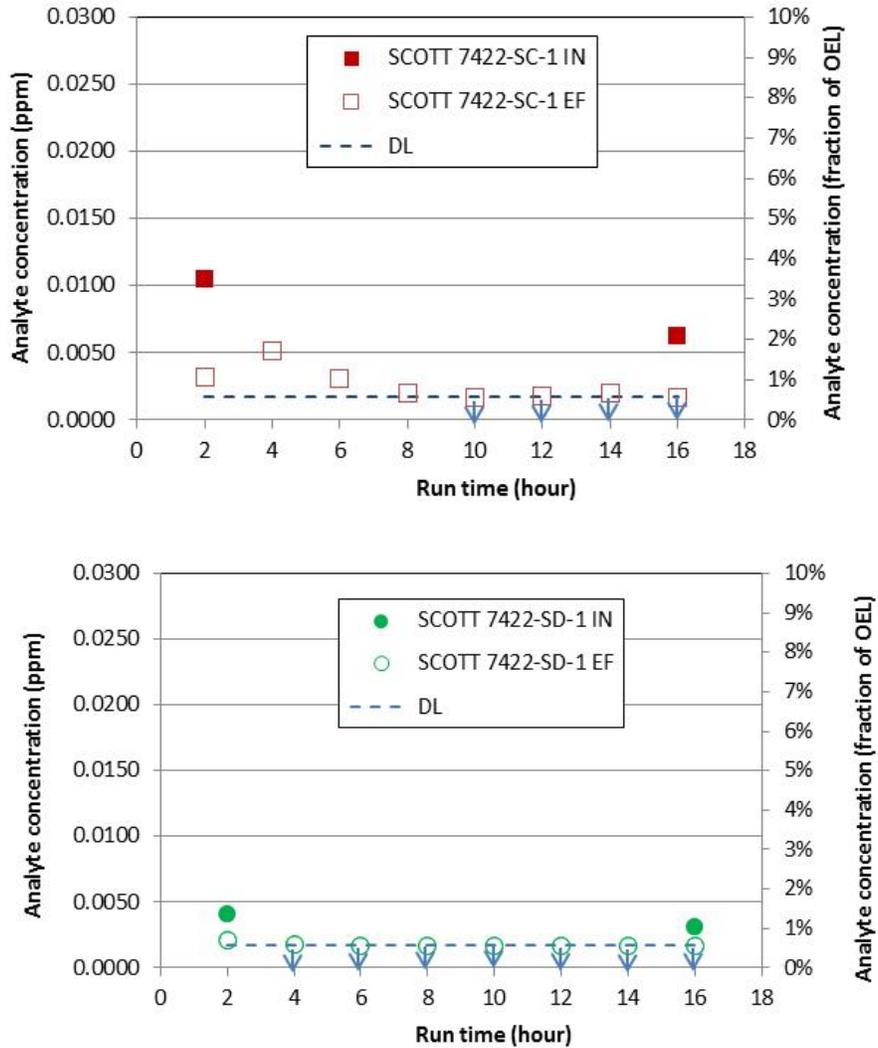


Figure E.2. Plot of Measured Formaldehyde Concentrations before the Inlets and after the Outlets of the two Respirator Cartridges Tested (cartridge #1 = SCOTT 7422-SC1 and cartridge #2 = SCOTT 7422-SD1). Data points noted with ↓ indicates measurement <DL.

The outlet measurements for both respirators were greater than DLs for the early readings, but generally appeared to follow a decrease with time like the inlet values. Since the outlet concentrations were high than DLs early breakthrough could be an explanation. However, environment background interference is another possibility. Based on cartridge service-life estimation using SCOTT online tool (SureLife Cartridge Calculator), the SCOTT 7422-SC1 cartridges can have a service life of more than 48 hours under conditions (0.3 ppm at 25°C, 50% RH with a flow rate of 60 L/min) similar to the field-testing conditions. Nevertheless, more measurements are recommended, with higher inlet concentrations, to confirm this conclusion.

2-Pentylfuran (see *Figure E.3*) – The DL for 2-Pentylfuran corresponds to approximately 1.7% of the OEL. All values (inlet and outlet) were less than 10% of the OEL—specifically, less than 7%. Multiple inlet and outlet values were greater than the DL, but all of these except one outlet (6.5%) were less than 2.3% of OEL. The general trends of the data do not support evidence of breakthrough since there was no steady increase in outlet concentrations with time. The one high outlet reading is suspected to be due to measurement error. Even if the one high outlet reading is real, all data was less than 7% of OEL.

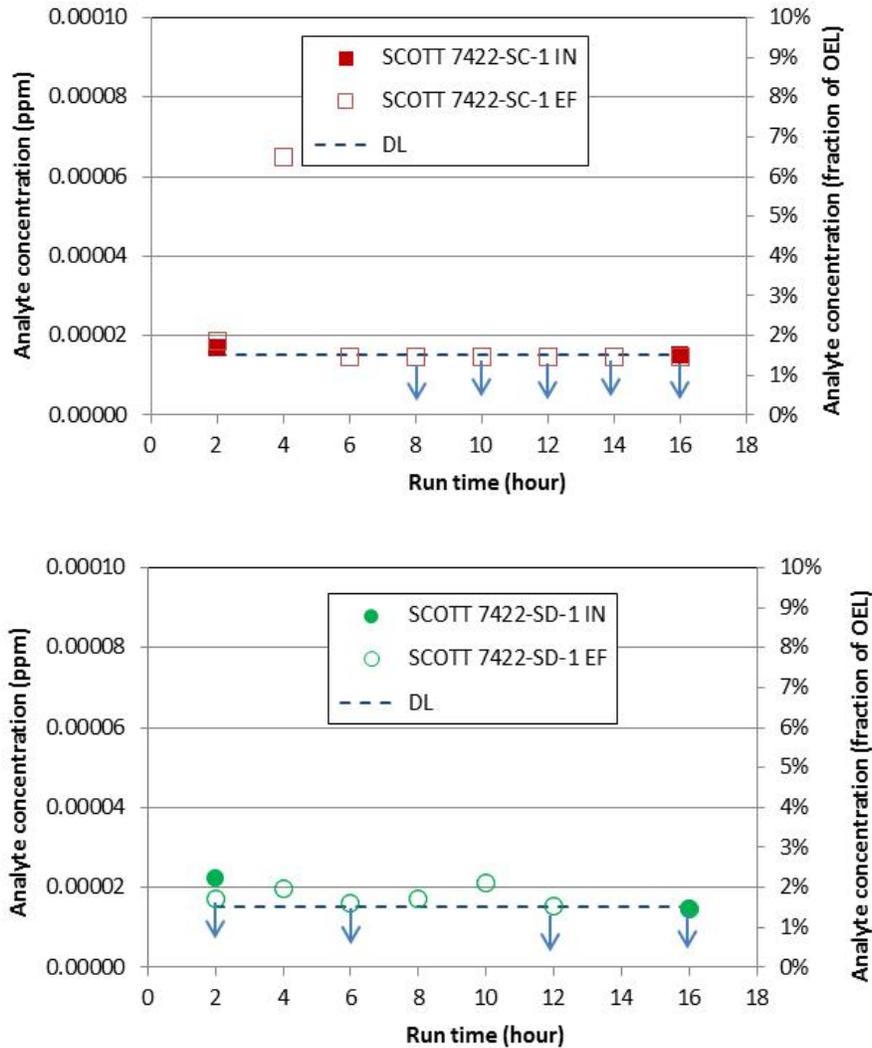


Figure E.3. Plot of Measured 2-Pentylfuran Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (cartridge #1 = SCOTT 7422-SC1 and cartridge #2 = SCOTT 7422-SD1). Data points noted with ↓ indicates measurement <DL.

2-Heptylfuran (see Figure E.4) – The DL for 2-Heptylfuran corresponds to approximately 1.1% of the OEL. The two initial inlet concentrations for the two different respirator cartridges had measurements above the DL (2.3% and 1.3% of the OEL, respectively). All other measurements were below DLs. Therefore, no evidence of breakthrough is observed in the data.

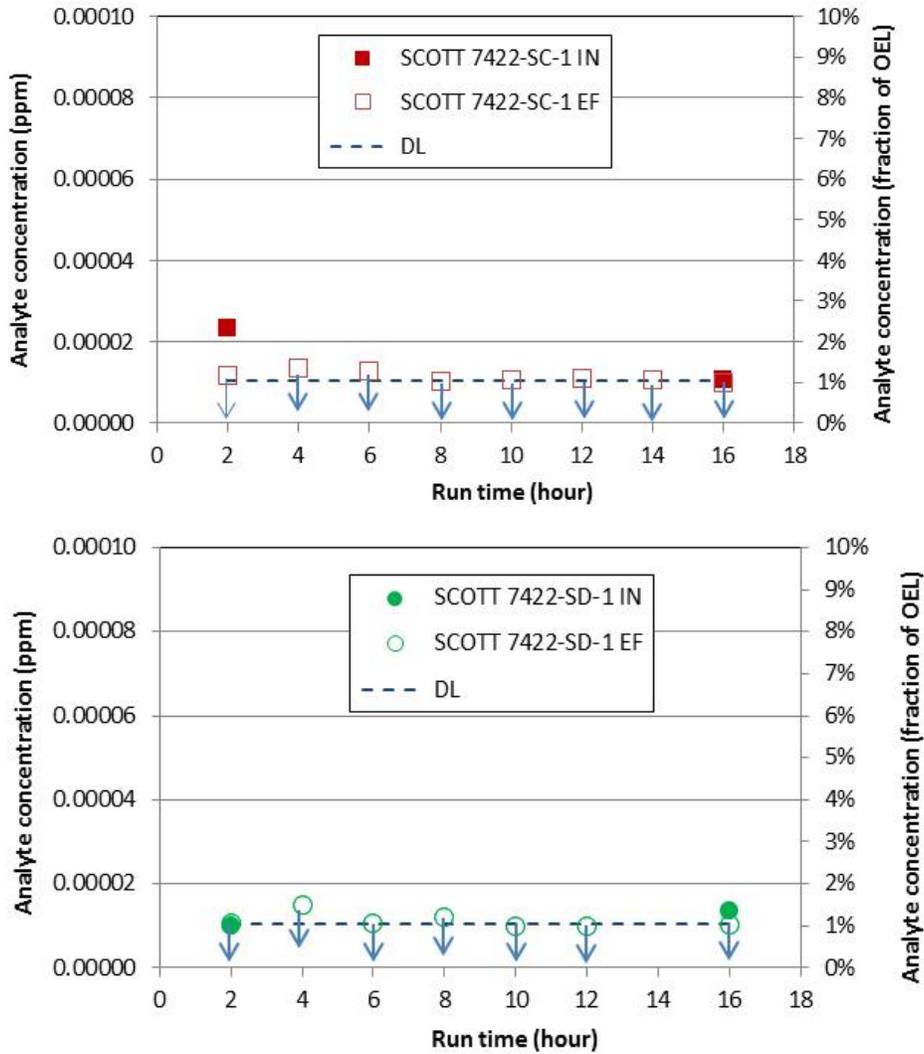


Figure E.4. Plot of Measured 2-Heptylfuran Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (cartridge #1 = SCOTT 7422-SC1 and cartridge #2 = SCOTT 7422-SD1). Data points noted with ↓ indicates measurement <DL.

2-Propylfuran (see Figure E.5) – The DL for 2-Propylfuran corresponds to approximately 2.8% of the OEL. All values (inlet and outlet) were less than 10% of the OEL—specifically, less than 6%. Multiple inlet and outlet values were greater than the DL. The measured outlet concentrations from Respirator Cartridge #1 appeared to increase with time, to approximately 4% during the course of the experiment. This trend could be due to breakthrough or environmental environment background interference. More measurements are recommended, with higher inlet concentrations, to better determine the behavior. In the case of Respirator Cartridge #2, one outlet point (hour 10) was the highest reading at 5.0%. This value cannot be explained, other than a likely measurement error. Still, all of these values were less than 6% of the OEL.

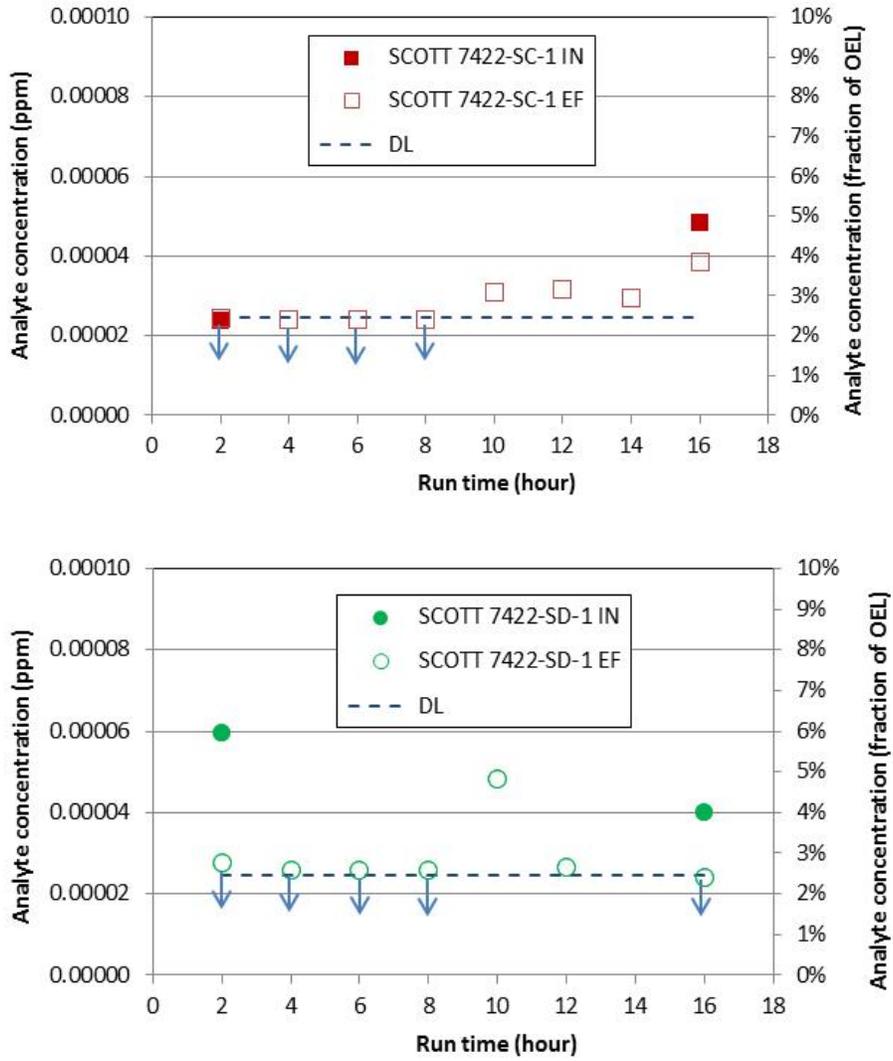


Figure E.5. Plot of Measured 2-Propylfuran Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (cartridge #1 = SCOTT 7422-SC1 and cartridge #2 = SCOTT 7422-SD1). Data points noted with ↓ indicates measurement <DL.

N-Nitrosomethylethylamine (see Figure E.6) – The DL for N-nitrosomethylethylamine (NMEA) corresponds to approximately 8.6% of the OEL. All the inlet and outlet values for both Respirator Cartridges are below the DL. Therefore, there is no evidence of breakthrough over the measured time period.

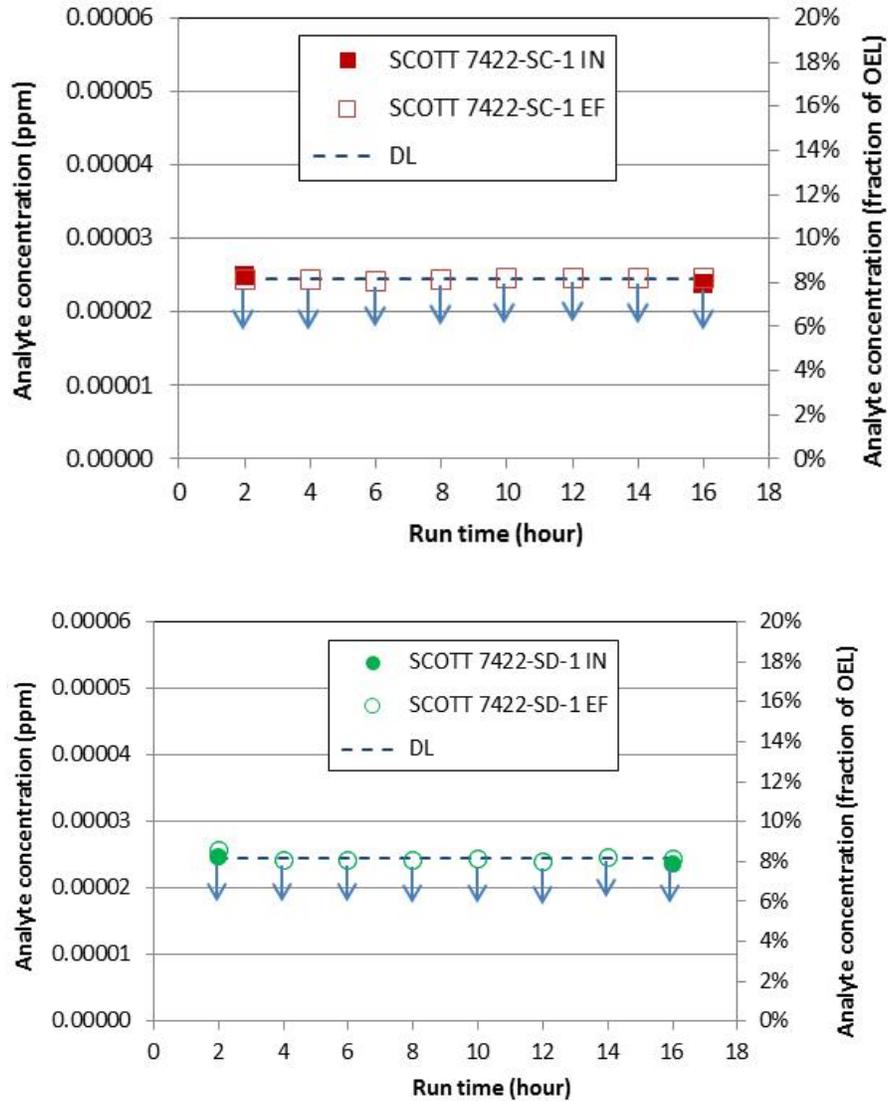


Figure E.6. Plot of Measured N-Nitrosomethylethylamine Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (cartridge #1 = SCOTT 7422-SC1 and cartridge #2 = SCOTT 7422-SD1). Data points noted with ↓ indicates measurement <DL.

N-Nitrosomorpholine (see *Figure E.7*) – The DL for *N-nitrosomorpholine* corresponds to approximately 3.1% of the OEL. All the inlet and outlet values for both Respirator Cartridges were below the DL. Therefore, there is no evidence of breakthrough over the measured time period.

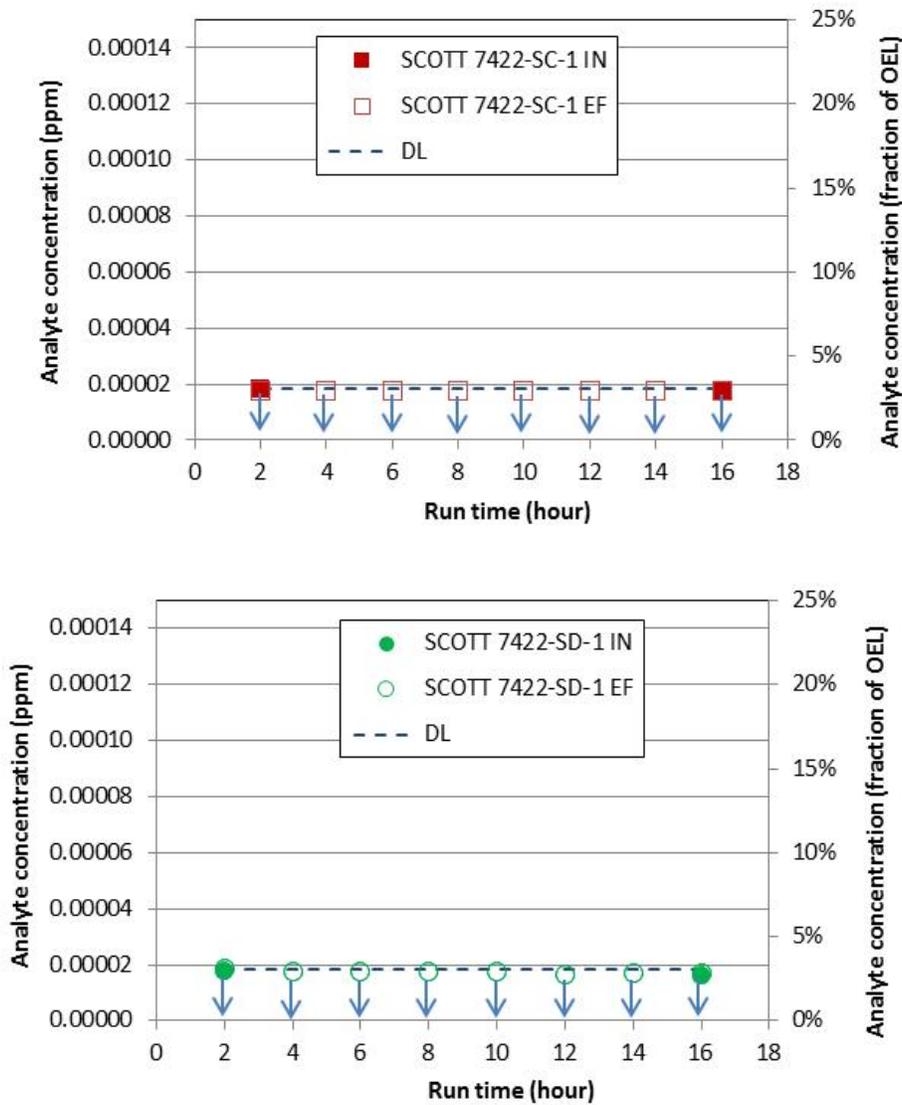


Figure E.7. Plot of Measured *N-Nitrosomorpholine* Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (cartridge #1 = SCOTT 7422-SC1 and cartridge #2 = SCOTT 7422-SD1). Data points noted with ↓ indicates measurement <DL.

N-Nitrosodiethylamine (see Figure E.8) – The DL for N-nitrosodiethylamine (NDEA) corresponds to approximately 21% of the OEL. For both respirator cartridges, all of the inlet and outlet values were at or below the DL; therefore, there is no evidence of breakthrough. Because the the DL is greater than 10%, it is recommended that this current NDEA DL (~21% of OEL) be used for making respirator performance determinations. Based on the outlet measurements there is no evidence of breakthrough over the measured time period for either cartridge tested.

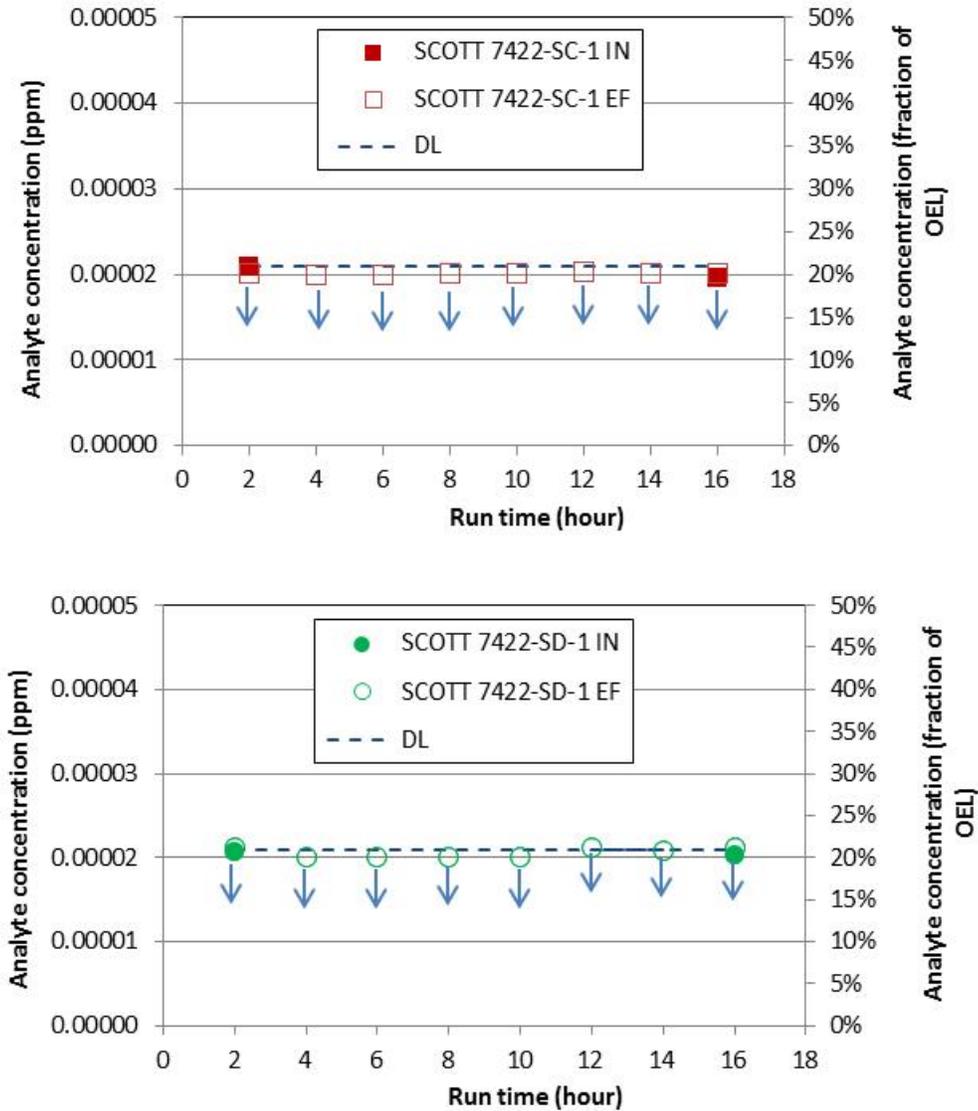


Figure E.8. Plot of Measured N-Nitrosodiethylamine Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (cartridge #1 = SCOTT 7422-SC1 and cartridge #2 = SCOTT 7422-SD1). Data points noted with ↓ indicates measurement <DL.

Appendix F

Historical Data Comparison

Appendix F

Historical Data Comparison

Headspace-characterization data and industrial-hygiene (IH) data—hereafter referred to as “TWINS HS” and “TWINS IH”—were obtained from the Tank Characterization Database via the Tank Waste Information Network System (TWINS). All vapor analysis results for tank 241-SY-102 (SY-102) and its exhaust system were obtained via a TWINS query on June 20, 2016, for TWINS HS,¹ and another query on October 7, 2016, for TWINS IH. More recent headspace data were also obtained from the Site-Wide Industrial Hygiene Database (SWIHD) by two queries. The first, on July 12, 2016, contained all data loaded as of that date. The second query contained all data with survey dates between May 1, 2016, and October 7, 2016. This latter data set was used to update and supplement the former, producing a set referred to as “SWIHD HS.”

TWINS HS and TWINS IH data were eliminated from consideration if they were

- Quality Assurance samples (blanks, laboratory control samples, or spikes)
- Marked as suspect (Data Qualifier flag S)
- Associated with a contaminant in a blank, trip blank, or field blank (Data Qualifier flags B, T, or F)
- A laboratory control sample that was out of range (Data Qualifier flag a)
- An excessive relative percent difference (Data Qualifier flag c)
- Marked with a laboratory-defined flag whose meaning was not generically defined and might indicate a serious data-quality issue (Data Qualifier flags L or Y).

Flags a, c, and L were found only in the TWINS IH database, not in TWINS HS.

The exclusions for the SWIHD HS data set were similar:

- Having a laboratory control sample that was out of range (flag a)
- Associated with a contaminant in a blank (flags b or B)
- Having an excessive relative percent difference or relative standard deviation (flags c or d)
- Having an excessive difference between the sample result and its serial dilution (flag e)
- Having a failed mass spectrometer reading on the sample but not on its serial dilution (flag f)
- Marked with a laboratory-defined flag whose meaning was not generically defined and might indicate a serious data-quality issue (flags L or Y).

TWINS HS results associated with chemicals that were ambiguously identified (e.g., “alkane,” “unknown,” “C6 ketone”) were deleted unless the molecular weight of one of the chemicals could be unambiguously specified (e.g., “octanenitrile and others” was kept). In these mixture cases, where the Chemical ID consisted of a Chemical Abstracts Service number followed by M, the molecular weight of the identified chemical was added to the data record, the Chemical Abstract Service number was used for

¹ No data have been added to TWINS HS since April 2005, so the June 2016 download does not require updating.

the Chemical ID, and the concentration expressed in parts per million (absent from the downloaded database) was calculated from the concentration in milligrams per cubic meter at 25°C and the molecular weight.

A number of chemicals in the TWINS IH data set had “needs conversion” notes in the concentration (mg/m³ and ppm) columns, rather than numbers, and required calculations to supply these concentrations. The calculations made use of values already in the database: the molecular weight, the Reported Value and its units, and the Sample Volume and its units. A temperature of 25°C and a pressure of 1 atm were assumed.

The method described above was consistent with that used in PNNL-25880,¹ except that measurements that were non-reports—less than the reporting limit (RL) for the analyte—were excluded in PNNL-25880 and were not excluded in this study.

For comparison to cartridge tests that were made using a gas stream from the SY-102 headspace, only headspace measurements were appropriate. This required no scrutiny for the TWINS HS or SWIHD HS databases, but the TWINS IH database required sorting so that only headspace data were used. All of the SY-related data in the TWINS IH database was given a Primary Location of “Primary Exhauster” or “Inside Farm.” Of these, most measurements had Survey Titles that included phrases such as “transfer...baseline”, “transfer...stack”, “S-complex...Summa sampling”, “stack sampling”, etc. These were deemed not to qualify as SY-102 headspace samples because it was not clear that they included SY-101 contributions at the stack. However, one set of samples whose Primary Location was “Primary Exhauster” had a Survey Title of “SY-102 Riser #14 Headspace Summa.” These were deemed to be headspace samples, in spite of the exhauster label in the location, and were included in the analysis.

Maximum and average⁽²⁾ headspace concentrations were found for each analyte for the combined TWINS IH and SWIHD HS databases. These are given in Table F.1, together with Occupational Exposure Limits (OELs) and counts of the number of samples. The notation “n/a” is used where there were no measurements of the analyte.

Because the TWINS HS data were older, they were considered less representative of the vapors present during cartridge testing and the default was to omit them from calculations. However, in some cases, the maximum and average for an analyte were considerably different if they were determined from a combination of all three databases. When this was the case, the results for the three-database combination are tabulated along with those for the default two-database combination. The criterion for tabulating this extra information was that there was difference of a factor of three or more, in either direction, between the value obtained from the two-database combination and that from the three-database combination. The three-database values are shown in italics in Table F.1.

Because the reporting limits on concentrations in the historical database were generally higher than the detection limits in the cartridge tests, it was necessary to analyze data in a way that would let the effect of “less than reporting limit” (<RL) historical data be recognized. To do this, it was assumed that all of the non-reports in the databases had concentrations equal to the measurements’ RLs. Then the following rules were applied:

¹ Hoppe, EW, LA Mahoney, J Cole, and KS Rohlfling. 2016. *Hanford Tank Vapors COPCs Update*. PNNL-25880, Pacific Northwest National Laboratory, Richland, Washington.

² Arithmetic average.

1. If a maximum value was a non-report, it was marked as “< RL” in the table.
2. If all the data contributing to an average were non-reports, the average was marked as “< RL”.
3. If the presence of non-reports in an average caused it to be more than a factor of two different, in either direction, from the value it would have had if only the reported concentrations were averaged, the average was marked with an asterisk (“*”).

Table F.1. COPC Comparison to Historical SY-102 Measurements

COPC Number and Name	CAS Number	Boiling Point (°F)	Boiling Point Source	Occupational Exposure Limit (OEL)	Number of Values	Historical Measurements ¹				Measurements in this study			
						Maximum Value	Average Value	Maximum Value (%OEL)	Average Value (%OEL)	Max Inlet (%OEL)	Avg. Inlet (%OEL)	Max outlet (%OEL)	Approx. DL ¹³ (%OEL)
<i>Inorganic</i>													
1	Ammonia	7664-41-7	-28	Poling et al., 2007 ²	25 ppm	3.31 551	1.78 80	13.2% 2204%	7.1% 320%	7.45%	5.73%	<RL	2.45% (RL)
2	Nitrous Oxide	10024-97-2	-127	Poling et al., 2007	50 ppm	n/a <RL	n/a <RL	n/a <RL	n/a <RL	Not measured			
3	Mercury	7439-97-6	674	Poling et al., 2007	0.025 mg/m ³	<RL	<RL	<RL	<RL	<RL	<RL	<RL	6.8% (RL)
<i>Hydrocarbons</i>													
4	1,3-Butadiene	106-99-0	24	Poling et al., 2007	1 ppm	<RL	<RL	<RL	<RL	<RL	<RL	<RL	1.9% (RL)
5	Benzene	71-43-2	176	Poling et al., 2007	0.5 ppm	<RL	<RL	<RL	<RL	0.102%	0.053%	0.053%	0.025%
6	Biphenyl	92-52-4	491	Poling et al., 2007	0.2 ppm	<RL	<RL	<RL	<RL	<DL	<DL	<DL	0.045%
<i>Alcohols</i>													
7	1-Butanol	71-36-3	243	NIOSH	20 ppm	0.012	0.00745	0.06%	0.04%	0.037%	0.024%	0.004%	0.002%
8	Methanol	67-56-1	148	Poling et al., 2007	200 ppm	0.17	0.0778	0.09%	0.04%	Not measured			
<i>Ketones</i>													
9	2-Hexanone	591-78-6	262	NIOSH	5 ppm	<RL	<RL	<RL	<RL	0.003%	0.003%	<DL	0.003%
10	3-Methyl-3-butene-2-one	814-78-8	208	CRC Handbook 1989 ⁴	0.02 ppm	n/a	n/a	n/a	n/a	Not detected - TIC ¹²			
11	4-Methyl-2-hexanone	105-42-0	282	Predicted ACD/Labs ⁵	0.5 ppm	<RL	<RL	<RL	<RL	<DL	<DL	<DL	0.028%
12	6-Methyl-2-heptanone	928-68-7	333	Predicted ACD/Labs	8 ppm	n/a	n/a	n/a	n/a	Not detected - TIC			
13	3-Buten-2-one	78-94-4	179	CRC Handbook 1989	0.2 ppm	<RL	<RL	<RL	<RL	0.184%	0.123%	0.232%	0.090%
<i>Aldehydes</i>													
14	Formaldehyde	50-00-0	-6	NIOSH	0.3 ppm	0.003	0.0025	1.00%	0.83%	3.50%	2.96%	3.26%	0.571% (RL)
15	Acetaldehyde	75-07-0	69	NIOSH	25 ppm	0.025	0.00742	0.10%	0.03%	0.026%	0.016%	0.031%	0.005% (RL)
16	Butanal	123-72-8	167	Oxford safety data ⁶	25 ppm	<RL	0.00387*	<RL	0.02%*	0.003%	0.002%	<DL	0.004%
17	2-Methyl-2-butenal	1115-11-3	244	United Nations ⁷	0.03 ppm	n/a	n/a	n/a	n/a	Not detected - TIC			
18	2-Ethyl-hex-2-enal	645-62-5	347	Predicted ACD/Labs	0.1 ppm	n/a	n/a	n/a	n/a	Not detected - TIC			

Table F.1. COPC Comparison to Historical SY-102 Measurements (continued)

COPC Number and Name	CAS Number	Boiling Point (°F)	Boiling Point Source	Occupational Exposure Limit (OEL)	Number of Values	Historical Measurements ¹			Measurements in this study				
						Maximum Value	Average Value	Maximum Value (%OEL)	Average Value (%OEL)	Max Inlet (%OEL)	Avg. Inlet (%OEL)	Max outlet (%OEL)	Approx. DL ¹³ (%OEL)
<i>Furans</i>													
19	Furan	110-00-9	Poling et al., 2007	1 ppb	36	<RL	<RL	<RL	<RL	1.74%	1.26%	1.58%	0.86%
20	2,3-Dihydrofuran	1191-99-7	Alfa Aesar ^a	1 ppb	12	<RL	<RL	<RL	<RL	2.48%	1.87%	<DL	1.69%
21	2,5-Dihydrofuran	1708-29-8	Aldrich ⁹	1 ppb	36	<RL	<RL	<RL	<RL	2.75%	2.18%	<DL	2.27%
22	2-Methylfuran	534-22-5	Oxford safety data	1 ppb	36	<RL	<RL	<RL	<RL	<DL	<DL	<DL	1.94%
23	2,5-Dimethylfuran	625-86-5	Alfa Aesar	1 ppb	12	<RL	<RL	<RL	<RL	<DL	<DL	<DL	3.10%
24	2-Ethyl-5-methylfuran	1703-52-2	Predicted ACD/Labs	1 ppb	0	n/a	n/a	n/a	n/a	Not detected - TIC			
25	4-[1-Methylpropyl]-2,3-dihydrofuran	34379-54-9	Predicted ACD/Labs	1 ppb	0	n/a	n/a	n/a	n/a	Not detected - TIC			
26	3-[1,1-Dimethyl-2,3-dihydrofuran	34314-82-4	Predicted ACD/Labs	1 ppb	0	n/a	n/a	n/a	n/a	Not detected - TIC			
27	2-Pentylfuran	3777-69-3	Alfa Aesar	1 ppb	12	<RL	<RL	<RL	<RL	2.23%	1.72%	6.49%	1.70%
28	2-Heptylfuran	3777-71-7	Alfa Aesar	1 ppb	12	<RL	<RL	<RL	<RL	2.32%	1.41%	<DL	1.06%
29	2-Propylfuran	4229-91-8	Alfa Aesar	1 ppb	12	<RL	<RL	<RL	<RL	5.96%	4.28%	4.83%	2.76%
30	2-Octylfuran	4179-38-8	Predicted ACD/Labs	1 ppb	0	n/a	n/a	n/a	n/a	Not detected - TIC			
31	2-[3-Oxo-3-phenylprop-1-enyl]furan	717-21-5	Predicted ACD/Labs	1 ppb	0	n/a	n/a	n/a	n/a	Not detected - TIC			
32	2-[2-Methyl-6-oxoheptyl]furan	51595-87-0	Not available	1 ppb	0	n/a	n/a	n/a	n/a	Not detected - TIC			
<i>Phthalates</i>													
33	Diethylphthalate	84-66-2	NIOSH	5 mg/m ³	24	<RL	<RL	<RL	<RL	<DL	<DL	<DL	0.015%

Table F.1. COPC Comparison to Historical SY-102 Measurements (continued)

COPC Number and Name	CAS Number	Boiling Point (°F)	Boiling Point Source	Occupational Exposure Limit (OEL)	Historical Measurements ¹					Measurements in this study				
					Number of Values	Maximum Value	Average Value	Maximum Value (%OEL)	Average Value (%OEL)	Max Inlet (%OEL)	Avg. Inlet (%OEL)	Max outlet (%OEL)	Approx. DL ¹³ (%OEL)	
Nitriles														
34	Acetonitrile	75-05-8	179	NIOSH	20 ppm	42	1.44	0.287	7.2%	1.4%	1.15%	0.40%	0.9%	0.010%
35	Propanenitrile	107-12-0	207	NIOSH	6 ppm	24	<RL	<RL	<RL	<RL	<DL	<DL	<DL	0.004%
36	Butanenitrile	109-74-0	244	NIOSH	8 ppm	24	<RL	<RL	<RL	<RL	<DL	<DL	<DL	0.003%
37	Pentanenitrile	110-59-8	284	Alfa Aesar	6 ppm	24	<RL	<RL	<RL	<RL	0.004%	0.004%	<DL	0.004%
38	Hexanenitrile	628-73-9	328	Predicted ACD/Labs	6 ppm	24	<RL	<RL	<RL	<RL	<DL	<DL	<DL	0.003%
39	Heptanenitrile	629-08-3	368	Alfa Aesar	6 ppm	0	n/a	n/a	n/a	n/a	Not detected - TIC			
40	2-Methylene butanenitrile	1647-11-6	Not available	Not available	0.3 ppm	0	n/a	n/a	n/a	n/a	Not detected - TIC			
41	2,4-Pentadienenitrile	1615-70-9	278	Predicted ACD/Labs	0.3 ppm	0	n/a	n/a	n/a	n/a	Not detected - TIC			
Amines														
42	Ethylamine	75-04-7	62	Poling et al., 2007	5 ppm	12	<RL	<RL	<RL	<RL	<RL	<RL	<RL	0.094% (RL)
Nitrosamines														
43	N-Nitrosodimethylamine	62-75-9	306	NIOSH	0.3 ppb	4	0.436	0.26	145%	87%	142%	92%	<RL	10.2% (RL)
44	N-Nitrosodiethylamine	55-18-5	351	Oxford safety data	0.1 ppb	12	<RL	<RL	<RL	<RL	<RL	<RL	<RL	21.4% (RL)
45	N-Nitrosomethylethylamine	10595-95-6	310	Predicted ACD/Labs	0.3 ppb	12	<RL	<RL	<RL	<RL	<RL	<RL	<RL	8.56% (RL)
46	N-Nitrosomorpholine	59-89-2	435	Oxford safety data	0.6 ppb	12	<RL	<RL	<RL	<RL	<RL	<RL	<RL	3.09% (RL)
Organophosphates														
47	Tributyl phosphate	126-73-8	552	NIOSH	0.2 ppm	24	<RL	<RL	<RL	<RL	<DL	<DL	<DL	0.078%
48	Dibutyl butylphosphonate	78-46-6	602	Predicted ACD/Labs	0.007 ppm	24	<RL	<RL	<RL	<RL	<DL	<DL	<DL	1.14%

Table F.1. COPC Comparison to Historical SY-102 Measurements (continued)

COPC Number and Name	CAS Number	Boiling Point (°F)	Boiling Point Source	Occupational Exposure Limit (OEL)	Number of Values	Historical Measurements ¹			Measurements in this study			
						Maximum Value	Average Value	Maximum Value (%OEL)	Average Value (%OEL)	Max Inlet (%OEL)	Avg. Inlet (%OEL)	Max outlet (%OEL)
Halogenated												
49 Chlorinated Biphenyls	Varies	Varies	Varies	1 mg/m ³	0	n/a	n/a	n/a	n/a	Not detected - TIC		
50 2-Fluoropropene	1184-60-7	-11	SynQuest ¹¹	0.1 ppm	0	n/a	n/a	n/a	n/a	Not detected - TIC		
Pyridines												
51 Pyridine	110-86-1	240	NIOSH	1 ppm	36	<RL	<RL	<RL	<RL	<RL	<RL	<RL
52 2,4-Dimethylpyridine	108-47-4	318	Alfa Aesar	0.5 ppm	36	<RL	<RL	<RL	<RL	<RL	<RL	0.024% (RL)
Organonitriles												
53 Methyl nitrite	624-91-9	10	Oxford safety data	0.1 ppm	0	n/a	n/a	n/a	n/a	Not detected - TIC		
54 Butyl nitrite	544-16-1	172	Alfa Aesar	0.1 ppm	0	n/a	n/a	n/a	n/a	Not detected - TIC		
Isocyanates												
55 Butyl nitrate	928-45-0	276	Predicted ACD/Labs	2.5 ppm	0	n/a	n/a	n/a	n/a	Not detected - TIC		
56 1,4-Butanediol, dinitrate	3457-91-8	499	Predicted ACD/Labs	0.05 ppm	0	n/a	n/a	n/a	n/a	Not detected - TIC		
57 2-Nitro-2-methylpropane	594-70-7	260	Alfa Aesar	0.3 ppm	0	n/a	n/a	n/a	n/a	Not detected - TIC		
58 1,2,3-Propanetriol, 1,3-dinitrate	623-87-0	338	Predicted ACD/Labs	0.05 ppm	0	n/a	n/a	n/a	n/a	Not detected - TIC		
59 Methyl isocyanate	624-83-9	104	NIOSH	0.02 ppm	0	n/a	n/a	n/a	n/a	Not detected - TIC		

¹ Historical data from TWINS industrial hygiene vapor database and SWIH database; see text for links and dates of queries. Values in italics include those data plus data from the TWINS headspace database, all samples ¹⁴ ¹⁵ ¹⁶ ¹⁷ ¹⁸ ¹⁹ ²⁰ ²¹ ²² ²³ ²⁴ ²⁵ ²⁶ ²⁷ ²⁸ ²⁹ ³⁰ ³¹ ³² ³³ ³⁴ ³⁵ ³⁶ ³⁷ ³⁸ ³⁹ ⁴⁰ ⁴¹ ⁴² ⁴³ ⁴⁴ ⁴⁵ ⁴⁶ ⁴⁷ ⁴⁸ ⁴⁹ ⁵⁰ ⁵¹ ⁵² ⁵³ ⁵⁴ ⁵⁵ ⁵⁶ ⁵⁷ ⁵⁸ ⁵⁹ ⁶⁰ ⁶¹ ⁶² ⁶³ ⁶⁴ ⁶⁵ ⁶⁶ ⁶⁷ ⁶⁸ ⁶⁹ ⁷⁰ ⁷¹ ⁷² ⁷³ ⁷⁴ ⁷⁵ ⁷⁶ ⁷⁷ ⁷⁸ ⁷⁹ ⁸⁰ ⁸¹ ⁸² ⁸³ ⁸⁴ ⁸⁵ ⁸⁶ ⁸⁷ ⁸⁸ ⁸⁹ ⁹⁰ ⁹¹ ⁹² ⁹³ ⁹⁴ ⁹⁵ ⁹⁶ ⁹⁷ ⁹⁸ ⁹⁹ ¹⁰⁰ ¹⁰¹ ¹⁰² ¹⁰³ ¹⁰⁴ ¹⁰⁵ ¹⁰⁶ ¹⁰⁷ ¹⁰⁸ ¹⁰⁹ ¹¹⁰ ¹¹¹ ¹¹² ¹¹³ ¹¹⁴ ¹¹⁵ ¹¹⁶ ¹¹⁷ ¹¹⁸ ¹¹⁹ ¹²⁰ ¹²¹ ¹²² ¹²³ ¹²⁴ ¹²⁵ ¹²⁶ ¹²⁷ ¹²⁸ ¹²⁹ ¹³⁰ ¹³¹ ¹³² ¹³³ ¹³⁴ ¹³⁵ ¹³⁶ ¹³⁷ ¹³⁸ ¹³⁹ ¹⁴⁰ ¹⁴¹ ¹⁴² ¹⁴³ ¹⁴⁴ ¹⁴⁵ ¹⁴⁶ ¹⁴⁷ ¹⁴⁸ ¹⁴⁹ ¹⁵⁰ ¹⁵¹ ¹⁵² ¹⁵³ ¹⁵⁴ ¹⁵⁵ ¹⁵⁶ ¹⁵⁷ ¹⁵⁸ ¹⁵⁹ ¹⁶⁰ ¹⁶¹ ¹⁶² ¹⁶³ ¹⁶⁴ ¹⁶⁵ ¹⁶⁶ ¹⁶⁷ ¹⁶⁸ ¹⁶⁹ ¹⁷⁰ ¹⁷¹ ¹⁷² ¹⁷³ ¹⁷⁴ ¹⁷⁵ ¹⁷⁶ ¹⁷⁷ ¹⁷⁸ ¹⁷⁹ ¹⁸⁰ ¹⁸¹ ¹⁸² ¹⁸³ ¹⁸⁴ ¹⁸⁵ ¹⁸⁶ ¹⁸⁷ ¹⁸⁸ ¹⁸⁹ ¹⁹⁰ ¹⁹¹ ¹⁹² ¹⁹³ ¹⁹⁴ ¹⁹⁵ ¹⁹⁶ ¹⁹⁷ ¹⁹⁸ ¹⁹⁹ ²⁰⁰ ²⁰¹ ²⁰² ²⁰³ ²⁰⁴ ²⁰⁵ ²⁰⁶ ²⁰⁷ ²⁰⁸ ²⁰⁹ ²¹⁰ ²¹¹ ²¹² ²¹³ ²¹⁴ ²¹⁵ ²¹⁶ ²¹⁷ ²¹⁸ ²¹⁹ ²²⁰ ²²¹ ²²² ²²³ ²²⁴ ²²⁵ ²²⁶ ²²⁷ ²²⁸ ²²⁹ ²³⁰ ²³¹ ²³² ²³³ ²³⁴ ²³⁵ ²³⁶ ²³⁷ ²³⁸ ²³⁹ ²⁴⁰ ²⁴¹ ²⁴² ²⁴³ ²⁴⁴ ²⁴⁵ ²⁴⁶ ²⁴⁷ ²⁴⁸ ²⁴⁹ ²⁵⁰ ²⁵¹ ²⁵² ²⁵³ ²⁵⁴ ²⁵⁵ ²⁵⁶ ²⁵⁷ ²⁵⁸ ²⁵⁹ ²⁶⁰ ²⁶¹ ²⁶² ²⁶³ ²⁶⁴ ²⁶⁵ ²⁶⁶ ²⁶⁷ ²⁶⁸ ²⁶⁹ ²⁷⁰ ²⁷¹ ²⁷² ²⁷³ ²⁷⁴ ²⁷⁵ ²⁷⁶ ²⁷⁷ ²⁷⁸ ²⁷⁹ ²⁸⁰ ²⁸¹ ²⁸² ²⁸³ ²⁸⁴ ²⁸⁵ ²⁸⁶ ²⁸⁷ ²⁸⁸ ²⁸⁹ ²⁹⁰ ²⁹¹ ²⁹² ²⁹³ ²⁹⁴ ²⁹⁵ ²⁹⁶ ²⁹⁷ ²⁹⁸ ²⁹⁹ ³⁰⁰ ³⁰¹ ³⁰² ³⁰³ ³⁰⁴ ³⁰⁵ ³⁰⁶ ³⁰⁷ ³⁰⁸ ³⁰⁹ ³¹⁰ ³¹¹ ³¹² ³¹³ ³¹⁴ ³¹⁵ ³¹⁶ ³¹⁷ ³¹⁸ ³¹⁹ ³²⁰ ³²¹ ³²² ³²³ ³²⁴ ³²⁵ ³²⁶ ³²⁷ ³²⁸ ³²⁹ ³³⁰ ³³¹ ³³² ³³³ ³³⁴ ³³⁵ ³³⁶ ³³⁷ ³³⁸ ³³⁹ ³⁴⁰ ³⁴¹ ³⁴² ³⁴³ ³⁴⁴ ³⁴⁵ ³⁴⁶ ³⁴⁷ ³⁴⁸ ³⁴⁹ ³⁵⁰ ³⁵¹ ³⁵² ³⁵³ ³⁵⁴ ³⁵⁵ ³⁵⁶ ³⁵⁷ ³⁵⁸ ³⁵⁹ ³⁶⁰ ³⁶¹ ³⁶² ³⁶³ ³⁶⁴ ³⁶⁵ ³⁶⁶ ³⁶⁷ ³⁶⁸ ³⁶⁹ ³⁷⁰ ³⁷¹ ³⁷² ³⁷³ ³⁷⁴ ³⁷⁵ ³⁷⁶ ³⁷⁷ ³⁷⁸ ³⁷⁹ ³⁸⁰ ³⁸¹ ³⁸² ³⁸³ ³⁸⁴ ³⁸⁵ ³⁸⁶ ³⁸⁷ ³⁸⁸ ³⁸⁹ ³⁹⁰ ³⁹¹ ³⁹² ³⁹³ ³⁹⁴ ³⁹⁵ ³⁹⁶ ³⁹⁷ ³⁹⁸ ³⁹⁹ ⁴⁰⁰ ⁴⁰¹ ⁴⁰² ⁴⁰³ ⁴⁰⁴ ⁴⁰⁵ ⁴⁰⁶ ⁴⁰⁷ ⁴⁰⁸ ⁴⁰⁹ ⁴¹⁰ ⁴¹¹ ⁴¹² ⁴¹³ ⁴¹⁴ ⁴¹⁵ ⁴¹⁶ ⁴¹⁷ ⁴¹⁸ ⁴¹⁹ ⁴²⁰ ⁴²¹ ⁴²² ⁴²³ ⁴²⁴ ⁴²⁵ ⁴²⁶ ⁴²⁷ ⁴²⁸ ⁴²⁹ ⁴³⁰ ⁴³¹ ⁴³² ⁴³³ ⁴³⁴ ⁴³⁵ ⁴³⁶ ⁴³⁷ ⁴³⁸ ⁴³⁹ ⁴⁴⁰ ⁴⁴¹ ⁴⁴² ⁴⁴³ ⁴⁴⁴ ⁴⁴⁵ ⁴⁴⁶ ⁴⁴⁷ ⁴⁴⁸ ⁴⁴⁹ ⁴⁵⁰ ⁴⁵¹ ⁴⁵² ⁴⁵³ ⁴⁵⁴ ⁴⁵⁵ ⁴⁵⁶ ⁴⁵⁷ ⁴⁵⁸ ⁴⁵⁹ ⁴⁶⁰ ⁴⁶¹ ⁴⁶² ⁴⁶³ ⁴⁶⁴ ⁴⁶⁵ ⁴⁶⁶ ⁴⁶⁷ ⁴⁶⁸ ⁴⁶⁹ ⁴⁷⁰ ⁴⁷¹ ⁴⁷² ⁴⁷³ ⁴⁷⁴ ⁴⁷⁵ ⁴⁷⁶ ⁴⁷⁷ ⁴⁷⁸ ⁴⁷⁹ ⁴⁸⁰ ⁴⁸¹ ⁴⁸² ⁴⁸³ ⁴⁸⁴ ⁴⁸⁵ ⁴⁸⁶ ⁴⁸⁷ ⁴⁸⁸ ⁴⁸⁹ ⁴⁹⁰ ⁴⁹¹ ⁴⁹² ⁴⁹³ ⁴⁹⁴ ⁴⁹⁵ ⁴⁹⁶ ⁴⁹⁷ ⁴⁹⁸ ⁴⁹⁹ ⁵⁰⁰ ⁵⁰¹ ⁵⁰² ⁵⁰³ ⁵⁰⁴ ⁵⁰⁵ ⁵⁰⁶ ⁵⁰⁷ ⁵⁰⁸ ⁵⁰⁹ ⁵¹⁰ ⁵¹¹ ⁵¹² ⁵¹³ ⁵¹⁴ ⁵¹⁵ ⁵¹⁶ ⁵¹⁷ ⁵¹⁸ ⁵¹⁹ ⁵²⁰ ⁵²¹ ⁵²² ⁵²³ ⁵²⁴ ⁵²⁵ ⁵²⁶ ⁵²⁷ ⁵²⁸ ⁵²⁹ ⁵³⁰ ⁵³¹ ⁵³² ⁵³³ ⁵³⁴ ⁵³⁵ ⁵³⁶ ⁵³⁷ ⁵³⁸ ⁵³⁹ ⁵⁴⁰ ⁵⁴¹ ⁵⁴² ⁵⁴³ ⁵⁴⁴ ⁵⁴⁵ ⁵⁴⁶ ⁵⁴⁷ ⁵⁴⁸ ⁵⁴⁹ ⁵⁵⁰ ⁵⁵¹ ⁵⁵² ⁵⁵³ ⁵⁵⁴ ⁵⁵⁵ ⁵⁵⁶ ⁵⁵⁷ ⁵⁵⁸ ⁵⁵⁹ ⁵⁶⁰ ⁵⁶¹ ⁵⁶² ⁵⁶³ ⁵⁶⁴ ⁵⁶⁵ ⁵⁶⁶ ⁵⁶⁷ ⁵⁶⁸ ⁵⁶⁹ ⁵⁷⁰ ⁵⁷¹ ⁵⁷² ⁵⁷³ ⁵⁷⁴ ⁵⁷⁵ ⁵⁷⁶ ⁵⁷⁷ ⁵⁷⁸ ⁵⁷⁹ ⁵⁸⁰ ⁵⁸¹ ⁵⁸² ⁵⁸³ ⁵⁸⁴ ⁵⁸⁵ ⁵⁸⁶ ⁵⁸⁷ ⁵⁸⁸ ⁵⁸⁹ ⁵⁹⁰ ⁵⁹¹ ⁵⁹² ⁵⁹³ ⁵⁹⁴ ⁵⁹⁵ ⁵⁹⁶ ⁵⁹⁷ ⁵⁹⁸ ⁵⁹⁹ ⁶⁰⁰ ⁶⁰¹ ⁶⁰² ⁶⁰³ ⁶⁰⁴ ⁶⁰⁵ ⁶⁰⁶ ⁶⁰⁷ ⁶⁰⁸ ⁶⁰⁹ ⁶¹⁰ ⁶¹¹ ⁶¹² ⁶¹³ ⁶¹⁴ ⁶¹⁵ ⁶¹⁶ ⁶¹⁷ ⁶¹⁸ ⁶¹⁹ ⁶²⁰ ⁶²¹ ⁶²² ⁶²³ ⁶²⁴ ⁶²⁵ ⁶²⁶ ⁶²⁷ ⁶²⁸ ⁶²⁹ ⁶³⁰ ⁶³¹ ⁶³² ⁶³³ ⁶³⁴ ⁶³⁵ ⁶³⁶ ⁶³⁷ ⁶³⁸ ⁶³⁹ ⁶⁴⁰ ⁶⁴¹ ⁶⁴² ⁶⁴³ ⁶⁴⁴ ⁶⁴⁵ ⁶⁴⁶ ⁶⁴⁷ ⁶⁴⁸ ⁶⁴⁹ ⁶⁵⁰ ⁶⁵¹ ⁶⁵² ⁶⁵³ ⁶⁵⁴ ⁶⁵⁵ ⁶⁵⁶ ⁶⁵⁷ ⁶⁵⁸ ⁶⁵⁹ ⁶⁶⁰ ⁶⁶¹ ⁶⁶² ⁶⁶³ ⁶⁶⁴ ⁶⁶⁵ ⁶⁶⁶ ⁶⁶⁷ ⁶⁶⁸ ⁶⁶⁹ ⁶⁷⁰ ⁶⁷¹ ⁶⁷² ⁶⁷³ ⁶⁷⁴ ⁶⁷⁵ ⁶⁷⁶ ⁶⁷⁷ ⁶⁷⁸ ⁶⁷⁹ ⁶⁸⁰ ⁶⁸¹ ⁶⁸² ⁶⁸³ ⁶⁸⁴ ⁶⁸⁵ ⁶⁸⁶ ⁶⁸⁷ ⁶⁸⁸ ⁶⁸⁹ ⁶⁹⁰ ⁶⁹¹ ⁶⁹² ⁶⁹³ ⁶⁹⁴ ⁶⁹⁵ ⁶⁹⁶ ⁶⁹⁷ ⁶⁹⁸ ⁶⁹⁹ ⁷⁰⁰ ⁷⁰¹ ⁷⁰² ⁷⁰³ ⁷⁰⁴ ⁷⁰⁵ ⁷⁰⁶ ⁷⁰⁷ ⁷⁰⁸ ⁷⁰⁹ ⁷¹⁰ ⁷¹¹ ⁷¹² ⁷¹³ ⁷¹⁴ ⁷¹⁵ ⁷¹⁶ ⁷¹⁷ ⁷¹⁸ ⁷¹⁹ ⁷²⁰ ⁷²¹ ⁷²² ⁷²³ ⁷²⁴ ⁷²⁵ ⁷²⁶ ⁷²⁷ ⁷²⁸ ⁷²⁹ ⁷³⁰ ⁷³¹ ⁷³² ⁷³³ ⁷³⁴ ⁷³⁵ ⁷³⁶ ⁷³⁷ ⁷³⁸ ⁷³⁹ ⁷⁴⁰ ⁷⁴¹ ⁷⁴² ⁷⁴³ ⁷⁴⁴ ⁷⁴⁵ ⁷⁴⁶ ⁷⁴⁷ ⁷⁴⁸ ⁷⁴⁹ ⁷⁵⁰ ⁷⁵¹ ⁷⁵² ⁷⁵³ ⁷⁵⁴ ⁷⁵⁵ ⁷⁵⁶ ⁷⁵⁷ ⁷⁵⁸ ⁷⁵⁹ ⁷⁶⁰ ⁷⁶¹ ⁷⁶² ⁷⁶³ ⁷⁶⁴ ⁷⁶⁵ ⁷⁶⁶ ⁷⁶⁷ ⁷⁶⁸ ⁷⁶⁹ ⁷⁷⁰ ⁷⁷¹ ⁷⁷² ⁷⁷³ ⁷⁷⁴ ⁷⁷⁵ ⁷⁷⁶ ⁷⁷⁷ ⁷⁷⁸ ⁷⁷⁹ ⁷⁸⁰ ⁷⁸¹ ⁷⁸² ⁷⁸³ ⁷⁸⁴ ⁷⁸⁵ ⁷⁸⁶ ⁷⁸⁷ ⁷⁸⁸ ⁷⁸⁹ ⁷⁹⁰ ⁷⁹¹ ⁷⁹² ⁷⁹³ ⁷⁹⁴ ⁷⁹⁵ ⁷⁹⁶ ⁷⁹⁷ ⁷⁹⁸ ⁷⁹⁹ ⁸⁰⁰ ⁸⁰¹ ⁸⁰² ⁸⁰³ ⁸⁰⁴ ⁸⁰⁵ ⁸⁰⁶ ⁸⁰⁷ ⁸⁰⁸ ⁸⁰⁹ ⁸¹⁰ ⁸¹¹ ⁸¹² ⁸¹³ ⁸¹⁴ ⁸¹⁵ ⁸¹⁶ ⁸¹⁷ ⁸¹⁸ ⁸¹⁹ ⁸²⁰ ⁸²¹ ⁸²² ⁸²³ ⁸²⁴ ⁸²⁵ ⁸²⁶ ⁸²⁷ ⁸²⁸ ⁸²⁹ ⁸³⁰ ⁸³¹ ⁸³² ⁸³³ ⁸³⁴ ⁸³⁵ ⁸³⁶ ⁸³⁷ ⁸³⁸ ⁸³⁹ ⁸⁴⁰ ⁸⁴¹ ⁸⁴² ⁸⁴³ ⁸⁴⁴ ⁸⁴⁵ ⁸⁴⁶ ⁸⁴⁷ ⁸⁴⁸ ⁸⁴⁹ ⁸⁵⁰ ⁸⁵¹ ⁸⁵² ⁸⁵³ ⁸⁵⁴ ⁸⁵⁵ ⁸⁵⁶ ⁸⁵⁷ ⁸⁵⁸ ⁸⁵⁹ ⁸⁶⁰ ⁸⁶¹ ⁸⁶² ⁸⁶³ ⁸⁶⁴ ⁸⁶⁵ ⁸⁶⁶ ⁸⁶⁷ ⁸⁶⁸ ⁸⁶⁹ ⁸⁷⁰ ⁸⁷¹ ⁸⁷² ⁸⁷³ ⁸⁷⁴ ⁸⁷⁵ ⁸⁷⁶ ⁸⁷⁷ ⁸⁷⁸ ⁸⁷⁹ ⁸⁸⁰ ⁸⁸¹ ⁸⁸² ⁸⁸³ ⁸⁸⁴ ⁸⁸⁵ ⁸⁸⁶ ⁸⁸⁷ ⁸⁸⁸ ⁸⁸⁹ ⁸⁹⁰ ⁸⁹¹ ⁸⁹² ⁸⁹³ ⁸⁹⁴ ⁸⁹⁵ ⁸⁹⁶ ⁸⁹⁷ ⁸⁹⁸ ⁸⁹⁹ ⁹⁰⁰ ⁹⁰¹ ⁹⁰² ⁹⁰³ ⁹⁰⁴ ⁹⁰⁵ ⁹⁰⁶ ⁹⁰⁷ ⁹⁰⁸ ⁹⁰⁹ ⁹¹⁰ ⁹¹¹ ⁹¹² ⁹¹³ ⁹¹⁴ ⁹¹⁵ ⁹¹⁶ ⁹¹⁷ ⁹¹⁸ ⁹¹⁹ ⁹²⁰ ⁹²¹ ⁹²² ⁹²³ ⁹²⁴ ⁹²⁵ ⁹²⁶ ⁹²⁷ ⁹²⁸ ⁹²⁹ ⁹³⁰ ⁹³¹ ⁹³² ⁹³³ ⁹³⁴ ⁹³⁵ ⁹³⁶ ⁹³⁷ ⁹³⁸ ⁹³⁹ ⁹⁴⁰ ⁹⁴¹ ⁹⁴² ⁹⁴³ ⁹⁴⁴ ⁹⁴⁵ ⁹⁴⁶ ⁹⁴⁷ ⁹⁴⁸ ⁹⁴⁹ ⁹⁵⁰ ⁹⁵¹ ⁹⁵² ⁹⁵³ ⁹⁵⁴ ⁹⁵⁵ ⁹⁵⁶ ⁹⁵⁷ ⁹⁵⁸ ⁹⁵⁹ ⁹⁶⁰ ⁹⁶¹ ⁹⁶² ⁹⁶³ ⁹⁶⁴ ⁹⁶⁵ ⁹⁶⁶ ⁹⁶⁷ ⁹⁶⁸ ⁹⁶⁹ ⁹⁷⁰ ⁹⁷¹ ⁹⁷² ⁹⁷³ ⁹⁷⁴ ⁹⁷⁵ ⁹⁷⁶ ⁹⁷⁷ ⁹⁷⁸ ⁹⁷⁹ ⁹⁸⁰ ⁹⁸¹ ⁹⁸² ⁹⁸³ ⁹⁸⁴ ⁹⁸⁵ ⁹⁸⁶ ⁹⁸⁷ ⁹⁸⁸ ⁹⁸⁹ ⁹⁹⁰ ⁹⁹¹ ⁹⁹² ⁹⁹³ ⁹⁹⁴ ⁹⁹⁵ ⁹⁹⁶ ⁹⁹⁷ ⁹⁹⁸ ⁹⁹⁹ ¹⁰⁰⁰

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