



# Analysis of Respirator Cartridge Performance Testing on the 702-AZ Primary Exhauster for the Hanford AY/AZ Tank Farms

**July 2020**

SK Nune  
CK Clayton  
J Liu  
CJ Freeman  
TM Brouns  
LA Mahoney



Prepared for the U.S. Department of Energy  
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## Executive Summary

Washington River Protection Solutions conducted tests on two types of chemical cartridges for use in air-purifying respirators to determine the period of time that the cartridges would provide adequate performance<sup>1</sup> for APRs used to protect workers when exposed to a mixture of Chemicals of Potential Concern (COPC) from vapors exiting the 702-AZ primary exhauster for the Hanford AY/AZ tank farms. The Occupational Safety and Health Administration (OSHA) identifies cartridge testing as a valid approach for establishing cartridge change schedules.[3] 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 from August 26–28, 2016, on a slipstream from the 702-AZ exhauster, under static conditions fed to a respirator cartridge test stand developed by Washington River Protection Solutions in collaboration with HiLine Engineering (Richland, Washington). Multipurpose respirator cartridges, SCOTT 7422-SD1 and SCOTT 7422-SC1 (SCOTT Safety, Monroe, North Carolina) were assessed on separate days. Sample media (sorbent tubes) were used to collect samples of the vapor stream entering and exiting the respirator cartridge and 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. Key conclusions from the assessment of the 59 COPCs in this study are described below:

- Based on measured cartridge inlet vapor concentrations from the 702-AZ exhauster, only one COPC—N-nitrosodimethylamine (NDMA)—exceeded its corresponding Occupational Exposure Limit (OEL).<sup>2</sup> Five COPCs—ammonia, mercury, 2,5-dihydrofuran, N-nitrosodiethylamine (NDEA), and 2-methylfuran—had one or more inlet concentration measurements >10% of their corresponding OEL, but <100% of their OEL. Four additional COPCs—biphenyl, diethylphthalate, dibutyl butylphosphonate and tributylphosphate—each had a single suspect inlet measurement with elevated detection limits<sup>3</sup> (DL) that were >10% of their OEL. All other COPC’s inlet and outlet measurements were <10% of their OELs.
- Ammonia concentrations at the respirator cartridge inlet reached nearly 76% of the OEL (19 ppm) during the testing, which was similar to average historical measurements from the exhauster, but lower than the historic maxima of over 600% of the OEL. Ammonia appeared to breakthrough the SCOTT 7422-SD1 cartridge at >10% of its OEL after 12 hours. Ammonia from the outlet of the SCOTT 7422-SC1 cartridge were detectable toward the end of its testing but were <10% of its OEL.

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<sup>1</sup> “Adequate performance” refers to being below the breakthrough criterion used in this analysis, which is having sustained cartridge outlet concentrations >10% of a compound’s OEL. Ultimately, Industrial Hygiene professionals will use these results along with specific hazard assessments to determine service life, change schedules, and cartridge selection needed to provide the necessary performance for specific applications in Hanford tank farms.

<sup>2</sup> OELs 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 the best available science. The OEL for NDMA was established in 2005 based on the MAK (Maximale Arbeitsplatzkonzentration) Commission standard adopted in Europe.

<sup>3</sup> The term “detection limit” is used here to refer either to an analytical reporting limit (RL) or a DL. The use of either an RL or a DL varied among analytical laboratories. An RL (equivalent to a limit of quantification) was used instead of an analytical method DL by several laboratories for specific COPC analyses. See Appendix C and Appendix F for additional information on the specific use of RLs or DLs for each COPC.

- Mercury inlet concentrations measured throughout the testing period for both cartridges remained relatively constant, ~80% of the OEL, which were comparable to average historical measurements, but less than the historic maxima of over 460% of the OEL. Mercury outlet concentrations were all below the DL, indicating no breakthrough for the testing period.
- Respirator inlet concentration measurements for NDMA reached 2.3 ppb, or ~760% of its OEL. However, all outlet concentrations were less than the analytical RL of ~11% of the OEL, indicating no breakthrough for either cartridge.
- Inlet concentrations for 2,5-dihydrofuran and 2-methylfuran were higher than previous exhaust measurements with RL values. Further, the inlet concentrations of both of these COPCs were higher at the beginning of the testing on the SCOTT 7422-SD1 cartridge. The corresponding outlet measurements were also higher but never exceeded 10% of the OEL for either respirator cartridge tested. Subsequent reanalyses of furan, 2,5-dihydrofuran, and 2-methylfuran were performed using the Carbotrap 300 TDU Method.<sup>4</sup> These results indicated a respirator cartridge inlet maximum concentration for furan of 58% of the OEL. All furan outlet concentrations for both cartridges were less than the DL, indicating no breakthrough during the duration of the tests. Inlet and outlet measurements for 2,5-dihydrofuran and 2-methylfuran were all less than their DLs.
- A single dibutyl butylphosphonate concentration measurement with an elevated DL reached ~377% of its OEL for a SCOTT 7422-SC1 cartridge inlet test, which was significantly higher than historical exhaust measurements. However, this high reading was suspect because of a low-flow issue through the sample tube, and all other inlet concentration measurements for both cartridges were less than the DL and <2% of the OEL. A similar observation was made for biphenyl, diethylphthalate, and tributylphosphate, where a single measurement from the same inlet time period and sorbent tube indicated a concentration that was elevated but less than the DL. Therefore, the high value was likely a result of sampling error from an unusually low flowrate relative to other time periods for the same analyte and media. All other inlet and outlet measurements for these COPCs were less than their DLs and never exceeded 10% of their OELs, indicating no breakthrough.
- Several respirator inlet concentration measurements for NDEA were slightly over its DL, but all outlet concentrations were less than the DL, indicating no breakthrough for either cartridge at or above that limit.

Based on the measurements taken for this study, only ammonia appeared to break through at >10% of its OEL after 12 hours for the SCOTT 7422-SD1 cartridge. Ammonia outlet concentrations were rising toward the end of the SCOTT 7422-SC1 cartridge testing but did not exceed 10% the OEL. However, variations in humidity, temperature, or any known changes in cartridge respirator inlet concentrations for any COPCs, compared to those measured in the current study, could increase or decrease the impact recommended cartridge change-out breakthrough time, especially if OEL thresholds are exceeded. In these circumstances, additional respirator cartridge evaluations may be necessary to determine proper respiratory protection requirements.

The 2016–2018 overview report by Freeman et.al.<sup>4</sup> provides additional information on the use of the cartridge testing results for the first 28 cartridge tests with the manufacturer's service life models.

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<sup>4</sup> Inlet maximum concentrations for furan using the Carbotrap 300 TDU results were 27.1% of the OEL for the 7422-SD1 and 58.0% of the OEL for the 7422-SC1 cartridge. All effluent measurements for furan were less than the DL indicating no breakthrough during testing. The re-evaluation of the furans using the Carbotrap 300 TDU is documented in the report Freeman CJ, J Liu, C Clayton, SK Nune, LA Mahoney, CL Bottenus, TM Brouns, MJ Minette, and P Humble. 2020. *Overview of 2016 through 2018 Testing of Respirator Cartridge Performance on Multiple Hanford Tank Headspaces and Exhausters*. PNNL-26821 Revision 1, Pacific Northwest National Laboratory, Richland, Washington..

## Revision History

Revision Number	Effective Date	Description of Change
0		Initial issue
1	July 2020	<p>This report has been revised to address external peer review comments on the Rev. 0 report and subsequent test reports from 2016 cartridge testing and corrected data related to N-nitrosodiethylamine, N-nitrosomethylethylamine, and N-nitrosomorpholine in figures and tables. The principal changes include:</p> <ol style="list-style-type: none"> <li>1. Addressing several external peer review comments including: <ul style="list-style-type: none"> <li>• Referenced the <i>Overview of 2016 Through 2018 Testing of Air-Purifying Respirator Cartridge Performance on Multiple Hanford Tank Headspace and Exhausters PNNL-26821 Rev. 1</i><sup>5</sup> in which additional information on historic Chemicals of Potential Concern source concentrations and the significance of any differences between cartridge-testing results and historic maxima are provided.</li> <li>• Adding descriptive information to Appendices A, B, and C to provide additional clarity on the contents and methods applied</li> <li>• Clarifying terminology regarding breakthrough time versus service life and change-out schedule.</li> </ul> </li> <li>2. A furans analytical methods review was conducted 2018 (Assessment of the Use of Alternate Furan Measurements for Respirator Cartridge Performance Determinations letter report 69802-01). The assessment recommended the use of the Carbotrap 300 TDU volatile organic compound tube analytical results for furan, 2,5-dihydrofuran, and 2-methylfuran in lieu of the TDU Tenax TA tube. All of the furan, 2,5-dihydrofuran, and 2-methylfuran results for the 2016 APR cartridge testing have been re-evaluated and documented in Appendix F of Freeman et al.<sup>5</sup> Therefore, values for furan, 2,5-dihydrofuran, and 2-methylfuran have not been updated in this revision of the report.</li> </ol> <p>Inlet concentrations for furan were higher by the Carbotrap 300 TDU method and 2-methylfuran was lower by the Carbotrap 300 TDU method than those documented in this report. No breakthrough for furan<sup>6</sup>, 2,5-dihydrofuran, and 2-methylfuran<sup>7</sup> was observed on either cartridge tested .</p>

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<sup>5</sup> Freeman CJ, J Liu, C Clayton, SK Nune, LA Mahoney, CL Bottenus, TM Brouns, MJ Minette, and P Humble. 2020. *Overview of 2016 through 2018 Testing of Air-Purifying Respirator Cartridge Performance on Multiple Hanford Tank Headspace and Exhausters*. PNNL-26821, Rev. 1, Pacific Northwest National Laboratory, Richland, Washington.

<sup>6</sup> Inlet maximum concentrations for furan using the Carbotrap 300 TDU results were 27.1% of the OEL for the 7422-SD1 and 58.0% of the OEL for the 7422-SC1 cartridge. All effluent measurements for furan were less than the DL, indicating no breakthrough during testing.

<sup>7</sup> Inlet and effluent concentration measurements for 2,5-dihydrofuran and 2-methylfuran using the Carbotrap 300 TDU method were all less than the DL.





## Acronyms and Abbreviations

ALS	ALS Environmental Salt Lake City
APR	Air Purifying Respirator
CAS	Chemical Abstract Service
CBAL	Columbia Basin Analytical Laboratory, part of the RJ Lee Group
CFR	Code of Federal Regulations
COPC	Chemicals Of Potential Concern
CVAA	Cold Vapor Atomic Absorption
DL	Detection Limit
EPA	U.S. Environmental Protection Agency
GC-FID	Gas Chromatography-Flame Ionization Detector
GC/MS	Gas Chromatography/Mass Spectrometry
GC-TEA	Gas Chromatography-Thermal Energy Analyzer
HPLC	High Performance Liquid Chromatography
HPLC-UV	High Performance Liquid Chromatography-Ultraviolet
IC	Ion Chromatography
NDEA	N-nitrosodiethylamine
NDMA	N-nitrosodimethylamine
NIOSH	National Institute of Occupational Safety and Health
NMEA	N-nitrosomethylethylamine
NMOR	N-nitrosomorpholine
OEL	Occupational Exposure Limit
OSHA	Occupational Safety and Health Administration
SCBA	Self-Contained Breathing Apparatus
ppm	Parts Per Million
PNNL	Pacific Northwest National Laboratory
RL	Reporting Limit
SWIHD	Site-Wide Industrial Hygiene Database
TIC	Tentatively Identified Compound
TWINS	Tank Waste Information Network System
VOC	Volatile Organic Compound
WC	Water Column
WHL	Wastren Hanford Laboratory (222S)
WRPS	Washington River Protection Solutions



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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. The tests were conducted to determine the period of time that the cartridges would provide adequate performance for APRs used 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 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 vapors from the 702-AZ exhauster on the Hanford AY/AZ double-shell tank farms.





## 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 (greater than 2 hours). If the contaminant concentration in a workplace is high, supplied air respirators or self-contained breathing apparatuses (SCBA) must be used to provide additional protection. While the use of supplied air respirators or SCBAs offers more protection, a tradeoff exists, particularly for SCBAs that employ a large, heavy (approximately 30-pound), 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 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 manufacture's recommendation* – Once information about 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, service lives 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 waste storage tanks at Hanford, manufacturer recommendations may be of limited value, and experimental testing is recommended.

- *Use mathematical models* – Mathematical models usually are 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:

- Number of cartridges used by the respirator
- Mass of the sorbent used in each cartridge
- Carbon micro-pore volume
- Density of the packed bed
- Maximum temperature
- Maximum relative humidity
- 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 modeling might result in a service-life estimate that is shorter than it needs to be because of conservative assumptions used during calculations.

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 greater than 70°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, sulfur dioxide, and hydrogen sulfide, compositions that vary with time, location, and contaminants that undergo continuous reactions. However, some of the general drivers<sup>8</sup> can help in interpreting the results obtained from experimental testing of respirator cartridges.

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<sup>8</sup> The general drivers (a.k.a., rules of thumb) are applicable to certain compounds, but not to all compounds in a mixture, such as those in specific Hanford tank mixtures. However, an Industrial Hygiene professional can use these rules of thumb to support interpretation of results from both experiments and predictions.

### 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 702-AZ primary exhausters.[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 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 test stands to tank farms.

The APR cartridge test assembly was designed and constructed to operate to the following environmental conditions without negatively impacting system performance:

- 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.

WRPS developed a testing program with the following conservative conditions to support robust cartridge service life estimates:

- 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 or exhausters stack vapors rather than from Hanford tank farm atmospheric concentrations (i.e., source sampling versus the breathing zone).
- 10% of the 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-SD1 for Survey 1 and SCOTT 7422-SC1 for Survey 2.<sup>9</sup>[16] These cartridges were chosen because they are suitable for capturing organic vapors, acid gases, ammonia, formaldehyde, and particulates.[16]

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<sup>9</sup> SCOTT part numbers 7422-SC1 and 7422-SD1 are multipurpose APR respirator cartridges for use on Xcel Half-Mask and all SCOTT full facepieces with NIOSH approval for OV/AM/MA/CL/HC/SD/CD/HF/FM/HS applications. The -SD1 cartridge has the same multipurpose features as the -SC1 but also includes a P100 particulate filter. <https://www.3m-scott.com/download/742-series-cartridges-user-instructions-english/>

Vapor concentrations upstream and downstream of the APR cartridge were monitored with an array of sorbent tubes (see Appendix B). Influent (upstream) concentration measurements were recorded every 2 hours during the 16-hour verification survey. Downstream effluent sorbent tubes also 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 identified 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 >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

Respirator cartridge testing on the 702-AZ primary exhauster was conducted from August 26–28, 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 for the detected COPCs. Appendix C also gives the average temperatures of the sample slipstream during testing, which ranged from 66 to 107°F, and the average relative humidity ranged from 25 to 54%. 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. In addition, 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.

Table 1 shows the measured concentrations in the current study for all of the COPCs tested. This table further provides a summary of the test information. For example, if all of the measurements for a specific compound were less than detection limits (DL), that compound is marked accordingly. Further, if concentrations were detected for a compound, the extent of the detection also is described. The inlet concentrations of one COPC—N-nitrosodimethylamine (NDMA)—exceeded its corresponding OEL. The inlet (or outlet) concentrations of five additional COPCs were lower than their corresponding OELs but still were >10%. These COPCs were ammonia, mercury, 2,5-dihydrofuran, 2-methylfuran, and nitrosodiethylamine (NDEA). All six of those COPCs are highlighted in yellow in Table 1. Four additional COPCs—biphenyl, diethylphthalate, dibutyl butylphosphonate and tributylphosphate—each had a single suspect inlet measurement with an elevated DL that was >10% of their OELs. For dibutyl butylphosphonate, the elevated DL was >370% of its OEL. These six COPCs are highlighted in yellow in Table 1 and assessed in more detail in Section 5.0. Appendix E shows similar detailed assessments for an additional 10 COPCs with respirator cartridge inlet (or outlet) concentrations <10% of their OELs but >2%. These COPCs were 1,3-butadiene, formaldehyde, furan, 2,3-dihydrofuran, 2,5-dimethylfuran, 2-pentylfuran, 2-heptylfuran, 2-propylfuran, N-nitrosomethylethylamine (NMEA), and N-nitrosomorpholine. All of the other COPCs had inlet (or outlet) concentrations or DLs <2% of their OELs.<sup>10</sup>

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<sup>10</sup> The term “detection limit” or its abbreviation DL is used here and in subsequent tables and figures in Section 5.0, Section 6.0, and Appendix E to refer either to analytical reporting limit (RL) or DL. The use of either an RL or a DL varied among analytical laboratories. The RL (equivalent to a limit of quantification) was used instead of an analytical method DL by several laboratories for specific COPC analyses. See Appendix C and F for additional information on the specific use of RLs or DLs for each COPC.

**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 <sup>1</sup> (% of OEL)	All Data Values (inlet and outlet) < Detection Limit	Highest Detected Value Compared to OEL
<b>Inorganic</b>						
1 Ammonia	7664-41-7	19.0 ppm	25 ppm	5.19%		Up to 76% of OEL for inlet values. All outlets < 9.2%.
2 Nitrous Oxide	10024-97-2	Not Measured	50 ppm			
3 Mercury	7439-97-6	21.1 ug/m3	25 ug/m3	7.61%		Up to 84.6% of OEL for inlet values. All outlets <DL.
<b>Hydrocarbons</b>						
4 1,3-Butadiene	106-99-0	0.0360 ppm	1 ppm	3.57%	X	
5 Benzene	71-43-2	0.0020 ppm	0.5 ppm	0.031%		Up to 0.4% of OEL for inlet values. All outlets <0.04%.
6 Biphenyl	92-52-4	0.0476 ppm	0.2 ppm	23.8%	X	
<b>Alcohols</b>						
7 1-Butanol	71-36-3	0.053 ppm	20 ppm	0.004%		Up to 0.3% of OEL for inlet values. All outlets <0.006%.
8 Methanol	67-56-1	Not Measured	200 ppm			
<b>Ketones</b>						
9 2-Hexanone	591-78-6	0.0009 ppm	5 ppm	0.004%		Up to 0.02% of OEL for inlet values. All outlets <DL.
10 3-Methyl-3-butene-2-one	814-78-8	Not Detected	0.02 ppm	TIC <sup>2</sup>	X	
11 4-Methyl-2-hexanone	105-42-0	0.0003 ppm	0.5 ppm	0.060%	X	
12 6-Methyl-2-heptanone	928-68-7	Not Detected	8 ppm	TIC	X	
13 3-Buten-2-one	78-94-4	0.0023 ppm	0.2 ppm	0.099%		Up to 1.1% of OEL for inlet values. All outlets <0.2%.
<b>Aldehydes</b>						
14 Formaldehyde	50-00-0	0.0090 ppm	0.3 ppm	0.630%		Up to 3.0% of OEL for inlet values. All outlets <1.1%.
15 Acetaldehyde	75-07-0	0.0143 ppm	25 ppm	0.005%		Up to 0.06% of OEL for inlet values. All outlets <0.05%.
16 Butanal	123-72-8	0.0036 ppm	25 ppm	0.001%		Up to 0.02% of OEL for inlet values. All outlets <0.001%.
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	

<sup>1</sup> Approximate detection limit is calculated using reported DLs (or RLs) from the analytical laboratory and the average volume (from flowrate x time) of vapor exposed to the sorbent tube.

<sup>2</sup> A TIC (Tentatively Identified Compound) designation 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 DL, or definitively confirm the identity of the TIC. TICs are reported when the peak area is sufficiently large, estimated as greater than or equal to 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 less than 1.0 ppb, based on the average of all TICs in the COPC list.

<sup>3</sup> Inlet maximum concentrations for furan using the Carbotrap 300 TDU results were 27.1% of the OEL for the 7422-SD1 and 58.0% of the OEL for the 7422-SC1 cartridge. All effluent measurements for furan were less than the DL, indicating no breakthrough during testing. Inlet and effluent concentration measurements for 2,5-dihydrofuran and 2-methylfuran using the Carbotrap 300 TDU Method were all less than their DLs.[19]

**Table 1. (continued)**

<b>Furans<sup>3</sup></b>						
19 Furan	110-00-9	0.09 ppb	1 ppb	0.55-5.74%		Up to 9.5% of OEL for inlet values. All outlets <3.8%.
20 2,3-Dihydrofuran	1191-99-7	0.06 ppb	1 ppb	1.10-3.08%		Up to 6.2% OEL for inlet values. All outlets <DL
21 2,5-Dihydrofuran	1708-29-8	0.22 ppb	1 ppb	1.37-4.32%		Up to 22.0% OEL for inlet values. All outlets <4.6%
22 2-Methylfuran	534-22-5	0.25 ppb	1 ppb	1.17-3.82%		Up to 25.3% OEL for inlet values. All outlets <5.1%.
23 2,5-Dimethylfuran	625-86-5	0.05 ppb	1 ppb	1.82-5.32%	X	
24 2-Ethyl-5-methylfuran	1703-52-2	Not Detected	1 ppb	TIC	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	0.05 ppb	1 ppb	1.06-4.31%		Up to 5.5% of OEL for inlet values. All outlets <2.9%.
28 2-Heptylfuran	3777-71-7	0.04 ppb	1 ppb	1.12-3.42%		Up to 3.5% of OEL for inlet values. All outlets <DL
29 2-Propylfuran	4229-91-8	0.04 ppb	1 ppb	1.28-3.84%	X	
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	
<b>Phthalates</b>						
33 Diethylphthalate	84-66-2	0.520 mg/m <sup>3</sup>	5 mg/m <sup>3</sup>	10.5%	X	Single inlet value was 10.5% of OEL but still <DL.
<b>Nitriles</b>						
34 Acetonitrile	75-05-8	0.130 ppm	20 ppm	0.002%		Up to 0.65% of OEL for all inlet and outlet values.
35 Propanenitrile	107-12-0	0.003 ppm	6 ppm	0.004%		Up to 0.04% of OEL for inlet values. All outlets <0.004%.
36 Butanenitrile	109-74-0	0.0028 ppm	8 ppm	0.003%		Up to 0.03% of OEL for inlet values. All outlets <DL
37 Pentanenitrile	110-59-8	0.0007 ppm	6 ppm	0.004%		Up to 0.01% of OEL for inlet values. All outlets <DL.
38 Hexanenitrile	628-73-9	0.0012 ppm	6 ppm	0.004%		Up to 0.02% of OEL for inlet values. All outlets <DL
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	

**Table 1. (continued)**

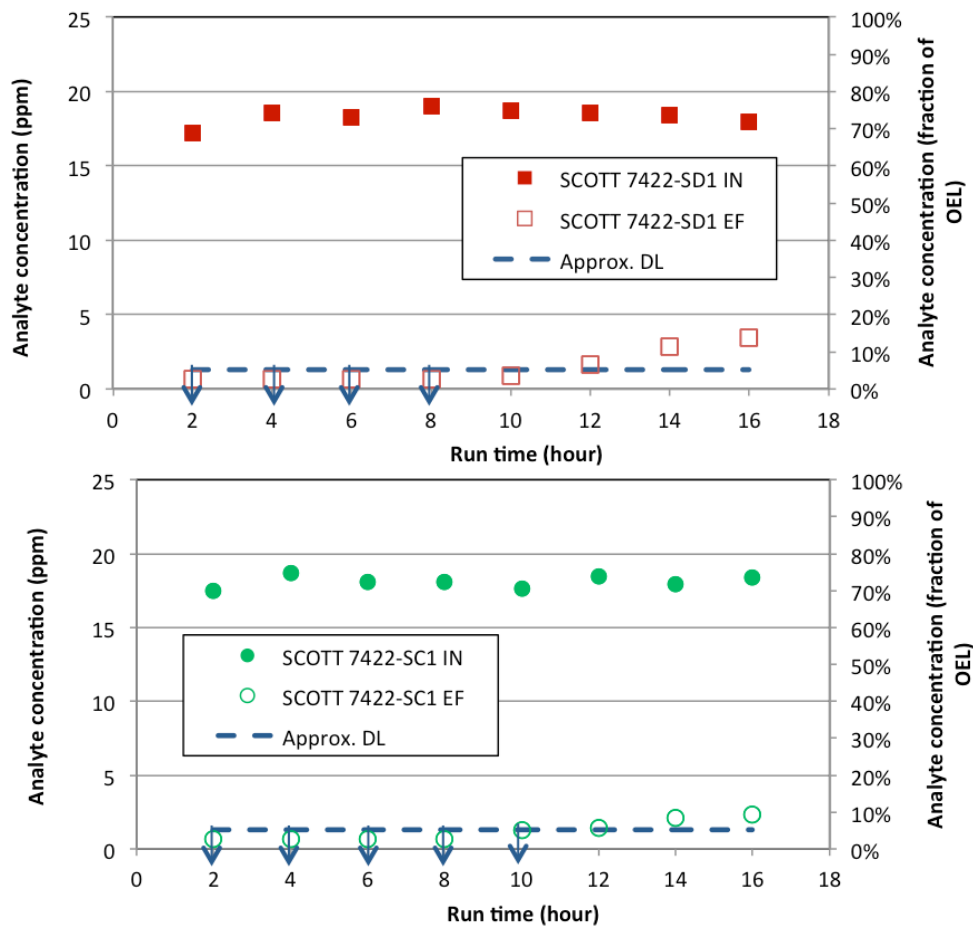
COPC Number and Name	CAS Number	Highest Measured Value (this study)	Occupational Exposure Limit (OEL)	Approximate Analytical Detection Limit, DL <sup>1</sup> (% of OEL)	All Data Values (inlet and outlet) < Detection Limit	Highest Detected Value Compared to OEL
<b>Amines</b>						
42 Ethylamine	75-04-7	0.0050 ppm	5 ppm	0.099%	X	
<b>Nitrosamines</b>						
43 N-Nitrosodimethylamine	62-75-9	2.28 ppb	0.3 ppb	11.4%		Up to 760% of OEL for inlet values. All outlets <DL.
44 N-Nitrosodiethylamine	55-18-5	0.03 ppb	0.1 ppb	30.9%		Up to 30.9% of OEL for inlet values. All outlets <DL.
45 N-Nitrosomethylethylamine	10595-95-6	0.03 ppb	0.3 ppb	9.60%	X	
46 N-Nitrosomorpholine	59-89-2	0.02 ppb	0.6 ppb	3.70%	X	
<b>Organophosphates</b>						
47 Tributyl phosphate	126-73-8	38.5 ppb	200 ppb	19.3%	X	
48 Dibutyl butylphosphonate	78-46-6	26.4 ppb	7 ppb	377%	X	
<b>Halogenated</b>						
49 Chlorinated Biphenyls	Varies	Not Detected	1 mg/m3	TIC	X	
50 2-Fluoropropene	1184-60-7	Not Detected	0.1 ppm	TIC	X	
<b>Pyridines</b>						
51 Pyridine	110-86-1	1.48 ppb	1000 ppb	0.15%	X	
52 2,4-Dimethylpyridine	108-47-4	1.09 ppb	500 ppb	0.22%	X	
<b>Organonitrites</b>						
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	
<b>Organonitrates</b>						
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	
<b>Isocyanates</b>						
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 listed in Table 1, only NDMA exceeded its OEL. Ammonia, mercury, 2-methylfuran, 2,5-dihydrofuran, and NDEA had inlet concentrations less than their corresponding OELs but >10% (see COPCs highlighted in yellow in Table 1). Biphenyl, diethylphthalate, dibutyl butylphosphonate, and tributylphosphate had a single inlet measurement with an elevated DL that was >10% of their respective OELs. This section provides more detail on these ten COPCs, 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% of their corresponding OELs.

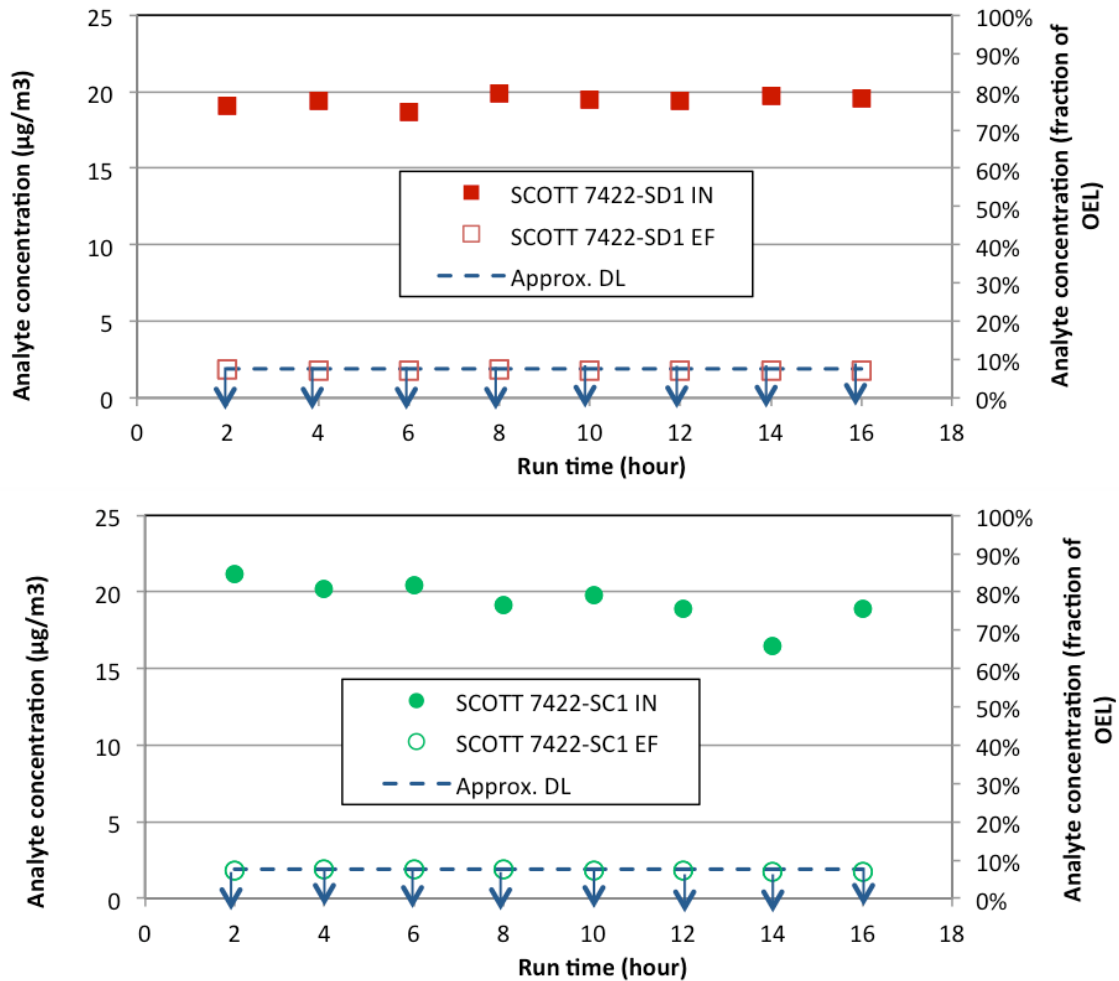
**Ammonia** (see Figure 1) – The DL for ammonia corresponds to ~5.2% of the OEL. Inlet concentrations were measured for every 2 hours throughout the testing period. The highest measured value recorded for the SCOTT 7422-SD1 cartridge test was 76% of the OEL.



**Figure 1.** Plot of Measured Ammonia Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (SCOTT 7422-SD1 and SCOTT 7422-SC1). Data points noted with ↓ indicates measurements less than the DL or RL.

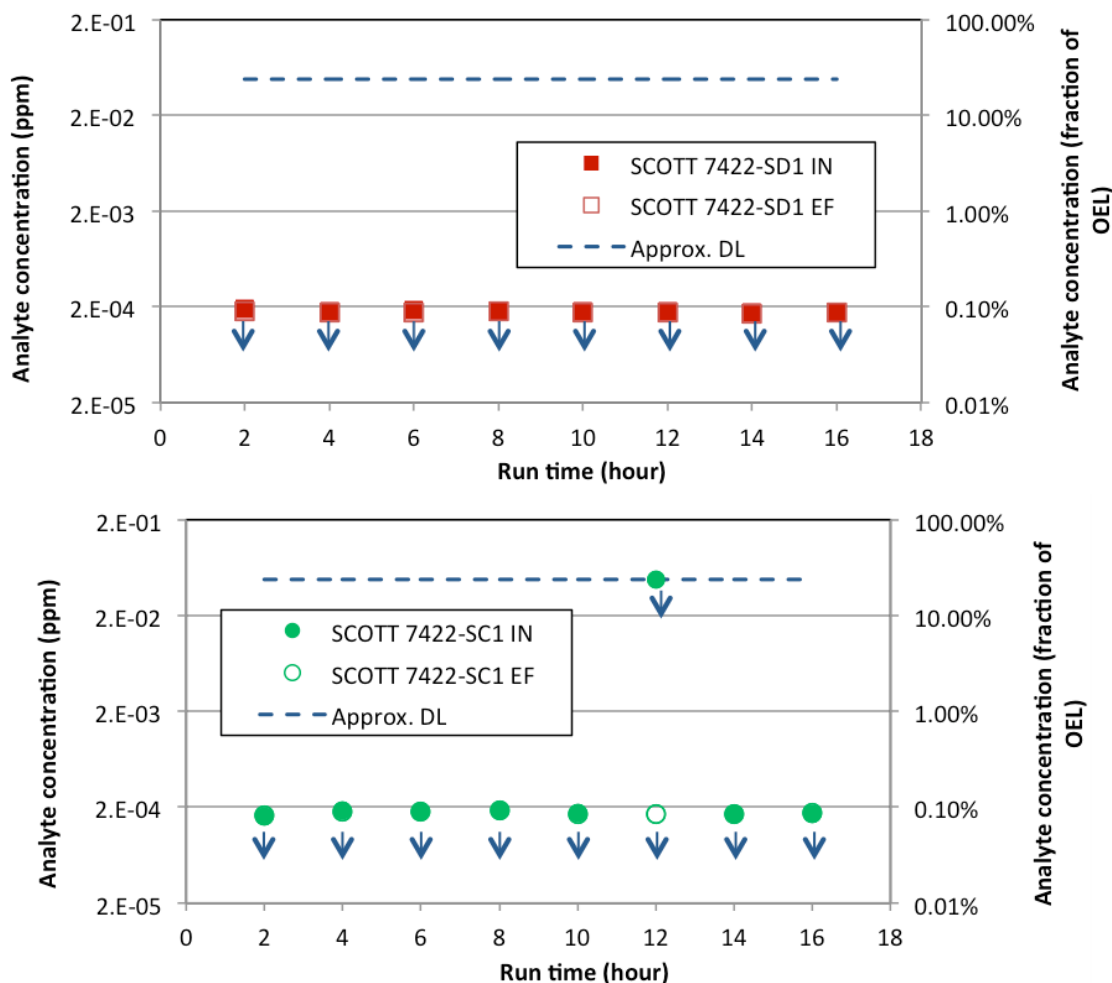
Outlet concentrations for this cartridge exceeded the DL midway into the testing and was >10% of the OEL after 12 hours. The outlet concentrations measured for the SCOTT 7422-SC1 cartridge also exceeded the DL midway into the testing, but never exceeded 10% of the OEL.

**Mercury** (see Figure 2) – The DL for mercury corresponds to ~7.6% of the OEL. Inlet concentrations measured throughout the testing period for both cartridges remained relatively similar, with the highest value recorded being 85% of the OEL. All outlet concentrations were below the DL, indicating no evidence of breakthrough over the measured time period for either cartridge tested.



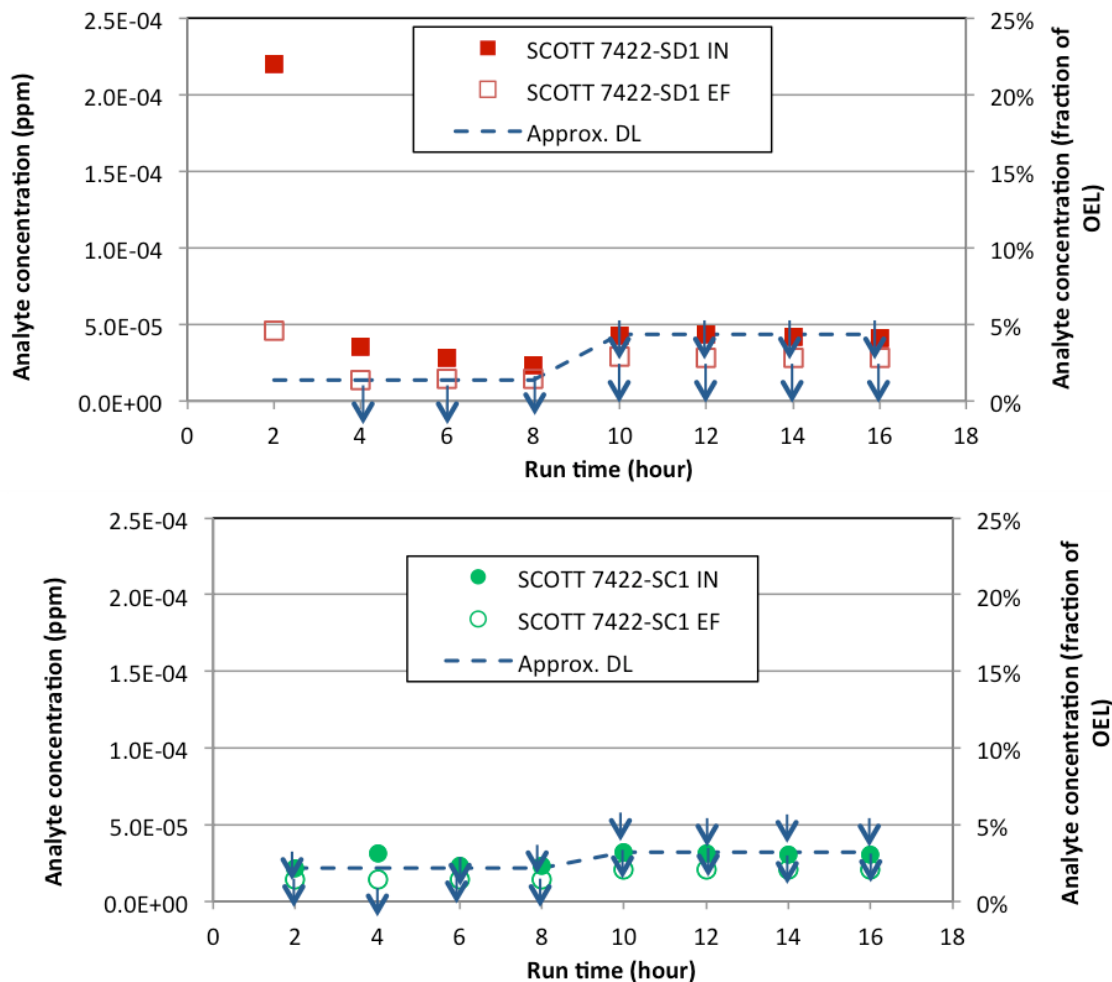
**Figure 2.** Plot of Measured Mercury Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (SCOTT 7422-SD1 and SCOTT 7422-SC1). Data points noted with ↓ indicates measurements less than the DL or RL.

**Biphenyl** (see Figure 3) – The DL for biphenyl corresponds to ~24% of the OEL, primarily based on one data point that appears to be an error-induced outlier. All inlet and outlet concentration measurements for biphenyl were below the DL, and <1% of the OEL, except for the inlet concentration at 12 hours on the SCOTT 7422-SC1 cartridge, which was higher than all other measurements at 23.8% of the OEL but still less than the DL. This single point is suspect due to a low-flow issue through the sample tube and is likely a result of sampling error. Thus, there is no conclusive evidence of biphenyl breakthrough over the measured time period for either cartridge tested.



**Figure 3.** Plot of Measured Biphenyl Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (SCOTT 7422-SD1 and SCOTT 7422-SC1). Data points noted with ↓ indicates measurements less than the DL or RL. Outlet data points not visible are obscured by the inlet data points.

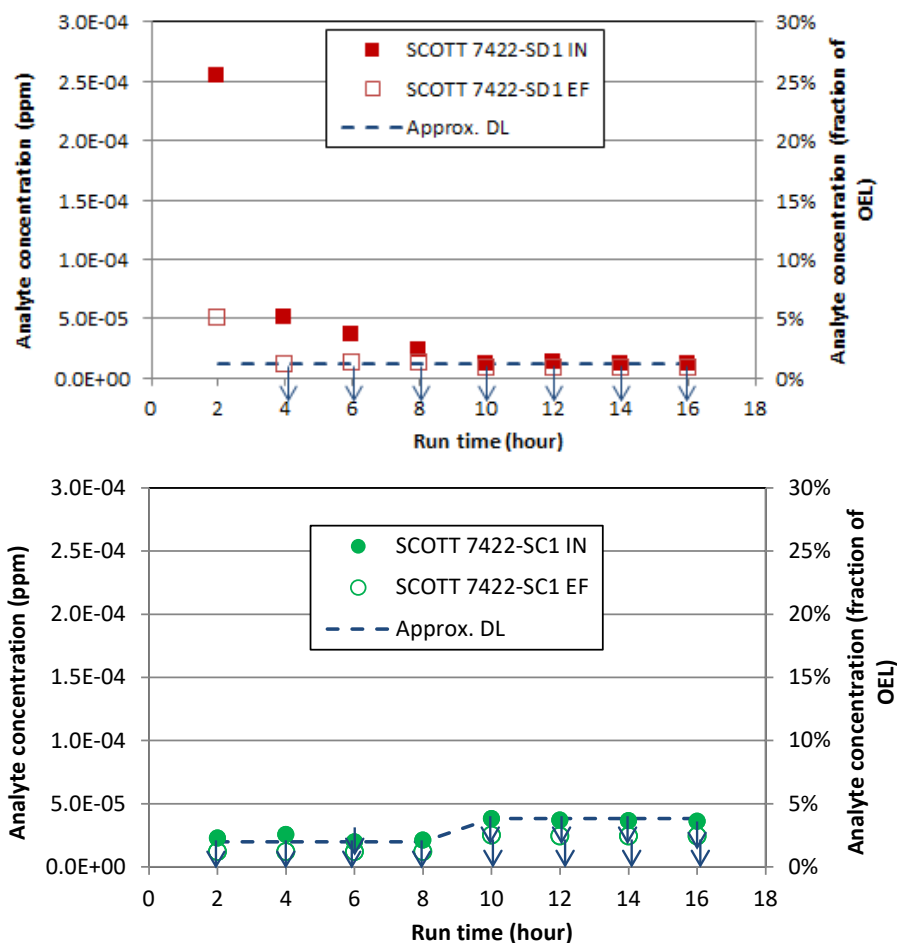
**2,5-Dihydrofuran** (see Figure 4) – The DL for 2,5-dihydrofuran<sup>11</sup> for respirator cartridge SCOTT 7422-SD1 ranged from ~1.4 to 4.3% of the OEL and 2.2 to 3.2% for SCOTT 7422-SC1 due to analytical laboratory and instrument differences between tests and samples. All of the measured inlet and outlet concentrations were <5% of the OEL except for the first inlet concentration measured for SCOTT 7422-SD1, which was at 22%. All of the measured outlet concentrations were below the DL for both cartridges, except for the first outlet concentration for cartridge SCOTT 7422-SD1, which was 4.6% of the OEL. Because the higher outlet concentration corresponded to the higher inlet concentration, data error is not suspected. Initial contamination in the system could explain the high initial readings, but this would need to be confirmed. Nevertheless, all measured outlet concentrations were <5%, with all but one below the DL.



**Figure 4.** Plot of Measured 2,5-Dihydrofuran Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (SCOTT 7422-SD1 and SCOTT 7422-SC1). Data points noted with ↓ indicates measurements less than the DL or RL.

<sup>11</sup> All 2,5-dihydrofuran concentration measurements using the Carbotrap 300 TDU Method for both inlet and effluent samples were less than the DL.

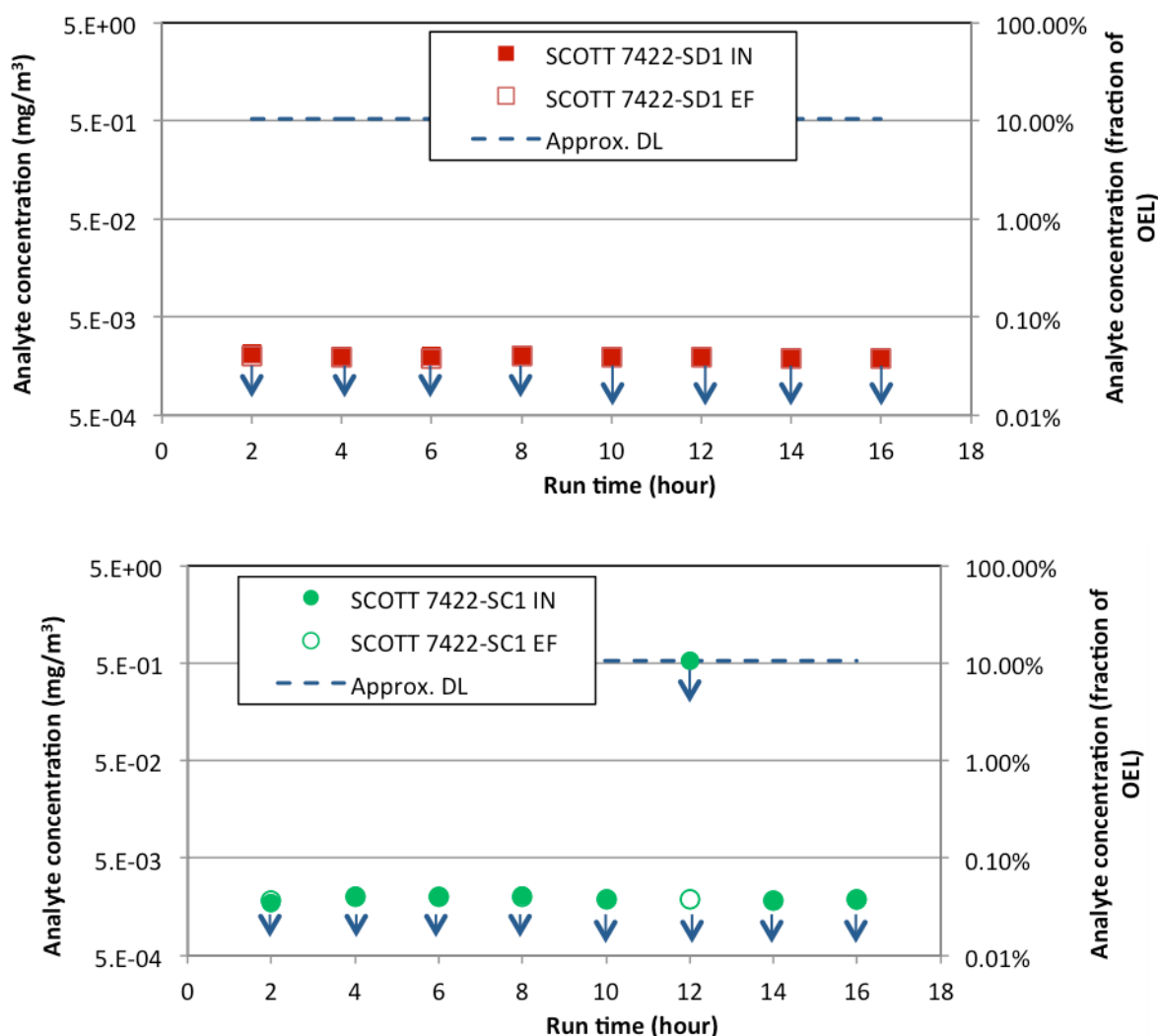
**2-Methylfuran** (see Figure 5) – The DL for 2-methylfuran for respirator cartridge SCOTT 7422-SD1 corresponded to ~1.2% of the OEL and ranged from 2.0% to 3.8% of the OEL for SCOTT 7422-SC1 due to analytical laboratory and instrument differences between tests and samples. All of the measured inlet and outlet concentrations for 2-methylfuran<sup>12</sup> were <6% of the OEL except for the first inlet concentration measured for SCOTT 7422-SD1, which was 25.3% of the OEL. All of the measured outlet concentrations were below the DL for both cartridges, except for the first outlet concentration for cartridge SCOTT 7422-SD1, which was at 5.1% of the OEL. Because the higher outlet concentration corresponded to the higher inlet concentration, data error is not suspected. Initial contamination in the system could explain the high initial readings, but this would need to be confirmed. Nevertheless, all measured outlet concentrations were <6%, with all but one below the DL.



**Figure 5.** Plot of Measured 2-Methylfuran Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (SCOTT 7422-SD1 and SCOTT 7422-SC1). Data points noted with ↓ indicates measurements less than the DL or RL.

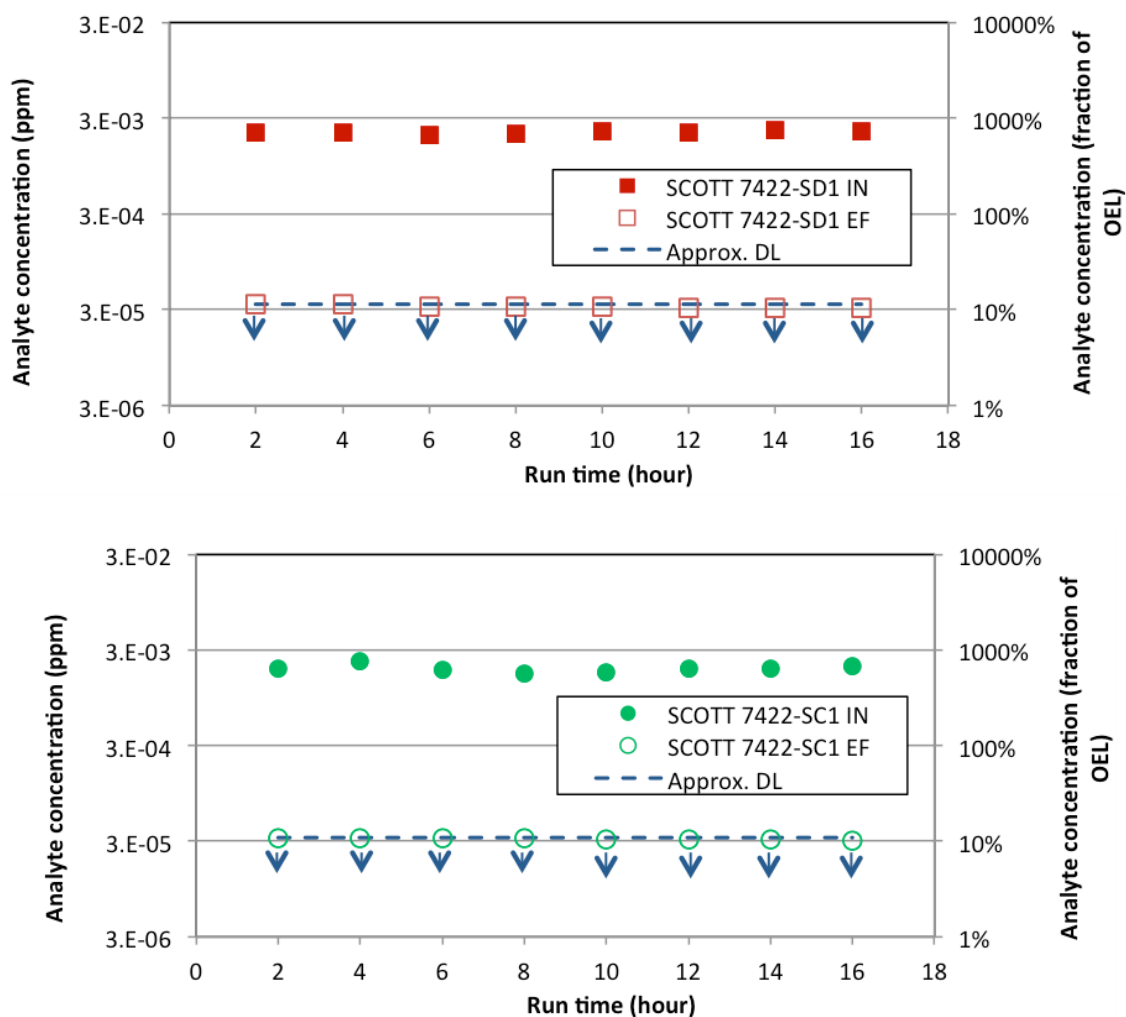
<sup>12</sup> All 2-methylfuran concentration measurements using the Carbotrap 300 TDU Method for both inlet and effluent samples were less than the DL.

**Diethylphthalate** (see Figure 6) – The DL for diethylphthalate corresponds to ~10.5% of the OEL, primarily based on one data point that appears to be an error-induced outlier. For both respirator cartridges, all inlet and outlet concentration measurements were below the DL, and <1% of the OEL, except for the inlet concentration at 12 hours on the SCOTT 7422-SC1 cartridge, which was higher than all other measurements at 10.5% of the OEL but still below the DL. This single point is suspect because of a low-flow issue through the sample tube and is likely a result of sampling error. Because all outlet measurements were less than the DL, there is no evidence of breakthrough over the measured time period for either cartridge tested.



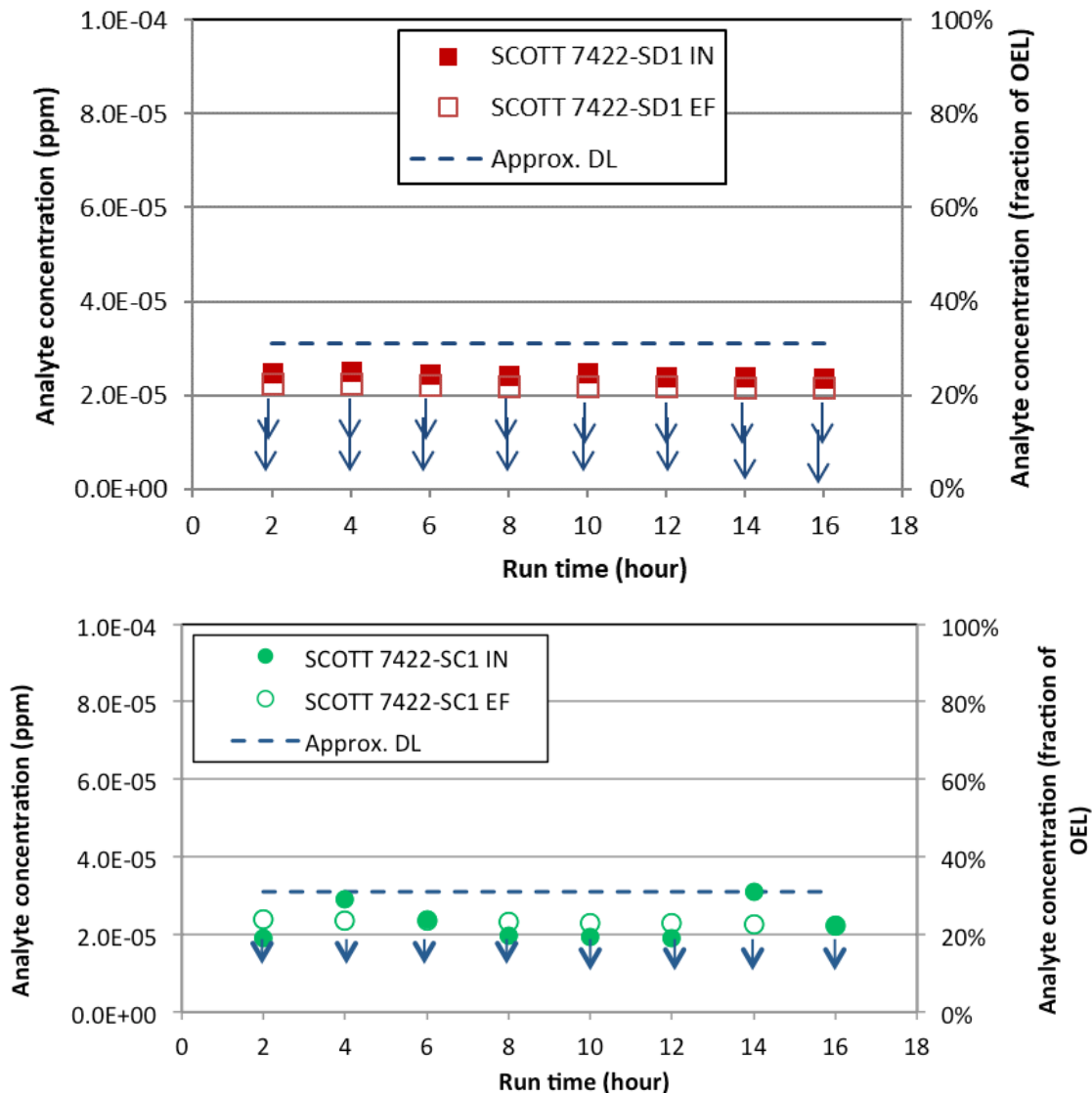
**Figure 6.** Plot of Measured Diethylphthalate Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (SCOTT 7422-SD1 and SCOTT 7422-SC1). Data points noted with ↓ indicates measurements less than the DL or RL. Outlet data points not visible are obscured by the inlet data points.

*N-nitrosodimethylamine* (see Figure 7) – The DL for NDMA corresponds to ~11.4% of the OEL. All inlet measurements for both cartridge tests were significantly greater than the DL, ranging between 566% and 760% of the OEL. However, all of the outlet measurements were below the analytical DL for both respirator cartridges. Even though the DL is slightly >10% OEL there is no evidence of breakthrough over the measured time period for either cartridge tested.



**Figure 7.** Plot of Measured N-nitrosodimethylamine Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (SCOTT 7422-SD1 and SCOTT 7422-SC1). Data points noted with ↓ indicates measurements less than the DL or RL.

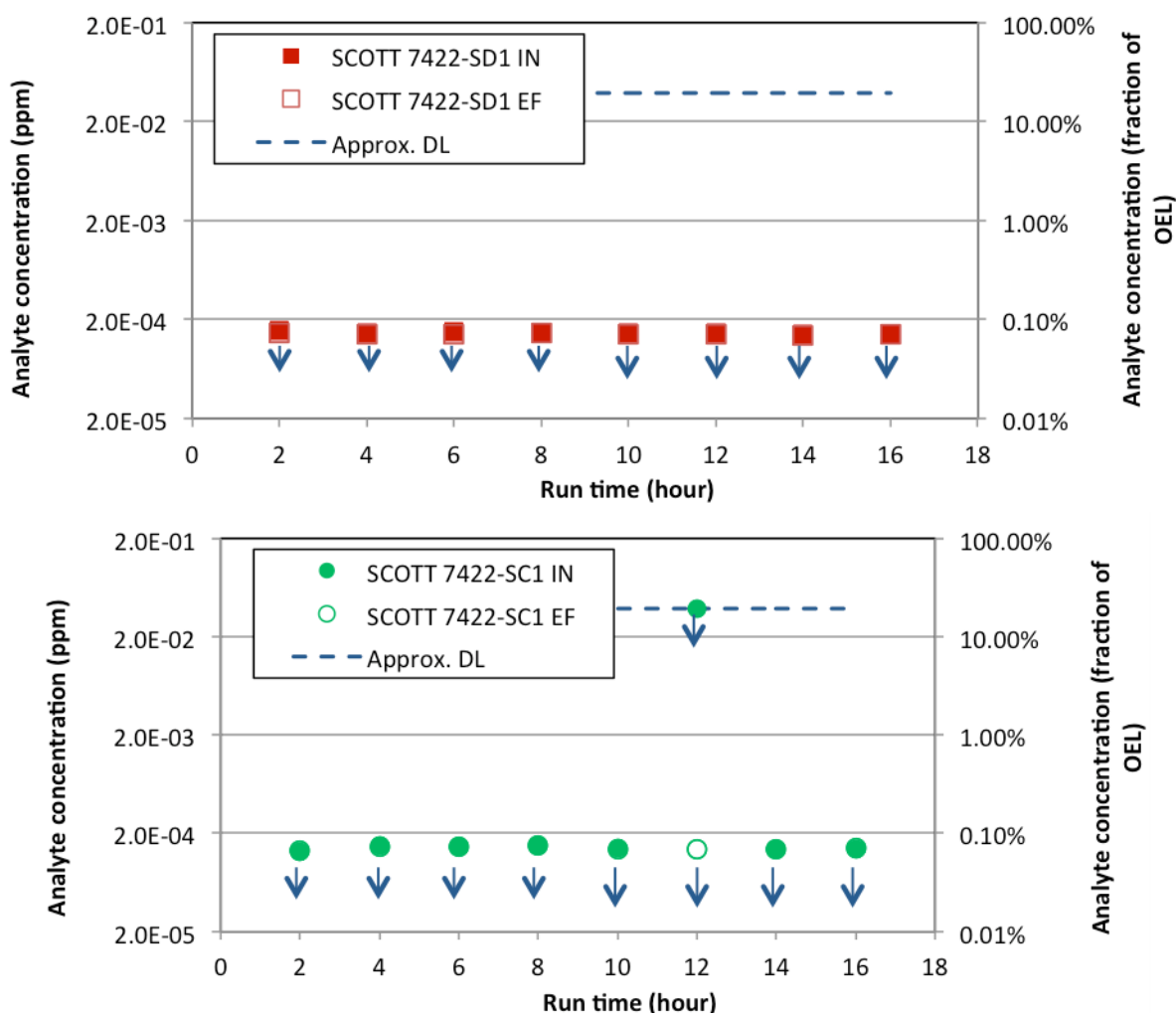
*N-nitrosodiethylamine* (see Figure 8) – The DL for NDEA corresponds to ~31% of the OEL. All inlet measurements for both respirator cartridges were less than the DL, except for the measurement after 2 hours and after 6 hours for the SCOTT 7422-SC1 cartridge. All of the respirator outlet measurements were below the DL. Even though the DL is >10% of the OEL, the outlet measurements do not indicate breakthrough over the measured time period for either cartridge tested.



**Figure 8.** Plot of Measured N-nitrosodiethylamine Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (SCOTT 7422-SD1 and SCOTT 7422-SC1). Data points noted with ↓ indicates measurements less than the DL or RL.

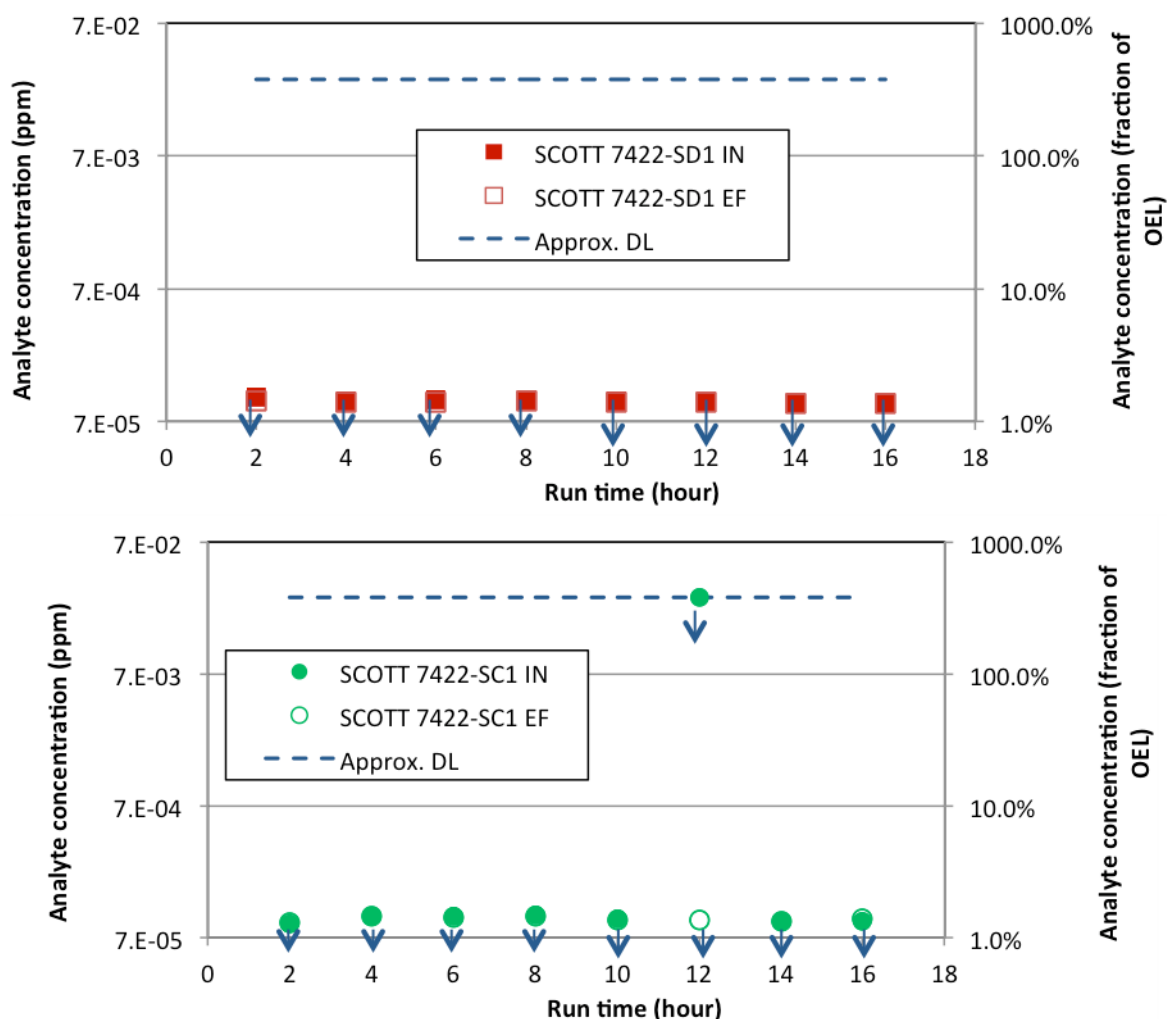


**Tributyl phosphate** (see Figure 9) – The DL for tributyl phosphate corresponds to ~19% of the OEL, primarily based on one data point that appears to be an error-induced outlier. For both respirator cartridges all inlet and outlet concentrations were below the DL, and <1% of the OEL, except for the inlet concentration at 12 hours on the SCOTT 7422-SC1 cartridge, which was higher than all other measurements at 19.3% of the OEL but still below the DL. This single point is suspect because of a low-flow issue through the sample tube and is likely a result of sampling error. All outlet measurements were less than the DL, supporting no evidence of breakthrough over the measured time period for either cartridge tested.



**Figure 9.** Plot of Measured Tributyl phosphate Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (SCOTT 7422-SD1 and SCOTT 7422-SC1). Data points noted with ↓ indicates measurements less than the DL or RL. Outlet data points not visible are obscured by the inlet data points.

**Dibutyl butylphosphonate** (see Figure 10) – The DL for dibutyl butylphosphonate corresponds to ~377% of the OEL, primarily based on one data point that appears to be an error-induced outlier. For both respirator cartridges all inlet and outlet concentrations were below the DL, and <2% of the OEL, except for the inlet concentration at 12 hours on the SCOTT 7422-SC1 cartridge, which was higher than all other measurements at 377% of the OEL but still below the DL. This single point is suspect because of a low-flow issue through the sample tube and is likely a result of sampling error. All outlet measurements were less than the DL, supporting no evidence of breakthrough over the measured time period for either cartridge tested.



**Figure 10.** Plot of Measured Dibutyl butylphosphonate Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (SCOTT 7422-SD1 and SCOTT 7422-SC1). Data points noted with ↓ indicates measurements less than the DL or RL. Outlet data points not visible are obscured by the inlet data points.

## 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 702-AZ exhauster 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.

In total, nine COPCs have been previously measured in the 702-AZ exhauster stack at concentrations >10% of their respective OELs and above analytical RLs. These COPCs include ammonia, mercury, 1,3-butadiene, furan, 2,3-dihydrofuran, NDMA, NDEA, NMEA, and N-nitrosomorpholine (NMOR). Of these nine COPCs:

- Ammonia, mercury, and 1,3-butadiene average inlet concentrations measured in this cartridge study were generally consistent<sup>13</sup> with historic exhauster stack measurements. However, maximum inlet concentrations were 67% to 89% lower than historic exhauster stack maxima.
- Furan maximum inlet concentration from cartridge testing measured ~9.5% of the OEL<sup>14</sup>. By comparison, the maximum historical concentration was a below-report with an RL of 14,500% of the OEL, and the maximum historical above-report was 79% of the OEL. The maximum and average inlet concentrations for 2,3-dihydrofuran measured 6.2% and 3.4% of the OEL, respectively, which are lower than the maximum historical above-report concentration of 23% of the OEL.
- NDMA maximum inlet concentrations measured in this study were generally consistent with historic exhauster stack measurements, while the average inlet concentration was ~112% higher than historic average exhauster stack measurements. For other nitrosamine compounds, the maximum historic measurements were all less than the RL. NDEA maximum and average inlet concentrations from this study measured ~31% and 23% of the OEL, respectively, which was ~70% lower than the historic average exhauster stack measurements.

In addition to the nine COPCs listed above with historic concentrations exceeding 10% of the OEL, two additional COPCs were detected in this study at inlet concentrations exceeding 10% of the OELs. 2,5-Dihydrofuran and 2-methylfuran maximum inlet concentrations in the current study exceeded all historic measurements, which were less than the RLs.

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<sup>13</sup> Inlet concentrations were considered to be generally consistent if they were within a factor of 2 (–50% to +100%) of historic maximum or average exhauster stack measurements.

<sup>14</sup> Inlet maximum concentrations for furan using the Carbotrap 300 TDU Method were 27.1% of the OEL for the 7422-SD1 and 58.0% of the OEL for the 7422-SC1 cartridge. All furan outlet concentrations for both cartridges were less than the DL, indicating no breakthrough during the duration of the tests.

**Table 2.** Historical 702-AZ Exhauster Data for COPCs with Boiling Points less than 70°C (158°F)

COPC Number and Name	CAS Number	Boiling Point (°F)	Occupational Exposure Limit (OEL)	Historical Measurements <sup>1</sup>					Measurements in this Study	
				# of Values	Max. 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	-127	50 ppm	1 3	<RL <RL	<RL <RL	<RL <RL	<RL <RL	Not Measured	
1 Ammonia	7664-41-7	-28	25 ppm	25	169	22.5	676%	90%	76%	9.2%
50 2-Fluoropropene	1184-60-7	-11	0.1 ppm	0	n/a	n/a	n/a	n/a	Not Detected - TIC	
14 Formaldehyde	50-00-0	-6	0.3 ppm	27	<RL	0.0177*	<RL	5.9%*	3.0%	1.1%
53 Methyl nitrite	624-91-9	10	0.1 ppm	0	n/a	n/a	n/a	n/a	Not Detected - TIC	
4 1,3-Butadiene	106-99-0	24	1 ppm	34	0.109	0.0374*	11%	3.7%*	3.6% (RL)	2.1 (RL) <sup>2</sup>
42 Ethylamine	75-04-7	62	5 ppm	20	<RL	<RL	<RL	<RL	0.10% (RL)	0.10% (RL)
15 Acetaldehyde	75-07-0	69	25 ppm	19	<RL	0.078*	<RL	0.31%*	0.06%	0.05%
19 Furan	110-00-9	88	1 ppb	27	<RL	6.31*	<RL	631%*	9.5%	3.8%
59 Methyl Isocyanate	624-83-9	103	0.02 ppm	1	<RL	<RL	<RL	<RL	Not Detected - TIC	
20 2,3-Dihydrofuran	1191-99-7	130	1 ppb	17	<RL	0.14	<RL	14%	6.2%	2.0% (DL)
22 2-Methylfuran	534-22-5	147	1 ppb	26	<RL	<RL	<RL	<RL	25%	5.1%
8 Methanol	67-56-1	148	200 ppm	7	<RL	1.06*	<RL	0.53%*	Not Measured	
21 2,5-Dihydrofuran	1708-29-8	152	1 ppb	26	<RL	<RL	<RL	<RL	22%	4.6%

<sup>1</sup> 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 earlier than May 2005.

\* indicates that the value of the average would differ by a factor of 2 or more (in either direction) if non-reports were excluded.

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

Plain font in the table indicates that only the recent databases (SWIHD headspace and TWINS Industrial Hygiene) were included.

Italics mean that the pre-2006 TWINS headspace data were also included.

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

<sup>2</sup> "(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 August 26–28, 2016, period using a slipstream from the 702-AZ exhauster in the Hanford AY/AZ tank farms 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-SD1 and SCOTT 7422-SC1 (SCOTT Safety, Monroe, North Carolina) were each assessed with the tank farm exhauster 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 independently analyze the collected data, and make recommendations based on results for respiratory cartridge performance and change-out frequency.

The 702-AZ exhauster 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 107°F, and the average relative humidity ranged from 25% to 53%. 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 measured cartridge inlet vapor concentrations from the 702-AZ exhauster, only one COPC, NDMA, exceeded its corresponding OEL. 15 Five COPCs, ammonia, mercury, 2,5-dihydrofuran, 2-methylfuran, and NDEA, reported one or more inlet concentration measurements >10% of their corresponding OEL<sup>15</sup>, but less than 100%. Four additional COPCs, diethylphthalate, biphenyl, dibutyl butylphosphonate, and tributylphosphate, had a single inlet measurement with an elevated DL that was >10% of their OELs. All other COPC's inlet and outlet measurements were <10% of their OELs.
- Ammonia concentrations at the respirator cartridge inlet reached nearly 76% of the OEL (19 ppm) during testing, which was similar but slightly lower than historical measurements. Ammonia appeared to breakthrough the SCOTT 7422-SD1 cartridge above 10% of its OEL after 12 hours. Ammonia measurements from the outlet of the SCOTT 7422-SC1 cartridge were detectable toward the end of its testing but did not exceed the 10% OEL.
- Mercury inlet concentrations measured throughout the testing period for both cartridges remained relatively constant, ~80% of OEL, which were comparable to average historical measurements, but less than the historic maxima of over 460% of the OEL. Mercury outlet concentrations were all below the DL, indicating no breakthrough for the testing period.
- Respirator inlet concentration measurements for NDMA reached 2.3 ppb, or ~760% of the OEL. However, all outlet concentrations were less than the analytical RL of ~11% of the OEL, indicating no breakthrough for either cartridge.

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<sup>15</sup> OELs 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 the best available science. The OEL for NDMA was established in 2005 based on the MAK (Maximale Arbeitsplatzkonzentration) Commission standard adopted in Europe.

<sup>16</sup> Furan also was >10% of the OEL for the inlet measurement when using the Carbotrap 300 TDU method.

- Inlet concentrations for 2,5-dihydrofuran and 2-methylfuran were higher than previous exhauster measurements that only reported values that were less than the RLs. Further, the inlet concentrations of both these COPCs were higher at the beginning of the testing on the SCOTT 7422-SD1 cartridge. The corresponding outlet measurements were also higher but never exceeded 10% of the OEL for either respirator cartridge tested. Subsequent reanalysis of furan, 2,5-dihydrofuran, and 2-methylfuran was performed using the the Carbotrap 300 TDU Method.<sup>17</sup> These results indicated a respirator cartridge inlet maximum concentration for furan of 58% of the OEL. All furan outlet concentrations for both cartridges were less than the DL, indicating no breakthrough during the duration of the tests. Inlet and outlet measurements for 2,5-dihydrofuran and 2-methylfuran were all less than their DLs.
- A single dibutyl butylphosphonate concentration measurement with an elevated DL reached ~377% of its OEL for a SCOTT 7422-SC1 cartridge inlet test, which was significantly higher than historical exhauster measurements. However, this high reading was suspect due to a low-flow issue through the sample tube, and all other inlet concentration measurements for both cartridges were less than the DL and less than 2% of the OEL. A similar observation was made for biphenyl, diethylphthalate, and tributylphosphate, where a single measurement from the same inlet time period and sorbent tube indicated a concentration that was elevated but less than the DL. Therefore, the high value was likely a result of sampling error from an unusually low flowrate measurement relative to other time periods for the same analyte and media. All other inlet and outlet measurements for these COPCs were less than the DL and never exceeded 10% of their OELs, indicating no breakthrough.

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<sup>17</sup> Inlet maximum concentrations for furan using the Carbotrap 300 TDU results were 27.1% of the OEL for the 7422-SD1 and 58.0% of the OEL for the 7422-SC1 cartridge. All effluent measurements for furan were less than the DL indicating no breakthrough during testing. The re-evaluation of the Furans using the Carbotrap 300 TDU is discussed in Freeman et. al. [19].

## 8.0 Recommendations

- Based on the measurements taken for this study, only ammonia appeared to breakthrough above 10% the OEL after 12 hours for the SCOTT 7422-SD1 cartridge. Ammonia outlet concentrations were rising toward the end of the SCOTT 7422-SC1 cartridge testing but did not exceed 10% of the OEL. Therefore, it is recommended that the service life of 12 hours be considered for both respirator cartridges. This service life pertains only to the conditions run in this study. Any increases or decreases in inlet concentrations for other COPCs, water, etc., compared to those measured in the current study, could impact the recommended cartridge change-out time. In these circumstances, additional respirator cartridge evaluations would be necessary to determine proper respiratory protection requirements.
- Additional recommendations related to the DLs for NDMA and NDEA, TICs, further data assessment, and future testing documented in PNNL-25860<sup>18</sup> for respirator cartridge testing on a slipstream from the Hanford AP tank exhausters are also relevant to the 702-AZ exhauster. Future testing and multi-tank analysis of cartridge performance with a wider range of COPC concentrations and test conditions should help improve understanding of overall cartridge performance.

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<sup>18</sup> 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

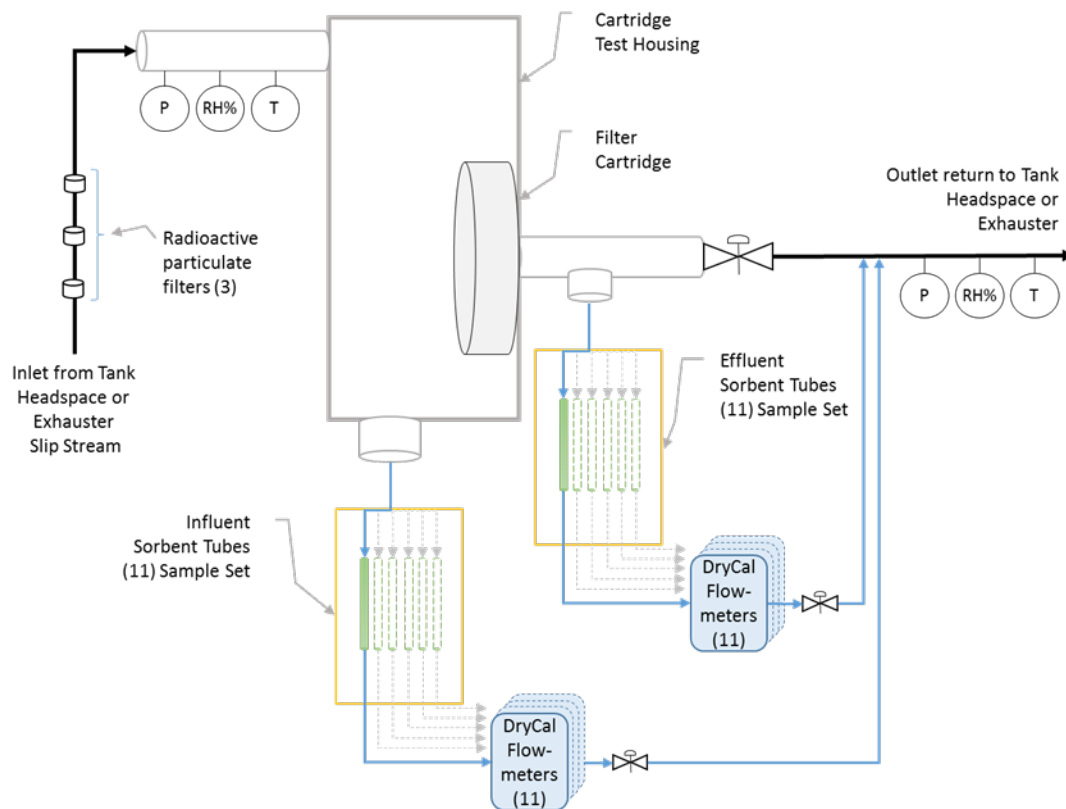
The respirator cartridge-testing system was developed by Washington River Protection Solutions and HiLine Engineering (Richland, Washington) as a means to comprehensively test respirator cartridge performance with actual Hanford tank headspace or exhaust slip stream gases. Tank headspace or exhaust slip stream vapors are pulled direct from the source through a flexible hose that connects the tank or exhaust sampling port within the tank farm/exhaust fence line to the respirator cartridge-testing system outside the farm.[13,14] Multiple in-line particulate filters are installed in the line between the tank/exhaust and test system to remove potential radioactive particulates. Each filter unit contains a hydrophobic Fluoropore™ polytetrafluoroethylene filter (Millipore Sigma, Billerica, Massachusetts) that is required pursuant to the radiological work permit. This polytetrafluoroethylene filter medium is the same material used for routine tank vapor area monitoring as well as sampling and analysis of sources (headspace and exhausters) and was selected because of its broad chemical compatibility that minimizes sorption of, or reactions with, chemical compounds. The filter medium is not expected to adversely impact the test objectives because all tank farm vapor sampling uses this type of filter medium.

The test equipment allows sampling of 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.

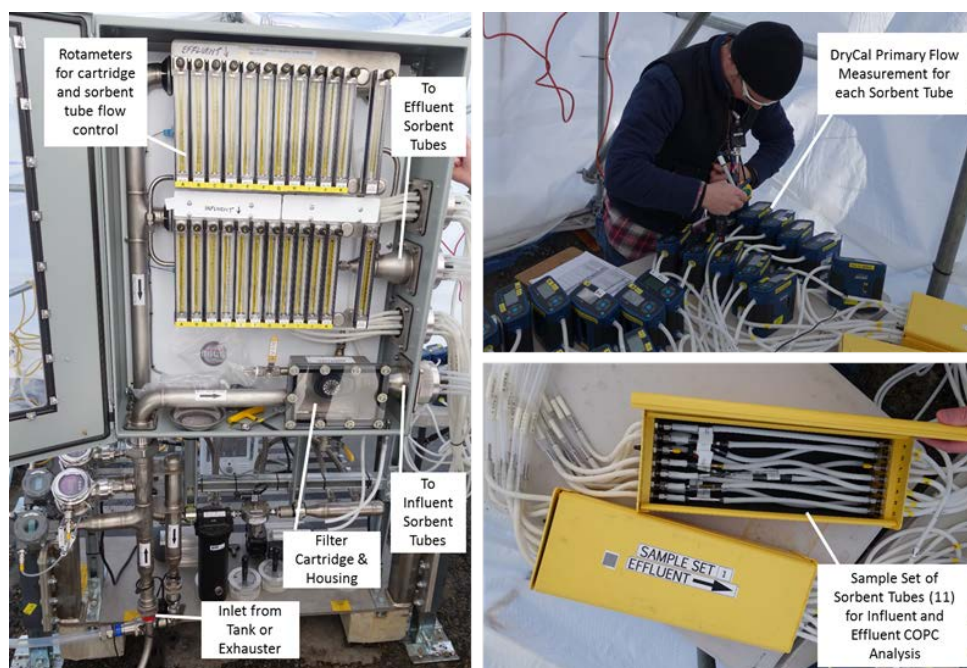
Figure A.1 provides a general schematic diagram for the respirator cartridge test apparatus, and Figure A.2 shows photographs of the actual equipment. The test system operates using vacuum to draw tank gases/vapors into the unit so that the potential for leakage to atmosphere is minimized until the gases/vapors are under positive pressure downstream of the vacuum pumps. By the time gases reach the vacuum pump, COPCs are essentially captured or 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 DryCal primary flow calibrators before and after testing. DryCal flow meters also were used downstream of the sorbent tubes to measure the flow through each sorbent tube. 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 are used 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-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 <sup>a</sup>	Instrument Used <sup>b</sup>	Analysis Location <sup>c</sup>
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
Semivolatile Organic Compounds	Carbotrap 150 TDU Tube	33	EPA TO-17 Modified	GC/MS	WRPS
Volatile Organic Compounds	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, (Parts A and B)	200	NIOSH-1024	GC-FID	ALS
Aldehyde	DNPH Treated Silica Gel, SKC-226-119	200	EPA TO-11A	HPLC	ALS
Pyridine	Coconut Shell Charcoal, SKC-226-01offsite	1000	NIOSH-1613	GC-FID	ALS

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

<sup>a</sup> Analytical Method

NIOSH: National Institute of Occupation Safety and Health

EPA: U.S. Environmental Protection Agency

OSHA: Occupational Safety and Health Administration

<sup>b</sup> Instrument Used

GC-FID: Gas Chromatography-Flame Ionization Detector

GC/MS: Gas Chromatography-Mass Spectrometry

CVAA: Cold Vapor Atomic Absorption

IC: Ion Chromatography

HPLC: High Performance Liquid Chromatography

GC-TEA: Gas Chromatography-Thermal Energy Analyzer

HPLC-UV: High Performance Liquid Chromatography-Ultraviolet Detector

<sup>c</sup> Analysis Location

ALS: ALS Environmental Salt Lake City

WRPS-222S: Washington River Protection Solutions, Organic Studies Group

WHL-222S: Wastren Hanford Laboratory

CBAL: Columbia Basin Analytical Laboratory, part of the RJ Lee Group

## **Appendix C**

### **Raw Analytical Data**



## Appendix C

### Raw Analytical Data

#### C.1 Description

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

The raw analytical data is only given in this appendix. Washington River Protection Solutions (WRPS) converted these data into Excel data spreadsheets that were transmitted to Pacific Northwest National Laboratory. Comments on that conversion are provided below:

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 (RL) was listed as 'n/a,' the result entry in the spreadsheet was given as '0.0.'

The use of the RL or detection limit (DL) varied among analytical laboratories. The term RL (equivalent to a limit of quantification) was used instead of a DL by ALS Environmental Salt Lake City, Columbia Basin Analytical Laboratory, and 222S–Wastren Hanford Laboratory (see Table F.1 in Appendix F for a complete correlation of which Chemicals of Potential Concern used an RL or a DL). The WRPS laboratory provided a DL, in contrast to an RL. Neither RLs nor DLs 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 identification (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 versus tank vapor).

'7645' designations correspond to testing with the SCOTT 7422-SD1 respirator cartridge, whereas '7654' designations correspond to testing with the SCOTT 7422-SC1 respirator cartridge.

Position designation 'A1' and 'A2' correspond to the respirator cartridge inlet and outlet measurements, respectively, at the 0 to 2 hours time interval. Position designations 'B' through 'H' correspond to the subsequent two-hour measurements for inlet (1) and outlet (2): B1/B2 (2 to 4 hours), C1/C2 (4 to 6 hours), D1/D2 (6 to 8 hours), E1/E2 (8 to 10 hours), F1/F2 (10 to 12 hours), G1/G2 (12 to 14 hours), and H1/H2 (14 to 16 hours).

The sample IDs embed the information given above. For example, sample ID 16-07654-8-A1 corresponds to the SCOTT 7422-SC1 cartridge (16-07654), sample line 8, and the first (0 to 2 hours) influent sample bundle (A1).

The flow rate passing through the main cartridge is approximately 30 L/min while the sampling flow rates are from 30-200 mL/min for different chemicals and they are summarized in the excel file 'AZ-107 Exhauster 8-26 through 8-27 Flow Rates.xlsx' and 'AZ-107 Exhauster 8-27 through 8-28 Flow Rates.xlsx.'

The temperature and humidity information are recorded in the test note 'AZ 107 Exhauster DRI 8-26 through 8-27.xlsx' and 'AZ 107 Exhauster DRI 8-27 through 8-28.xlsx.' The information is shown in the tables provided in this appendix. Several terms used in the DRI files are described below.

- 'Pre' and 'Post' indicate the general time signature when the direct read instrument measurements were taken. 'Pre' refers to the beginning of the 2-hour sample duration, and 'Post' refers to the end of the 2-hour sample duration.
- 'Influent' and 'Effluent' indicate the location of the measurement within the test system. 'Influent' measurements are taken at the inlet of the system upstream of the respirator cartridge. 'Effluent' measurements are taken downstream of the respirator cartridge. The pressure, temperature, and humidity effluent sensors are located at the end of the test system near the vacuum pump, whereas the DRI measurements for ammonia and volatile organic compounds (VOC) are from a sampling location between the respirator cartridge and the effluent sorbent tube samples.
- The DRI measurements for ammonia and VOCs could not be taken while the test system sample pumps were operational. 'After Sample Taken' refers to the time signature for these direct read results (e.g., Sample A DRI measurements were taken immediately after the Sample A sorbent tubes were taken and replaced with Sample B sorbent tubes).
- Prior to testing with the waste tank vapors, a 2 hour "baseline" samples is collected by running ambient outside air through the sampling system before each cartridge is installed for testing. 'BASE' means measurements obtained for ambient air (fresh air versus tank vapor) running through the test system before initiation of tank vapor testing.
- Columns labeled Mach. Base 1 and Mach. Base 2 refer to the 'BASE' baseline samples for influent and effluent, respectively, to verify machine cleanliness prior to experimental measurements.
- 'BLANK' means measurements obtained from sorbent tubes that have not had any vapor stream passed through them.

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

- SVOC: Biphenyl, Diethylphthalate, Tributyl phosphate, Dibutyl butylphosphonate, Dodecane, Hexadecane
- SVOCTIC: Undecane, Cyclotetrasiloxane, octamethyl, Decamethylcyclopentasiloxane, Dodecane, 4,6-dimethyl
- VOC: Acetone, Acetonitrile, Acetophenone, Benzene, Butanal, 1-Butanol, Butanenitrile, 3-Buten-2-one, Cyclohexane, Decane, Ethanol, Ethylbenzene, Furan, Hexane, Hexanone, Methylene Chloride, Propanenitrile, Styrene, Tetrachloroethene, Toluene, Trichlorofluoromethane
- VOCTIC: 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, Tetrahydrofuran
- 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.

## C.2 Experimental Parameters

### C.2.1 Flow Rates

SCOTT 7422-SD1 Cartridge (8/26/16) 702-AZ primary exhauster

Volumes Air Collected (L)

Sample Box Number		Mach.	Mach.	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2	G1	G2	H1	H2
Analyte	Line	Base 1	Base 2																
SVOC	A	3.81	3.85	3.65	3.90	3.87	4.02	3.79	4.04	3.83	3.89	3.85	3.96	3.84	3.91	3.92	3.98	3.88	3.91
VOC	B	3.78	4.06	1.03	3.64	3.96	3.19	4.02	3.83	3.91	3.62	3.88	3.69	4.14	3.88	3.92	3.93	4.09	4.10
Furans	C	3.96	6.15	3.98	6.29	3.88	6.45	3.87	6.04	3.88	5.93	3.94	5.90	3.85	5.95	3.92	5.87	3.98	5.84
Ethylamine	D	12.0	12.1	12.1	12.4	12.5	12.2	12.5	12.6	11.9	12.3	12.0	12.2	11.7	12.1	12.2	11.8	12.1	11.8
Acetonitrile	E	13.0	13.0	13.0	13.0	12.8	12.6	12.5	12.7	12.1	12.4	11.9	12.0	12.0	11.9	11.5	12.3	12.0	
Mercury	F	30.2	29.2	30.9	29.6	29.8	30.5	30.0	30.3	29.4	29.7	30.0	30.2	30.1	29.8	29.9	29.8	30.0	30.2
Ammonia	G	25.1	23.4	25.1	23.5	23.8	23.7	23.5	23.7	23.6	23.8	23.6	23.8	23.8	25.1	23.7	23.9	24.6	24.4
Aldehyde	H	24.5	24.1	25.0	23.8	24.1	23.8	23.9	23.6	23.9	23.6	23.9	24.4	23.7	24.2	24.3	24.3	24.5	24.2
1,3-Butadiene	I	23.4	24.6	23.6	24.5	23.7	25.1	23.5	25.1	23.3	23.9	24.0	23.9	23.6	23.8	23.8	23.8	23.7	23.7
Pyridine	J	119	122	118	121	120	122	119	123	121	122	119	121	121	122	122	123	122	121
Nitrosamines	K	235	238	235	238	235	239	237	242	239	241	233	239	238	239	237	240	236	239

Flow Rates (ml/min)

Sample Box Number		Mach.	Mach.	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2	G1	G2	H1	H2
Analyte	Line	Base 1	Base 2																
SVOC	A	31.79	32.1	30.4	32.5	32.2	33.5	31.6	33.7	32.0	32.5	32.1	33.0	32.0	32.6	32.7	33.2	32.3	32.6
VOC	B	31.50	33.8	8.6	30.3	33.0	26.6	33.5	32.0	32.6	30.2	32.3	30.7	34.5	32.3	32.7	32.8	34.1	34.2
Furans	C	33.00	51.3	33.1	52.4	32.3	53.7	32.3	50.3	32.3	49.5	32.8	49.1	32.1	49.6	32.7	48.9	33.2	48.7
Ethylamine	D	100.0	101	101	104	104	102	104	105	99.1	102	100	102	97.4	101	102	98.7	101	98.6
Acetonitrile	E	108.3	108	108	108	107	105	104	106	101	103	99.1	100	100	99.9	99.0	96.1	103	100
Mercury	F	252.0	243	257	246	248	254	250	253	245	248	250	252	251	249	249	249	250	252
Ammonia	G	209.2	195	209	196	198	198	196	198	197	198	197	198	199	210	198	199	205	203
Aldehyde	H	203.8	201	208	199	200	198	199	197	199	197	199	203	197	201	202	202	204	202
1,3-Butadiene	I	194.7	205	197	204	198	209	196	209	194	199	200	199	197	198	198	198	198	197
Pyridine	J	992.5	1015	985	1010	998	1015	995	1025	1005	1015	990	1010	1010	1020	1015	1025	1015	1010
Nitrosamines	K	1955	1980	1960	1985	1955	1995	1975	2020	1995	2010	1940	1995	1980	1995	1975	2000	1970	1990

SCOTT 7422-SC1 Cartridge (8/27/16) 702-AZ primary exhauster

Volumes Air Collected (L)

Sample Box Number		Mach.	Mach.	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2	G1	G2	H1	H2
Analyte	Line	Base 1	Base 2																
SVOC	A	4.12	4.30	4.43	4.32	3.83	3.93	3.84	3.90	3.72	3.83	3.94	4.04	0.01	4.01	3.95	4.01	3.92	3.84
VOC	B	4.01	4.07	4.03	4.28	3.73	3.44	3.82	3.66	3.65	3.69	3.86	3.71	3.92	3.81	3.94	3.90	3.74	3.95
Furans	C	3.73	6.75	4.02	6.29	3.70	6.27	3.76	6.18	3.67	6.16	3.81	5.85	3.87	5.92	3.89	5.90	3.91	5.83
Ethylamine	D	12.6	11.5	12.7	12.0	12.3	12.2	12.1	12.1	11.9	12.0	11.7	11.6	11.9	11.7	11.9	12.0	11.8	12.1
Acetonitrile	E	12.5	11.8	13.0	12.7	11.2	12.0	12.1	12.1	11.9	11.9	12.0	12.0	12.0	11.7	11.9	11.9	11.9	11.7
Mercury	F	28.5	30.3	30.3	31.3	29.4	29.5	29.8	29.8	29.6	28.8	29.5	29.6	29.9	29.8	29.6	30.3	29.7	30.0
Ammonia	G	26.5	22.9	23.4	22.9	23.8	23.6	23.6	23.5	23.5	23.8	23.7	11.9	23.7	23.9	23.8	23.9	23.9	23.9
Aldehyde	H	23.9	23.5	24.6	23.0	23.8	23.2	23.8	23.8	23.6	23.9	23.8	23.7	23.7	23.9	24.0	23.6	24.1	23.8
1,3-Butadiene	I	26.3	25.7	25.9	26.5	24.1	23.7	23.8	23.5	23.5	23.2	24.1	60.4	23.6	23.9	23.6	24.1	13.1	23.9
Pyridine	J	145	142	141	140	124	122	121	122	121	122	123	125	123	121	122	122	123	121
Nitrosamines	K	254	241	254	238	241	240	244	239	241	239	241	240	241	238	238	236	238	240

Flow Rates (ml/min)

Sample Box Number		Mach.	Mach.	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2	G1	G2	H1	H2
Analyte	Line	Base 1	Base 2																
SVOC	A	34.3	35.9	36.9	36.0	31.9	32.8	32.0	32.5	31.0	31.9	32.8	33.7	2.84	32.1	32.9	33.4	31.9	31.2
VOC	B	33.4	33.9	33.6	35.7	31.1	28.6	31.9	30.5	30.4	30.8	32.2	31.0	31.3	30.5	32.8	32.5	30.4	32.1
Furans	C	31.1	56.3	33.5	52.4	30.8	52.2	31.3	51.5	30.6	51.4	31.8	48.8	31.0	47.4	32.4	49.1	31.7	47.4
Ethylamine	D	105	96.0	106	100	103	102	101	101	99.5	100	97.3	97.1	94.9	93.8	98.8	100	96.1	98.7
Acetonitrile	E	104	98.7	108	106	93.7	100	101	101	99.5	99.3	100	99.9	95.6	93.7	99.1	99.5	96.8	95.1
Mercury	F	238	252	252	260	245	246	248	249	247	240	246	246	239	239	247	253	241	244
Ammonia	G	220	191	195	191	198	196	197	196	196	198	198	198	190	191	198	199	195	194
Aldehyde	H	199	196	205	192	198	193	199	198	196	199	198	197	189	191	200	197	196	193
1, 3-Butadiene	I	219	214	216	221	201	198	198	195	196	193	201	504	188	191	197	201	106	195
Pyridine	J	1205	1185	1175	1165	1030	1015	1010	1020	1010	1015	1027	1040	984	968	1015	1015	1001	985
Nitrosamines	K	2115	2009	2120	1985	2005	2000	2030	1995	2005	1990	2010	2000	1924	1901	1980	1970	1932	1951



## C.2.2 Temperature, Pressure and Relative Humidity

SCOTT 7422-SD1 Cartridge (8/26/16) 702-AZ primary exhauster

Influent - Pre		After Sample Taken								
Reading	UOM	Baseline	A	B	C	D	E	F	G	H
Temperature	F	83	93.2	101.4	97.3	94.6	89	82.2	78.8	75.8
Pressure	Torr	734.5	731.5	730.5	729.1	728.1	727.6	727.8	727.7	726.8
Relative Humidity	%	45.4	32.2	27.7	30	30.4	34.2	37.8	40.6	43.7
NH3	ppm									
VOC	ppm									

Influent - Post		After Sample Taken								
Reading	UOM	Baseline	A	B	C	D	E	F	G	H
Temperature	F	89	107.2	98.8	94.4	89.2	84.5	80.5	75.4	72.6
Pressure	Torr	734	730.6	729.2	728.3	727.6	727.9	727.5	727.1	726.8
Relative Humidity	%	40.4	27.8	31.1	31.1	33.1	36	40.2	45.2	47.4
NH3	ppm		19	18	11	22	20	18	18	18
VOC	ppm		1.6	0.88	0.49	1.1	1	0.84	0.78	0.79

Effluent - Pre		After Sample Taken								
Reading	UOM	Baseline	A	B	C	D	E	F	G	H
Temperature	F	83.8	88.5	98.1	100.4	97.4	90.4	86.5	84	79.2
Pressure	Torr	380.8	390	398.3	402	393.9	353.4	399.4	397.4	381.9
Relative Humidity	%	24.5	20.9	18.1	15.5	15.6	16.9	18	19.4	20.2
NH3	ppm									
VOC	ppm									

Effluent- Post		After Sample Taken								
Reading	UOM	Baseline	A	B	C	D	E	F	G	H
Temperature	F	88.1	98.4	101.7	98.7	91.2	87.8	85.8	80.4	77.9
Pressure	Torr	393.4	401.9	404.6	405.3	405.4	402.5	402	398	396.4
Relative Humidity	%	19.6	18.7	15.7	15.7	17.2	17.9	19.1	20.8	77.9
NH3	ppm		2	0	0	1	0	0	2	2
VOC	ppm		0	0.4	0	0.22	0	0	0.04	0.02

SCOTT 7422-SC1 Cartridge (8/27/16) 702-AZ primary exhauster

Influent - Pre		After Sample Taken								
Reading	UOM	Baseline	A	B	C	D	E	F	G	H
Temperature	F	73.4	92.7	104.4	95.8	93.4	86.5	78.3	72.3	71.6
Pressure	Torr	728.1	726.7	726	726.3	726.1	726.9	727.9	729.5	731.4
Relative Humidity	%	46.8	31.5	25.6	28.9	30.4	34.3	41.8	52.5	49.1
NH3	ppm									
VOC	ppm									
Influent - Post		After Sample Taken								
Reading	UOM	Baseline	A	B	C	D	E	F	G	H
Temperature	F	90	106.9	95.9	94	87.8	79.7	73.5	71.6	66.1
Pressure	Torr	728.7	729.9	726.4	725.9	726.8	727.9	729.5	730.6	732.3
Relative Humidity	%	36.3	25.1	28.9	30	33.7	40.5	47	47.2	53.7
NH3	ppm		18	0	16	0	18	18	22	21
VOC	ppm		1.8	1.8	4.94	0.001	0.24	0.62	0.77	0.72
Effluent - Pre		After Sample Taken								
Reading	UOM	Baseline	A	B	C	D	E	F	G	H
Temperature	F	72.7	91.6	103.9	96.7	96.2	87.9	78.3	71.9	70.3
Pressure	Torr	384.7	387	398.1	396.3	399.6	398.9	385.7	392.7	392.2
Relative Humidity	%	29	23.9	14.3	15.7	15.8	18.4	21.4	26.4	26.5
NH3	ppm									
VOC	ppm									
Effluent- Post		After Sample Taken								
Reading	UOM	Baseline	A	B	C	D	E	F	G	H
Temperature	F	89.3	103	98.6	97.1	91.3	79.8	73.3	70.8	67.1
Pressure	Torr	398.8	407.9	404.9	403.6	402.1	399	396.8	397	397.2
Relative Humidity	%	20.5	16.5	15	15.7	18.3	21.5	25.7	26.9	29
NH3	ppm		0	18	0	14	0	0	1	1
VOC	ppm		2.2	5.37	0.36	3.34	0.05	0.04	0.04	0.03

## C.3 Raw Analytical Data

### C.3.1 SVOC and SVOCTIC

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*John J. J. J.*  
9/19/16

#### Cartridge Evaluation Data Summary Report

Sample Group: 20162534

SDG Number:

Customer Sample ID: 16-07645-1-B1

Customer Sample ID: 16-07645-1-B1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Roc %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026891			3891-98-3	2,6,10-Trimethyldecane	NGS	97	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026891			95-48-7	2-Methylphenol	NGS	94	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026891			108-39-4M	Cresol (m & p)	NGS	91	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026891			92-52-4	Biphenyl	NGS	100	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026891			78-46-6	Dibutyl butylphosphonate	NGS	120	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026891			84-66-2	Diethylphthalate	NGS	100	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026891			112-40-3	Dodecane	NGS	100	<0.60	77	n/a	n/a	n/a	n/a	0.55	n/a	E
S16T026891			544-76-3	Hexadecane	NGS	120	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026891			829-59-4	Tetradecane	NGS	100	<3.9	11	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026891			126-73-8	Tributyl phosphate	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026891			829-50-5	Tridecane	NGS	95	<1.6	24	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026891			829-78-7	Heptadecane	NGS	120	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026891			829-62-9	Pentadecane	NGS	110	<3.0	4.7	n/a	n/a	n/a	n/a	3.0	n/a	U

NA = Not Analyzed, ND = Not Detected

U - Less Than Detection Limit

E - Outside Calibration Range

J - Estimated

# Cartridge Evaluation Data Summary Report

Sample Group: 20162534  
SDG Number:  
Customer Sample ID: 16-07645-1-BLANK  
Customer Sample ID: 16-07645-1-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															
S16T026893			3891-98-3	2,6,10-Trimethyldodecane	NGS	97	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026893			95-48-7	2-Methylphenol	NGS	94	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026893			108-39-4M	Cresol (m & p)	NGS	91	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026893			92-52-4	Biphenyl	NGS	100	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026893			78-46-6	Dibutyl butylphosphonate	NGS	120	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026893			34-66-2	Diethylphthalate	NGS	100	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026893			112-40-3	Dodecane	NGS	100	<0.60	<0.60	n/a	n/a	n/a	n/a	0.60	n/a	U
S16T026893			544-76-3	Hexadecane-	NGS	120	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026893			629-59-4	Tetradecane	NGS	100	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026893			126-73-8	Tributyl phosphate	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026893			629-50-5	Tridecane	NGS	95	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026893			629-78-7	Heptadecane	NGS	120	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026893			629-62-9	Pentadecane	NGS	110	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U

NA = Not Analyzed, ND = Not Detected

U - Less Than Detection Limit

E - Outside Calibration Range

J - Estimated

# Cartridge Evaluation Data Summary Report

Sample Group: 20162534

SDG Number:

Customer Sample ID: 16-07645-1-BLANK2

Customer Sample ID: 16-07645-1-BLANK2

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026894			3891-98-3	2,6,10-Trimethyldodecane	NGS	97	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026894			95-48-7	2-Methylphenol	NGS	94	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026894			108-39-4M	Cresol (m & p)	NGS	91	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026894			92-52-4	Biphenyl	NGS	100	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026894			78-46-6	Dibutyl butylphosphonate	NGS	120	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026894			94-66-2	Diethylphthalate	NGS	100	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026894			112-40-3	Dodecane	NGS	100	<0.60	1.2	n/a	n/a	n/a	n/a	0.55	n/a	J
S16T026894			544-76-3	Hexadecane-	NGS	120	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026894			629-59-4	Tetradecane	NGS	100	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026894			126-73-8	Tributyl phosphate	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026894			629-50-5	Tridecane	NGS	95	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026894			629-78-7	Heptadecane	NGS	120	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026894			629-62-9	Pentadecane	NGS	110	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U

NA = Not Analyzed, ND = Not Detected

U - Less Than Detection Limit

E - Outside Calibration Range

J - Estimated

# Cartridge Evaluation Data Summary Report

Sample Group: 20162534  
SDG Number:  
Customer Sample ID: 16-07645-1-C1  
Customer Sample ID: 16-07645-1-C1

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026895			3891-98-3	2,6,10-Trimethyldecane	NGS	97	<3.9	11	n/a	n/a	n/a	n/a	3.9	n/a	
S16T026895			95-48-7	2-Methylphenol	NGS	94	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026895			108-39-4M	Cresol (m & p)	NGS	91	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026895			92-52-4	Biphenyl	NGS	100	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026895			78-46-6	Dibutyl butylphosphonate	NGS	120	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026895			94-66-2	Diethylphthalate	NGS	100	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026895			112-40-3	Dodecane	NGS	100	<0.60	47	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026895			544-76-3	Hexadecane-	NGS	120	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026895			629-59-4	Tetradecane	NGS	100	<3.9	18	n/a	n/a	n/a	n/a	3.9	n/a	
S16T026895			126-73-8	Tributyl phosphate	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026895			629-50-5	Tridecane	NGS	95	<1.6	22	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026895			629-78-7	Heptadecane	NGS	120	<2.4	2.7	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T026895			629-62-9	Pentadecane	NGS	110	<3.0	7.5	n/a	n/a	n/a	n/a	3.0	n/a	J

NA = Not Analyzed, ND = Not Detected

U - Less Than Detection Limit

E - Outside Calibration Range

J - Estimated

# Cartridge Evaluation Data Summary Report

Sample Group: 20162534  
SDG Number:  
Customer Sample ID: 16-07645-1-D1  
Customer Sample ID: 16-07645-1-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															
S16T026897			3891-98-3	2,6,10-Trimethyldodecane	NGS	97	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026897			95-48-7	2-Methylphenol	NGS	94	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026897			108-39-4M	Cresol (m & p)	NGS	91	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026897			92-52-4	Biphenyl	NGS	100	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026897			78-46-6	Dibutyl butylphosphonate	NGS	120	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026897			84-66-2	Diethylphthalate	NGS	100	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026897			112-40-3	Dodecane	NGS	100	<0.60	86	n/a	n/a	n/a	n/a	0.55	n/a	E
S16T026897			544-76-3	Hexadecane-	NGS	120	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026897			629-59-4	Tetradecane	NGS	100	<3.9	7.2	n/a	n/a	n/a	n/a	3.9	n/a	J
S16T026897			126-73-8	Tributyl phosphate	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026897			629-50-5	Tridecane	NGS	95	<1.6	19	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026897			629-78-7	Heptadecane	NGS	120	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026897			629-62-9	Pentadecane	NGS	110	<3.0	3.8	n/a	n/a	n/a	n/a	3.0	n/a	J

NA = Not Analyzed, ND = Not Detected

U - Less Than Detection Limit

E - Outside Calibration Range

J - Estimated

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162534  
SDG Number:  
Customer Sample ID: 16-07645-1-E1  
Customer Sample ID: 16-07645-1-E1

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026899			3891-98-3	2,6,10-Trimethyldecane	NGS	97	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9		n/a U
S16T026899			95-48-7	2-Methylphenol	NGS	94	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9		n/a U
S16T026899			108-39-4M	Cresol (m & p)	NGS	91	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6		n/a U
S16T026899			92-52-4	Biphenyl	NGS	100	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0		n/a U
S16T026899			78-46-6	Dibutyl butylphosphonate	NGS	120	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6		n/a U
S16T026899			84-66-2	Diethylphthalate	NGS	100	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0		n/a U
S16T026899			112-40-3	Dodecane	NGS	100	<0.60	92	n/a	n/a	n/a	n/a	0.55		n/a E
S16T026899			544-76-3	Hexadecane-	NGS	120	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3		n/a U
S16T026899			629-59-4	Tetradecane	NGS	100	<3.9	7.1	n/a	n/a	n/a	n/a	3.9		n/a J
S16T026899			126-73-8	Tributyl phosphate	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6		n/a U
S16T026899			629-50-5	Tridecane	NGS	95	<1.6	18	n/a	n/a	n/a	n/a	1.6		n/a
S16T026899			629-78-7	Heptadecane	NGS	120	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4		n/a U
S16T026899			629-62-9	Pentadecane	NGS	110	<3.0	3.7	n/a	n/a	n/a	n/a	3.0		n/a J

NA = Not Analyzed, ND = Not Detected

U - Less Than Detection Limit

E - Outside Calibration Range

J - Estimated

# Cartridge Evaluation Data Summary Report

Sample Group: 20162534

SDG Number:

Customer Sample ID: 16-07645-1-EFF-BASE

Customer Sample ID: 16-07645-1-EFF-BASE

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026901			3891-98-3	2,6,10-Trimethyldecane	NGS	97	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	n/a U
S16T026901			95-48-7	2-Methylphenol	NGS	94	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	n/a U
S16T026901			108-39-4M	Cresol (m & p)	NGS	91	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	n/a U
S16T026901			82-52-4	Biphenyl	NGS	100	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	n/a U
S16T026901			78-46-6	Dibutyl butylphosphonate	NGS	120	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	n/a U
S16T026901			84-66-2	Diethylphthalate	NGS	100	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	n/a U
S16T026901			112-40-3	Dodecane	NGS	100	<0.60	44	n/a	n/a	n/a	n/a	0.55	n/a	n/a
S16T026901			544-76-3	Hexadecane-	NGS	120	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	n/a U
S16T026901			629-59-4	Tetradecane	NGS	100	<3.9	6.3	n/a	n/a	n/a	n/a	3.9	n/a	n/a J
S16T026901			126-73-8	Tributyl phosphate	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	n/a U
S16T026901			629-50-5	Tridecane	NGS	95	<1.6	24	n/a	n/a	n/a	n/a	1.6	n/a	n/a
S16T026901			629-78-7	Heptadecane	NGS	120	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	n/a U
S16T026901			629-62-9	Pentadecane	NGS	110	<3.0	7.0	n/a	n/a	n/a	n/a	3.0	n/a	n/a J

NA = Not Analyzed, ND = Not Detected

U - Less Than Detection Limit

E - Outside Calibration Range

J - Estimated



Cartridge Evaluation  
Data Summary Report

Sample Group: 20162534  
SDG Number:  
Customer Sample ID: 16-07645-1-F1  
Customer Sample ID: 16-07645-1-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															
S16T026902			3891-98-3	2,6,10-Trimethyldecane	NGS	97	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026902			95-48-7	2-Methylphenol	NGS	94	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026902			108-39-4M	Cresol (m & p)	NGS	91	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026902			92-52-4	Biphenyl	NGS	100	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026902			78-46-6	Dibutyl butylphosphonate	NGS	120	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026902			84-66-2	Diethylphthalate	NGS	100	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026902			112-40-3	Dodecane	NGS	100	<0.60	62	n/a	n/a	n/a	n/a	0.55	n/a	E
S16T026902			544-76-3	Hexadecane-	NGS	120	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026902			629-59-4	Tetradecane	NGS	100	<3.9	4.2	n/a	n/a	n/a	n/a	3.9	n/a	J
S16T026902			126-73-8	Tributyl phosphate	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026902			629-50-5	Tridecane	NGS	95	<1.6	12	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026902			629-78-7	Heptadecane	NGS	120	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026902			629-62-9	Pentadecane	NGS	110	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U

NA = Not Analyzed, ND = Not Detected

U - Less Than Detection Limit

E - Outside Calibration Range

J - Estimated

# Cartridge Evaluation Data Summary Report

Sample Group: 20162534  
SDG Number:  
Customer Sample ID: 16-07645-1-G1  
Customer Sample ID: 16-07645-1-G1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026904			3891-98-3	2,6,10-Trimethyldecane	NGS	97	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026904			95-48-7	2-Methylphenol	NGS	94	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026904			108-39-4M	Cresol (m & p)	NGS	91	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026904			92-52-4	Biphenyl	NGS	100	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026904			78-46-6	Dibutyl butylphosphonate	NGS	120	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026904			84-66-2	Diethyl phthalate	NGS	100	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026904			112-40-3	Dodecane	NGS	100	<0.60	30	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026904			544-76-3	Hexadecane-	NGS	120	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026904			829-59-4	Tetradecane	NGS	100	<3.9	5.5	n/a	n/a	n/a	n/a	3.9	n/a	J
S16T026904			126-73-8	Tributyl phosphate	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026904			829-50-5	Tridecane	NGS	95	<1.6	7.7	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026904			829-78-7	Heptadecane	NGS	120	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026904			829-62-9	Pentadecane	NGS	110	<3.0	5.3	n/a	n/a	n/a	n/a	3.0	n/a	J

NA = Not Analyzed, ND = Not Detected

U - Less Than Detection Limit

E - Outside Calibration Range

J - Estimated

# Cartridge Evaluation Data Summary Report

Sample Group: 20162534  
SDG Number:  
Customer Sample ID: 16-07645-1-IN-BASE  
Customer Sample ID: 16-07645-1-IN-BASE

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026908			3891-98-3	2,6,10-Trimethyldecane	NGS	97	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026908			95-48-7	2-Methylphenol	NGS	94	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026908			108-39-4M	Cresol (m & p)	NGS	91	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026908			92-52-4	Biphenyl	NGS	100	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026908			78-46-6	Dibutyl butylphosphonate	NGS	120	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026908			84-66-2	Diethylphthalate	NGS	100	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026908			112-40-3	Dodecane	NGS	100	<0.60	11	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026908			544-76-3	Hexadecane-	NGS	120	<3.3	4.1	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T026908			829-59-4	Tetradecane	NGS	100	<3.9	5.8	n/a	n/a	n/a	n/a	3.9	n/a	J
S16T026908			126-73-8	Tributyl phosphate	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026908			829-50-5	Tridecane	NGS	95	<1.6	8.7	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026908			829-78-7	Heptadecane	NGS	120	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026908			829-62-9	Pentadecane	NGS	110	<3.0	7.2	n/a	n/a	n/a	n/a	3.0	n/a	J

NA = Not Analyzed, ND = Not Detected

U - Less Than Detection Limit

E - Outside Calibration Range

J - Estimated

*John*  
*9/28/14*

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162535

SDG Number:

Customer Sample ID: 16-07654-1-B1

Customer Sample ID: 16-07654-1-B1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026911			3891-98-3	2,6,10-Trimethyldecane	NGS	100	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026911			95-48-7	2-Methylphenol	NGS	89	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026911			108-39-4M	Cresol (m & p)	NGS	88	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026911			92-52-4	Biphenyl	NGS	100	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026911			78-46-6	Dibutyl butylphosphonate	NGS	120	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026911			84-66-2	Diethylphthalate	NGS	110	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026911			112-40-3	Dodecane	NGS	98	<0.60	93	n/a	n/a	n/a	n/a	0.55	n/a	E
S16T026911			544-76-3	Hexadecane-	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026911			629-59-4	Tetradecane	NGS	110	<3.9	10	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026911			126-73-8	Tributyl phosphate	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026911			629-50-5	Tridecane	NGS	96	<1.6	27	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026911			629-78-7	Heptadecane	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026911			629-62-9	Pentadecane	NGS	110	<3.0	4.4	n/a	n/a	n/a	n/a	3.0	n/a	J

NA = Not Analyzed, ND = Not Detected

E - Outside Calibration Range

U - Less Than Detection Limit

J - Estimated

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162535

SDG Number:

Customer Sample ID: 16-07654-1-BLANK

Customer Sample ID: 16-07654-1-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															
S16T026913			3891-98-3	2,6,10-Trimethyldecane	NGS	100	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026913			95-48-7	2-Methylphenol	NGS	89	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026913			108-39-4M	Cresol (m & p)	NGS	88	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026913			92-52-4	Biphenyl	NGS	100	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026913			78-46-6	Dibutyl butylphosphonate	NGS	120	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026913			84-66-2	Diethylphthalate	NGS	110	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026913			112-40-3	Dodecane	NGS	98	<0.60	0.60	n/a	n/a	n/a	n/a	0.55	n/a	J
S16T026913			544-76-3	Hexadecane-	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026913			629-59-4	Tetradecane	NGS	110	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026913			126-73-8	Tributyl phosphate	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026913			629-50-5	Tridecane	NGS	96	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026913			629-78-7	Heptadecane	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026913			629-62-9	Pentadecane	NGS	110	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U

NA = Not Analyzed, ND = Not Detected

E - Outside Calibration Range

U - Less Than Detection Limit

J - Estimated

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162535

SDG Number:

Customer Sample ID: 16-07654-1-BLANK2

Customer Sample ID: 16-07654-1-BLANK2

Sample#	R	AI#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026914			3891-98-3	2,6,10-Trimethyldodecane	NGS	100	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026914			95-48-7	2-Methylphenol	NGS	89	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026914			108-39-4M	Cresol (m & p)	NGS	88	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026914			92-52-4	Biphenyl	NGS	100	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026914			78-46-6	Dibutyl butylphosphonate	NGS	120	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026914			84-66-2	Diethylphthalate	NGS	110	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026914			112-40-3	Dodecane	NGS	98	<0.60	0.70	n/a	n/a	n/a	n/a	0.55	n/a	J
S16T026914			544-76-3	Hexadecane-	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026914			629-59-4	Tetradecane	NGS	110	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026914			126-73-8	Tributyl phosphate	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026914			629-50-5	Tridecane	NGS	96	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026914			629-78-7	Heptadecane	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026914			629-62-9	Pentadecane	NGS	110	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U

NA = Not Analyzed, ND = Not Detected

E - Outside Calibration Range

U - Less Than Detection Limit

J - Estimated

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162535  
SDG Number:  
Customer Sample ID: 16-07654-1-C1  
Customer Sample ID: 16-07654-1-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															
S16T026915			3891-98-3	2,6,10-Trimethyldodecane	NGS	100	<3.9	9.9	n/a	n/a	n/a	n/a	3.9	n/a	J
S16T026915			95-48-7	2-Methylphenol	NGS	89	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026915			108-39-4M	Cresol (m & p)	NGS	88	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026915			92-52-4	Biphenyl	NGS	100	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026915			78-46-6	Dibutyl butylphosphonate	NGS	120	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026915			84-66-2	Diethylphthalate	NGS	110	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026915			112-40-3	Dodecane	NGS	98	<0.60	43	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026915			544-76-3	Hexadecane-	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026915			629-59-4	Tetradecane	NGS	110	<3.9	20	n/a	n/a	n/a	n/a	3.9	n/a	
S16T026915			126-73-8	Tributyl phosphate	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026915			629-50-5	Tridecane	NGS	96	<1.6	21	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026915			629-78-7	Heptadecane	NGS	110	<2.4	2.8	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T026915			629-62-9	Pentadecane	NGS	110	<3.0	7.2	n/a	n/a	n/a	n/a	3.0	n/a	J

NA = Not Analyzed, ND = Not Detected

E - Outside Calibration Range

U - Less Than Detection Limit

J - Estimated

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162535

SDG Number:

Customer Sample ID: 16-07654-1-D1

Customer Sample ID: 16-07654-1-D1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026917			3891-98-3	2,6,10-Trimethyldodecane	NGS	100	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026917			95-48-7	2-Methylphenol	NGS	89	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026917			108-39-4M	Cresol (m & p)	NGS	88	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026917			92-52-4	Biphenyl	NGS	100	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026917			78-46-6	Dibutyl butylphosphonate	NGS	120	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026917			84-66-2	Diethylphthalate	NGS	110	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026917			112-40-3	Dodecane	NGS	98	<0.60	96	n/a	n/a	n/a	n/a	0.55	n/a	E
S16T026917			544-76-3	Hexadecane-	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026917			629-59-4	Tetradecane	NGS	110	<3.9	5.7	n/a	n/a	n/a	n/a	3.9	n/a	J
S16T026917			126-73-8	Tributyl phosphate	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026917			629-50-5	Tridecane	NGS	96	<1.6	18	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026917			629-78-7	Heptadecane	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026917			629-62-9	Pentadecane	NGS	110	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U

NA = Not Analyzed, ND = Not Detected

E - Outside Calibration Range

U - Less Than Detection Limit

J - Estimated



Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162535  
SDG Number:  
Customer Sample ID: 16-07654-1-E1  
Customer Sample ID: 16-07654-1-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															
S16T026919			3891-98-3	2,6,10-Trimethyldecane	NGS	100	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026919			95-48-7	2-Methylphenol	NGS	89	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026919			108-39-4M	Cresol (m & p)	NGS	88	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026919			92-52-4	Biphenyl	NGS	100	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026919			78-46-6	Dibutyl butylphosphonate	NGS	120	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026919			84-66-2	Diethylphthalate	NGS	110	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026919			112-40-3	Dodecane	NGS	98	<0.60	62	n/a	n/a	n/a	n/a	0.55	n/a	E
S16T026919			544-76-3	Hexadecane-	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026919			629-59-4	Tetradecane	NGS	110	<3.9	4.8	n/a	n/a	n/a	n/a	3.9	n/a	J
S16T026919			126-73-8	Tributyl phosphate	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026919			629-50-5	Tridecane	NGS	96	<1.6	11	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026919			629-78-7	Heptadecane	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026919			629-62-9	Pentadecane	NGS	110	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U

NA = Not Analyzed, ND = Not Detected

E - Outside Calibration Range

U - Less Than Detection Limit

J - Estimated

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162535  
SDG Number:  
Customer Sample ID: 16-07654-1-EFF-BASE  
Customer Sample ID: 16-07654-1-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															
S16T026921			3891-98-3	2,6,10-Trimethyldecane	NGS	100	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026921			95-48-7	2-Methylphenol	NGS	89	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026921			108-39-4M	Cresol (m & p)	NGS	88	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026921			92-52-4	Biphenyl	NGS	100	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026921			78-46-6	Dibutyl butylphosphonate	NGS	120	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026921			84-66-2	Diethylphthalate	NGS	110	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026921			112-40-3	Dodecane	NGS	98	<0.60	43	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026921			544-76-3	Hexadecane-	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026921			629-59-4	Tetradecane	NGS	110	<3.9	7.0	n/a	n/a	n/a	n/a	3.9	n/a	J
S16T026921			126-73-8	Tributyl phosphate	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026921			629-50-5	Tridecane	NGS	96	<1.6	25	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026921			629-78-7	Heptadecane	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026921			629-62-9	Pentadecane	NGS	110	<3.0	8.6	n/a	n/a	n/a	n/a	3.0	n/a	J

NA = Not Analyzed, ND = Not Detected

J - Estimated

U - Less Than Detection Limit

E - Outside Calibration Range

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162535  
SDG Number:  
Customer Sample ID: 16-07654-1-F1  
Customer Sample ID: 16-07654-1-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															
S16T026922			3891-98-3	2,6,10-Trimethyldecane	NGS	100	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9		n/a U
S16T026922			95-48-7	2-Methylphenol	NGS	89	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9		n/a U
S16T026922			108-39-4M	Cresol (m & p)	NGS	88	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6		n/a U
S16T026922			92-52-4	Biphenyl	NGS	100	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0		n/a U
S16T026922			78-46-6	Dibutyl butylphosphonate	NGS	120	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6		n/a U
S16T026922			84-66-2	Diethylphthalate	NGS	110	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0		n/a U
S16T026922			112-40-3	Dodecane	NGS	98	<0.60	4.6	n/a	n/a	n/a	n/a	0.55		n/a U
S16T026922			544-76-3	Hexadecane-	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3		n/a U
S16T026922			929-59-4	Tetradecane	NGS	110	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9		n/a U
S16T026922			126-73-8	Tributyl phosphate	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6		n/a U
S16T026922			929-50-5	Tridecane	NGS	96	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6		n/a U
S16T026922			929-78-7	Heptadecane	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4		n/a U
S16T026922			929-62-9	Pentadecane	NGS	110	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0		n/a U

NA = Not Analyzed, ND = Not Detected

E - Outside Calibration Range

U - Less Than Detection Limit

J - Estimated

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162535  
SDG Number:  
Customer Sample ID: 16-07654-1-G1  
Customer Sample ID: 16-07654-1-G1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spt Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026924			3891-98-3	2,6,10-Trimethyldecane	NGS	100	<3.9	<3.9	n/a	n/a	n/a	n/a	n/a	3.9	n/a U
S16T026924			95-48-7	2-Methylphenol	NGS	89	<4.9	<4.9	n/a	n/a	n/a	n/a	n/a	4.9	n/a U
S16T026924			108-39-4M	Cresol (m & p)	NGS	88	<5.6	<5.6	n/a	n/a	n/a	n/a	n/a	5.6	n/a U
S16T026924			92-52-4	Biphenyl	NGS	100	<4.0	<4.0	n/a	n/a	n/a	n/a	n/a	4.0	n/a U
S16T026924			78-46-6	Dibutyl butylphosphonate	NGS	120	<3.6	<3.6	n/a	n/a	n/a	n/a	n/a	3.6	n/a U
S16T026924			84-66-2	Diethylphthalate	NGS	110	<7.0	<7.0	n/a	n/a	n/a	n/a	n/a	7.0	n/a U
S16T026924			112-40-3	Dodecane	NGS	98	<0.60	22	n/a	n/a	n/a	n/a	n/a	0.55	n/a
S16T026924			544-76-3	Hexadecane-	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	n/a	3.3	n/a U
S16T026924			629-59-4	Tetradecane	NGS	110	<3.9	4.7	n/a	n/a	n/a	n/a	n/a	3.9	n/a U
S16T026924			126-73-8	Tributyl phosphate	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	n/a	5.6	n/a U
S16T026924			629-50-5	Tridecane	NGS	96	<1.6	5.7	n/a	n/a	n/a	n/a	n/a	1.6	n/a U
S16T026924			629-78-7	Heptadecane	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	n/a	2.4	n/a U
S16T026924			629-62-9	Pentadecane	NGS	110	<3.0	6.5	n/a	n/a	n/a	n/a	n/a	3.0	n/a U

NA = Not Analyzed, ND = Not Detected

J - Estimated

U - Less Than Detection Limit

E - Outside Calibration Range

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162535  
SDG Number:  
Customer Sample ID: 16-07654-1-IN-BASE  
Customer Sample ID: 16-07654-1-IN-BASE

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026928			3891-98-3	2,6,10-Trimethyldodecane	NGS	100	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026928			95-48-7	2-Methylphenol	NGS	89	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026928			108-39-4M	Cresol (m & p)	NGS	88	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026928			92-52-4	Biphenyl	NGS	100	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026928			78-46-6	Dibutyl butylphosphonate	NGS	120	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026928			84-66-2	Diethylphthalate	NGS	110	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026928			112-40-3	Dodecane	NGS	98	<0.60	10	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026928			544-76-3	Hexadecane-	NGS	110	<3.3	4.3	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T026928			629-59-4	Tetradecane	NGS	110	<3.9	6.0	n/a	n/a	n/a	n/a	3.9	n/a	J
S16T026928			126-73-8	Tributyl phosphate	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026928			629-50-5	Tridecane	NGS	96	<1.6	8.3	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026928			629-78-7	Heptadecane	NGS	110	<2.4	4.8	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T026928			629-62-9	Pentadecane	NGS	110	<3.0	7.9	n/a	n/a	n/a	n/a	3.0	n/a	J

NA = Not Analyzed, ND = Not Detected

E - Outside Calibration Range

U - Less Than Detection Limit

J - Estimated

*Spencer*  
10/12/16

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162523

SDG Number:

Customer Sample ID: 16-07645-1-A1

Customer Sample ID: 16-07645-1-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															
S16T026889			3891-98-3	2,6,10-Trimethylidodecane	NGS	89	<3.9	<3.9	n/a	n/a	n/a	n/a	n/a	3.9	n/a U
S16T026889			95-48-7	2-Methylphenol	NGS	100	<4.9	<4.9	n/a	n/a	n/a	n/a	n/a	4.9	n/a U
S16T026889			108-39-4M	Cresol (m & p)	NGS	100	<5.6	<5.6	n/a	n/a	n/a	n/a	n/a	5.6	n/a U
S16T026889			92-52-4	Biphenyl	NGS	96	<4.0	<4.0	n/a	n/a	n/a	n/a	n/a	4.0	n/a U
S16T026889			78-46-6	Dibutyl butylphosphonate	NGS	100	<3.6	<3.6	n/a	n/a	n/a	n/a	n/a	3.6	n/a U
S16T026889			84-66-2	Diethylphthalate	NGS	95	<7.0	<7.0	n/a	n/a	n/a	n/a	n/a	7.0	n/a U
S16T026889			112-40-3	Dodecane	NGS	94	<0.60	38	n/a	n/a	n/a	n/a	n/a	0.55	n/a
S16T026889			544-76-3	Hexadecane-	NGS	100	<3.3	4.3	n/a	n/a	n/a	n/a	n/a	3.3	n/a J
S16T026889			629-59-4	Tetradecane	NGS	92	<3.9	7.0	n/a	n/a	n/a	n/a	n/a	3.9	n/a J
S16T026889			126-73-8	Tributyl phosphate	NGS	86	<5.6	<5.6	n/a	n/a	n/a	n/a	n/a	5.6	n/a U
S16T026889			629-50-5	Tridecane	NGS	92	<1.6	19	n/a	n/a	n/a	n/a	n/a	1.6	n/a
S16T026889			629-78-7	Heptadecane	NGS	110	<2.4	4.4	n/a	n/a	n/a	n/a	n/a	2.4	n/a J
S16T026889			629-62-9	Pentadecane	NGS	96	<3.0	6.7	n/a	n/a	n/a	n/a	n/a	3.0	n/a J

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

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162523  
SDG Number:  
Customer Sample ID: 16-07645-1-A2  
Customer Sample ID: 16-07645-1-A2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVQA #2															
S16T026890			3891-98-3	2,6,10-Trimethyldodecane	NGS	89	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026890			95-48-7	2-Methylphenol	NGS	100	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026890			108-39-4M	Cresol (m & p)	NGS	100	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026890			92-52-4	Biphenyl	NGS	96	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026890			78-46-6	Dibutyl butylphosphonate	NGS	100	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026890			84-66-2	Diethylphthalate	NGS	95	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026890			112-40-3	Dodecane	NGS	94	<0.60	35	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026890			544-76-3	Hexadecane-	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026890			629-59-4	Tetradecane	NGS	92	<3.9	4.1	n/a	n/a	n/a	n/a	3.9	n/a	J
S16T026890			126-73-8	Tributyl phosphate	NGS	86	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026890			629-50-5	Tridecane	NGS	92	<1.6	16	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026890			629-78-7	Heptadecane	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026890			629-62-9	Pentadecane	NGS	96	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U

NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit

T - Tentatively Identified Compound

J - Estimated

E - Outside Calibration Range  
N - Named TIC

# Cartridge Evaluation Data Summary Report

Sample Group: 20162523  
SDG Number:  
Customer Sample ID: 16-07645-1-B2  
Customer Sample ID: 16-07645-1-B2

Sample#	R	Ad	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026892			3891-98-3	2,6,10-Trimethyldodecane	NGS	89	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026892			95-48-7	2-Methylphenol	NGS	100	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026892			108-39-4M	Cresol (m & p)	NGS	100	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026892			92-52-4	Biphenyl	NGS	96	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026892			78-46-6	Dibutyl butylphosphonate	NGS	100	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026892			84-66-2	Diethylphthalate	NGS	95	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026892			112-40-3	Dodecane	NGS	94	<0.60	56	n/a	n/a	n/a	n/a	0.55	n/a	E
S16T026892			544-76-3	Hexadecane-	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026892			629-59-4	Tetradecane	NGS	92	<3.9	5.9	n/a	n/a	n/a	n/a	3.9	n/a	J
S16T026892			126-73-8	Tributyl phosphate	NGS	86	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026892			629-50-5	Tridecane	NGS	92	<1.6	22	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026892			629-78-7	Heptadecane	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026892			629-62-9	Pentadecane	NGS	96	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U

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



Cartridge Evaluation  
Data Summary Report

Sample Group: 20162523  
SDG Number:  
Customer Sample ID: 16-07645-1-C2  
Customer Sample ID: 16-07645-1-C2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026896			3891-98-3	2,6,10-Trimethyldecane	NGS	89	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026896			95-48-7	2-Methylphenol	NGS	100	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026896			108-39-4M	Cresol (m & p)	NGS	100	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026896			92-52-4	Biphenyl	NGS	96	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026896			78-46-6	Dibutyl butylphosphonate	NGS	100	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026896			84-66-2	Diethylphthalate	NGS	95	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026896			112-40-3	Dodecane	NGS	94	<0.60	47	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026896			544-76-3	Hexadecane-	NGS	100	<3.3	4.7	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T026896			629-59-4	Tetradecane	NGS	92	<3.9	7.1	n/a	n/a	n/a	n/a	3.9	n/a	J
S16T026896			126-73-8	Tributyl phosphate	NGS	86	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026896			629-50-5	Tridecane	NGS	92	<1.6	27	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026896			629-78-7	Heptadecane	NGS	110	<2.4	4.9	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T026896			629-62-9	Pentadecane	NGS	96	<3.0	7.2	n/a	n/a	n/a	n/a	3.0	n/a	J

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

# Cartridge Evaluation Data Summary Report

Sample Group: 20162523  
SDG Number:  
Customer Sample ID: 16-07645-1-D2  
Customer Sample ID: 16-07645-1-D2

Sample#	R	Ad	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026898			3891-98-3	2,6,10-Trimethyldecane	NGS	89	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026898			85-48-7	2-Methylphenol	NGS	100	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026898			108-39-4M	Cresol (m & p)	NGS	100	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026898			92-52-4	Biphenyl	NGS	96	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026898			78-46-6	Dibutyl butylphosphonate	NGS	100	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026898			84-66-2	Diethylphthalate	NGS	95	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026898			112-40-3	Dodecane	NGS	94	<0.60	26	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026898			544-76-3	Hexadecane-	NGS	100	<3.3	5.1	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T026898			629-59-4	Tetradecane	NGS	92	<3.9	6.3	n/a	n/a	n/a	n/a	3.9	n/a	J
S16T026898			126-73-8	Tributyl phosphate	NGS	86	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026898			629-50-5	Tridecane	NGS	92	<1.6	13	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026898			629-78-7	Heptadecane	NGS	110	<2.4	5.8	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T026898			629-62-9	Pentadecane	NGS	96	<3.0	7.7	n/a	n/a	n/a	n/a	3.0	n/a	J

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

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162523

SDG Number:

Customer Sample ID: 16-07645-1-E2

Customer Sample ID: 16-07645-1-E2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026900			3891-98-3	2,6,10-Trimethyldecane	NGS	89	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026900			95-48-7	2-Methylphenol	NGS	100	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026900			108-39-4M	Cresol (m & p)	NGS	100	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026900			92-52-4	Biphenyl	NGS	96	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026900			78-46-6	Dibutyl butylphosphonate	NGS	100	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026900			84-66-2	Diethylphthalate	NGS	95	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026900			112-40-3	Dodecane	NGS	94	<0.60	30	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026900			544-76-3	Hexadecane-	NGS	100	<3.3	3.9	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T026900			629-59-4	Tetradecane	NGS	92	<3.9	6.0	n/a	n/a	n/a	n/a	3.9	n/a	J
S16T026900			126-73-8	Tributyl phosphate	NGS	86	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026900			629-50-5	Tridecane	NGS	92	<1.6	14	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026900			629-78-7	Heptadecane	NGS	110	<2.4	3.9	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T026900			629-62-9	Pentadecane	NGS	96	<3.0	6.8	n/a	n/a	n/a	n/a	3.0	n/a	J

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

# Cartridge Evaluation Data Summary Report

Sample Group: 20162523  
SDG Number:  
Customer Sample ID: 16-07645-1-F2  
Customer Sample ID: 16-07645-1-F2

Sample#	R	Ad	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026903			3891-98-3	2,6,10-Trimethyldecane	NGS	89	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026903			95-48-7	2-Methylphenol	NGS	100	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026903			108-39-4M	Cresol (m & p)	NGS	100	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026903			92-52-4	Biphenyl	NGS	96	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026903			78-46-6	Dibutyl butylphosphonate	NGS	100	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026903			94-66-2	Diethylphthalate	NGS	95	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026903			112-40-3	Dodecane	NGS	94	<0.60	30	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026903			544-76-3	Hexadecane-	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026903			629-59-4	Tetradecane	NGS	92	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026903			126-73-8	Tributyl phosphate	NGS	86	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026903			629-50-5	Tridecane	NGS	92	<1.6	12	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026903			629-78-7	Heptadecane	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026903			629-62-9	Pentadecane	NGS	96	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U

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

# Cartridge Evaluation Data Summary Report

Sample Group: 20162523

SDG Number:

Customer Sample ID: 16-07645-1-G2

Customer Sample ID: 16-07645-1-G2

Sample#	R	Ad	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026905			3891-98-3	2,6,10-Trimethylidodecane	NGS	89	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026905			95-43-7	2-Methylphenol	NGS	100	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026905			108-39-4M	Cresol (m & p)	NGS	100	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026905			92-52-4	Biphenyl	NGS	98	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026905			78-46-6	Dibutyl butylphosphonate	NGS	100	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026905			84-66-2	Diethylphthalate	NGS	95	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026905			112-40-3	Dodecane	NGS	94	<0.60	33	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026905			544-76-3	Hexadecane-	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026905			629-59-4	Tetradecane	NGS	92	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026905			126-73-8	Tributyl phosphate	NGS	86	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026905			629-50-5	Tridecane	NGS	92	<1.6	12	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026905			629-78-7	Heptadecane	NGS	110	<2.4	2.6	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T026905			629-62-9	Pentadecane	NGS	96	<3.0	4.3	n/a	n/a	n/a	n/a	3.0	n/a	J

E - Outside Calibration Range  
N - Named TIC

J - Estimated

T - Tentatively Identified Compound

NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit

# Cartridge Evaluation Data Summary Report

Sample Group: 20162523  
SDG Number:  
Customer Sample ID: 16-07645-1-H1  
Customer Sample ID: 16-07645-1-H1

Sample#	R	AI#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026906			3891-98-3	2,6,10-Trimethyldecane	NGS	89	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026906			95-48-7	2-Methylphenol	NGS	100	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026906			108-39-4M	Cresol (m & p)	NGS	100	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026906			92-52-4	Biphenyl	NGS	96	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026906			78-46-6	Dibutyl butylphosphonate	NGS	100	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026906			84-66-2	Diethylphthalate	NGS	95	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026906			112-40-3	Dodecane	NGS	94	<0.60	43	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026906			544-76-3	Hexadecane-	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026906			629-59-4	Tetradecane	NGS	92	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026906			126-73-8	Tributyl phosphate	NGS	86	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026906			629-50-5	Tridecane	NGS	92	<1.6	22	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026906			629-78-7	Heptadecane	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026906			629-62-9	Pentadecane	NGS	96	<3.0	3.3	n/a	n/a	n/a	n/a	3.0	n/a	J

E - Outside Calibration Range  
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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162523

SDG Number:

Customer Sample ID: 16-07645-1-H2

Customer Sample ID: 16-07645-1-H2

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026907			3891-98-3	2,6,10-Trimethyldecane	NGS	89	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026907			95-48-7	2-Methylphenol	NGS	100	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026907			108-39-4M	Cresol (m & p)	NGS	100	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026907			92-52-4	Biphenyl	NGS	98	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026907			78-46-6	Dibutyl butylphosphonate	NGS	100	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026907			94-66-2	Diethylphthalate	NGS	95	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026907			112-40-3	Dodecane	NGS	94	<0.60	32	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026907			544-76-3	Hexadecane-	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026907			629-59-4	Tetradecane	NGS	92	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026907			126-73-8	Tributyl phosphate	NGS	86	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026907			629-50-5	Tridecane	NGS	92	<1.6	11	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026907			629-78-7	Heptadecane	NGS	110	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026907			629-62-9	Pentadecane	NGS	96	<3.0	4.0	n/a	n/a	n/a	n/a	3.0	n/a	J

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*permed Aug 10/12/16*

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162523

SDG Number:

Customer Sample ID: 16-07645-1-A1

Customer Sample ID: 16-07645-1-A1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T026889				Cyclobutene, 2-propenylidene-	52097-85-5	2.58	NGS	47 JNT	
S16T026889				Ethylbenzene	100-41-4	3.41	NGS	42 JNT	
S16T026889				Heptanal	111-71-7	3.68	NGS	35 JNT	
S16T026889				Cycloetrasiloxane, octamethyl	556-67-2	4.37	NGS	35 JNT	
S16T026889				Phenol	108-95-2	4.45	NGS	42 JNT	
S16T026889				Cyclohexene, 1-methyl-4-(1-methyl-2-propenyl)-	7705-14-8	4.86	NGS	63 JNT	
S16T026889				Benzyl alcohol	100-51-6	4.95	NGS	40 JNT	
S16T026889				Acetophenone	98-86-2	5.20	NGS	20 JNT	
S16T026889				Benzeneacetic acid, 2-methoxy-	56143-21-6	5.39	NGS	74 JNT	
S16T026889				2,6-Dimethyldecane	13150-81-7	5.45	NGS	38 JNT	
S16T026889				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	74 JNT	
S16T026889				Ethanol, 2-phenoxy-	122-99-6	6.54	NGS	74 JNT	
S16T026889				1,2-Benzisothiazole	272-16-2	6.62	NGS	58 JNT	
S16T026889				3,3-Dimethylhexane	563-16-6	6.90	NGS	28 JNT	
S16T026889				Decane, 2,4,6-trimethyl-	62108-27-4	6.97	NGS	6.3 JNT	
S16T026889				Dodecamethylcyclohexasiloxane	540-97-6	7.07	NGS	30 JNT	
S16T026889				Undecane, 2-methyl-	7045-71-8	7.26	NGS	24 JNT	
S16T026889				Dodecane, 2,6,11-trimethyl-	31295-56-4	7.41	NGS	6.9 JNT	
S16T026889				Propanoic acid, 2-methyl-, 1-(2-methyl-2-propenyl)-	74381-40-1	9.20	NGS	83 JNT	
S16T026889			BLNK	Chrysene-D12	1719-03-5	14.03	NGS	7.5	
S16T026889			BLNK	Perylene-D12	1520-96-3	15.80	NGS	2.2	

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162523

SDG Number:

Customer Sample ID: 16-07645-1-A2

Customer Sample ID: 16-07645-1-A2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T026890				Formamide	75-12-7	2.71	NGS	44 JNT	
S16T026890				Tetrachloroethene	127-18-4	2.87	NGS	36 JNT	
S16T026890				Heptanal	111-71-7	3.88	NGS	45 JNT	
S16T026890				Cycloetrasiloxane, octamethyl	556-67-2	4.37	NGS	44 JNT	
S16T026890				Cyclohexene, 1-methyl-5-(1-met	1461-27-4	4.86	NGS	58 JNT	
S16T026890				1-Octene, 3,7-dimethyl-	4984-01-4	4.90	NGS	27 JNT	
S16T026890				Decane, 2,4,6-trimethyl-	82108-27-4	5.11	NGS	12 JNT	
S16T026890				Ethanone, 2-(formyloxy)-1-phen	55153-12-3	5.20	NGS	31 JNT	
S16T026890				?-Ethyl-?-methylbenzyl alcohol	1585-75-9	5.38	NGS	31 JNT	
S16T026890				2,6-Dimethyldecane	13150-81-7	5.45	NGS	66 JNT	
S16T026890				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	81 JNT	
S16T026890				1,2-Benzisothiazole	272-16-2	6.62	NGS	77 JNT	
S16T026890				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.90	NGS	28 JNT	
S16T026890				Dodecamethylcyclohexasiloxane	540-97-6	7.07	NGS	31 JNT	
S16T026890				Undecane, 2-methyl-	7045-71-8	7.26	NGS	34 JNT	
S16T026890			BLNK	Chrysene-D12	1719-03-5	14.03	NGS	7.5	
S16T026890			BLNK	Perylene-D12	1520-96-3	15.80	NGS	2.2	

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162523

SDG Number:

Customer Sample ID: 16-07645-1-B2

Customer Sample ID: 16-07645-1-B2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T026892				Tetrachloroethene	127-18-4	2.85	NGS	64 JNT	
S16T026892				Ethylbenzene	100-41-4	3.41	NGS	13 JNT	
S16T026892				Heptanal	111-71-7	3.68	NGS	49 JNT	
S16T026892				Cyclotetrasiloxane, octamethyl	556-67-2	4.37	NGS	27 JNT	
S16T026892				Cyclohexene, 1-methyl-5-(1-met	1461-27-4	4.86	NGS	80 JNT	
S16T026892				Decane, 2,4,6-trimethyl-	82108-27-4	5.11	NGS	14 JNT	
S16T026892				Acetophenone	98-86-2	5.20	NGS	32 JNT	
S16T026892				?-Ethyl-?-methylbenzyl alcohol	1565-75-9	5.38	NGS	29 JNT	
S16T026892				Undecane	1120-21-4	5.45	NGS	94 JNT	
S16T026892				Hydroxylamine, O-decyl-	29812-79-1	5.51	NGS	35 JNT	
S16T026892				2,4,6,8-Tetramethyl-1-undecene	59920-26-2	5.52	NGS	26 JNT	
S16T026892				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	65 JNT	
S16T026892				Butanoic acid, 4-(2-methoxy-1-	54966-46-0	5.76	NGS	25 JNT	
S16T026892				1,2-Benzisothiazole	272-16-2	6.62	NGS	75 JNT	
S16T026892				Unknown-1	-	6.68	NGS	31 JT	
S16T026892				Dodecane, 2,7,10-trimethyl-	74645-98-0	6.90	NGS	34 JNT	
S16T026892				1-Iodo-2-methylundecane	73105-67-6	7.07	NGS	26 JNT	
S16T026892				Undecane, 2-methyl-	7045-71-8	7.26	NGS	38 JNT	
S16T026892				Dodecane, 2,6,11-trimethyl-	31295-56-4	7.41	NGS	13 JNT	
S16T026892		BLNK		Chrysene-D12	1719-03-5	14.03	NGS	7.5	
S16T026892		BLNK		Perylene-D12	1520-96-3	15.80	NGS	2.2	

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162523

SDG Number:

Customer Sample ID: 16-07645-1-C2

Customer Sample ID: 16-07645-1-C2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T026896				Tetrachloroethene	127-18-4	2.87	NGS	34 JNT	
S16T026896				Trimethyl(4-(1,1,3,3-tetramet	78721-87-6	2.91	NGS	42 JNT	
S16T026896				Ethylbenzene	100-41-4	3.41	NGS	12 JNT	
S16T026896				Heptanal	111-71-7	3.68	NGS	48 JNT	
S16T026896				Cyclotetrasiloxane, octamethyl	556-87-2	4.37	NGS	33 JNT	
S16T026896				Phenol	108-95-2	4.43	NGS	26 JNT	
S16T026896				?-D-Glucopyranoside, methyl 3,	3056-46-0	4.60	NGS	36 JNT	
S16T026896				Cyclohexene, 1-methyl-5-(1-met	1461-27-4	4.86	NGS	65 JNT	
S16T026896				Acetophenone	98-86-2	5.20	NGS	39 JNT	
S16T026896				Undecane	1120-21-4	5.45	NGS	76 JNT	
S16T026896				Undecanal	112-44-7	5.51	NGS	33 JNT	
S16T026896				2,4,6,8-Tetramethyl-1-undecene	59920-26-2	5.52	NGS	29 JNT	
S16T026896				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	76 JNT	
S16T026896				1,2-Benzisothiazole	272-16-2	6.62	NGS	79 JNT	
S16T026896				Dodecane, 2,7,10-trimethyl-	74645-98-0	6.90	NGS	40 JNT	
S16T026896				Dodecamethylcyclotetrasiloxane	540-97-6	7.07	NGS	36 JNT	
S16T026896				Decane, 2,3,5,8-tetramethyl-	192823-15-7	7.26	NGS	37 JNT	
S16T026896				Decane, 2,4,6-trimethyl-	62108-27-4	7.34	NGS	12 JNT	
S16T026896				Dodecane, 2,6,11-trimethyl-	31295-56-4	7.41	NGS	9.4 JNT	
S16T026896				Propanoic acid, 2-methyl-, 1-(	74381-40-1	9.19	NGS	36 JNT	
S16T026896		BLNK		Chrysene-D12	1719-03-5	14.03	NGS	7.5	
S16T026896		BLNK		Perylene-D12	1520-96-3	15.80	NGS	2.2	

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162523

SDG Number:

Customer Sample ID: 16-07645-1-D2

Customer Sample ID: 16-07645-1-D2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T026898				Cyclotrisiloxane, hexamethyl-	541-05-9	2.92	NGS	82 JNT	
S16T026898				Heptanal	111-71-7	3.68	NGS	37 JNT	
S16T026898				Cyclotetrasiloxane, octamethyl	556-67-2	4.37	NGS	63 JNT	
S16T026898				Cyclohexene, 1-methyl-5-(1-met	1461-27-4	4.86	NGS	70 JNT	
S16T026898				Ethanone, 2-(formyloxy)-1-phen	55153-12-3	5.19	NGS	43 JNT	
S16T026898				?-Ethyl-?-methylbenzyl alcohol	1565-75-9	5.37	NGS	26 JNT	
S16T026898				Undecane, 2,6-dimethyl-	17301-23-4	5.45	NGS	23 JNT	
S16T026898				Heptanoic acid	111-14-8	5.60	NGS	57 JNT	
S16T026898				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	69 JNT	
S16T026898				1,2-Benzisothiazole	272-16-2	6.61	NGS	75 JNT	
S16T026898				3,3-Dimethylhexane	563-16-6	6.90	NGS	31 JNT	
S16T026898				Decane, 2,4,6-trimethyl-	62108-27-4	7.01	NGS	8.6 JNT	
S16T026898				Dodecamethylcyclodioxasiloxane	540-37-6	7.07	NGS	46 JNT	
S16T026898				1-Iodo-2-methylundecane	73105-67-6	7.26	NGS	33 JNT	
S16T026898				Dodecane, 2,6,11-trimethyl-	31295-56-4	7.40	NGS	7.4 JNT	
S16T026898			BLNK	Chrysene-D12	1719-03-5	14.03	NGS	7.5	
S16T026898			BLNK	Perylene-D12	1520-96-3	15.80	NGS	2.2	

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162523

SDG Number:

Customer Sample ID: 16-07645-1-E2

Customer Sample ID: 16-07645-1-E2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T026900				Cyclotrisiloxane, hexamethyl-	541-05-9	2.92	NGS	55	JNT
S16T026900				Heptanal	111-71-7	3.68	NGS	31	JNT
S16T026900				Cyclotetrasiloxane, octamethyl	556-67-2	4.37	NGS	29	JNT
S16T026900				Cyclohexene, 1-methyl-5-(1-met	1461-27-4	4.86	NGS	47	JNT
S16T026900				Acetophenone	98-86-2	5.19	NGS	26	JNT
S16T026900				Undecane	1120-21-4	5.45	NGS	36	JNT
S16T026900				Undecanal	112-44-7	5.50	NGS	25	JNT
S16T026900				Decamethylcyclopentasiloxane	541-02-6	5.71	NGS	46	JNT
S16T026900				1,2-Benzisothiazole	272-16-2	6.62	NGS	71	JNT
S16T026900				Dodecane, 2,7,10-trimethyl-	74845-98-0	6.90	NGS	32	JNT
S16T026900				Decane, 2,4,6-trimethyl-	62108-27-4	6.96	NGS	9.8	JNT
S16T026900				Dodecamethylcyclohexasiloxane	540-97-6	7.07	NGS	32	JNT
S16T026900				Undecane, 2-methyl-	7045-71-8	7.26	NGS	29	JNT
S16T026900		BLNK		Chrysene-D12	1719-03-5	14.03	NGS	7.5	
S16T026900		BLNK		Perylene-D12	1520-96-3	15.80	NGS	2.2	

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162523

SDG Number:

Customer Sample ID: 16-07645-1-F2

Customer Sample ID: 16-07645-1-F2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T026903				Tetrachloroethene	127-18-4	2.85	NGS	7.0	JNT
S16T026903				Cyclotrisiloxane, hexamethyl-	541-05-9	2.92	NGS	60	JNT
S16T026903				Cyclotetrasiloxane, octamethyl	556-67-2	4.36	NGS	30	JNT
S16T026903				Acetophenone	98-86-2	5.19	NGS	22	JNT
S16T026903				Undecane	1120-21-4	5.45	NGS	39	JNT
S16T026903				Decamethylcyclopentasiloxane	541-02-6	5.71	NGS	54	JNT
S16T026903				Ethanol, 2-phenoxy-	122-99-6	6.52	NGS	36	JNT
S16T026903				1,2-Benzisothiazole	272-16-2	6.61	NGS	56	JNT
S16T026903				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.90	NGS	24	JNT
S16T026903				Decane, 2,4,6-trimethyl-	62108-27-4	6.96	NGS	8.4	JNT
S16T026903				Dodecamethylcyclododecasiloxane	540-97-6	7.07	NGS	26	JNT
S16T026903				1-Iodo-2-methylundecane	73105-67-6	7.26	NGS	26	JNT
S16T026903				Undecane, 2,6-dimethyl-	17301-23-4	7.35	NGS	9.4	JNT
S16T026903				Propanoic acid, 2-methyl-, 1-(	74381-40-1	9.18	NGS	25	JNT
S16T026903		BLNK		Chrysene-D12	1719-03-5	14.03	NGS	7.5	
S16T026903		BLNK		Perylene-D12	1520-96-3	15.80	NGS	2.2	

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162523

SDG Number:

Customer Sample ID: 16-07645-1-G2

Customer Sample ID: 16-07645-1-G2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T026905				Tetrachloroethene	127-18-4	2.87	NGS	12	JNT
S16T026905				Cyclotrisiloxane, hexamethyl-	541-05-9	2.91	NGS	43	JNT
S16T026905				Cyclotetrasiloxane, octamethyl	556-87-2	4.37	NGS	37	JNT
S16T026905				Decane, 2,4,6-trimethyl-	62108-27-4	5.10	NGS	10	JNT
S16T026905				Acetophenone	98-86-2	5.19	NGS	17	JNT
S16T026905				Decanoic acid, 3-methyl-	60308-82-9	5.37	NGS	32	JNT
S16T026905				Undecane	1120-21-4	5.45	NGS	35	JNT
S16T026905				Undecane, 2,6-dimethyl-	17301-23-4	5.50	NGS	29	JNT
S16T026905				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	77	JNT
S16T026905				1,2-Benzisothiazole	272-16-2	6.60	NGS	39	JNT
S16T026905				Dodecane, 2,7,10-trimethyl-	74845-98-0	6.90	NGS	25	JNT
S16T026905				Dodecamethylcyclohexasiloxane	540-97-6	7.07	NGS	36	JNT
S16T026905				Undecane, 2-methyl-	7045-71-8	7.26	NGS	20	JNT
S16T026905				Undecane, 3,7-dimethyl-	17301-29-0	7.33	NGS	10	JNT
S16T026905			BLNK	Chrysene-D12	1719-03-5	14.03	NGS	7.5	
S16T026905			BLNK	Perylene-D12	1520-96-3	15.80	NGS	2.2	

E - Outside Calibration Range  
N - Named TIC

J - Estimated

T - Tentatively Identified Compound

NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162523

SDG Number:

Customer Sample ID: 16-07645-1-H1

Customer Sample ID: 16-07645-1-H1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T026906				Tetrachloroethene	127-18-4	2.87	NGS	23 JNT	
S16T026906				Heptanal	111-71-7	3.68	NGS	35 JNT	
S16T026906				Cyclotetrasiloxane, octamethyl	556-87-2	4.37	NGS	30 JNT	
S16T026906				Cyclohexene, 1-methyl-5-(1-met	1461-27-4	4.86	NGS	26 JNT	
S16T026906				Undecane, 2,6-dimethyl-	17301-23-4	5.11	NGS	12 JNT	
S16T026906				?-Ethyl-?-methylbenzyl alcohol	1565-75-9	5.37	NGS	42 JNT	
S16T026906				Undecane	1120-21-4	5.45	NGS	42 JNT	
S16T026906				Decamethylcyclopentasiloxane	541-02-6	5.71	NGS	65 JNT	
S16T026906				1,2-Benzisothiazole	272-16-2	6.61	NGS	67 JNT	
S16T026906				1-Iodo-2-methylundecane	73105-67-6	6.90	NGS	25 JNT	
S16T026906				Decane, 2,4,6-trimethyl-	62108-27-4	6.96	NGS	8.4 JNT	
S16T026906				Dodecamethylcyclohexasiloxane	540-97-6	7.07	NGS	20 JNT	
S16T026906				Dodecane, 2,6,11-trimethyl-	31295-56-4	7.26	NGS	19 JNT	
S16T026906				Propanoic acid, 2-methyl-, 1-(	74381-40-1	9.19	NGS	73 JNT	
S16T026906		BLNK		Chrysene-D12	1719-03-5	14.03	NGS	7.5	
S16T026906		BLNK		Perylene-D12	1520-96-3	15.80	NGS	2.2	

E - Outside Calibration Range  
N - Named TIC

J - Estimated

T - Tentatively Identified Compound

NA = Not Analyzed, ND = Not Detected  
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DSR-Jar v. 3.0.12

# Cartridge Evaluation Data Summary Report

Sample Group: 20162523

SDG Number:

Customer Sample ID: 16-07645-1-H2

Customer Sample ID: 16-07645-1-H2

Sample#	R	Alt	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T026907				Tetrachloroethene	127-18-4	2.86	NGS	16	JNT
S16T026907				Cyclotrisiloxane, hexamethyl-	541-05-9	2.91	NGS	43	JNT
S16T026907				Cyclotetrasiloxane, octamethyl	556-87-2	4.37	NGS	43	JNT
S16T026907				Decane, 2,4,6-trimethyl-	62108-27-4	5.10	NGS	9.6	JNT
S16T026907				Undecane, 2,6-dimethyl-	17301-23-4	5.14	NGS	6.7	JNT
S16T026907				Undecane	1120-21-4	5.45	NGS	48	JNT
S16T026907				Hexyl octyl ether	17071-54-4	5.50	NGS	28	JNT
S16T026907				Decamethylcyclopentasiloxane	541-02-6	5.71	NGS	66	JNT
S16T026907				1,2-Benzisothiazole	272-16-2	6.60	NGS	48	JNT
S16T026907				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.90	NGS	15	JNT
S16T026907		BLNK		Chrysene-D12	1719-03-5	14.03	NGS	7.5	
S16T026907		BLNK		Perylene-D12	1520-96-3	15.80	NGS	2.2	

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

*John J. J.*  
10/12/14

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162524

SDG Number:

Customer Sample ID: 16-07654-1-A1

Customer Sample ID: 16-07654-1-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															
S16T026909			3891-98-3	2,6,10-Trimethyldodecane	NGS	97	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026909			95-48-7	2-Methylphenol	NGS	110	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026909			108-39-4M	Cresol (m & p)	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026909			92-52-4	Biphenyl	NGS	110	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026909			78-46-6	Dibutyl butylphosphonate	NGS	130	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026909			84-66-2	Diethylphthalate	NGS	110	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026909			112-40-3	Dodecane	NGS	91	<0.60	40	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026909			544-76-3	Hexadecane-	NGS	120	<3.3	4.9	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T026909			629-59-4	Tetradecane	NGS	100	<3.9	10	n/a	n/a	n/a	n/a	3.9	n/a	
S16T026909			126-73-8	Tributyl phosphate	NGS	82	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026909			629-50-5	Tridecane	NGS	88	<1.6	24	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026909			629-76-7	Heptadecane	NGS	88	<2.4	4.6	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T026909			629-62-9	Pentadecane	NGS	110	<3.0	9.0	n/a	n/a	n/a	n/a	3.0	n/a	J

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

# Cartridge Evaluation Data Summary Report

Sample Group: 20162524  
SDG Number:  
Customer Sample ID: 16-07654-1-A2  
Customer Sample ID: 16-07654-1-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															
S16T026910			3891-98-3	2,6,10-Trimethyldecane	NGS	97	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026910			95-48-7	2-Methylphenol	NGS	110	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026910			108-39-4M	Cresol (m & p)	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026910			82-52-4	Biphenyl	NGS	110	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026910			78-46-6	Dibutyl butylphosphonate	NGS	130	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026910			84-66-2	Diethylphthalate	NGS	110	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026910			112-40-3	Dodecane	NGS	91	<0.60	42	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026910			544-76-3	Hexadecane-	NGS	120	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026910			829-59-4	Tetradecane	NGS	100	<3.9	6.4	n/a	n/a	n/a	n/a	3.9	n/a	J
S16T026910			126-73-8	Tributyl phosphate	NGS	82	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026910			629-50-5	Tridecane	NGS	88	<1.6	20	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026910			629-78-7	Heptadecane	NGS	88	<2.4	2.5	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T026910			629-62-9	Pentadecane	NGS	110	<3.0	3.3	n/a	n/a	n/a	n/a	3.0	n/a	J

E - Outside Calibration Range  
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J - Estimated  
T - Tentatively Identified Compound  
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U - Less Than Detection Limit

# Cartridge Evaluation Data Summary Report

Sample Group: 20162524

SDG Number:

Customer Sample ID: 16-07654-1-B2

Customer Sample ID: 16-07654-1-B2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026912			3891-98-3	2,6,10-Trimethyldecane	NGS	97	<3.9	<3.9	n/a	n/a	n/a	n/a	n/a	n/a	U
S16T026912			95-48-7	2-Methylphenol	NGS	110	<4.9	<4.9	n/a	n/a	n/a	n/a	n/a	n/a	U
S16T026912			108-39-4M	Cresol (m & p)	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	n/a	n/a	U
S16T026912			92-52-4	Biphenyl	NGS	110	<4.0	<4.0	n/a	n/a	n/a	n/a	n/a	n/a	U
S16T026912			78-46-6	Dibutyl butylphosphonate	NGS	130	<3.6	<3.6	n/a	n/a	n/a	n/a	n/a	n/a	U
S16T026912			84-66-2	Diethylphthalate	NGS	110	<7.0	<7.0	n/a	n/a	n/a	n/a	n/a	n/a	U
S16T026912			112-40-3	Dodecane	NGS	91	<0.60	62	n/a	n/a	n/a	n/a	n/a	n/a	E
S16T026912			544-76-3	Hexadecane-	NGS	120	<3.3	<3.3	n/a	n/a	n/a	n/a	n/a	n/a	U
S16T026912			629-59-4	Tetradecane	NGS	100	<3.9	7.0	n/a	n/a	n/a	n/a	n/a	n/a	J
S16T026912			126-73-8	Tributyl phosphate	NGS	82	<5.6	<5.6	n/a	n/a	n/a	n/a	n/a	n/a	U
S16T026912			629-50-5	Tridecane	NGS	88	<1.6	26	n/a	n/a	n/a	n/a	n/a	n/a	U
S16T026912			629-76-7	Heptadecane	NGS	88	<2.4	2.5	n/a	n/a	n/a	n/a	n/a	n/a	J
S16T026912			629-62-9	Pentadecane	NGS	110	<3.0	3.0	n/a	n/a	n/a	n/a	n/a	n/a	J

E - Outside Calibration Range  
N - Named TIC  
J - Estimated  
T - Tentatively Identified Compound  
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U - Less Than Detection Limit

# Cartridge Evaluation Data Summary Report

Sample Group: 20162524

SDG Number:

Customer Sample ID: 16-07654-1-C2

Customer Sample ID: 16-07654-1-C2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026916			3891-98-3	2,6,10-Trimethyldecane	NGS	97	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026916			95-48-7	2-Methylphenol	NGS	110	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026916			108-39-4M	Cresol (m & p)	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026916			92-52-4	Biphenyl	NGS	110	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026916			78-46-6	Dibutyl butylphosphonate	NGS	130	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026916			84-66-2	Diethylphthalate	NGS	110	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026916			112-40-3	Dodecane	NGS	91	<0.60	54	n/a	n/a	n/a	n/a	0.55	n/a	E
S16T026916			544-76-3	Hexadecane	NGS	120	<3.3	6.6	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T026916			629-59-4	Tetradecane	NGS	100	<3.9	9.1	n/a	n/a	n/a	n/a	3.9	n/a	J
S16T026916			126-73-8	Tributyl phosphate	NGS	82	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026916			629-50-5	Tridecane	NGS	88	<1.6	34	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026916			629-78-7	Heptadecane	NGS	88	<2.4	5.9	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T026916			629-62-9	Pentadecane	NGS	110	<3.0	10	n/a	n/a	n/a	n/a	3.0	n/a	

E - Outside Calibration Range  
N - Named TIC

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T - Tentatively Identified Compound

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U - Less Than Detection Limit

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162524

SDG Number:

Customer Sample ID: 16-07654-1-D2

Customer Sample ID: 16-07654-1-D2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Dot Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026918			3891-98-3	2,6,10-Trimethyldecane	NGS	97	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026918			95-48-7	2-Methylphenol	NGS	110	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026918			108-39-4M	Cresol (m & p)	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026918			92-52-4	Biphenyl	NGS	110	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026918			78-46-6	Dibutyl butylphosphonate	NGS	130	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026918			84-66-2	Diethylphthalate	NGS	110	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026918			112-40-3	Dodecane	NGS	91	<0.60	22	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026918			544-76-3	Hexadecane-	NGS	120	<3.3	4.7	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T026918			629-59-4	Tetradecane	NGS	100	<3.9	5.5	n/a	n/a	n/a	n/a	3.9	n/a	J
S16T026918			126-73-8	Tributyl phosphate	NGS	82	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026918			629-50-5	Tridecane	NGS	88	<1.6	13	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026918			629-78-7	Heptadecane	NGS	88	<2.4	4.4	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T026918			629-62-9	Pentadecane	NGS	110	<3.0	6.0	n/a	n/a	n/a	n/a	3.0	n/a	J

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T - Tentatively Identified Compound

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162524

SDG Number:

Customer Sample ID: 16-07654-1-E2

Customer Sample ID: 16-07654-1-E2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026920			3891-98-3	2,6,10-Trimethyldecane	NGS	97	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026920			95-48-7	2-Methylphenol	NGS	110	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026920			108-39-4M	Cresol (m & p)	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026920			92-52-4	Biphenyl	NGS	110	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026920			78-46-6	Dibutyl butylphosphonate	NGS	130	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026920			84-66-2	Diethylphthalate	NGS	110	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026920			112-40-3	Dodecane	NGS	91	<0.60	27	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026920			544-76-3	Hexadecane-	NGS	120	<3.3	3.5	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T026920			629-59-4	Tetradecane	NGS	100	<3.9	5.6	n/a	n/a	n/a	n/a	3.9	n/a	J
S16T026920			126-73-8	Tributyl phosphate	NGS	82	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026920			629-50-5	Tridecane	NGS	88	<1.6	13	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026920			629-78-7	Heptadecane	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026920			629-62-9	Pentadecane	NGS	110	<3.0	5.9	n/a	n/a	n/a	n/a	3.0	n/a	J

E - Outside Calibration Range  
N - Named TIC  
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# Cartridge Evaluation Data Summary Report

Sample Group: 20162524

SDG Number:

Customer Sample ID: 16-07654-1-F2

Customer Sample ID: 16-07654-1-F2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026923			3891-98-3	2,6,10-Trimethyldodecane	NGS	97	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026923			95-48-7	2-Methylphenol	NGS	110	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026923			108-39-4M	Cresol (m & p)	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026923			92-52-4	Biphenyl	NGS	110	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026923			78-46-6	Dibutyl butylphosphonate	NGS	130	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026923			84-66-2	Diethylphthalate	NGS	110	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026923			112-40-3	Dodecane	NGS	91	<0.60	38	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026923			544-76-3	Hexadecane-	NGS	120	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	
S16T026923			629-59-4	Tetradecane	NGS	100	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026923			126-73-8	Tributyl phosphate	NGS	82	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026923			629-50-5	Tridecane	NGS	88	<1.6	14	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026923			629-78-7	Heptadecane	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026923			629-62-9	Pentadecane	NGS	110	<3.0	3.8	n/a	n/a	n/a	n/a	3.0	n/a	J

NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit

T - Tentatively Identified Compound

J - Estimated

E - Outside Calibration Range  
N - Named TIC



# Cartridge Evaluation Data Summary Report

Sample Group: 20162524

SDG Number:

Customer Sample ID: 16-07654-1-G2

Customer Sample ID: 16-07654-1-G2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026925			3891-98-3	2,6,10-Trimethyldodecane	NGS	97	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026925			95-48-7	2-Methylphenol	NGS	110	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026925			108-39-4M	Cresol (m & p)	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026925			92-52-4	Biphenyl	NGS	110	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026925			78-46-6	Dibutyl butylphosphonate	NGS	130	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026925			84-86-2	Diethylphthalate	NGS	110	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026925			112-40-3	Dodecane	NGS	91	<0.60	28	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026925			544-76-3	Hexadecane-	NGS	120	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026925			629-59-4	Tetradecane	NGS	100	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026925			126-73-8	Tributyl phosphate	NGS	82	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026925			629-50-5	Tridecane	NGS	88	<1.6	9.9	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026925			629-78-7	Heptadecane	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026925			629-62-9	Pentadecane	NGS	110	<3.0	3.3	n/a	n/a	n/a	n/a	3.0	n/a	J

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

# Cartridge Evaluation Data Summary Report

Sample Group: 20162524

SDG Number:

Customer Sample ID: 16-07654-1-H1

Customer Sample ID: 16-07654-1-H1

Sample#	R	AI#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU SVOA #2															
S16T026926			3891-98-3	2,6,10-Trimethyldodecane	NGS	97	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026926			95-48-7	2-Methylphenol	NGS	110	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026926			108-39-4M	Cresol (m & p)	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026926			92-52-4	Biphenyl	NGS	110	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026926			78-46-6	Dibutyl butylphosphonate	NGS	130	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026926			84-66-2	Diethylphthalate	NGS	110	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026926			112-40-3	Dodecane	NGS	91	<0.60	35	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026926			544-76-3	Hexadecane-	NGS	120	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026926			629-59-4	Tetradecane	NGS	100	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026926			126-73-8	Tributyl phosphate	NGS	82	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026926			629-50-5	Tridecane	NGS	88	<1.6	16	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026926			629-78-7	Heptadecane	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026926			629-62-9	Pentadecane	NGS	110	<3.0	6.1	n/a	n/a	n/a	n/a	3.0	n/a	J

E - Outside Calibration Range  
N - Named TIC

J - Estimated

T - Tentatively Identified Compound

NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit

# Cartridge Evaluation Data Summary Report

Sample Group: 20162524

SDG Number:

Customer Sample ID: 16-07654-1-H2

Customer Sample ID: 16-07654-1-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															
S16T026927			3891-98-3	2,6,10-Trimethyldecane	NGS	97	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026927			95-48-7	2-Methylphenol	NGS	110	<4.9	<4.9	n/a	n/a	n/a	n/a	4.9	n/a	U
S16T026927			108-39-4M	Cresol (m & p)	NGS	110	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026927			92-52-4	Biphenyl	NGS	110	<4.0	<4.0	n/a	n/a	n/a	n/a	4.0	n/a	U
S16T026927			78-46-6	Dibutyl butylphosphonate	NGS	130	<3.6	<3.6	n/a	n/a	n/a	n/a	3.6	n/a	U
S16T026927			84-86-2	Diethylphthalate	NGS	110	<7.0	<7.0	n/a	n/a	n/a	n/a	7.0	n/a	U
S16T026927			112-40-3	Dodecane	NGS	91	<0.60	19	n/a	n/a	n/a	n/a	0.55	n/a	
S16T026927			544-76-3	Hexadecane-	NGS	120	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026927			629-59-4	Tetradecane	NGS	100	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026927			126-73-8	Tributyl phosphate	NGS	82	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026927			629-50-5	Tridecane	NGS	88	<1.6	7.2	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026927			629-78-7	Heptadecane	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	
S16T026927			629-62-9	Pentadecane	NGS	110	<3.0	4.6	n/a	n/a	n/a	n/a	3.0	n/a	J

NA = Not Analyzed, ND = Not Detected  
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T - Tentatively Identified Compound

J - Estimated

E - Outside Calibration Range  
N - Named TIC

*John J. Jorg*  
10/12/16

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162524

SDG Number:

Customer Sample ID: 16-07654-1-A1

Customer Sample ID: 16-07654-1-A1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T026909				Hexanal	86-25-1	2.80	NGS	45 JNT	
S16T026909				Ethylbenzene	100-41-4	3.41	NGS	16 JNT	
S16T026909				Heptanal	111-71-7	3.68	NGS	72 JNT	
S16T026909				Benzyl alcohol	100-51-6	4.95	NGS	50 JNT	
S16T026909				Acetophenone	98-86-2	5.20	NGS	33 JNT	
S16T026909				Benzeneacetic acid, 2-methoxy-	56143-21-6	5.39	NGS	120 JNT	
S16T026909				Undecane, 2,6-dimethyl-	17301-23-4	5.45	NGS	22 JNT	
S16T026909				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	61 JNT	
S16T026909				Ethanol, 2-phenoxy-	122-99-6	6.53	NGS	62 JNT	
S16T026909				1,2-Benzisothiazole	272-16-2	6.61	NGS	57 JNT	
S16T026909				1-Iodo-2-methylundecane	73105-67-6	6.90	NGS	35 JNT	
S16T026909				Dodecamethylcyclotrihexasiloxane	540-97-6	7.07	NGS	29 JNT	
S16T026909				Decane, 2,3,5,8-tetramethyl-	192823-15-7	7.26	NGS	27 JNT	
S16T026909				Decane, 2,4,6-trimethyl-	82108-27-4	7.33	NGS	9.2 JNT	
S16T026909				Propanoic acid, 2-methyl-, 1-(	74381-40-1	9.18	NGS	32 JNT	
S16T026909			BLNK	Chrysene-D12	1719-03-5	14.03	NGS	7.9	
S16T026909			BLNK	Perylene-D12	1520-96-3	15.80	NGS	2.8	

E - Outside Calibration Range  
N - Named TIC  
J - Estimated  
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NA = Not Analyzed, ND = Not Detected  
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### Cartridge Evaluation Data Summary Report

Sample Group: 20162524

SDG Number:

Customer Sample ID: 16-07654-1-A2

Customer Sample ID: 16-07654-1-A2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T026910				Tetrachloroethene	127-18-4	2.86	NGS	68 JNT	
S16T026910				Heptanal	111-71-7	3.88	NGS	36 JNT	
S16T026910				Cyclotetrasiloxane, octamethyl	556-67-2	4.36	NGS	38 JNT	
S16T026910				Cyclohexene, 1-methyl-5-(1-met	1461-27-4	4.86	NGS	38 JNT	
S16T026910				Ethanone, 2-(formyloxy)-1-phen	55153-12-3	5.19	NGS	47 JNT	
S16T026910				?-Ethyl-?-methylbenzyl alcohol	1565-75-9	5.37	NGS	26 JNT	
S16T026910				2,6-Dimethyldecane	13150-81-7	5.45	NGS	52 JNT	
S16T026910				Heptanoic acid	111-14-8	5.60	NGS	42 JNT	
S16T026910				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	69 JNT	
S16T026910				1,2-Benzisothiazole	272-16-2	6.62	NGS	83 JNT	
S16T026910				Dodecane, 2,7,10-trimethyl-	74645-98-0	6.90	NGS	38 JNT	
S16T026910				Undecane, 3,7-dimethyl-	17301-29-0	7.01	NGS	8.2 JNT	
S16T026910				Dodecamethylcyclotetrasiloxane	540-97-6	7.07	NGS	33 JNT	
S16T026910				Decane, 2,3,5,8-tetramethyl-	192823-15-7	7.26	NGS	39 JNT	
S16T026910				Decane, 2,4,6-trimethyl-	62108-27-4	7.34	NGS	13 JNT	
S16T026910			BLNK	Chrysene-D12	1719-03-5	14.03	NGS	7.9	
S16T026910			BLNK	Perylene-D12	1520-96-3	15.80	NGS	2.8	

E - Outside Calibration Range  
N - Named TIC

J - Estimated

T - Tentatively Identified Compound

NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162524

SDG Number:

Customer Sample ID: 16-07654-1-B2

Customer Sample ID: 16-07654-1-B2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T026912				Tetrachloroethene	127-18-4	2.89	NGS	40	JNT
S16T026912				Cyclotrisiloxane, hexamethyl-	541-05-9	2.91	NGS	38	JNT
S16T026912				Cyclotetrasiloxane, octamethyl	556-87-2	4.37	NGS	30	JNT
S16T026912				Cyclohexene, 1-methyl-5-(1-met	1461-27-4	4.86	NGS	31	JNT
S16T026912				Undecane	1120-21-4	5.11	NGS	12	JNT
S16T026912				Acetophenone	98-86-2	5.19	NGS	39	JNT
S16T026912				2,6-Dimethyldecane	13150-81-7	5.45	NGS	89	JNT
S16T026912				Hydroxylamine, O-decyl-	29812-79-1	5.50	NGS	60	JNT
S16T026912				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	72	JNT
S16T026912				1,2-Benzisothiazole	272-16-2	6.62	NGS	110	JNT
S16T026912				Unknown-1	-	6.65	NGS	32	JT
S16T026912				1-Octene, 3,7-dimethyl-	4984-01-4	6.68	NGS	44	JNT
S16T026912				2-Propenoic acid, octyl ester	2499-59-4	6.72	NGS	34	JNT
S16T026912				3,3-Dimethylhexane	563-16-6	6.91	NGS	52	JNT
S16T026912				Dodecamethylcyclotrihexasiloxane	540-97-6	7.07	NGS	39	JNT
S16T026912				Undecane, 2-methyl-	7045-71-8	7.27	NGS	48	JNT
S16T026912				Decane, 2,4,6-trimethyl-	62108-27-4	7.34	NGS	20	JNT
S16T026912		BLNK		Chrysene-D12	1719-03-5	14.03	NGS	7.9	
S16T026912		BLNK		Perylene-D12	1520-96-3	15.80	NGS	2.8	

E - Outside Calibration Range  
N - Named TIC

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162524

SDG Number:

Customer Sample ID: 16-07654-1-C2

Customer Sample ID: 16-07654-1-C2

Sample#	R	Ad	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T026916				Tetrachloroethene	127-18-4	2.87	NGS	53	JNT
S16T026916				Trimethyl[4-(1,1,3,3-tetramet	78721-87-6	2.91	NGS	27	JNT
S16T026916				Heptanal	111-71-7	3.68	NGS	31	JNT
S16T026916				Cyclotetrasiloxane, octamethyl	556-67-2	4.36	NGS	36	JNT
S16T026916				Cyclohexene, 1-methyl-5-(1-met	1461-27-4	4.86	NGS	35	JNT
S16T026916				Acetophenone	98-86-2	5.19	NGS	42	JNT
S16T026916				?-Ethyl-?-methylbenzyl alcohol	1565-75-9	5.37	NGS	26	JNT
S16T026916				Undecane	1120-21-4	5.45	NGS	69	JNT
S16T026916				Undecanal	112-44-7	5.50	NGS	28	JNT
S16T026916				2,4,6,8-Tetramethyl-1-undecene	59920-26-2	5.52	NGS	33	JNT
S16T026916				Decamethylcyclopentasiloxane	541-02-6	5.72	NGS	76	JNT
S16T026916				1,2-Benzisothiazole	272-16-2	6.62	NGS	91	JNT
S16T026916				Dodecane, 2,7,10-trimethyl-	74645-98-0	6.90	NGS	42	JNT
S16T026916				Decane, 2,4,6-trimethyl-	62108-27-4	6.97	NGS	10	JNT
S16T026916				Dodecamethylcyclohexasiloxane	540-97-6	7.07	NGS	39	JNT
S16T026916				Dodecane, 2,6,10-trimethyl-	3891-98-3	7.26	NGS	40	JNT
S16T026916				Undecane, 3,7-dimethyl-	17301-29-0	7.34	NGS	12	JNT
S16T026916				Dodecane, 2,6,11-trimethyl-	31295-56-4	7.41	NGS	13	JNT
S16T026916				Propanoic acid, 2-methyl-, 1-(	74381-40-1	9.18	NGS	31	JNT
S16T026916		BLNK		Chrysene-D12	1719-03-5	14.03	NGS	7.9	
S16T026916		BLNK		Perylene-D12	1520-96-3	15.80	NGS	2.8	

NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit

T - Tentatively Identified Compound

J - Estimated

E - Outside Calibration Range  
N - Named TIC

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### Cartridge Evaluation Data Summary Report

Sample Group: 20162524

SDG Number:

Customer Sample ID: 16-07654-1-D2

Customer Sample ID: 16-07654-1-D2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T026918				Tetrachloroethene	127-18-4	2.87	NGS	36	JNT
S16T026918				Acetophenone	98-86-2	5.19	NGS	23	JNT
S16T026918				2,3-Dimethyldecane	17312-44-6	5.45	NGS	41	JNT
S16T026918				2,5-Dimethyl-5-hexen-3-ol	67760-91-2	5.50	NGS	46	JNT
S16T026918				Decamethylcyclopentasiloxane	541-02-6	5.71	NGS	54	JNT
S16T026918				1,2-Benzisothiazole	272-16-2	6.61	NGS	74	JNT
S16T026918				Dodecane, 2,7,10-trimethyl-	74845-98-0	6.90	NGS	30	JNT
S16T026918				Dodecamethylcyclohexasiloxane	540-97-6	7.07	NGS	28	JNT
S16T026918				1-Iodo-2-methylundecane	73105-67-6	7.26	NGS	31	JNT
S16T026918				Decane, 2,4,6-trimethyl-	82108-27-4	7.33	NGS	11	JNT
S16T026918		BLNK		Chrysene-D12	1719-03-5	14.03	NGS	7.9	
S16T026918		BLNK		Perylene-D12	1520-96-3	15.80	NGS	2.8	

E - Outside Calibration Range  
N - Named TIC  
J - Estimated  
T - Tentatively Identified Compound  
NA = Not Analyzed, ND = Not Detected  
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# Cartridge Evaluation Data Summary Report

Sample Group: 20162524

SDG Number:

Customer Sample ID: 16-07654-1-E2

Customer Sample ID: 16-07654-1-E2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T026920				Cyclotrisiloxane, hexamethyl-	541-05-9	2.92	NGS	38	JNT
S16T026920				Cyclotetrasiloxane, octamethyl	556-87-2	4.37	NGS	28	JNT
S16T026920				Acetophenone	98-86-2	5.19	NGS	19	JNT
S16T026920				Undecane	1120-21-4	5.45	NGS	62	JNT
S16T026920				Decamethylcyclopentasiloxane	541-02-6	5.71	NGS	55	JNT
S16T026920				1,2-Benzisothiazole	272-16-2	6.61	NGS	79	JNT
S16T026920				3,3-Dimethylhexane	563-16-6	6.90	NGS	30	JNT
S16T026920				Decane, 2,4,6-trimethyl-	62108-27-4	6.97	NGS	7.6	JNT
S16T026920				Dodecamethylcyclodexasiloxane	540-97-6	7.07	NGS	31	JNT
S16T026920				Undecane, 2-methyl-	7045-71-8	7.26	NGS	31	JNT
S16T026920				Undecane, 3,7-dimethyl-	17301-29-0	7.33	NGS	13	JNT
S16T026920		BLNK		Chrysene-D12	1719-03-5	14.03	NGS	7.9	
S16T026920		BLNK		Perylene-D12	1520-96-3	15.80	NGS	2.8	

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

# Cartridge Evaluation Data Summary Report

Sample Group: 20162524

SDG Number:

Customer Sample ID: 16-07654-1-F2

Customer Sample ID: 16-07654-1-F2

Sample#	R	Ad	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T026923				Tetrachloroethene	127-18-4	2.88	NGS	12	JNT
S16T026923				Cyclotetrasiloxane, octamethyl	556-67-2	4.37	NGS	39	JNT
S16T026923				Decane, 2,4,6-trimethyl-	62108-27-4	5.06	NGS	24	JNT
S16T026923				Acetophenone	98-86-2	5.19	NGS	24	JNT
S16T026923				Undecane	1120-21-4	5.45	NGS	59	JNT
S16T026923				Hexyl octyl ether	17071-54-4	5.50	NGS	35	JNT
S16T026923				Decamethylcyclopentasiloxane	541-02-6	5.71	NGS	83	JNT
S16T026923				1,2-Benzisothiazole	272-16-2	6.61	NGS	73	JNT
S16T026923				Dodecane, 2,7,10-trimethyl-	74645-98-0	6.90	NGS	26	JNT
S16T026923				Undecane, 2-methyl-	7045-71-8	7.26	NGS	24	JNT
S16T026923				Undecane, 3,7-dimethyl-	17301-29-0	7.33	NGS	9.7	JNT
S16T026923		BLNK		Chrysene-D12	1719-03-5	14.03	NGS	7.9	
S16T026923		BLNK		Perylene-D12	1520-96-3	15.80	NGS	2.8	

E - Outside Calibration Range  
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# Cartridge Evaluation Data Summary Report

Sample Group: 20162524

SDG Number:

Customer Sample ID: 16-07654-1-G2

Customer Sample ID: 16-07654-1-G2

Sample#	R	Alt	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T026925				Cyclotetrasiloxane, octamethyl	556-67-2	4.36	NGS	36	JNT
S16T026925				Decane, 2,4,6-trimethyl-	62108-27-4	5.05	NGS	20	JNT
S16T026925				Undecane	1120-21-4	5.45	NGS	48	JNT
S16T026925				Undecane, 2,6-dimethyl-	17301-23-4	5.50	NGS	23	JNT
S16T026925				Decamethylcyclopentasiloxane	541-02-6	5.71	NGS	72	JNT
S16T026925				1,2-Benzisothiazole	272-16-2	6.59	NGS	32	JNT
S16T026925				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.90	NGS	24	JNT
S16T026925				Undecane, 2-methyl-	7045-71-8	7.26	NGS	19	JNT
S16T026925		BLNK		Chrysene-D12	1719-03-5	14.03	NGS	7.9	
S16T026925		BLNK		Perylene-D12	1520-96-3	15.80	NGS	2.8	

E - Outside Calibration Range  
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NA = Not Analyzed, ND = Not Detected  
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# Cartridge Evaluation Data Summary Report

Sample Group: 20162524

SDG Number:

Customer Sample ID: 16-07654-1-H1

Customer Sample ID: 16-07654-1-H1

Sample#	R	Alt	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T026926				Cyclotrisiloxane, hexamethyl-	541-05-9	2.92	NGS	79	JNT
S16T026926				Cyclotetrasiloxane, octamethyl	556-87-2	4.37	NGS	69	JNT
S16T026926				Acetophenone	98-86-2	5.19	NGS	13	JNT
S16T026926				Undecane	1120-21-4	5.45	NGS	39	JNT
S16T026926				Decamethylcyclopentasiloxane	541-02-6	5.71	NGS	51	JNT
S16T026926				1,2-Benzisothiazole	272-16-2	6.60	NGS	42	JNT
S16T026926				Decane, 2,4,6-trimethyl-	52108-27-4	6.90	NGS	15	JNT
S16T026926				Dodecamethylcyclohexasiloxane	540-97-6	7.07	NGS	28	JNT
S16T026926		BLNK		Chrysene-D12	1719-03-5	14.03	NGS	7.9	
S16T026926		BLNK		Perylene-D12	1520-96-3	15.80	NGS	2.8	

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

Sample Group: 20162524

SDG Number:

Customer Sample ID: 16-07654-1-H2

Customer Sample ID: 16-07654-1-H2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU SVOA #2									
S16T026927				Cyclotrisiloxane, hexamethyl-	541-05-9	2.92	NGS	57	JNT
S16T026927				Cyclotetrasiloxane, octamethyl	556-67-2	4.36	NGS	38	JNT
S16T026927				Acetophenone	98-86-2	5.19	NGS	9.3	JNT
S16T026927				Undecane	1120-21-4	5.45	NGS	22	JNT
S16T026927				Decamethylcyclopentasiloxane	541-02-6	5.71	NGS	44	JNT
S16T026927				1,2-Benzisothiazole	272-16-2	6.60	NGS	36	JNT
S16T026927				Dodecane, 2,6,11-trimethyl-	31295-56-4	6.90	NGS	14	JNT
S16T026927			BLNK	Chrysene-D12	1719-03-5	14.03	NGS	7.9	
S16T026927			BLNK	Perylene-D12	1520-96-3	15.80	NGS	2.8	

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## Cartridge Evaluation Data Summary Report

Sample Group: 20162525

SDG Number:

Customer Sample ID: 16-07645-2-A1

Customer Sample ID: 16-07645-2-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															
S16T026929			79-34-5	1,1,2,2-Tetrachloroethane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	n/a U
S16T026929			79-00-5	1,1,2-Trichloroethane	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	n/a U
S16T026929			75-34-3	1,1-Dichloroethane	NGS	98	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	n/a U
S16T026929			75-35-4	1,1-Dichloroethane	NGS	96	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	n/a U
S16T026929			107-06-2	1,2-Dichloroethane	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	n/a U
S16T026929			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	10	n/a	n/a	n/a	n/a	1.2	n/a	n/a J
S16T026929			106-46-7	1,4-Dichlorobenzene	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	n/a U
S16T026929			123-91-1	1,4-Dioxane	NGS	100	<1.7	4.7	n/a	n/a	n/a	n/a	1.7	n/a	n/a J
S16T026929			71-36-3	1-Butanol	NGS	130	<8.9	150	n/a	n/a	n/a	n/a	8.9	n/a	n/a Y
S16T026929			111-70-6	1-Heptanol	NGS	97	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	n/a U
S16T026929			71-23-8	1-Propanol	NGS	120	<3.0	32	n/a	n/a	n/a	n/a	3.0	n/a	n/a
S16T026929			108-47-4	2,4-Dimethylpyridine	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	n/a U
S16T026929			1708-29-8	2,5-Dihydrofuran	NGS	100	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	n/a U
S16T026929			78-93-3	2-Butanone	NGS	97	<1.9	24	n/a	n/a	n/a	n/a	1.9	n/a	n/a
S16T026929			110-43-0	2-Heptanone	NGS	98	<1.6	6.7	n/a	n/a	n/a	n/a	1.6	n/a	n/a J
S16T026929			591-78-6	2-Hexanone	NGS	96	<1.2	3.4	n/a	n/a	n/a	n/a	1.2	n/a	n/a J
S16T026929			534-22-5	2-Methylfuran	NGS	96	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	n/a U
S16T026929			78-94-4	3-Buten-2-one	NGS	91	<1.7	6.1	n/a	n/a	n/a	n/a	1.7	n/a	n/a J
S16T026929			106-35-4	3-Heptanone	NGS	96	<1.5	6.9	n/a	n/a	n/a	n/a	1.5	n/a	n/a J
S16T026929			106-68-3	3-Octanone	NGS	94	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	n/a U
S16T026929			105-42-0	4-Methyl-2-hexanone	NGS	98	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	n/a U
S16T026929			108-10-1	4-Methyl-2-Pentanone	NGS	100	<1.9	23	n/a	n/a	n/a	n/a	1.9	n/a	n/a
S16T026929			67-64-1	Acetone	NGS	91	4.8	510	n/a	n/a	n/a	n/a	4.3	n/a	n/a BE
S16T026929			75-05-8	Acetonitrile	NGS	91	<1.8	34	n/a	n/a	n/a	n/a	1.8	n/a	n/a
S16T026929			98-86-2	Acetophenone	NGS	97	<2.6	35	n/a	n/a	n/a	n/a	2.6	n/a	n/a
S16T026929			107-13-1	Acrylonitrile	NGS	98	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	n/a U
S16T026929			107-18-6	Allyl Alcohol	NGS	110	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	n/a U

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-A1  
Customer Sample ID: 16-07645-2-A1

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026929			107-05-1	Allyl Chloride	NGS	94	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026929			71-43-2	Benzene	NGS	98	<1.2	6.0	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026929			100-47-0	Benzonitrile	NGS	98	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026929			123-72-8	Butanal	NGS	110	<2.1	10	n/a	n/a	n/a	n/a	2.1	n/a	J
S16T026929			109-74-0	Butanenitrile	NGS	100	<1.2	6.0	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026929			56-23-5	Carbon tetrachloride	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026929			108-90-7	Chlorobenzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026929			75-00-3	Chloroethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026929			87-66-3	Chloroform	NGS	100	<1.5	36	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026929			110-82-7	Cyclohexane	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026929			124-18-5	Decane	NGS	99	<2.8	3.8	n/a	n/a	n/a	n/a	2.8	n/a	J
S16T026929			64-17-5	Ethanol	NGS	100	<7.4	180	n/a	n/a	n/a	n/a	7.4	n/a	U
S16T026929			141-78-6	Ethyl acetate	NGS	84	<1.5	2.5	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026929			100-41-4	Ethylbenzene	NGS	99	<1.5	13	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026929			110-00-9	Furan	NGS	96	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026929			110-54-3	Hexane	NGS	98	<1.7	8.1	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026929			628-73-9	Hexanenitrile	NGS	100	<1.5	4.6	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026929			126-98-7	Methacrylonitrile	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026929			75-09-2	Methylene Chloride	NGS	99	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026929			91-20-3	Naphthalene	NGS	110	<3.7	<3.7	n/a	n/a	n/a	n/a	3.7	n/a	U
S16T026929			98-95-3	Nitrobenzene	NGS	100	<2.6	3.0	n/a	n/a	n/a	n/a	2.6	n/a	J
S16T026929			110-59-8	Pentanitrile	NGS	98	<1.6	2.2	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026929			107-12-0	Propanenitrile	NGS	99	<1.4	5.5	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T026929			110-86-1	Pyridine	NGS	110	<3.8	<3.8	n/a	n/a	n/a	n/a	3.8	n/a	U
S16T026929			100-42-5	Styrene	NGS	100	<1.6	4.6	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026929			127-18-4	Tetrachloroethene	NGS	100	<1.6	460	n/a	n/a	n/a	n/a	1.6	n/a	E
S16T026929			108-88-3	Toluene	NGS	98	<1.5	56	n/a	n/a	n/a	n/a	1.5	n/a	U

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-A1  
Customer Sample ID: 16-07645-2-A1

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026929			79-01-6	Trichloroethene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026929			75-69-4	Trichlorofluoromethane	NGS	98	<1.6	580	n/a	n/a	n/a	n/a	1.6	n/a	E
S16T026929			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.3	10	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T026929			123-86-4	n-Butyl acetate	NGS	84	<1.4	2.0	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T026929			142-82-5	n-Heptane	NGS	100	<1.4	12	n/a	n/a	n/a	n/a	1.4	n/a	
S16T026929			10061-02-6	trans-1,3-Dichloropropene	NGS	99	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U

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N - Named TIC  
J - Estimated

E - Outside Calibration Range  
T - Tentatively Identified Compound



# Cartridge Evaluation Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-A2  
Customer Sample ID: 16-07645-2-A2

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026930			79-34-5	1,1,2,2-Tetrachloroethane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026930			79-00-5	1,1,2-Trichloroethane	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026930			75-34-3	1,1-Dichloroethane	NGS	98	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026930			75-35-4	1,1-Dichloroethene	NGS	96	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026930			107-06-2	1,2-Dichloroethane	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026930			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026930			106-46-7	1,4-Dichlorobenzene	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026930			123-91-1	1,4-Dioxane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026930			71-36-3	1-Butanol	NGS	130	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	UY
S16T026930			111-70-6	1-Heptanol	NGS	97	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026930			71-23-8	1-Propanol	NGS	120	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026930			108-47-4	2,4-Dimethylpyridine	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026930			1708-29-8	2,5-Dihydrofuran	NGS	100	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026930			78-93-3	2-Butanone	NGS	97	<1.9	6.1	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026930			110-43-0	2-Heptanone	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026930			591-78-6	2-Hexanone	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026930			534-22-5	2-Methylfuran	NGS	96	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026930			78-94-4	3-Buten-2-one	NGS	91	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026930			106-35-4	3-Heptanone	NGS	96	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026930			106-88-3	3-Octanone	NGS	94	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026930			105-42-0	4-Methyl-2-hexanone	NGS	98	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026930			108-10-1	4-Methyl-2-Pentanone	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026930			67-64-1	Acetone	NGS	91	4.8	34	n/a	n/a	n/a	n/a	4.3	n/a	B
S16T026930			75-05-8	Acetonitrile	NGS	91	<1.8	9.5	n/a	n/a	n/a	n/a	1.8	n/a	J
S16T026930			98-86-2	Acetophenone	NGS	97	<2.6	21	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026930			107-13-1	Acrylonitrile	NGS	98	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026930			107-18-6	Allyl Alcohol	NGS	110	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U

E - Outside Calibration Range  
T - Tentatively Identified Compound  
N - Named TIC  
J - Estimated  
B - Blank Contamination  
Y - Comment  
NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit

# Cartridge Evaluation Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-A2  
Customer Sample ID: 16-07645-2-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															
S16T026930			107-05-1	Allyl Chloride	NGS	94	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026930			71-43-2	Benzene	NGS	98	<1.2	1.6	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026930			100-47-0	Benzonitrile	NGS	98	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026930			123-72-8	Butanal	NGS	110	<2.1	3.0	n/a	n/a	n/a	n/a	2.1	n/a	J
S16T026930			109-74-0	Butanenitrile	NGS	100	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026930			56-23-5	Carbon tetrachloride	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026930			108-90-7	Chlorobenzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026930			75-00-3	Chloroethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026930			87-66-3	Chloroform	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026930			110-82-7	Cyclohexane	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026930			124-18-5	Decane	NGS	99	<2.8	3.3	n/a	n/a	n/a	n/a	2.8	n/a	J
S16T026930			84-17-5	Ethanol	NGS	100	<7.4	12	n/a	n/a	n/a	n/a	7.4	n/a	J
S16T026930			141-78-6	Ethyl acetate	NGS	84	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026930			100-41-4	Ethylbenzene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026930			110-00-9	Furan	NGS	96	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026930			110-54-3	Hexane	NGS	98	<1.7	2.0	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026930			628-73-9	Hexanenitrile	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026930			126-98-7	Methacrylonitrile	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026930			75-09-2	Methylene Chloride	NGS	99	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026930			91-20-3	Naphthalene	NGS	110	<3.7	<3.7	n/a	n/a	n/a	n/a	3.7	n/a	U
S16T026930			98-95-3	Nitrobenzene	NGS	100	<2.6	3.8	n/a	n/a	n/a	n/a	2.6	n/a	J
S16T026930			110-59-8	Pentanenitrile	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026930			107-12-0	Propanenitrile	NGS	99	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026930			110-86-1	Pyridine	NGS	110	<3.8	<3.8	n/a	n/a	n/a	n/a	3.8	n/a	J
S16T026930			100-42-5	Styrene	NGS	100	<1.6	5.0	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026930			127-18-4	Tetrachloroethene	NGS	100	<1.6	110	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026930			108-88-3	Toluene	NGS	98	<1.5	6.0	n/a	n/a	n/a	n/a	1.5	n/a	J

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B - Blank Contamination  
Y - Comment  
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U - Less Than Detection Limit

# Cartridge Evaluation Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-A2  
Customer Sample ID: 16-07645-2-A2

Sample#	R	AI#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026930			79-01-6	Trichloroethene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026930			75-69-4	Trichlorofluoromethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026930			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026930			123-86-4	n-Butyl acetate	NGS	84	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026930			142-82-5	n-Heptane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026930			10061-02-6	trans-1,3-Dichloropropene	NGS	99	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U

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Y - Comment

N - Named TIC  
J - Estimated

E - Outside Calibration Range  
T - Tentatively Identified Compound

# Cartridge Evaluation Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-B2  
Customer Sample ID: 16-07645-2-B2

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026932			79-34-5	1,1,2,2-Tetrachloroethane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026932			79-00-5	1,1,2-Trichloroethane	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026932			75-34-3	1,1-Dichloroethane	NGS	98	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026932			75-35-4	1,1-Dichloroethene	NGS	96	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026932			107-06-2	1,2-Dichloroethane	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026932			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026932			106-46-7	1,4-Dichlorobenzene	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026932			123-91-1	1,4-Dioxane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026932			71-36-3	1-Butanol	NGS	130	<8.9	10	n/a	n/a	n/a	n/a	8.9	n/a	JY
S16T026932			111-70-6	1-Heptanol	NGS	97	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026932			71-23-8	1-Propanol	NGS	120	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026932			108-47-4	2,4-Dimethylpyridine	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026932			1708-29-8	2,5-Dihydrofuran	NGS	100	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026932			78-93-3	2-Butanone	NGS	97	<1.9	6.2	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026932			110-43-0	2-Heptanone	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026932			591-78-6	2-Hexanone	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026932			534-22-5	2-Methylfuran	NGS	96	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026932			78-94-4	3-Buten-2-one	NGS	91	<1.7	2.9	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026932			106-35-4	3-Heptanone	NGS	96	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026932			106-68-3	3-Octanone	NGS	94	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026932			105-42-0	4-Methyl-2-hexanone	NGS	98	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026932			108-10-1	4-Methyl-2-pentanone	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026932			67-64-1	Acetone	NGS	91	4.8	39	n/a	n/a	n/a	n/a	4.3	n/a	B
S16T026932			75-05-8	Acetonitrile	NGS	91	<1.8	18	n/a	n/a	n/a	n/a	1.8	n/a	
S16T026932			98-86-2	Acetophenone	NGS	97	<2.6	29	n/a	n/a	n/a	n/a	2.6	n/a	
S16T026932			107-13-1	Acrylonitrile	NGS	98	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026932			107-18-6	Allyl Alcohol	NGS	110	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U

E - Outside Calibration Range  
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Y - Comment  
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U - Less Than Detection Limit

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-B2  
Customer Sample ID: 16-07645-2-B2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026932			107-05-1	Allyl Chloride	NGS	94	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026932			71-43-2	Benzene	NGS	98	<1.2	1.8	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026932			100-47-0	Benzonitrile	NGS	98	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026932			123-72-8	Butanal	NGS	110	<2.1	2.6	n/a	n/a	n/a	n/a	2.1	n/a	J
S16T026932			109-74-0	Butanenitrile	NGS	100	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026932			56-23-5	Carbon tetrachloride	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026932			108-90-7	Chlorobenzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026932			75-00-3	Chloroethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026932			87-66-3	Chloroform	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026932			110-82-7	Cyclohexane	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026932			124-18-5	Decane	NGS	99	<2.8	3.1	n/a	n/a	n/a	n/a	2.8	n/a	J
S16T026932			84-17-5	Ethanol	NGS	100	<7.4	17	n/a	n/a	n/a	n/a	7.4	n/a	J
S16T026932			141-78-6	Ethyl acetate	NGS	84	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026932			100-41-4	Ethylbenzene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026932			110-00-9	Furan	NGS	96	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026932			110-54-3	Hexane	NGS	99	<1.7	2.6	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026932			628-73-9	Hexanenitrile	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026932			126-98-7	Methacrylonitrile	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026932			75-09-2	Methylene Chloride	NGS	99	<2.7	3.9	n/a	n/a	n/a	n/a	2.7	n/a	J
S16T026932			91-20-3	Naphthalene	NGS	110	<3.7	<3.7	n/a	n/a	n/a	n/a	3.7	n/a	U
S16T026932			98-95-3	Nitrobenzene	NGS	100	<2.6	5.5	n/a	n/a	n/a	n/a	2.6	n/a	J
S16T026932			110-59-8	Pentanitrile	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026932			107-12-0	Propanenitrile	NGS	99	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026932			110-86-1	Pyridine	NGS	110	<3.8	<3.8	n/a	n/a	n/a	n/a	3.8	n/a	U
S16T026932			100-42-5	Styrene	NGS	100	<1.6	3.9	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026932			127-18-4	Tetrachloroethene	NGS	100	<1.6	130	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026932			108-88-3	Toluene	NGS	98	<1.5	6.4	n/a	n/a	n/a	n/a	1.5	n/a	J

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-B2  
Customer Sample ID: 16-07645-2-B2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026932			79-01-6	Trichloroethene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026932			75-69-4	Trichlorofluoromethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026932			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026932			123-86-4	n-Butyl acetate	NGS	84	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026932			142-82-5	n-Heptane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026932			10061-02-6	trans-1,3-Dichloropropene	NGS	99	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U

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Y - Comment

N - Named TIC  
J - Estimated

E - Outside Calibration Range  
T - Tentatively Identified Compound

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-C2  
Customer Sample ID: 16-07645-2-C2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026936			79-34-5	1,1,2,2-Tetrachloroethane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026936			79-00-5	1,1,2-Trichloroethane	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026936			75-34-3	1,1-Dichloroethane	NGS	98	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026936			75-35-4	1,1-Dichloroethene	NGS	96	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026936			107-06-2	1,2-Dichloroethane	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026936			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026936			106-46-7	1,4-Dichlorobenzene	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026936			123-91-1	1,4-Dioxane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026936			71-36-3	1-Butanol	NGS	130	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	UY
S16T026936			111-70-6	1-Heptanol	NGS	97	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026936			71-23-8	1-Propanol	NGS	120	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026936			108-47-4	2,4-Dimethylpyridine	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026936			1708-29-8	2,5-Dihydrofuran	NGS	100	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026936			78-93-3	2-Butanone	NGS	97	<1.9	6.7	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026936			110-43-0	2-Heptanone	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026936			591-78-6	2-Hexanone	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026936			534-22-5	2-Methylfuran	NGS	96	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026936			78-94-4	3-Buten-2-one	NGS	91	<1.7	2.6	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026936			106-35-4	3-Heptanone	NGS	96	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026936			106-68-3	3-Octanone	NGS	94	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026936			105-42-0	4-Methyl-2-hexanone	NGS	98	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026936			108-10-1	4-Methyl-2-Pentanone	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026936			67-64-1	Acetone	NGS	91	4.8	35	n/a	n/a	n/a	n/a	4.3	n/a	B
S16T026936			75-05-8	Acetonitrile	NGS	91	<1.8	24	n/a	n/a	n/a	n/a	1.8	n/a	
S16T026936			98-86-2	Acetophenone	NGS	97	<2.6	27	n/a	n/a	n/a	n/a	2.6	n/a	
S16T026936			107-13-1	Acrylonitrile	NGS	98	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026936			107-18-6	Allyl Alcohol	NGS	110	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U

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J - Estimated  
B - Blank Contamination  
Y - Comment  
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U - Less Than Detection Limit

# Cartridge Evaluation Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-C2  
Customer Sample ID: 16-07645-2-C2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026936			107-05-1	Allyl Chloride	NGS	94	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026936			71-43-2	Benzene	NGS	98	<1.2	1.7	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026936			100-47-0	Benzonitrile	NGS	98	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026936			123-72-8	Butanal	NGS	110	<2.1	2.2	n/a	n/a	n/a	n/a	2.1	n/a	J
S16T026936			109-74-0	Butanenitrile	NGS	100	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026936			56-23-5	Carbon tetrachloride	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026936			108-90-7	Chlorobenzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026936			75-00-3	Chloroethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026936			87-66-3	Chloroform	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026936			110-82-7	Cyclohexane	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026936			124-18-5	Decane	NGS	99	<2.8	3.0	n/a	n/a	n/a	n/a	2.8	n/a	J
S16T026936			64-17-5	Ethanol	NGS	100	<7.4	22	n/a	n/a	n/a	n/a	7.4	n/a	J
S16T026936			141-78-6	Ethyl acetate	NGS	84	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026936			100-41-4	Ethylbenzene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026936			110-00-9	Furan	NGS	96	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026936			110-54-3	Hexane	NGS	99	<1.7	1.9	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026936			628-73-9	Hexanenitrile	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026936			126-98-7	Methacrylonitrile	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026936			75-09-2	Methylene Chloride	NGS	99	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026936			91-20-3	Naphthalene	NGS	110	<3.7	<3.7	n/a	n/a	n/a	n/a	3.7	n/a	U
S16T026936			98-95-3	Nitrobenzene	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026936			110-59-8	Pentanitrile	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026936			107-12-0	Propanenitrile	NGS	99	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026936			110-86-1	Pyridine	NGS	110	<3.8	<3.8	n/a	n/a	n/a	n/a	3.8	n/a	U
S16T026936			100-42-5	Styrene	NGS	100	<1.6	4.2	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026936			127-18-4	Tetrachloroethene	NGS	100	<1.6	120	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026936			108-88-3	Toluene	NGS	98	<1.5	6.2	n/a	n/a	n/a	n/a	1.5	n/a	J

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-C2  
Customer Sample ID: 16-07645-2-C2

Sample#	R	AI#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026936			79-01-6	Trichloroethene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026936			75-69-4	Trichlorofluoromethane	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026936			10061-01-5	dis-1,3-Dichloropropene	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026936			123-86-4	n-Butyl acetate	NGS	84	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026936			142-82-5	n-Heptane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026936			10061-02-6	trans-1,3-Dichloropropene	NGS	99	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-D2  
Customer Sample ID: 16-07645-2-D2

Sample#	R	Adj	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026938			79-34-5	1,1,2,2-Tetrachloroethane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026938			79-00-5	1,1,2-Trichloroethane	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026938			75-34-3	1,1-Dichloroethane	NGS	98	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026938			75-35-4	1,1-Dichloroethene	NGS	96	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026938			107-06-2	1,2-Dichloroethane	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026938			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026938			106-46-7	1,4-Dichlorobenzene	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026938			123-91-1	1,4-Dioxane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026938			71-36-3	1-Butanol	NGS	130	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	UY
S16T026938			111-70-6	1-Heptanol	NGS	97	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026938			71-23-8	1-Propanol	NGS	120	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026938			108-47-4	2,4-Dimethylpyridine	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026938			1708-29-8	2,5-Dihydrofuran	NGS	100	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026938			78-93-3	2-Butanone	NGS	97	<1.9	5.4	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026938			110-43-0	2-Heptanone	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026938			591-78-6	2-Hexanone	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026938			534-22-5	2-Methylfuran	NGS	96	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026938			78-94-4	3-Buten-2-one	NGS	91	<1.7	1.9	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026938			106-35-4	3-Heptanone	NGS	96	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026938			106-88-3	3-Octanone	NGS	94	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026938			105-42-0	4-Methyl-2-hexanone	NGS	98	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026938			108-10-1	4-Methyl-2-Pentanone	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026938			87-64-1	Acetone	NGS	91	4.8	29	n/a	n/a	n/a	n/a	4.3	n/a	B
S16T026938			75-05-8	Acetonitrile	NGS	91	<1.8	25	n/a	n/a	n/a	n/a	1.8	n/a	
S16T026938			98-86-2	Acetophenone	NGS	97	<2.6	26	n/a	n/a	n/a	n/a	2.6	n/a	
S16T026938			107-13-1	Acrylonitrile	NGS	98	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026938			107-18-6	Allyl Alcohol	NGS	110	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-D2  
Customer Sample ID: 16-07645-2-D2

Sample#	R	AI#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026938			107-05-1	Allyl Chloride	NGS	94	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026938			71-43-2	Benzene	NGS	98	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026938			100-47-0	Benzonitrile	NGS	98	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026938			123-72-8	Butanal	NGS	110	<2.1	2.4	n/a	n/a	n/a	n/a	2.1	n/a	J
S16T026938			109-74-0	Butanenitrile	NGS	100	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026938			56-23-5	Carbon tetrachloride	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026938			108-90-7	Chlorobenzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026938			75-00-3	Chloroethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026938			67-66-3	Chloroform	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026938			110-92-7	Cyclohexane	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026938			124-18-5	Decane	NGS	99	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026938			64-17-5	Ethanol	NGS	100	<1.4	2.4	n/a	n/a	n/a	n/a	7.4	n/a	
S16T026938			141-78-6	Ethyl acetate	NGS	84	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026938			100-41-4	Ethylbenzene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026938			110-00-9	Furan	NGS	96	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026938			110-54-3	Hexane	NGS	99	<1.7	2.3	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026938			628-73-9	Hexanenitrile	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026938			126-98-7	Methacrylonitrile	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026938			75-09-2	Methylene Chloride	NGS	98	<2.7	5.6	n/a	n/a	n/a	n/a	2.7	n/a	J
S16T026938			91-20-3	Naphthalene	NGS	110	<3.7	<3.7	n/a	n/a	n/a	n/a	3.7	n/a	U
S16T026938			98-95-3	Nitrobenzene	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026938			110-59-8	Pentanitrile	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026938			107-12-0	Propanenitrile	NGS	99	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026938			110-96-1	Pyridine	NGS	110	<3.8	<3.8	n/a	n/a	n/a	n/a	3.8	n/a	U
S16T026938			100-42-5	Styrene	NGS	100	<1.6	1.9	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026938			127-18-4	Tetrachloroethene	NGS	100	<1.6	98	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026938			108-88-3	Toluene	NGS	98	<1.5	4.5	n/a	n/a	n/a	n/a	1.5	n/a	J

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-D2  
Customer Sample ID: 16-07645-2-D2

Sample#	R	Adj	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026938			79-01-6	Trichloroethene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026938			75-69-4	Trichlorofluoromethane	NGS	98	<1.6	3.0	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026938			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026938			123-86-4	n-Butyl acetate	NGS	84	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026938			142-82-5	n-Heptane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026938			10061-02-6	trans-1,3-Dichloropropene	NGS	99	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-E2  
Customer Sample ID: 16-07645-2-E2

Sample#	R	AI#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026940			79-34-5	1,1,2,2-Tetrachloroethane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026940			79-00-5	1,1,2-Trichloroethane	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026940			75-34-3	1,1-Dichloroethane	NGS	98	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026940			75-35-4	1,1-Dichloroethane	NGS	96	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026940			107-06-2	1,2-Dichloroethane	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026940			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026940			106-46-7	1,4-Dichlorobenzene	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026940			123-91-1	1,4-Dioxane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026940			71-36-3	1-Butanol	NGS	130	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	UY
S16T026940			111-70-6	1-Heptanol	NGS	97	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026940			71-23-8	1-Propanol	NGS	120	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026940			108-47-4	2,4-Dimethylpyridine	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026940			1708-29-8	2,5-Dihydrofuran	NGS	100	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026940			78-93-3	2-Butanone	NGS	97	<1.9	4.0	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026940			110-43-0	2-Heptanone	NGS	98	<1.8	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026940			591-78-6	2-Hexanone	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026940			534-22-5	2-Methylfuran	NGS	96	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026940			78-94-4	3-Buten-2-one	NGS	91	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026940			106-35-4	3-Heptanone	NGS	96	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026940			106-88-3	3-Octanone	NGS	94	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026940			105-42-0	4-Methyl-2-hexanone	NGS	98	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026940			108-10-1	4-Methyl-2-Pentanone	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026940			67-64-1	Acetone	NGS	91	4.8	20	n/a	n/a	n/a	n/a	4.3	n/a	B
S16T026940			75-05-8	Acetonitrile	NGS	91	<1.8	24	n/a	n/a	n/a	n/a	1.8	n/a	
S16T026940			98-86-2	Acetophenone	NGS	97	<2.6	17	n/a	n/a	n/a	n/a	2.6	n/a	
S16T026940			107-13-1	Acrylonitrile	NGS	98	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026940			107-18-6	Allyl Alcohol	NGS	110	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U

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N - Named TIC  
J - Estimated  
B - Blank Contamination  
Y - Comment  
NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit

# Cartridge Evaluation Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-E2  
Customer Sample ID: 16-07645-2-E2

Sample#	R	AI#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026940			107-05-1	Allyl Chloride	NGS	94	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026940			71-43-2	Benzene	NGS	98	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026940			100-47-0	Benzonitrile	NGS	98	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026940			123-72-8	Butanal	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026940			109-74-0	Butanenitrile	NGS	100	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026940			56-23-5	Carbon tetrachloride	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026940			108-90-7	Chlorobenzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026940			75-00-3	Chloroethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026940			87-66-3	Chloroform	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026940			110-82-7	Cyclohexane	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026940			124-18-5	Decane	NGS	99	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026940			64-17-5	Ethanol	NGS	100	<7.4	26	n/a	n/a	n/a	n/a	7.4	n/a	U
S16T026940			141-78-6	Ethyl acetate	NGS	84	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026940			100-41-4	Ethylbenzene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026940			110-00-9	Furan	NGS	96	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026940			110-54-3	Hexane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026940			628-73-9	Hexanenitrile	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026940			126-98-7	Methacrylonitrile	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026940			75-09-2	Methylene Chloride	NGS	99	<2.7	3.4	n/a	n/a	n/a	n/a	2.7	n/a	J
S16T026940			91-20-3	Naphthalene	NGS	110	<3.7	<3.7	n/a	n/a	n/a	n/a	3.7	n/a	U
S16T026940			98-95-3	Nitrobenzene	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026940			110-59-8	Pentanenitrile	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026940			107-12-0	Propanenitrile	NGS	99	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026940			110-86-1	Pyridine	NGS	110	<3.8	<3.8	n/a	n/a	n/a	n/a	3.8	n/a	U
S16T026940			100-42-5	Styrene	NGS	100	<1.6	1.7	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026940			127-18-4	Tetrachloroethene	NGS	100	<1.6	75	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026940			108-88-3	Toluene	NGS	98	<1.5	3.5	n/a	n/a	n/a	n/a	1.5	n/a	J

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-E2  
Customer Sample ID: 16-07645-2-E2

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026940			79-01-6	Trichloroethene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026940			75-69-4	Trichlorofluoromethane	NGS	98	<1.6	4.0	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026940			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026940			123-86-4	n-Butyl acetate	NGS	84	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026940			142-82-5	n-Heptane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026940			10061-02-6	trans-1,3-Dichloropropene	NGS	99	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-F2  
Customer Sample ID: 16-07645-2-F2

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026943			79-34-5	1,1,2,2-Tetrachloroethane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026943			79-00-5	1,1,2-Trichloroethane	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026943			75-34-3	1,1-Dichloroethane	NGS	98	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026943			75-35-4	1,1-Dichloroethene	NGS	96	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026943			107-06-2	1,2-Dichloroethane	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026943			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026943			106-46-7	1,4-Dichlorobenzene	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026943			123-91-1	1,4-Dioxane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026943			71-36-3	1-Butanol	NGS	130	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	UY
S16T026943			111-70-6	1-Heptanol	NGS	97	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026943			71-23-8	1-Propanol	NGS	120	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026943			108-47-4	2,4-Dimethylpyridine	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026943			1708-29-8	2,5-Dihydrofuran	NGS	100	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026943			78-93-3	2-Butanone	NGS	97	<1.9	3.2	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026943			110-43-0	2-Heptanone	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026943			591-78-6	2-Hexanone	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026943			534-22-5	2-Methylfuran	NGS	96	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026943			78-94-4	3-Buten-2-one	NGS	91	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026943			106-35-4	3-Heptanone	NGS	96	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026943			106-88-3	3-Octanone	NGS	94	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026943			105-42-0	4-Methyl-2-hexanone	NGS	98	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026943			108-10-1	4-Methyl-2-Pentanone	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026943			67-64-1	Acetone	NGS	91	4.8	16	n/a	n/a	n/a	n/a	4.3	n/a	B
S16T026943			75-05-8	Acetonitrile	NGS	91	<1.8	46	n/a	n/a	n/a	n/a	1.8	n/a	
S16T026943			98-86-2	Acetophenone	NGS	97	<2.6	13	n/a	n/a	n/a	n/a	2.6	n/a	
S16T026943			107-13-1	Acrylonitrile	NGS	98	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026943			107-18-6	Allyl Alcohol	NGS	110	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-F2  
Customer Sample ID: 16-07645-2-F2

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026943			107-05-1	Allyl Chloride	NGS	94	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026943			71-43-2	Benzene	NGS	98	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026943			100-47-0	Benzonitrile	NGS	98	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026943			123-72-8	Butanal	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026943			109-74-0	Butanenitrile	NGS	100	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026943			56-23-5	Carbon tetrachloride	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026943			108-90-7	Chlorobenzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026943			75-00-3	Chloroethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026943			67-66-3	Chloroform	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026943			110-82-7	Cyclohexane	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026943			124-18-5	Decane	NGS	99	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026943			84-17-5	Ethanol	NGS	100	<7.4	39	n/a	n/a	n/a	n/a	7.4	n/a	U
S16T026943			141-78-6	Ethyl acetate	NGS	84	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026943			100-41-4	Ethylbenzene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026943			110-00-9	Furan	NGS	96	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026943			110-54-3	Hexane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026943			628-73-9	Hexanenitrile	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026943			126-98-7	Methacrylonitrile	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026943			75-09-2	Methylene Chloride	NGS	99	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026943			91-20-3	Naphthalene	NGS	110	<3.7	<3.7	n/a	n/a	n/a	n/a	3.7	n/a	U
S16T026943			98-95-3	Nitrobenzene	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026943			110-59-8	Pentanitrile	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026943			107-12-0	Propanenitrile	NGS	99	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026943			110-86-1	Pyridine	NGS	110	<3.8	<3.8	n/a	n/a	n/a	n/a	3.8	n/a	U
S16T026943			100-42-5	Styrene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026943			127-18-4	Tetrachloroethene	NGS	100	<1.6	62	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026943			108-88-3	Toluene	NGS	98	<1.5	2.8	n/a	n/a	n/a	n/a	1.5	n/a	J

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-F2  
Customer Sample ID: 16-07645-2-F2

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026943			79-01-6	Trichloroethene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026943			75-69-4	Trichlorofluoromethane	NGS	98	<1.6	6.3	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026943			10061-01-5	dis-1,3-Dichloropropene	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026943			123-86-4	n-Butyl acetate	NGS	84	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026943			142-82-5	n-Heptane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026943			10061-02-6	trans-1,3-Dichloropropene	NGS	99	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U

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J - Estimated  
B - Blank Contamination  
Y - Comment  
NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162525

SDG Number:

Customer Sample ID: 16-07645-2-G2

Customer Sample ID: 16-07645-2-G2

Sample#	R	AI#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026945			79-34-5	1,1,2,2-Tetrachloroethane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026945			79-00-5	1,1,2-Trichloroethane	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026945			75-34-3	1,1-Dichloroethane	NGS	98	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026945			75-35-4	1,1-Dichloroethene	NGS	96	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026945			107-06-2	1,2-Dichloroethane	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026945			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026945			106-46-7	1,4-Dichlorobenzene	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026945			123-91-1	1,4-Dioxane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026945			71-36-3	1-Butanol	NGS	130	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	UY
S16T026945			111-70-6	1-Heptanol	NGS	97	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026945			71-23-8	1-Propanol	NGS	120	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026945			108-47-4	2,4-Dimethylpyridine	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026945			1708-29-8	2,5-Dihydrofuran	NGS	100	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026945			78-93-3	2-Butanone	NGS	97	<1.9	2.6	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026945			110-43-0	2-Heptanone	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026945			591-78-6	2-Hexanone	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026945			534-22-5	2-Methylfuran	NGS	96	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026945			78-94-4	3-Buten-2-one	NGS	91	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026945			106-35-4	3-Heptanone	NGS	96	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026945			106-68-3	3-Octanone	NGS	94	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026945			105-42-0	4-Methyl-2-hexanone	NGS	98	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026945			108-10-1	4-Methyl-2-pentanone	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026945			67-64-1	Acetone	NGS	91	4.8	15	n/a	n/a	n/a	n/a	4.3	n/a	B
S16T026945			75-05-8	Acetonitrile	NGS	91	<1.8	30	n/a	n/a	n/a	n/a	1.8	n/a	
S16T026945			98-86-2	Acetophenone	NGS	97	<2.6	9.9	n/a	n/a	n/a	n/a	2.6	n/a	J
S16T026945			107-13-1	Acrylonitrile	NGS	98	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026945			107-18-6	Allyl Alcohol	NGS	110	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-G2  
Customer Sample ID: 16-07645-2-G2

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026945			107-05-1	Allyl Chloride	NGS	94	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026945			71-43-2	Benzene	NGS	98	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026945			100-47-0	Benzonitrile	NGS	98	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026945			123-72-8	Butanal	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026945			109-74-0	Butanenitrile	NGS	100	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026945			56-23-5	Carbon tetrachloride	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026945			108-90-7	Chlorobenzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026945			75-00-3	Chloroethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026945			67-66-3	Chloroform	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026945			110-82-7	Cyclohexane	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026945			124-18-5	Decane	NGS	99	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026945			84-17-5	Ethanol	NGS	100	<7.4	57	n/a	n/a	n/a	n/a	7.4	n/a	
S16T026945			141-78-6	Ethyl acetate	NGS	84	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026945			100-41-4	Ethylbenzene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026945			110-00-9	Furan	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026945			110-54-3	Hexane	NGS	98	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026945			628-73-9	Hexanenitrile	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026945			126-98-7	Methacrylonitrile	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026945			75-09-2	Methylene Chloride	NGS	99	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026945			91-20-3	Naphthalene	NGS	110	<3.7	<3.7	n/a	n/a	n/a	n/a	3.7	n/a	U
S16T026945			98-95-3	Nitrobenzene	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026945			110-59-8	Pentanenitrile	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026945			107-12-0	Propanenitrile	NGS	99	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026945			110-86-1	Pyridine	NGS	110	<3.8	<3.8	n/a	n/a	n/a	n/a	3.8	n/a	U
S16T026945			100-42-5	Styrene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026945			127-18-4	Tetrachloroethene	NGS	100	<1.6	54	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026945			108-88-3	Toluene	NGS	98	<1.5	2.5	n/a	n/a	n/a	n/a	1.5	n/a	J

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162525  
 SDG Number:  
 Customer Sample ID: 16-07645-2-G2  
 Customer Sample ID: 16-07645-2-G2

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026945			79-01-6	Trichloroethene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026945			75-69-4	Trichlorofluoromethane	NGS	98	<1.6	9.4	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026945			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026945			123-86-4	n-Butyl acetate	NGS	84	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026945			142-82-5	n-Heptane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026945			10061-02-6	trans-1,3-Dichloropropene	NGS	99	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162525

SDG Number:

Customer Sample ID: 16-07645-2-H1

Customer Sample ID: 16-07645-2-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															
S16T026946			79-34-5	1,1,2,2-Tetrachloroethane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026946			79-00-5	1,1,2-Trichloroethane	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026946			75-34-3	1,1-Dichloroethane	NGS	98	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026946			75-35-4	1,1-Dichloroethane	NGS	96	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026946			107-06-2	1,2-Dichloroethane	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026946			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026946			106-46-7	1,4-Dichlorobenzene	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026946			123-91-1	1,4-Dioxane	NGS	100	<1.7	2.9	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026946			71-36-3	1-Butanol	NGS	130	<8.9	89	n/a	n/a	n/a	n/a	8.9	n/a	Y
S16T026946			111-70-6	1-Heptanol	NGS	97	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026946			71-23-8	1-Propanol	NGS	120	<3.0	29	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026946			108-47-4	2,4-Dimethylpyridine	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026946			1708-29-8	2,5-Dihydrofuran	NGS	100	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026946			78-93-3	2-Butanone	NGS	97	<1.9	15	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026946			110-43-0	2-Heptanone	NGS	98	<1.6	3.4	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026946			591-78-6	2-Hexanone	NGS	96	<1.2	2.0	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026946			534-22-5	2-Methylfuran	NGS	96	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026946			78-94-4	3-Buten-2-one	NGS	91	<1.7	3.8	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026946			106-35-4	3-Heptanone	NGS	96	<1.5	5.3	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026946			106-68-3	3-Octanone	NGS	94	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026946			105-42-0	4-Methyl-2-hexanone	NGS	98	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026946			108-10-1	4-Methyl-2-Pentanone	NGS	100	<1.9	2.5	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026946			67-64-1	Acetone	NGS	91	4.8	470	n/a	n/a	n/a	n/a	4.3	n/a	BE
S16T026946			75-05-8	Acetonitrile	NGS	91	<1.8	30	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026946			98-86-2	Acetophenone	NGS	97	<2.6	12	n/a	n/a	n/a	n/a	2.6	n/a	J
S16T026946			107-13-1	Acrylonitrile	NGS	98	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026946			107-18-6	Allyl Alcohol	NGS	110	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-H1  
Customer Sample ID: 16-07645-2-H1

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026946			107-05-1	Allyl Chloride	NGS	94	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026946			71-43-2	Benzene	NGS	98	<1.2	2.6	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026946			100-47-0	Benzonitrile	NGS	98	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026946			123-72-8	Butanal	NGS	110	<2.1	5.6	n/a	n/a	n/a	n/a	2.1	n/a	J
S16T026946			109-74-0	Butanenitrile	NGS	100	<1.2	5.8	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026946			56-23-5	Carbon tetrachloride	NGS	100	<1.6	1.8	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026946			108-90-7	Chlorobenzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026946			75-00-3	Chloroethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026946			67-66-3	Chloroform	NGS	100	<1.5	37	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026946			110-82-7	Cyclohexane	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026946			124-18-5	Decane	NGS	99	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026946			84-17-5	Ethanol	NGS	100	<7.4	160	n/a	n/a	n/a	n/a	7.4	n/a	U
S16T026946			141-78-6	Ethyl acetate	NGS	84	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026946			100-41-4	Ethylbenzene	NGS	99	<1.5	3.4	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026946			110-00-9	Furan	NGS	96	<1.6	1.9	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026946			110-54-3	Hexane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026946			628-73-9	Hexanenitrile	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026946			126-98-7	Methacrylonitrile	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026946			75-09-2	Methylene Chloride	NGS	99	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026946			91-20-3	Naphthalene	NGS	110	<3.7	<3.7	n/a	n/a	n/a	n/a	3.7	n/a	U
S16T026946			98-95-3	Nitrobenzene	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026946			110-59-8	Pentanenitrile	NGS	98	<1.6	2.0	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026946			107-12-0	Propanenitrile	NGS	99	<1.4	5.7	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T026946			110-86-1	Pyridine	NGS	110	<3.8	<3.8	n/a	n/a	n/a	n/a	3.8	n/a	U
S16T026946			100-42-5	Styrene	NGS	100	<1.6	2.1	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026946			127-18-4	Tetrachloroethene	NGS	100	<1.6	62	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026946			108-88-3	Toluene	NGS	98	<1.5	6.1	n/a	n/a	n/a	n/a	1.5	n/a	J

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B - Blank Contamination  
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U - Less Than Detection Limit

# Cartridge Evaluation Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-H1  
Customer Sample ID: 16-07645-2-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															
S16T026946			79-01-6	Trichloroethene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026946			75-69-4	Trichlorofluoromethane	NGS	98	<1.6	590	n/a	n/a	n/a	n/a	1.6	n/a	E
S16T026946			10061-01-5	dis-1,3-Dichloropropene	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026946			123-86-4	n-Butyl acetate	NGS	84	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026946			142-82-5	n-Heptane	NGS	100	<1.4	3.8	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T026946			10061-02-6	trans-1,3-Dichloropropene	NGS	99	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U

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J - Estimated  
B - Blank Contamination  
Y - Comment  
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U - Less Than Detection Limit



Cartridge Evaluation  
Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-H2  
Customer Sample ID: 16-07645-2-H2

Sample#	R	AW	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026947			79-34-5	1,1,2,2-Tetrachloroethane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026947			79-00-5	1,1,2-Trichloroethane	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026947			75-34-3	1,1-Dichloroethane	NGS	98	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026947			75-35-4	1,1-Dichloroethene	NGS	96	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026947			107-06-2	1,2-Dichloroethane	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026947			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026947			106-46-7	1,4-Dichlorobenzene	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026947			123-91-1	1,4-Dioxane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026947			71-36-3	1-Butanol	NGS	130	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	UY
S16T026947			111-70-6	1-Heptanol	NGS	97	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	U
S16T026947			71-23-8	1-Propanol	NGS	120	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026947			108-47-4	2,4-Dimethylpyridine	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026947			1708-29-8	2,5-Dihydrofuran	NGS	100	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026947			78-93-3	2-Butanone	NGS	97	<1.9	2.1	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026947			110-43-0	2-Heptanone	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026947			591-78-6	2-Hexanone	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026947			534-22-5	2-Methylfuran	NGS	96	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026947			78-94-4	3-Buten-2-one	NGS	91	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026947			106-35-4	3-Heptanone	NGS	96	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026947			106-68-3	3-Octanone	NGS	94	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026947			105-42-0	4-Methyl-2-hexanone	NGS	98	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026947			108-10-1	4-Methyl-2-Pentanone	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026947			67-64-1	Acetone	NGS	91	4.8	17	n/a	n/a	n/a	n/a	4.3	n/a	B
S16T026947			75-05-8	Acetonitrile	NGS	91	<1.8	25	n/a	n/a	n/a	n/a	1.8	n/a	
S16T026947			98-86-2	Acetophenone	NGS	97	<2.6	10	n/a	n/a	n/a	n/a	2.6	n/a	J
S16T026947			107-13-1	Acrylonitrile	NGS	98	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026947			107-18-6	Allyl Alcohol	NGS	110	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-H2  
Customer Sample ID: 16-07645-2-H2

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026947			107-05-1	Allyl Chloride	NGS	94	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026947			71-43-2	Benzene	NGS	98	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026947			100-47-0	Benzonitrile	NGS	98	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026947			123-72-8	Butanal	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026947			109-74-0	Butanenitrile	NGS	100	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026947			56-23-5	Carbon tetrachloride	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026947			108-90-7	Chlorobenzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026947			75-00-3	Chloroethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026947			87-66-3	Chloroform	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026947			110-82-7	Cyclohexane	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026947			124-18-5	Decane	NGS	99	<2.8	3.2	n/a	n/a	n/a	n/a	2.8	n/a	J
S16T026947			84-17-5	Ethanol	NGS	100	<7.4	60	n/a	n/a	n/a	n/a	7.4	n/a	
S16T026947			141-78-6	Ethyl acetate	NGS	84	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026947			100-41-4	Ethylbenzene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026947			110-00-9	Furan	NGS	96	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026947			110-54-3	Hexane	NGS	99	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026947			628-73-9	Hexanenitrile	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026947			126-98-7	Methacrylonitrile	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026947			75-09-2	Methylene Chloride	NGS	99	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026947			91-20-3	Naphthalene	NGS	110	<3.7	<3.7	n/a	n/a	n/a	n/a	3.7	n/a	U
S16T026947			98-95-3	Nitrobenzene	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026947			110-59-8	Pentanitrile	NGS	98	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026947			107-12-0	Propanenitrile	NGS	99	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026947			110-86-1	Pyridine	NGS	110	<3.8	<3.8	n/a	n/a	n/a	n/a	3.8	n/a	U
S16T026947			100-42-5	Styrene	NGS	100	<1.6	3.2	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026947			127-18-4	Tetrachloroethene	NGS	100	<1.6	42	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026947			108-88-3	Toluene	NGS	98	<1.5	3.6	n/a	n/a	n/a	n/a	1.5	n/a	J

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-H2  
Customer Sample ID: 16-07645-2-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															
S16T026947			79-01-6	Trichloroethene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026947			75-69-4	Trichlorofluoromethane	NGS	98	<1.6	10	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026947			10061-01-5	cis-1,3-Dichloropropene	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026947			123-86-4	n-Butyl acetate	NGS	84	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026947			142-82-5	n-Heptane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026947			10061-02-6	trans-1,3-Dichloropropene	NGS	99	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U

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*James J. J.*  
9/29/16

### Cartridge Evaluation Data Summary Report

Sample Group: 20162525

SDG Number:

Customer Sample ID: 16-07645-2-A1

Customer Sample ID: 16-07645-2-A1

Sample#	R	Alt	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T026929				Formic acid	64-18-6	6.68	NGS	53 JNT	
S16T026929				2-Propanol, 2-methyl-	75-85-0	7.15	NGS	34 JNT	
S16T026929				Methoxytrimethylsilane	1825-61-2	8.69	NGS	63 JNT	
S16T026929				Acetic acid	64-19-7	9.68	NGS	83 JNT	
S16T026929				Tetrahydrofuran	109-99-9	11.97	NGS	49 JNT	
S16T026929				Ethylene Glycol	107-21-1	14.01	NGS	150 JNT	
S16T026929				Formamide	75-12-7	14.25	NGS	540 JNT	
S16T026929				Pentanal	110-62-3	14.40	NGS	33 JNT	
S16T026929				Hexanal	66-25-1	16.82	NGS	35 JNT	
S16T026929				o-Xylene	95476	18.61	NGS	73 JNT	
S16T026929				Heptanal	111-71-7	18.95	NGS	28 JNT	
S16T026929				Phenol	108-95-2	20.50	NGS	47 JNT	
S16T026929				Benzaldehyde	100-52-7	20.88	NGS	61 JNT	
S16T026929				Benzyl alcohol	100-51-6	22.58	NGS	110 JNT	
S16T026929				Decane, 2,4,6-trimethyl-	62108-27-4	22.97	NGS	14 JNT	
S16T026929				Hexanoic acid, 2-ethyl-	149-57-5	23.68	NGS	120 JNT	
S16T026929				Benzenemethanol, 7-methyl-2-(1	61967-11-1	23.81	NGS	160 JNT	
S16T026929				Hexyl octyl ether	17071-54-4	23.91	NGS	29 JNT	
S16T026929				Unknown-1	-	24.22	NGS	180 JT	
S16T026929				Dodecane	112-40-3	25.25	NGS	49 JNT	
S16T026929				2-Propenoic acid, octyl ester	2499-59-4	25.40	NGS	30 JNT	
S16T026929				Ethanol, 2-phenoxy-	122-99-6	25.82	NGS	130 JNT	
S16T026929				2-Propenoic acid, tridecyl est	3076-04-8	25.99	NGS	35 JNT	
S16T026929				Benzothiazole	95-16-9	26.33	NGS	130 JNT	
S16T026929				Dodecane, 4,6-dimethyl-	6114728	26.42	NGS	43 JNT	
S16T026929				Dodecane, 2,6,11-trimethyl-	31295-56-4	26.57	NGS	20 JNT	
S16T026929				Silane, trimethyl(2-methylene-	97778-15-9	26.61	NGS	27 JNT	

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162525

SDG Number:

Customer Sample ID: 16-07645-2-A1

Customer Sample ID: 16-07645-2-A1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T026929				Tetradecane	629-59-4	26.99	NGS	22	JNT
S16T026929			BLNK	Unknown-1	-	24.18	NGS	28	
S16T026929			BLNK	Unknown-2	-	25.25	NGS	40	

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162525

SDG Number:

Customer Sample ID: 16-07645-2-A2

Customer Sample ID: 16-07645-2-A2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T026930				Methyl formate	107-31-3	4.72	NGS	25	JNT
S16T026930				Formic acid	64-18-6	6.65	NGS	100	JNT
S16T026930				Unknown-1	-	8.27	NGS	25	JT
S16T026930				Acetic acid	64-19-7	9.53	NGS	33	JNT
S16T026930				Formamide	75-12-7	14.28	NGS	480	JNT
S16T026930				Cyclohexene, 1-methyl-5-(1-met	1461-27-4	22.60	NGS	25	JNT
S16T026930				Decane, 2,4,6-trimethyl-	62108-27-4	22.97	NGS	20	JNT
S16T026930				Hexanoic acid, 2-ethyl-	149-57-5	23.66	NGS	26	JNT
S16T026930				Undecane, 5,7-dimethyl-	17312-83-3	23.82	NGS	40	JNT
S16T026930				Hydroxylamine, O-decyl-	28812-79-1	23.92	NGS	27	JNT
S16T026930				Unknown-2	-	24.22	NGS	130	JT
S16T026930				Dodecane	112-40-3	25.25	NGS	40	JNT
S16T026930				2-Propenoic acid, octyl ester	2499-59-4	25.40	NGS	28	JNT
S16T026930				Unknown-3	-	26.00	NGS	28	JT
S16T026930				Benzothiazole	95-16-9	26.34	NGS	170	JNT
S16T026930				Dodecane, 4,6-dimethyl-	61141728	26.43	NGS	36	JNT
S16T026930				Unknown-4	-	26.55	NGS	61	JT
S16T026930				1,2,3,4,5-Cyclopentanepental	56772-25-9	26.62	NGS	26	JNT
S16T026930				Tetradecane	629-59-4	27.01	NGS	22	JNT
S16T026930			BLNK	Unknown-1	-	24.18	NGS	28	
S16T026930			BLNK	Unknown-2	-	25.25	NGS	40	

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162525

SDG Number:

Customer Sample ID: 16-07645-2-B2

Customer Sample ID: 16-07645-2-B2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T026932				Formic acid	64-18-6	6.60	NGS	69 JNT	
S16T026932				Acetic acid	64-19-7	9.49	NGS	25 JNT	
S16T026932				Formamide	75-12-7	14.23	NGS	320 JNT	
S16T026932				Decane, 2,4,6-trimethyl-	62108-27-4	22.97	NGS	28 JNT	
S16T026932				Hexanoic acid, 2-ethyl-	149-57-5	23.66	NGS	33 JNT	
S16T026932				Undecane	1120-21-4	23.82	NGS	52 JNT	
S16T026932				Undecane, 5,7-dimethyl-	17312-83-3	23.92	NGS	27 JNT	
S16T026932				Unknown-1	-	24.22	NGS	96 JT	
S16T026932				2-Isopropenyl-5-methylhex-4-en	75697-98-2	24.84	NGS	26 JNT	
S16T026932				Dodecane	112-40-3	25.25	NGS	51 JNT	
S16T026932				2-Propenoic acid, octyl ester	2499-59-4	25.40	NGS	59 JNT	
S16T026932				Unknown-2	-	25.99	NGS	58 JT	
S16T026932				2-Propenoic acid, tridecyl est	3076-04-8	26.16	NGS	25 JNT	
S16T026932				Benzothiazole	95-16-9	26.33	NGS	170 JNT	
S16T026932				Dodecane, 4,6-dimethyl-	61141728	26.42	NGS	41 JNT	
S16T026932				Unknown-3	-	26.56	NGS	37 JT	
S16T026932				Tetradecane	629-59-4	26.99	NGS	35 JNT	
S16T026932			BLNK	Unknown-1	-	24.18	NGS	28	
S16T026932			BLNK	Unknown-2	-	25.25	NGS	40	

NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit

B - Blank Contamination  
Y - Comment

N - Named TIC  
J - Estimated

E - Outside Calibration Range  
T - Tentatively Identified Compound

# Cartridge Evaluation Data Summary Report

Sample Group: 20162525

SDG Number:

Customer Sample ID: 16-07645-2-C2

Customer Sample ID: 16-07645-2-C2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T026936				Formic acid	64-18-6	6.60	NGS	69	JNT
S16T026936				2-Propanol, 2-methyl-	75-85-0	7.15	NGS	26	JNT
S16T026936				Acetic acid	64-19-7	9.50	NGS	27	JNT
S16T026936				Formamide	75-12-7	14.19	NGS	250	JNT
S16T026936				D-Limonene	5989-27-5	22.61	NGS	27	JNT
S16T026936				Decane, 2,4,6-trimethyl-	62108-27-4	22.97	NGS	21	JNT
S16T026936				Hexanoic acid, 2-ethyl-	149-57-5	23.67	NGS	30	JNT
S16T026936				Undecane, 2,6-dimethyl-	17301-23-4	23.82	NGS	37	JNT
S16T026936				Undecane, 5,7-dimethyl-	17312-83-3	23.92	NGS	30	JNT
S16T026936				Unknown-1	-	24.22	NGS	140	JT
S16T026936				Pentanedioic acid, dimethyl es	1119-40-0	24.32	NGS	26	JNT
S16T026936				Dodecane	112-40-3	25.25	NGS	58	JNT
S16T026936				2-Propenoic acid, octyl ester	2499-59-4	25.40	NGS	26	JNT
S16T026936				2-Propenoic acid, tridecyl est	3076-04-8	26.00	NGS	29	JNT
S16T026936				Benzothiazole	95-16-9	26.34	NGS	180	JNT
S16T026936				Dodecane, 4,6-dimethyl-	61141728	26.43	NGS	51	JNT
S16T026936				Tridecane	629505	26.58	NGS	32	JNT
S16T026936				Unknown-2	-	26.62	NGS	33	JT
S16T026936				Dodecane, 2,6,11-trimethyl-	31295564	26.74	NGS	11	JNT
S16T026936				Tetradecane	629594	27.01	NGS	29	JNT
S16T026936			BLNK	Unknown-1	-	24.18	NGS	28	
S16T026936			BLNK	Unknown-2	-	25.25	NGS	40	

E - Outside Calibration Range  
T - Tentatively Identified Compound

N - Named TIC  
J - Estimated

B - Blank Contamination  
Y - Comment

NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit



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# Cartridge Evaluation Data Summary Report

Sample Group: 20162525

SDG Number:

Customer Sample ID: 16-07645-2-D2

Customer Sample ID: 16-07645-2-D2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T026938				Formic acid	64-18-6	6.54	NGS	33	JNT
S16T026938				Unknown-1	-	8.27	NGS	31	JT
S16T026938				Acetic acid	64-19-7	9.46	NGS	18	JNT
S16T026938				Formamide	75-12-7	14.14	NGS	140	JNT
S16T026938				Decane, 2,4,6-trimethyl-	62108-27-4	22.97	NGS	5.2	JNT
S16T026938				Heptanoic acid, 2-ethyl-	3274-29-1	23.66	NGS	25	JNT
S16T026938				Unknown-2	-	24.22	NGS	67	JT
S16T026938				Dodecane	112-40-3	25.25	NGS	19	JNT
S16T026938				Benzothiazole	95-16-9	26.34	NGS	110	JNT
S16T026938				Dodecane, 4,6-dimethyl-	61141728	26.43	NGS	29	JNT
S16T026938				Propanoic acid, 2-methyl-, 1-(	74381-40-1	26.58	NGS	49	JNT
S16T026938				Unknown-3	-	26.63	NGS	26	JT
S16T026938				Tetradecane	629-59-4	27.01	NGS	21	JNT
S16T026938		BLNK		Unknown-1	-	24.18	NGS	28	
S16T026938		BLNK		Unknown-2	-	25.25	NGS	40	

NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit

B - Blank Contamination  
Y - Comment

N - Named TIC  
J - Estimated

E - Outside Calibration Range  
T - Tentatively Identified Compound

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162525

SDG Number:

Customer Sample ID: 16-07645-2-E2

Customer Sample ID: 16-07645-2-E2

Sample#	R	Al#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T026940				Formic acid	64-18-6	6.52	NGS	30	JNT
S16T026940				Acetic acid	64-19-7	9.42	NGS	16	JNT
S16T026940				Formamide	75-12-7	14.11	NGS	110	JNT
S16T026940				Decane, 2,4,6-trimethyl-	62108-27-4	22.98	NGS	7.5	JNT
S16T026940				Undecane, 2,6-dimethyl-	17301-23-4	23.82	NGS	21	JNT
S16T026940				Undecanal	112-44-7	23.95	NGS	33	JNT
S16T026940				Unknown-1	-	24.22	NGS	99	JT
S16T026940				Dodecane	112-40-3	25.25	NGS	32	JNT
S16T026940				Benzothiazole	95-16-9	26.32	NGS	180	JNT
S16T026940				Dodecane, 4,6-dimethyl-	61141728	26.42	NGS	41	JNT
S16T026940				Tridecane	629505	26.57	NGS	32	JNT
S16T026940				Unknown-2	-	26.61	NGS	29	JT
S16T026940				Tetradecane	629-59-4	26.99	NGS	34	JNT
S16T026940		BLNK		Unknown-1	-	24.18	NGS	28	
S16T026940		BLNK		Unknown-2	-	25.25	NGS	40	

E - Outside Calibration Range  
T - Tentatively Identified Compound

N - Named TIC  
J - Estimated

B - Blank Contamination  
Y - Comment

NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162525

SDG Number:

Customer Sample ID: 16-07645-2-F2

Customer Sample ID: 16-07645-2-F2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T028943				Acetic acid	64-19-7	9.36	NGS	8.0	JNT
S16T028943				Formamide	75-12-7	14.11	NGS	100	JNT
S16T028943				Decane, 2,4,6-trimethyl-	62108-27-4	22.97	NGS	9.9	JNT
S16T028943				Undecane, 5,7-dimethyl-	17312-83-3	23.82	NGS	25	JNT
S16T028943				Undecanal	112-44-7	23.94	NGS	26	JNT
S16T028943				Unknown-1	-	24.22	NGS	100	JT
S16T028943				Dodecane	112-40-3	25.25	NGS	32	JNT
S16T028943				Unknown-2	-	25.84	NGS	45	JT
S16T028943				2-Propenoic acid, octyl ester	2499-59-4	25.99	NGS	48	JNT
S16T028943				Benzothiazole	95-16-9	26.34	NGS	120	JNT
S16T028943				Dodecane, 4,6-dimethyl-	61141728	26.42	NGS	28	JNT
S16T028943				Unknown-3	-	26.55	NGS	62	JT
S16T028943				Unknown-4	-	26.62	NGS	27	JT
S16T028943				Tetradecane	629-59-4	27.00	NGS	19	JNT
S16T028943			BLNK	Unknown-1	-	24.18	NGS	28	
S16T028943			BLNK	Unknown-2	-	25.25	NGS	40	

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B - Blank Contamination  
Y - Comment

N - Named TIC  
J - Estimated

E - Outside Calibration Range  
T - Tentatively Identified Compound

# Cartridge Evaluation Data Summary Report

Sample Group: 20162525  
SDG Number:  
Customer Sample ID: 16-07645-2-G2  
Customer Sample ID: 16-07645-2-G2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T026945				Acetic acid	64-19-7	9.38	NGS	6.9	JNT
S16T026945				Formamide	75-12-7	14.10	NGS	70	JNT
S16T026945				Cyclotetrasiloxane, octamethyl	556-67-2	20.43	NGS	25	JNT
S16T026945				Decane, 2,4,6-trimethyl-	62108-27-4	22.97	NGS	32	JNT
S16T026945				Undecane	1120214	23.71	NGS	24	JNT
S16T026945				Undecane, 4,6-dimethyl-	17312-82-2	23.82	NGS	46	JNT
S16T026945				Undecane, 5,7-dimethyl-	17312-83-3	23.92	NGS	32	JNT
S16T026945				Unknown-1	-	24.22	NGS	170	JT
S16T026945				Dodecane	112-40-3	25.25	NGS	38	JNT
S16T026945				Unknown-2	-	25.81	NGS	44	JT
S16T026945				2-Propenoic acid, octyl ester	2499-59-4	26.01	NGS	32	JNT
S16T026945				Benzothiazole	95-16-9	26.35	NGS	77	JNT
S16T026945				Dodecane, 4,6-dimethyl-	61141728	26.43	NGS	33	JNT
S16T026945				Unknown-3	-	26.56	NGS	36	JT
S16T026945				Silane, trimethyl[2-methylene-	97778-15-9	26.63	NGS	28	JNT
S16T026945				Dodecane, 2,6,11-trimethyl-	31295564	26.75	NGS	6.7	JNT
S16T026945				Tetradecane	628594	27.01	NGS	19	JNT
S16T026945			BLNK	Unknown-1	-	24.18	NGS	28	
S16T026945			BLNK	Unknown-2	-	25.25	NGS	40	

E - Outside Calibration Range  
T - Tentatively Identified Compound

N - Named TIC  
J - Estimated

B - Blank Contamination  
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NA = Not Analyzed, ND = Not Detected  
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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162525

SDG Number:

Customer Sample ID: 16-07645-2-H1

Customer Sample ID: 16-07645-2-H1

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T026946				Unknown-1	-	8.27	NGS	30	JT
S16T026946				Acetic acid	64-19-7	9.46	NGS	21	JNT
S16T026946				Tetrahydrofuran	109-99-9	11.96	NGS	50	JNT
S16T026946				Formamide	75-12-7	14.12	NGS	110	JNT
S16T026946				N-Nitrosodimethylamine	62-75-9	15.68	NGS	6.5	JNT
S16T026946				Decane, 2,4,6-trimethyl-	62109-27-4	22.97	NGS	13	JNT
S16T026946				Undecane	1120214	23.71	NGS	41	JNT
S16T026946				?-Ethyl-?-methylbenzyl alcohol	1565-75-9	23.81	NGS	66	JNT
S16T026946				Unknown-2	-	24.22	NGS	110	JT
S16T026946				Dodecane	112-40-3	25.25	NGS	52	JNT
S16T026946				Unknown-3	-	25.87	NGS	33	JT
S16T026946				Methenamine	100-97-0	26.24	NGS	26	JNT
S16T026946				Benzothiazole	95-16-9	26.33	NGS	120	JNT
S16T026946				Dodecane, 4,6-dimethyl-	61141728	26.42	NGS	21	JNT
S16T026946				Dodecane, 2,7,10-trimethyl-	74645980	26.57	NGS	36	JNT
S16T026946				Tetradecane	629594	27.00	NGS	13	JNT
S16T026946		BLNK		Unknown-1	-	24.18	NGS	28	
S16T026946		BLNK		Unknown-2	-	25.25	NGS	40	

NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit

B - Blank Contamination  
Y - Comment

N - Named TIC  
J - Estimated

E - Outside Calibration Range  
T - Tentatively Identified Compound

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162525

SDG Number:

Customer Sample ID: 16-07645-2-H2

Customer Sample ID: 16-07645-2-H2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T026947				Unknown-1	-	9.35	NGS	5.2	JT
S16T026947				Formamide	75-12-7	14.10	NGS	83	JNT
S16T026947				Cyclotetrasiloxane, octamethyl	556-67-2	20.43	NGS	26	JNT
S16T026947				Decane, 2,4,6-trimethyl-	62108-27-4	22.97	NGS	24	JNT
S16T026947				Undecane	1120214	23.71	NGS	31	JNT
S16T026947				Undecane, 5,7-dimethyl-	17312-83-3	23.82	NGS	37	JNT
S16T026947				Decane, 2,3,5,8-tetramethyl-	192823-15-7	23.92	NGS	30	JNT
S16T026947				Unknown-2	-	24.22	NGS	130	JT
S16T026947				Dodecane	112-40-3	25.25	NGS	33	JNT
S16T026947				2-Propenoic acid, octyl ester	2499-59-4	26.01	NGS	26	JNT
S16T026947				Methenamine	100-97-0	26.23	NGS	44	JNT
S16T026947				Benzothiazole	95-16-9	26.34	NGS	120	JNT
S16T026947				Dodecane, 4,6-dimethyl-	61141728	26.43	NGS	26	JNT
S16T026947				Propanoic acid, 2-methyl-, 1-(	74381-40-1	26.55	NGS	110	JNT
S16T026947				Dodecane, 2,6,11-trimethyl-	31295564	26.75	NGS	5.3	JNT
S16T026947				Tetradecane	629594	27.01	NGS	13	JNT
S16T026947			BLNK	Unknown-1	-	24.18	NGS	28	
S16T026947			BLNK	Unknown-2	-	25.25	NGS	40	

E - Outside Calibration Range  
T - Tentatively Identified Compound

N - Named TIC  
J - Estimated

B - Blank Contamination  
Y - Comment

NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit

*Signature*  
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Cartridge Evaluation  
 Data Summary of All Results

Sample Group: 20162537

SDG Number:

Customer Sample ID: 16-07654-2-B1

Customer Sample ID: 16-07654-2-B1

Sample#	R	Ad	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026951			79-34-5	1,1,2,2-Tetrachloroethane	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026951			79-00-5	1,1,2-Trichloroethane	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026951			75-34-3	1,1-Dichloroethane	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026951			75-35-4	1,1-Dichloroethene	NGS	92	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026951			107-06-2	1,2-Dichloroethane	NGS	97	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026951			542-75-6	1,3-Dichloropropene (Total)	NGS	96	<1.2	1.8	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026951			106-46-7	1,4-Dichlorobenzene	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026951			123-91-1	1,4-Dioxane	NGS	98	<1.7	2.6	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026951			71-36-3	1-Butanol	NGS	100	<8.9	120	n/a	n/a	n/a	n/a	8.9	n/a	LY
S16T026951			111-70-6	1-Heptanol	NGS	72	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	LQU
S16T026951			71-23-8	1-Propanol	NGS	100	<3.0	25	n/a	n/a	n/a	n/a	3.0	n/a	
S16T026951			108-47-4	2,4-Dimethylpyridine	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026951			1708-29-8	2,5-Dihydrofuran	NGS	100	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026951			78-93-3	2-Butanone	NGS	94	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026951			110-43-0	2-Heptanone	NGS	93	<1.6	4.4	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026951			591-78-6	2-Hexanone	NGS	95	<1.2	2.6	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026951			534-22-5	2-Methylfuran	NGS	94	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026951			78-94-4	3-Buten-2-one	NGS	88	<1.7	6.1	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026951			106-35-4	3-Heptanone	NGS	92	<1.5	5.6	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026951			106-68-3	3-Octanone	NGS	93	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026951			105-42-0	4-Methyl-2-hexanone	NGS	95	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026951			108-10-1	4-Methyl-2-pentanone	NGS	97	<1.9	3.7	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026951			67-64-1	Acetone	NGS	88	5.5	480	n/a	n/a	n/a	n/a	4.3	n/a	E
S16T026951			75-05-8	Acetonitrile	NGS	87	<1.8	84	n/a	n/a	n/a	n/a	1.8	n/a	
S16T026951			98-86-2	Acetophenone	NGS	95	<2.6	21	n/a	n/a	n/a	n/a	2.6	n/a	
S16T026951			107-13-1	Acrylonitrile	NGS	93	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026951			107-18-6	Allyl Alcohol	NGS	94	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026951			107-05-1	Allyl Chloride	NGS	90	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U

J - Estimated  
 Y - Comment  
 E - Outside Calibration Range  
 Q - Qualitative  
 L - LLS Outside Range  
 NA = Not Analyzed, ND = Not Detected  
 U - Less Than Detection Limit

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-B1  
Customer Sample ID: 16-07654-2-B1

Sample#	R	Ad	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026951			71-43-2	Benzene	NGS	96	<1.2	2.8	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026951			100-47-0	Benzonitrile	NGS	97	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026951			123-72-8	Butanal	NGS	110	<2.1	9.5	n/a	n/a	n/a	n/a	2.1	n/a	J
S16T026951			109-74-0	Butanenitrile	NGS	95	<1.2	5.3	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026951			56-23-5	Carbon tetrachloride	NGS	100	<1.6	1.6	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026951			108-90-7	Chlorobenzene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026951			75-00-3	Chloroethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026951			67-66-3	Chloroform	NGS	99	<1.5	32	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026951			110-82-7	Cyclohexane	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026951			124-18-5	Decane	NGS	96	<2.8	7.1	n/a	n/a	n/a	n/a	2.8	n/a	J
S16T026951			64-17-5	Ethanol	NGS	96	<7.4	150	n/a	n/a	n/a	n/a	7.4	n/a	U
S16T026951			141-78-6	Ethyl acetate	NGS	81	<1.5	1.9	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026951			100-41-4	Ethylbenzene	NGS	97	<1.5	3.5	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026951			110-00-9	Furan	NGS	95	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026951			110-54-3	Hexane	NGS	97	<1.7	4.0	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026951			628-73-9	Hexanenitrile	NGS	97	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026951			126-98-7	Methacrylonitrile	NGS	96	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026951			75-09-2	Methylene Chloride	NGS	98	<2.7	4.2	n/a	n/a	n/a	n/a	2.7	n/a	J
S16T026951			91-20-3	Naphthalene	NGS	100	<3.7	<3.7	n/a	n/a	n/a	n/a	3.7	n/a	U
S16T026951			98-95-3	Nitrobenzene	NGS	97	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026951			110-59-8	Pentanitrile	NGS	95	<1.6	2.4	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026951			107-12-0	Propanenitrile	NGS	96	<1.4	5.3	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T026951			110-96-1	Pyridine	NGS	120	<3.8	<3.8	n/a	n/a	n/a	n/a	3.8	n/a	U
S16T026951			100-42-5	Styrene	NGS	97	<1.6	2.9	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026951			127-18-4	Tetrachloroethene	NGS	100	<1.6	89	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026951			108-88-3	Toluene	NGS	96	<1.5	8.3	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026951			79-01-6	Trichloroethene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026951			75-69-4	Trichlorofluoromethane	NGS	91	<1.6	480	n/a	n/a	n/a	n/a	1.6	n/a	E

J - Estimated  
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L - LLS Outside Range  
U - Less Than Detection Limit  
NA = Not Analyzed, ND = Not Detected



# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-B1  
Customer Sample ID: 16-07654-2-B1

Sample#	R	AP	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026951			10061-01-5	dis-1,3-Dichloropropene	NGS	97	<1.3	1.8	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T026951			123-86-4	n-Butyl acetate	NGS	81	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026951			142-82-5	n-Heptane	NGS	95	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026951			10061-02-6	trans-1,3-Dichloropropene	NGS	94	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U

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L - LLS Outside Range

NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-BLANK  
Customer Sample ID: 16-07654-2-BLANK

Sample#	R	AI#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026953			79-34-5	1,1,2,2-Tetrachloroethane	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026953			79-00-5	1,1,2-Trichloroethane	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026953			75-34-3	1,1-Dichloroethane	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026953			75-35-4	1,1-Dichloroethene	NGS	92	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026953			107-06-2	1,2-Dichloroethane	NGS	97	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026953			542-75-6	1,3-Dichloropropene (Total)	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026953			106-46-7	1,4-Dichlorobenzene	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026953			123-91-1	1,4-Dioxane	NGS	98	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026953			71-36-3	1-Butanol	NGS	100	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	LUY
S16T026953			111-70-6	1-Heptanol	NGS	72	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	LQU
S16T026953			71-23-8	1-Propanol	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026953			108-47-4	2,4-Dimethylpyridine	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026953			1708-29-8	2,5-Dihydrofuran	NGS	100	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026953			78-93-3	2-Butanone	NGS	94	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026953			110-43-0	2-Heptanone	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026953			591-78-6	2-Hexanone	NGS	95	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026953			534-22-5	2-Methylfuran	NGS	94	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026953			78-94-4	3-Buten-2-one	NGS	88	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026953			106-35-4	3-Heptanone	NGS	92	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026953			106-68-3	3-Octanone	NGS	93	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026953			105-42-0	4-Methyl-2-hexanone	NGS	95	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026953			108-10-1	4-Methyl-2-pentanone	NGS	97	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026953			67-64-1	Acetone	NGS	88	5.5	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	U
S16T026953			75-05-8	Acetonitrile	NGS	87	<1.8	710	n/a	n/a	n/a	n/a	1.8	n/a	E
S16T026953			98-86-2	Acetophenone	NGS	95	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026953			107-13-1	Acrylonitrile	NGS	93	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026953			107-18-6	Allyl Alcohol	NGS	94	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026953			107-05-1	Allyl Chloride	NGS	90	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U

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# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-BLANK  
Customer Sample ID: 16-07654-2-BLANK

Sample#	R	AP	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026953			71-43-2	Benzene	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026953			100-47-0	Benzonitrile	NGS	97	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026953			123-72-8	Butanal	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026953			109-74-0	Butanenitrile	NGS	95	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026953			56-23-5	Carbon tetrachloride	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026953			108-90-7	Chlorobenzene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026953			75-00-3	Chloroethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026953			67-66-3	Chloroform	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026953			110-82-7	Cyclohexane	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026953			124-18-5	Decane	NGS	96	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026953			64-17-5	Ethanol	NGS	96	<7.4	<7.4	n/a	n/a	n/a	n/a	7.4	n/a	U
S16T026953			141-78-6	Ethyl acetate	NGS	81	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026953			100-41-4	Ethylbenzene	NGS	97	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026953			110-00-9	Furan	NGS	95	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026953			110-54-3	Hexane	NGS	97	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026953			628-73-9	Hexanenitrile	NGS	97	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026953			126-98-7	Methacrylonitrile	NGS	96	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026953			75-09-2	Methylene Chloride	NGS	98	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026953			91-20-3	Naphthalene	NGS	100	<3.7	<3.7	n/a	n/a	n/a	n/a	3.7	n/a	U
S16T026953			98-95-3	Nitrobenzene	NGS	97	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026953			110-59-8	Pentanitrile	NGS	95	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026953			107-12-0	Propanenitrile	NGS	96	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026953			110-86-1	Pyridine	NGS	120	<3.8	<3.8	n/a	n/a	n/a	n/a	3.8	n/a	U
S16T026953			100-42-5	Styrene	NGS	97	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026953			127-18-4	Tetrachloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026953			108-88-3	Toluene	NGS	96	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026953			79-01-6	Trichloroethene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026953			75-69-4	Trichlorofluoromethane	NGS	91	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U

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# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-BLANK  
Customer Sample ID: 16-07654-2-BLANK

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026953			10061-01-5	dis-1,3-Dichloropropene	NGS	97	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026953			123-86-4	n-Butyl acetate	NGS	81	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026953			142-82-5	n-Heptane	NGS	95	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026953			10061-02-6	trans-1,3-Dichloropropene	NGS	94	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U

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L - LLS Outside Range

NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-BLANK2  
Customer Sample ID: 16-07654-2-BLANK2

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026954			79-34-5	1,1,2,2-Tetrachloroethane	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026954			79-00-5	1,1,2-Trichloroethane	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026954			75-34-3	1,1-Dichloroethane	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026954			75-35-4	1,1-Dichloroethene	NGS	92	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026954			107-06-2	1,2-Dichloroethane	NGS	97	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026954			542-75-6	1,3-Dichloropropene (Total)	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026954			106-46-7	1,4-Dichlorobenzene	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026954			123-91-1	1,4-Dioxane	NGS	98	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026954			71-36-3	1-Butanol	NGS	100	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	LUY
S16T026954			111-70-6	1-Heptanol	NGS	72	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	LQU
S16T026954			71-23-8	1-Propanol	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026954			108-47-4	2,4-Dimethylpyridine	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026954			1708-29-8	2,5-Dihydrofuran	NGS	100	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026954			78-93-3	2-Butanone	NGS	94	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026954			110-43-0	2-Heptanone	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026954			591-78-6	2-Hexanone	NGS	95	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026954			534-22-5	2-Methylfuran	NGS	94	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026954			78-94-4	3-Buten-2-one	NGS	88	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026954			106-35-4	3-Heptanone	NGS	92	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026954			106-68-3	3-Octanone	NGS	93	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026954			105-42-0	4-Methyl-2-hexanone	NGS	95	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026954			108-10-1	4-Methyl-2-pentanone	NGS	97	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026954			67-64-1	Acetone	NGS	88	5.5	11	n/a	n/a	n/a	n/a	4.3	n/a	J
S16T026954			75-05-8	Acetonitrile	NGS	87	<1.8	46	n/a	n/a	n/a	n/a	1.8	n/a	J
S16T026954			98-86-2	Acetophenone	NGS	95	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026954			107-13-1	Acrylonitrile	NGS	93	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026954			107-18-6	Allyl Alcohol	NGS	94	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026954			107-05-1	Allyl Chloride	NGS	90	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U

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# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-BLANK2  
Customer Sample ID: 16-07654-2-BLANK2

Sample#	R	AP	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026954			71-43-2	Benzene	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026954			100-47-0	Benzonitrile	NGS	97	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026954			123-72-8	Butanal	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026954			109-74-0	Butanenitrile	NGS	95	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026954			56-23-5	Carbon tetrachloride	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026954			108-90-7	Chlorobenzene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026954			75-00-3	Chloroethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026954			67-66-3	Chloroform	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026954			110-82-7	Cyclohexane	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026954			124-18-5	Decane	NGS	96	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026954			64-17-5	Ethanol	NGS	96	<7.4	<7.4	n/a	n/a	n/a	n/a	7.4	n/a	U
S16T026954			141-78-6	Ethyl acetate	NGS	81	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026954			100-41-4	Ethylbenzene	NGS	97	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026954			110-00-9	Furan	NGS	95	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026954			110-54-3	Hexane	NGS	97	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026954			528-73-9	Hexanenitrile	NGS	97	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026954			126-98-7	Methacrylonitrile	NGS	96	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026954			75-09-2	Methylene Chloride	NGS	98	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026954			91-20-3	Naphthalene	NGS	100	<3.7	<3.7	n/a	n/a	n/a	n/a	3.7	n/a	U
S16T026954			98-95-3	Nitrobenzene	NGS	97	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026954			110-59-8	Pentanitrile	NGS	95	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026954			107-12-0	Propanenitrile	NGS	96	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026954			110-86-1	Pyridine	NGS	120	<3.8	<3.8	n/a	n/a	n/a	n/a	3.8	n/a	U
S16T026954			100-42-5	Styrene	NGS	97	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026954			127-18-4	Tetrachloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026954			108-88-3	Toluene	NGS	96	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026954			79-01-6	Trichloroethene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026954			75-69-4	Trichlorofluoromethane	NGS	91	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U

J - Estimated  
Y - Comment  
E - Outside Calibration Range  
Q - Qualitative  
L - LLS Outside Range  
NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-BLANK2  
Customer Sample ID: 16-07654-2-BLANK2

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026954			10061-01-5	dis-1,3-Dichloropropene	NGS	97	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026954			123-86-4	n-Butyl acetate	NGS	81	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026954			142-82-5	n-Heptane	NGS	95	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026954			10061-02-6	trans-1,3-Dichloropropene	NGS	94	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U

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Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-C1  
Customer Sample ID: 16-07654-2-C1

Sample#	R	AI#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026955			79-34-5	1,1,2,2-Tetrachloroethane	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026955			79-00-5	1,1,2-Trichloroethane	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026955			75-34-3	1,1-Dichloroethane	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026955			75-35-4	1,1-Dichloroethene	NGS	92	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026955			107-06-2	1,2-Dichloroethane	NGS	97	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026955			542-75-6	1,3-Dichloropropene (Total)	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026955			106-46-7	1,4-Dichlorobenzene	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026955			123-91-1	1,4-Dioxane	NGS	98	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026955			71-36-3	1-Butanol	NGS	100	<8.9	88	n/a	n/a	n/a	n/a	8.9	n/a	LY
S16T026955			111-70-6	1-Heptanol	NGS	72	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	LQU
S16T026955			71-23-8	1-Propanol	NGS	100	<3.0	25	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026955			108-47-4	2,4-Dimethylpyridine	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026955			1708-29-8	2,5-Dihydrofuran	NGS	100	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026955			78-93-3	2-Butanone	NGS	94	<1.9	18	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026955			110-43-0	2-Heptanone	NGS	93	<1.6	4.9	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026955			591-78-6	2-Hexanone	NGS	95	<1.2	2.4	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026955			534-22-5	2-Methylfuran	NGS	94	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026955			78-94-4	3-Buten-2-one	NGS	88	<1.7	4.4	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026955			106-35-4	3-Heptanone	NGS	92	<1.5	6.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026955			106-68-3	3-Octanone	NGS	93	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026955			105-42-0	4-Methyl-2-hexanone	NGS	95	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026955			108-10-1	4-Methyl-2-Pentanone	NGS	97	<1.9	3.1	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026955			67-64-1	Acetone	NGS	88	5.5	480	n/a	n/a	n/a	n/a	4.3	n/a	E
S16T026955			75-05-8	Acetonitrile	NGS	87	<1.8	140	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026955			98-86-2	Acetophenone	NGS	95	<2.6	34	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026955			107-13-1	Acrylonitrile	NGS	93	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026955			107-18-6	Allyl Alcohol	NGS	94	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026955			107-05-1	Allyl Chloride	NGS	90	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U

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Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-C1  
Customer Sample ID: 16-07654-2-C1

Sample#	R	AI#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026955			71-43-2	Benzene	NGS	96	<1.2	2.9	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026955			100-47-0	Benzonitrile	NGS	97	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026955			123-72-8	Butanal	NGS	110	<2.1	5.9	n/a	n/a	n/a	n/a	2.1	n/a	J
S16T026955			109-74-0	Butanenitrile	NGS	95	<1.2	5.5	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026955			56-23-5	Carbon tetrachloride	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026955			108-90-7	Chlorobenzene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026955			75-00-3	Chloroethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026955			87-66-3	Chloroform	NGS	99	<1.5	34	n/a	n/a	n/a	n/a	1.5	n/a	
S16T026955			110-82-7	Cyclohexane	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026955			124-18-5	Decane	NGS	96	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026955			84-17-5	Ethanol	NGS	96	<7.4	130	n/a	n/a	n/a	n/a	7.4	n/a	
S16T026955			141-78-6	Ethyl acetate	NGS	81	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026955			100-41-4	Ethylbenzene	NGS	97	<1.5	3.6	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026955			110-00-9	Furan	NGS	95	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026955			110-54-3	Hexane	NGS	97	<1.7	4.0	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026955			628-73-9	Hexanenitrile	NGS	97	<1.5	2.1	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026955			126-98-7	Methacrylonitrile	NGS	96	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026955			75-09-2	Methylene Chloride	NGS	98	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026955			91-20-3	Naphthalene	NGS	100	<3.7	<3.7	n/a	n/a	n/a	n/a	3.7	n/a	U
S16T026955			98-95-3	Nitrobenzene	NGS	97	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026955			110-59-8	Pentanitrile	NGS	95	<1.6	2.3	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026955			107-12-0	Propanenitrile	NGS	96	<1.4	5.6	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T026955			110-86-1	Pyridine	NGS	120	<3.8	<3.8	n/a	n/a	n/a	n/a	3.8	n/a	U
S16T026955			100-42-5	Styrene	NGS	97	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026955			127-18-4	Tetrachloroethene	NGS	100	<1.6	82	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026955			108-88-3	Toluene	NGS	96	<1.5	6.2	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026955			79-01-6	Trichloroethene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026955			75-69-4	Trichlorofluoromethane	NGS	91	<1.6	500	n/a	n/a	n/a	n/a	1.6	n/a	E

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Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-C1  
Customer Sample ID: 16-07654-2-C1

Sample#	R	AI#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026955			10061-01-5	cis-1,3-Dichloropropene	NGS	97	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026955			123-86-4	n-Butyl acetate	NGS	81	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026955			142-82-5	n-Heptane	NGS	95	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026955			10061-02-6	trans-1,3-Dichloropropene	NGS	94	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U

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Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-D1  
Customer Sample ID: 16-07654-2-D1

Sample#	R	Ad	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026957			79-34-5	1,1,2,2-Tetrachloroethane	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026957			79-00-5	1,1,2-Trichloroethane	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026957			75-34-3	1,1-Dichloroethane	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026957			75-35-4	1,1-Dichloroethene	NGS	92	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026957			107-06-2	1,2-Dichloroethane	NGS	97	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026957			542-75-6	1,3-Dichloropropene (Total)	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026957			106-46-7	1,4-Dichlorobenzene	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026957			123-91-1	1,4-Dioxane	NGS	98	<1.7	2.5	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026957			71-36-3	1-Butanol	NGS	100	<8.9	90	n/a	n/a	n/a	n/a	8.9	n/a	LY
S16T026957			111-70-6	1-Heptanol	NGS	72	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	LQU
S16T026957			71-23-8	1-Propanol	NGS	100	<3.0	26	n/a	n/a	n/a	n/a	3.0	n/a	
S16T026957			108-47-4	2,4-Dimethylpyridine	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026957			1708-29-8	2,5-Dihydrofuran	NGS	100	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026957			78-93-3	2-Butanone	NGS	94	<1.9	16	n/a	n/a	n/a	n/a	1.9	n/a	
S16T026957			110-43-0	2-Heptanone	NGS	93	<1.6	3.4	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026957			591-78-6	2-Hexanone	NGS	95	<1.2	2.2	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026957			534-22-5	2-Methylfuran	NGS	94	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026957			78-94-4	3-Buten-2-one	NGS	88	<1.7	4.8	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026957			106-35-4	3-Heptanone	NGS	92	<1.5	4.7	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026957			106-68-3	3-Octanone	NGS	93	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026957			105-42-0	4-Methyl-2-hexanone	NGS	95	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026957			108-10-1	4-Methyl-2-Pentanone	NGS	97	<1.9	2.6	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026957			67-64-1	Acetone	NGS	88	5.5	430	n/a	n/a	n/a	n/a	4.3	n/a	E
S16T026957			75-05-8	Acetonitrile	NGS	87	<1.8	39	n/a	n/a	n/a	n/a	1.8	n/a	
S16T026957			98-86-2	Acetophenone	NGS	95	<2.6	14	n/a	n/a	n/a	n/a	2.6	n/a	
S16T026957			107-13-1	Acrylonitrile	NGS	93	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026957			107-18-6	Allyl Alcohol	NGS	94	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026957			107-05-1	Allyl Chloride	NGS	90	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U

J - Estimated  
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Q - Qualitative  
L - LLS Outside Range  
U - Less Than Detection Limit  
NA = Not Analyzed, ND = Not Detected

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-D1  
Customer Sample ID: 16-07654-2-D1

Sample#	R	AP	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026957			71-43-2	Benzene	NGS	96	<1.2	2.4	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026957			100-47-0	Benzonitrile	NGS	97	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026957			123-72-8	Butanal	NGS	110	<2.1	7.1	n/a	n/a	n/a	n/a	2.1	n/a	J
S16T026957			109-74-0	Butanenitrile	NGS	95	<1.2	5.2	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026957			56-23-5	Carbon tetrachloride	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026957			108-90-7	Chlorobenzene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026957			75-00-3	Chloroethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026957			67-66-3	Chloroform	NGS	99	<1.5	3.1	n/a	n/a	n/a	n/a	1.5	n/a	
S16T026957			110-82-7	Cyclohexane	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026957			124-18-5	Decane	NGS	96	<2.8	6.4	n/a	n/a	n/a	n/a	2.8	n/a	J
S16T026957			64-17-5	Ethanol	NGS	96	<7.4	150	n/a	n/a	n/a	n/a	7.4	n/a	U
S16T026957			141-78-6	Ethyl acetate	NGS	81	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026957			100-41-4	Ethylbenzene	NGS	97	<1.5	3.0	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026957			110-00-9	Furan	NGS	95	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026957			110-54-3	Hexane	NGS	97	<1.7	3.3	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026957			628-73-9	Hexanenitrile	NGS	97	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026957			126-98-7	Methacrylonitrile	NGS	96	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026957			75-09-2	Methylene Chloride	NGS	98	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026957			91-20-3	Naphthalene	NGS	100	<3.7	<3.7	n/a	n/a	n/a	n/a	3.7	n/a	U
S16T026957			98-95-3	Nitrobenzene	NGS	97	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026957			110-59-8	Pentanitrile	NGS	95	<1.6	1.9	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026957			107-12-0	Propanenitrile	NGS	96	<1.4	4.8	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T026957			110-86-1	Pyridine	NGS	120	<3.8	<3.8	n/a	n/a	n/a	n/a	3.8	n/a	U
S16T026957			100-42-5	Styrene	NGS	97	<1.6	2.0	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026957			127-18-4	Tetrachloroethene	NGS	100	<1.6	58	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026957			108-88-3	Toluene	NGS	96	<1.5	5.0	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026957			79-01-6	Trichloroethene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026957			75-69-4	Trichlorofluoromethane	NGS	91	<1.6	490	n/a	n/a	n/a	n/a	1.6	n/a	E

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L - LLS Outside Range  
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U - Less Than Detection Limit

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-D1  
Customer Sample ID: 16-07654-2-D1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rac %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026957			10061-01-5	dis-1,3-Dichloropropene	NGS	97	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026957			123-86-4	n-Butyl acetate	NGS	81	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026957			142-92-5	n-Heptane	NGS	95	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026957			10061-02-6	trans-1,3-Dichloropropene	NGS	94	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U

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Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-E1  
Customer Sample ID: 16-07654-2-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															
S16T026959		79-34-5		1,1,2,2-Tetrachloroethane	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026959		79-00-5		1,1,2-Trichloroethane	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026959		75-34-3		1,1-Dichloroethane	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026959		75-35-4		1,1-Dichloroethene	NGS	92	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026959		107-06-2		1,2-Dichloroethane	NGS	97	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026959		542-75-6		1,3-Dichloropropene (Total)	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026959		106-46-7		1,4-Dichlorobenzene	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026959		123-91-1		1,4-Dioxane	NGS	98	<1.7	2.8	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026959		71-36-3		1-Butanol	NGS	100	<8.9	90	n/a	n/a	n/a	n/a	8.9	n/a	LY
S16T026959		111-70-6		1-Heptanol	NGS	72	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	LQU
S16T026959		71-23-8		1-Propanol	NGS	100	<3.0	31	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026959		108-47-4		2,4-Dimethylpyridine	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026959		1708-29-8		2,5-Dihydrofuran	NGS	100	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026959		78-93-3		2-Butanone	NGS	94	<1.9	15	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026959		110-43-0		2-Heptanone	NGS	93	<1.6	3.2	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026959		591-78-6		2-Hexanone	NGS	95	<1.2	2.0	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026959		534-22-5		2-Methylfuran	NGS	94	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026959		78-94-4		3-Buten-2-one	NGS	88	<1.7	3.9	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026959		106-35-4		3-Heptanone	NGS	92	<1.5	4.6	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026959		106-68-3		3-Octanone	NGS	93	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026959		105-42-0		4-Methyl-2-hexanone	NGS	95	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026959		108-10-1		4-Methyl-2-Pentanone	NGS	97	<1.9	2.1	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026959		67-64-1		Acetone	NGS	88	5.5	440	n/a	n/a	n/a	n/a	4.3	n/a	E
S16T026959		75-05-8		Acetonitrile	NGS	87	<1.8	34	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026959		98-86-2		Acetophenone	NGS	95	<2.6	8.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026959		107-13-1		Acrylonitrile	NGS	93	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026959		107-18-6		Allyl Alcohol	NGS	94	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026959		107-05-1		Allyl Chloride	NGS	90	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U

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# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-E1  
Customer Sample ID: 16-07654-2-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															
S16T026959			71-43-2	Benzene	NGS	96	<1.2	2.3	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026959			100-47-0	Benzonitrile	NGS	97	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026959			123-72-8	Butanal	NGS	110	<2.1	5.0	n/a	n/a	n/a	n/a	2.1	n/a	J
S16T026959			109-74-0	Butanenitrile	NGS	95	<1.2	5.5	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026959			56-23-5	Carbon tetrachloride	NGS	100	<1.6	1.6	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026959			108-90-7	Chlorobenzene	NGS	98	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026959			75-00-3	Chloroethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026959			67-66-3	Chloroform	NGS	99	<1.5	32	n/a	n/a	n/a	n/a	1.5	n/a	
S16T026959			110-82-7	Cyclohexane	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026959			124-18-5	Decane	NGS	96	<2.8	5.7	n/a	n/a	n/a	n/a	2.8	n/a	J
S16T026959			64-17-5	Ethanol	NGS	96	<7.4	150	n/a	n/a	n/a	n/a	7.4	n/a	
S16T026959			141-78-6	Ethyl acetate	NGS	81	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026959			100-41-4	Ethylbenzene	NGS	97	<1.5	3.0	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026959			110-00-9	Furan	NGS	95	<1.6	2.0	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026959			110-54-3	Hexane	NGS	97	<1.7	3.6	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026959			628-73-9	Hexanenitrile	NGS	97	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026959			126-98-7	Methacrylonitrile	NGS	96	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026959			75-09-2	Methylene Chloride	NGS	98	<2.7	3.7	n/a	n/a	n/a	n/a	2.7	n/a	J
S16T026959			91-20-3	Naphthalene	NGS	100	<3.7	<3.7	n/a	n/a	n/a	n/a	3.7	n/a	U
S16T026959			98-95-3	Nitrobenzene	NGS	97	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026959			110-59-8	Pentanitrile	NGS	95	<1.6	2.0	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026959			107-12-0	Propanenitrile	NGS	96	<1.4	5.4	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T026959			110-86-1	Pyridine	NGS	120	<3.8	<3.8	n/a	n/a	n/a	n/a	3.8	n/a	U
S16T026959			100-42-5	Styrene	NGS	97	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026959			127-18-4	Tetrachloroethene	NGS	100	<1.6	46	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026959			108-88-3	Toluene	NGS	96	<1.5	4.5	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026959			79-01-6	Trichloroethene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026959			75-69-4	Trichlorofluoromethane	NGS	91	<1.6	520	n/a	n/a	n/a	n/a	1.6	n/a	E

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Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-E1  
Customer Sample ID: 16-07654-2-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															
S16T026959			10061-01-5	cis-1,3-Dichloropropene	NGS	97	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026959			123-86-4	n-Butyl acetate	NGS	81	<1.4	1.4	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T026959			142-82-5	n-Heptane	NGS	95	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026959			10061-02-6	trans-1,3-Dichloropropene	NGS	94	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U

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U - Less Than Detection Limit



Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-EFF-BASE  
Customer Sample ID: 16-07654-2-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															
S16T026961			79-34-5	1,1,2,2-Tetrachloroethane	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026961			79-00-5	1,1,2-Trichloroethane	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026961			75-34-3	1,1-Dichloroethane	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026961			75-35-4	1,1-Dichloroethane	NGS	92	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026961			107-06-2	1,2-Dichloroethane	NGS	97	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026961			542-75-6	1,3-Dichloropropene (Total)	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026961			106-46-7	1,4-Dichlorobenzene	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026961			123-91-1	1,4-Dioxane	NGS	98	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026961			71-36-3	1-Butanol	NGS	100	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	LUY
S16T026961			111-70-6	1-Heptanol	NGS	72	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	LQU
S16T026961			71-23-8	1-Propanol	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026961			108-47-4	2,4-Dimethylpyridine	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026961			1708-29-8	2,5-Dihydrofuran	NGS	100	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026961			78-93-3	2-Butanone	NGS	94	<1.9	3.9	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026961			110-43-0	2-Heptanone	NGS	93	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026961			591-78-6	2-Hexanone	NGS	95	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026961			534-22-5	2-Methylfuran	NGS	94	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026961			78-94-4	3-Buten-2-one	NGS	88	<1.7	1.7	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026961			106-35-4	3-Heptanone	NGS	92	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026961			106-68-3	3-Octanone	NGS	93	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026961			105-42-0	4-Methyl-2-hexanone	NGS	95	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026961			108-10-1	4-Methyl-2-pentanone	NGS	97	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026961			67-64-1	Acetone	NGS	88	5.5	18	n/a	n/a	n/a	n/a	4.3	n/a	
S16T026961			75-05-8	Acetonitrile	NGS	87	<1.8	150	n/a	n/a	n/a	n/a	1.8	n/a	
S16T026961			98-86-2	Acetophenone	NGS	95	<2.6	15	n/a	n/a	n/a	n/a	2.6	n/a	
S16T026961			107-13-1	Acrylonitrile	NGS	93	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026961			107-18-6	Allyl Alcohol	NGS	94	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026961			107-05-1	Allyl Chloride	NGS	90	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U

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L - LLS Outside Range  
NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-EFF-BASE  
Customer Sample ID: 16-07654-2-EFF-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															
S16T026961			71-43-2	Benzene	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026961			100-47-0	Benzonitrile	NGS	97	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026961			123-72-8	Butanal	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026961			109-74-0	Butanenitrile	NGS	95	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026961			56-23-5	Carbon tetrachloride	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026961			108-90-7	Chlorobenzene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026961			75-00-3	Chloroethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026961			67-66-3	Chloroform	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026961			110-82-7	Cyclohexane	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026961			124-18-5	Decane	NGS	96	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026961			64-17-5	Ethanol	NGS	96	<7.4	8.0	n/a	n/a	n/a	n/a	7.4	n/a	J
S16T026961			141-78-6	Ethyl acetate	NGS	81	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026961			100-41-4	Ethylbenzene	NGS	97	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026961			110-00-9	Furan	NGS	95	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026961			110-54-3	Hexane	NGS	97	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026961			628-73-9	Hexanenitrile	NGS	97	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026961			126-98-7	Methacrylonitrile	NGS	96	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026961			75-09-2	Methylene Chloride	NGS	98	<2.7	6.5	n/a	n/a	n/a	n/a	2.7	n/a	J
S16T026961			91-20-3	Naphthalene	NGS	100	<3.7	<3.7	n/a	n/a	n/a	n/a	3.7	n/a	U
S16T026961			98-95-3	Nitrobenzene	NGS	97	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026961			110-59-8	Pentanitrile	NGS	95	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026961			107-12-0	Propanenitrile	NGS	96	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026961			110-86-1	Pyridine	NGS	120	<3.8	<3.8	n/a	n/a	n/a	n/a	3.8	n/a	U
S16T026961			100-42-5	Styrene	NGS	97	<1.6	1.7	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026961			127-18-4	Tetrachloroethene	NGS	100	<1.6	72	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026961			108-88-3	Toluene	NGS	96	<1.5	3.4	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026961			79-01-6	Trichloroethene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026961			75-69-4	Trichlorofluoromethane	NGS	91	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U

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# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-EFF-BASE  
Customer Sample ID: 16-07654-2-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															
S16T026961			10061-01-5	dis-1,3-Dichloropropene	NGS	97	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026961			123-96-4	n-Butyl acetate	NGS	81	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026961			142-82-5	n-Heptane	NGS	95	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026961			10061-02-6	trans-1,3-Dichloropropene	NGS	94	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U

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Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-F1  
Customer Sample ID: 16-07654-2-F1

Sample#	R	AP	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026962		79-34-5		1,1,2,2-Tetrachloroethane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026962		79-00-5		1,1,2-Trichloroethane	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026962		75-34-3		1,1-Dichloroethane	NGS	93	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026962		75-35-4		1,1-Dichloroethane	NGS	90	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026962		107-06-2		1,2-Dichloroethane	NGS	99	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026962		542-75-6		1,3-Dichloropropene (Total)	NGS	99	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026962		106-46-7		1,4-Dichlorobenzene	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026962		123-91-1		1,4-Dioxane	NGS	100	<1.7	3.0	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026962		71-36-3		1-Butanol	NGS	110	<8.9	98	n/a	n/a	n/a	n/a	8.9	n/a	LY
S16T026962		111-70-6		1-Heptanol	NGS	81	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	LU
S16T026962		71-23-8		1-Propanol	NGS	100	<3.0	35	n/a	n/a	n/a	n/a	3.0	n/a	
S16T026962		108-47-4		2,4-Dimethylpyridine	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026962		1708-29-8		2,5-Dihydrofuran	NGS	99	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026962		78-93-3		2-Butanone	NGS	93	<1.9	14	n/a	n/a	n/a	n/a	1.9	n/a	
S16T026962		110-43-0		2-Heptanone	NGS	97	<1.6	3.5	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026962		591-78-6		2-Hexanone	NGS	97	<1.2	2.1	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026962		534-22-5		2-Methylfuran	NGS	93	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026962		78-94-4		3-Buten-2-one	NGS	87	<1.7	4.2	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026962		106-35-4		3-Heptanone	NGS	96	<1.5	5.0	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026962		106-68-3		3-Octanone	NGS	94	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026962		105-42-0		4-Methyl-2-hexanone	NGS	96	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026962		108-10-1		4-Methyl-2-Pentanone	NGS	100	<1.9	2.0	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026962		67-64-1		Acetone	NGS	88	<4.3	450	n/a	n/a	n/a	n/a	4.3	n/a	E
S16T026962		75-05-8		Acetonitrile	NGS	86	<1.8	76	n/a	n/a	n/a	n/a	1.8	n/a	
S16T026962		98-86-2		Acetophenone	NGS	95	<2.6	11	n/a	n/a	n/a	n/a	2.6	n/a	J
S16T026962		107-13-1		Acrylonitrile	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026962		107-18-6		Allyl Alcohol	NGS	100	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026962		107-05-1		Allyl Chloride	NGS	91	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U

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Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-F1  
Customer Sample ID: 16-07654-2-F1

Sample#	R	Ad	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Dot Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026962			71-43-2	Benzene	NGS	98	<1.2	2.5	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026962			100-47-0	Benzonitrile	NGS	97	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026962			123-72-8	Butanal	NGS	110	<2.1	6.0	n/a	n/a	n/a	n/a	2.1	n/a	J
S16T026962			109-74-0	Butanenitrile	NGS	98	<1.2	6.0	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026962			56-23-5	Carbon tetrachloride	NGS	100	<1.6	1.7	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026962			108-90-7	Chlorobenzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026962			75-00-3	Chloroethane	NGS	98	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026962			87-66-3	Chloroform	NGS	99	<1.5	34	n/a	n/a	n/a	n/a	1.5	n/a	
S16T026962			110-82-7	Cyclohexane	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026962			124-18-5	Decane	NGS	97	<2.8	3.1	n/a	n/a	n/a	n/a	2.8	n/a	J
S16T026962			84-17-5	Ethanol	NGS	100	<7.4	170	n/a	n/a	n/a	n/a	7.4	n/a	
S16T026962			141-78-6	Ethyl acetate	NGS	79	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026962			100-41-4	Ethylbenzene	NGS	97	<1.5	3.6	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026962			110-00-9	Furan	NGS	91	<1.6	3.0	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026962			110-54-3	Hexane	NGS	94	<1.7	2.2	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026962			828-73-9	Hexanenitrile	NGS	98	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026962			126-98-7	Methacrylonitrile	NGS	95	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026962			75-09-2	Methylene Chloride	NGS	95	<2.7	4.6	n/a	n/a	n/a	n/a	2.7	n/a	J
S16T026962			91-20-3	Naphthalene	NGS	100	<3.7	<3.7	n/a	n/a	n/a	n/a	3.7	n/a	U
S16T026962			98-95-3	Nitrobenzene	NGS	96	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026962			110-59-8	Pentanitrile	NGS	97	<1.6	2.3	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026962			107-12-0	Propanenitrile	NGS	95	<1.4	5.8	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T026962			110-96-1	Pyridine	NGS	120	<3.8	<3.8	n/a	n/a	n/a	n/a	3.8	n/a	U
S16T026962			100-42-5	Styrene	NGS	99	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026962			127-18-4	Tetrachloroethene	NGS	100	<1.6	48	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026962			108-88-3	Toluene	NGS	95	<1.5	4.5	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026962			79-01-6	Trichloroethene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026962			75-69-4	Trichlorofluoromethane	NGS	95	<1.6	620	n/a	n/a	n/a	n/a	1.6	n/a	E

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# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-F1  
Customer Sample ID: 16-07654-2-F1

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026962			10061-01-5	dis-1,3-Dichloropropene	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026962			123-86-4	n-Butyl acetate	NGS	84	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026962			142-82-5	n-Heptane	NGS	99	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026962			10061-02-6	trans-1,3-Dichloropropene	NGS	99	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U

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Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-G1  
Customer Sample ID: 16-07654-2-G1

Sample#	R	AP	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026964			79-34-5	1,1,2,2-Tetrachloroethane	NGS	99	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026964			79-00-5	1,1,2-Trichloroethane	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026964			75-34-3	1,1-Dichloroethane	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026964			75-35-4	1,1-Dichloroethene	NGS	92	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026964			107-06-2	1,2-Dichloroethane	NGS	97	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026964			542-75-6	1,3-Dichloropropene (Total)	NGS	96	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026964			106-46-7	1,4-Dichlorobenzene	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026964			123-91-1	1,4-Dioxane	NGS	98	<1.7	2.7	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026964			71-36-3	1-Butanol	NGS	100	<8.9	99	n/a	n/a	n/a	n/a	8.9	n/a	LY
S16T026964			111-70-6	1-Heptanol	NGS	72	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	LQU
S16T026964			71-23-8	1-Propanol	NGS	100	<3.0	33	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026964			108-47-4	2,4-Dimethylpyridine	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026964			1708-29-8	2,5-Dihydrofuran	NGS	100	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026964			78-93-3	2-Butanone	NGS	94	<1.9	14	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026964			110-43-0	2-Heptanone	NGS	93	<1.6	3.2	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026964			591-78-6	2-Hexanone	NGS	95	<1.2	1.9	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026964			534-22-5	2-Methylfuran	NGS	94	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026964			78-94-4	3-Buten-2-one	NGS	88	<1.7	3.3	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026964			106-35-4	3-Heptanone	NGS	92	<1.5	5.2	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026964			106-68-3	3-Octanone	NGS	93	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026964			105-42-0	4-Methyl-2-hexanone	NGS	95	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026964			108-10-1	4-Methyl-2-Pentanone	NGS	97	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026964			67-64-1	Acetone	NGS	88	5.5	360	n/a	n/a	n/a	n/a	4.3	n/a	U
S16T026964			75-05-8	Acetonitrile	NGS	87	<1.8	37	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026964			98-86-2	Acetophenone	NGS	95	<2.6	5.9	n/a	n/a	n/a	n/a	2.6	n/a	J
S16T026964			107-13-1	Acrylonitrile	NGS	93	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026964			107-18-6	Allyl Alcohol	NGS	94	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026964			107-05-1	Allyl Chloride	NGS	90	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U

J - Estimated  
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U - Less Than Detection Limit  
E - Outside Calibration Range  
Q - Qualitative  
L - LLS Outside Range

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-G1  
Customer Sample ID: 16-07654-2-G1

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026964			71-43-2	Benzene	NGS	96	<1.2	2.4	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026964			100-47-0	Benzonitrile	NGS	97	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026964			123-72-8	Butanal	NGS	110	<2.1	5.9	n/a	n/a	n/a	n/a	2.1	n/a	J
S16T026964			109-74-0	Butanenitrile	NGS	95	<1.2	6.0	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026964			56-23-5	Carbon tetrachloride	NGS	100	<1.6	1.7	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026964			108-90-7	Chlorobenzene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026964			75-00-3	Chloroethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026964			67-66-3	Chloroform	NGS	99	<1.5	2.9	n/a	n/a	n/a	n/a	1.5	n/a	
S16T026964			110-82-7	Cyclohexane	NGS	99	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026964			124-18-5	Decane	NGS	96	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026964			64-17-5	Ethanol	NGS	96	<7.4	160	n/a	n/a	n/a	n/a	7.4	n/a	
S16T026964			141-78-6	Ethyl acetate	NGS	81	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026964			100-41-4	Ethylbenzene	NGS	97	<1.5	3.5	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026964			110-00-9	Furan	NGS	95	<1.6	5.7	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026964			110-54-3	Hexane	NGS	97	<1.7	3.5	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026964			628-73-9	Hexanenitrile	NGS	97	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026964			126-98-7	Methacrylonitrile	NGS	96	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026964			75-09-2	Methylene Chloride	NGS	98	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026964			91-20-3	Naphthalene	NGS	100	<3.7	<3.7	n/a	n/a	n/a	n/a	3.7	n/a	U
S16T026964			98-95-3	Nitrobenzene	NGS	97	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026964			110-59-8	Pentanitrile	NGS	95	<1.6	2.3	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026964			107-12-0	Propanenitrile	NGS	96	<1.4	5.9	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T026964			110-86-1	Pyridine	NGS	120	<3.8	<3.8	n/a	n/a	n/a	n/a	3.8	n/a	U
S16T026964			100-42-5	Styrene	NGS	97	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026964			127-18-4	Tetrachloroethene	NGS	100	<1.6	4.3	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026964			108-88-3	Toluene	NGS	96	<1.5	3.6	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026964			79-01-6	Trichloroethene	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026964			75-69-4	Trichlorofluoromethane	NGS	91	<1.6	570	n/a	n/a	n/a	n/a	1.6	n/a	E

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L - LLS Outside Range  
NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit



Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-G1  
Customer Sample ID: 16-07654-2-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															
S16T026964			10061-01-5	dis-1,3-Dichloropropene	NGS	97	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026964			123-86-4	n-Butyl acetate	NGS	81	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026964			142-82-5	n-Heptane	NGS	95	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026964			10061-02-6	trans-1,3-Dichloropropene	NGS	94	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U

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Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-IN-BASE  
Customer Sample ID: 16-07654-2-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															
S16T026968		79-34-5		1,1,2,2-Tetrachloroethane	NGS	100	<1.3	1.3	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T026968		79-00-5		1,1,2-Trichloroethane	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026968		75-34-3		1,1-Dichloroethane	NGS	93	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026968		75-35-4		1,1-Dichloroethene	NGS	90	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026968		107-06-2		1,2-Dichloroethane	NGS	99	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026968		542-75-6		1,3-Dichloropropene (Total)	NGS	99	<1.2	3.5	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026968		106-46-7		1,4-Dichlorobenzene	NGS	100	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026968		123-91-1		1,4-Dioxane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026968		71-36-3		1-Butanol	NGS	110	<8.9	20	n/a	n/a	n/a	n/a	8.9	n/a	JLY
S16T026968		111-70-6		1-Heptanol	NGS	81	<5.6	<5.6	n/a	n/a	n/a	n/a	5.6	n/a	LU
S16T026968		71-23-8		1-Propanol	NGS	100	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026968		108-47-4		2,4-Dimethylpyridine	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026968		1708-29-8		2,5-Dihydrofuran	NGS	99	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026968		78-93-3		2-Butanone	NGS	93	<1.9	5.7	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026968		110-43-0		2-Heptanone	NGS	97	<1.6	3.0	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026968		591-78-6		2-Hexanone	NGS	97	<1.2	1.3	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026968		534-22-5		2-Methylfuran	NGS	93	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026968		78-94-4		3-Buten-2-one	NGS	87	<1.7	2.4	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026968		106-35-4		3-Heptanone	NGS	96	<1.5	3.5	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026968		106-68-3		3-Octanone	NGS	94	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026968		105-42-0		4-Methyl-2-hexanone	NGS	96	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026968		108-10-1		4-Methyl-2-Pentanone	NGS	100	<1.9	4.6	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026968		67-64-1		Acetone	NGS	88	<4.3	53	n/a	n/a	n/a	n/a	4.3	n/a	U
S16T026968		75-05-8		Acetonitrile	NGS	86	<1.8	8.8E+03	n/a	n/a	n/a	n/a	1.8	n/a	EY
S16T026968		98-86-2		Acetophenone	NGS	95	<2.6	17	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026968		107-13-1		Acrylonitrile	NGS	94	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026968		107-18-6		Allyl Alcohol	NGS	100	<3.9	<3.9	n/a	n/a	n/a	n/a	3.9	n/a	U
S16T026968		107-05-1		Allyl Chloride	NGS	91	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U

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U - Less Than Detection Limit

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-IN-BASE  
Customer Sample ID: 16-07654-2-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															
S16T026968		71-43-2		Benzene	NGS	98	<1.2	2.2	n/a	n/a	n/a	n/a	1.2	n/a	J
S16T026968		100-47-0		Benzonitrile	NGS	97	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026968		123-72-8		Butanal	NGS	110	<2.1	4.6	n/a	n/a	n/a	n/a	2.1	n/a	J
S16T026968		109-74-0		Butanenitrile	NGS	98	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U
S16T026968		56-23-5		Carbon tetrachloride	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026968		108-90-7		Chlorobenzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026968		75-00-3		Chloroethane	NGS	98	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026968		67-66-3		Chloroform	NGS	99	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026968		110-82-7		Cyclohexane	NGS	100	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026968		124-18-5		Decane	NGS	97	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026968		64-17-5		Ethanol	NGS	100	<7.4	200	n/a	n/a	n/a	n/a	7.4	n/a	U
S16T026968		141-78-6		Ethyl acetate	NGS	79	<1.5	4.2	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026968		100-41-4		Ethylbenzene	NGS	97	<1.5	3.3	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026968		110-00-9		Furan	NGS	91	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026968		110-54-3		Hexane	NGS	94	<1.7	2.9	n/a	n/a	n/a	n/a	1.7	n/a	J
S16T026968		628-73-9		Hexanenitrile	NGS	98	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026968		126-98-7		Methacrylonitrile	NGS	95	<1.6	4.3	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026968		75-09-2		Methylene Chloride	NGS	95	<2.7	6.0	n/a	n/a	n/a	n/a	2.7	n/a	J
S16T026968		91-20-3		Naphthalene	NGS	100	<3.7	<3.7	n/a	n/a	n/a	n/a	3.7	n/a	U
S16T026968		98-95-3		Nitrobenzene	NGS	96	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026968		110-59-8		Pentanitrile	NGS	97	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026968		107-12-0		Propanenitrile	NGS	95	<1.4	1.6	n/a	n/a	n/a	n/a	1.4	n/a	J
S16T026968		110-96-1		Pyridine	NGS	120	<3.8	<3.8	n/a	n/a	n/a	n/a	3.8	n/a	U
S16T026968		100-42-5		Styrene	NGS	99	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026968		127-18-4		Tetrachloroethene	NGS	100	<1.6	100	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026968		108-88-3		Toluene	NGS	95	<1.5	13	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026968		79-01-6		Trichloroethene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026968		75-69-4		Trichlorofluoromethane	NGS	95	<1.6	6.0	n/a	n/a	n/a	n/a	1.6	n/a	J

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L - ILS Outside Range  
NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162537  
SDG Number:  
Customer Sample ID: 16-07654-2-IN-BASE  
Customer Sample ID: 16-07654-2-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															
S16T026968			10061-01-5	dis-1,3-Dichloropropene	NGS	100	<1.3	3.5	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026968			123-86-4	n-Butyl acetate	NGS	84	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026968			142-82-5	n-Heptane	NGS	99	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026968			10061-02-6	trans-1,3-Dichloropropene	NGS	99	<1.2	<1.2	n/a	n/a	n/a	n/a	1.2	n/a	U

J - Estimated  
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Q - Qualitative

L - LLS Outside Range

NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit

*James J. J.*  
11/9/16

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162526

SDG Number:

Customer Sample ID: 16-07654-2-A1

Customer Sample ID: 16-07654-2-A1

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026949			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	U
S16T026949			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	U
S16T026949			75-34-3	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026949			75-35-4	1,2-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026949			107-06-2	1,2-Dichloroethane	NGS	110	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026949			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026949			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026949			123-91-1	1,4-Dioxane	NGS	110	<2.0	3.2	n/a	n/a	n/a	n/a	2.0	n/a	J
S16T026949			71-36-3	1-Butanol	NGS	110	<4.3	67	n/a	n/a	n/a	n/a	4.3	n/a	
S16T026949			111-70-6	1-Heptanol	NGS	93	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	U
S16T026949			71-23-8	1-Propanol	NGS	100	<8.9	19	n/a	n/a	n/a	n/a	8.9	n/a	J
S16T026949			108-47-4	2,4-Dimethylpyridine	NGS	110	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026949			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026949			78-93-3	2-Butanone	NGS	100	<3.1	17	n/a	n/a	n/a	n/a	3.1	n/a	
S16T026949			110-43-0	2-Heptanone	NGS	110	<2.6	5.9	n/a	n/a	n/a	n/a	2.6	n/a	J
S16T026949			591-78-6	2-Hexanone	NGS	100	<2.5	3.0	n/a	n/a	n/a	n/a	2.5	n/a	J
S16T026949			534-22-5	2-Methylfuran	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026949			78-94-4	3-Buten-2-one	NGS	96	<1.9	6.0	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026949			106-35-4	3-Heptanone	NGS	110	<2.7	6.9	n/a	n/a	n/a	n/a	2.7	n/a	J
S16T026949			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026949			105-42-0	4-Methyl-2-hexanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026949			108-10-1	4-Methyl-2-pentanone	NGS	100	<2.2	4.0	n/a	n/a	n/a	n/a	2.2	n/a	J
S16T026949			67-64-1	Acetone	NGS	99	3.1	490	n/a	n/a	n/a	n/a	2.8	n/a	BE
S16T026949			75-05-8	Acetonitrile	NGS	100	<1.6	170	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026949			98-86-2	Acetophenone	NGS	110	<6.2	40	n/a	n/a	n/a	n/a	6.2	n/a	L
S16T026949			107-13-1	Acrylonitrile	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026949			107-18-6	Allyl Alcohol	NGS	100	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	U

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N - Named TIC  
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L - LLS Outside Range

# Cartridge Evaluation Data Summary Report

Sample Group: 20162526  
 SDG Number:  
 Customer Sample ID: 16-07654-2-A1  
 Customer Sample ID: 16-07654-2-A1

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026949			107-05-1	Allyl Chloride	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026949			71-43-2	Benzene	NGS	100	<1.5	3.2	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026949			100-47-0	Benzonitrile	NGS	110	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	U
S16T026949			123-72-8	Butanal	NGS	110	<3.0	7.9	n/a	n/a	n/a	n/a	3.0	n/a	J
S16T026949			109-74-0	Butanenitrile	NGS	110	<2.1	6.0	n/a	n/a	n/a	n/a	2.1	n/a	J
S16T026949			56-23-5	Carbon tetrachloride	NGS	100	<1.5	1.8	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026949			108-90-7	Chlorobenzene	NGS	110	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026949			75-00-3	Chloroethane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026949			87-66-3	Chloroform	NGS	110	<1.8	34	n/a	n/a	n/a	n/a	1.8	n/a	
S16T026949			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026949			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026949			84-17-5	Ethanol	NGS	110	4.0	150	n/a	n/a	n/a	n/a	3.7	n/a	B
S16T026949			141-78-6	Ethyl acetate	NGS	89	<1.8	2.0	n/a	n/a	n/a	n/a	1.8	n/a	J
S16T026949			100-41-4	Ethylbenzene	NGS	100	<2.4	4.0	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T026949			110-00-9	Furan	NGS	100	<1.6	1.7	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026949			110-54-3	Hexane	NGS	100	<1.3	4.4	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T026949			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026949			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026949			75-09-2	Methylene Chloride	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026949			91-20-3	Naphthalene	NGS	100	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	U
S16T026949			98-95-3	Nitrobenzene	NGS	110	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	U
S16T026949			110-59-8	Pentanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026949			107-12-0	Propanenitrile	NGS	110	<1.8	5.3	n/a	n/a	n/a	n/a	1.8	n/a	J
S16T026949			110-86-1	Pyridine	NGS	120	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026949			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026949			127-18-4	Tetrachloroethene	NGS	110	<1.8	99	n/a	n/a	n/a	n/a	1.8	n/a	
S16T026949			108-88-3	Toluene	NGS	99	<2.2	7.7	n/a	n/a	n/a	n/a	2.2	n/a	J

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162526  
SDG Number:  
Customer Sample ID: 16-07654-2-A1  
Customer Sample ID: 16-07654-2-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															
S16T026949			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026949			75-69-4	Trichlorofluoromethane	NGS	100	<1.9	530	n/a	n/a	n/a	n/a	1.9	n/a	E
S16T026949			10061-01-5	cis-1,3-Dichloropropene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026949			123-86-4	n-Butyl acetate	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026949			142-82-5	n-Heptane	NGS	110	<1.6	2.8	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026949			10061-02-6	trans-1,3-Dichloropropene	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162526  
SDG Number:  
Customer Sample ID: 16-07654-2-A2  
Customer Sample ID: 16-07654-2-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															
S16T026950			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	U
S16T026950			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	U
S16T026950			75-34-3	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026950			75-35-4	1,1-Dichloroethene	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026950			107-06-2	1,2-Dichloroethane	NGS	110	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026950			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026950			108-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026950			123-91-1	1,4-Dioxane	NGS	110	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026950			71-36-3	1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	U
S16T026950			111-70-6	1-Heptanol	NGS	93	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	U
S16T026950			71-23-8	1-Propanol	NGS	100	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	U
S16T026950			108-47-4	2,4-Dimethylpyridine	NGS	110	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026950			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026950			78-93-3	2-Butanone	NGS	100	<3.1	6.2	n/a	n/a	n/a	n/a	3.1	n/a	J
S16T026950			110-43-0	2-Heptanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026950			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026950			534-22-5	2-Methylfuran	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026950			78-94-4	3-Buten-2-one	NGS	96	<1.9	2.8	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026950			106-35-4	3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026950			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026950			105-42-0	4-Methyl-2-hexanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026950			108-10-1	4-Methyl-2-pentanone	NGS	100	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026950			67-64-1	Acetone	NGS	99	3.1	27	n/a	n/a	n/a	n/a	2.8	n/a	B
S16T026950			75-05-8	Acetonitrile	NGS	100	<1.6	82	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026950			98-86-2	Acetophenone	NGS	110	<6.2	33	n/a	n/a	n/a	n/a	6.2	n/a	L
S16T026950			107-13-1	Acrylonitrile	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026950			107-18-6	Allyl Alcohol	NGS	100	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	U

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162526  
 SDG Number:  
 Customer Sample ID: 16-07654-2-A2  
 Customer Sample ID: 16-07654-2-A2

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026950			107-05-1	Allyl Chloride	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026950			71-43-2	Benzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026950			100-47-0	Benzonitrile	NGS	110	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	U
S16T026950			123-72-8	Butanal	NGS	110	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026950			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026950			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026950			108-90-7	Chlorobenzene	NGS	110	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026950			75-00-3	Chloroethane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026950			67-66-3	Chloroform	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026950			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026950			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026950			84-17-5	Ethanol	NGS	110	4.0	9.1	n/a	n/a	n/a	n/a	3.7	n/a	BJ
S16T026950			141-78-6	Ethyl acetate	NGS	89	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026950			100-41-4	Ethylbenzene	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026950			110-00-9	Furan	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026950			110-54-3	Hexane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T026950			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026950			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026950			75-09-2	Methylene Chloride	NGS	100	<4.1	4.1	n/a	n/a	n/a	n/a	4.1	n/a	J
S16T026950			91-20-3	Naphthalene	NGS	100	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	U
S16T026950			98-95-3	Nitrobenzene	NGS	110	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	U
S16T026950			110-59-8	Pentanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026950			107-12-0	Propanenitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026950			110-86-1	Pyridine	NGS	120	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026950			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026950			127-18-4	Tetrachloroethene	NGS	110	<1.8	91	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026950			108-88-3	Toluene	NGS	99	<2.2	3.1	n/a	n/a	n/a	n/a	2.2	n/a	J

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162526  
SDG Number:  
Customer Sample ID: 16-07654-2-A2  
Customer Sample ID: 16-07654-2-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															
S16T026950			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026950			75-69-4	Trichlorofluoromethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026950			10061-01-5	cis-1,3-Dichloropropene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026950			123-86-4	n-Butyl acetate	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026950			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026950			10061-02-6	trans-1,3-Dichloropropene	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U

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J - Estimated  
U - Less Than Detection Limit  
N - Named TIC  
NA = Not Analyzed, ND = Not Detected  
L - LLS Outside Range

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162526  
SDG Number:  
Customer Sample ID: 16-07654-2-B2  
Customer Sample ID: 16-07654-2-B2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026952			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	U
S16T026952			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	U
S16T026952			75-34-3	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026952			75-35-4	1,1-Dichloroethene	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026952			107-06-2	1,2-Dichloroethane	NGS	110	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026952			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026952			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026952			123-91-1	1,4-Dioxane	NGS	110	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026952			71-36-3	1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	U
S16T026952			111-70-6	1-Heptanol	NGS	93	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	U
S16T026952			71-23-8	1-Propanol	NGS	100	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	U
S16T026952			108-47-4	2,4-Dimethylpyridine	NGS	110	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026952			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026952			78-93-3	2-Butanone	NGS	100	<3.1	5.4	n/a	n/a	n/a	n/a	3.1	n/a	J
S16T026952			110-43-0	2-Heptanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026952			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026952			534-22-5	2-Methylfuran	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026952			78-94-4	3-Buten-2-one	NGS	96	<1.9	2.0	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026952			106-35-4	3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026952			108-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026952			105-42-0	4-Methyl-2-hexanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026952			108-10-1	4-Methyl-2-pentanone	NGS	100	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026952			67-64-1	Acetone	NGS	99	3.1	26	n/a	n/a	n/a	n/a	2.8	n/a	B
S16T026952			75-05-8	Acetonitrile	NGS	100	<1.6	59	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026952			98-86-2	Acetophenone	NGS	110	<6.2	24	n/a	n/a	n/a	n/a	6.2	n/a	L
S16T026952			107-13-1	Acrylonitrile	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026952			107-18-6	Allyl Alcohol	NGS	100	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	U

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162526  
SDG Number:  
Customer Sample ID: 16-07654-2-B2  
Customer Sample ID: 16-07654-2-B2

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026952			107-05-1	Allyl Chloride	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026952			71-43-2	Benzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026952			100-47-0	Benzonitrile	NGS	110	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	U
S16T026952			123-72-8	Butanal	NGS	110	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026952			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026952			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026952			108-90-7	Chlorobenzene	NGS	110	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026952			75-00-3	Chloroethane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026952			67-66-3	Chloroform	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026952			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026952			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026952			84-17-5	Ethanol	NGS	110	4.0	7.0	n/a	n/a	n/a	n/a	3.7	n/a	BJ
S16T026952			141-78-6	Ethyl acetate	NGS	89	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026952			100-41-4	Ethylbenzene	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026952			110-00-9	Furan	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026952			110-54-3	Hexane	NGS	100	<1.3	1.3	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T026952			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026952			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026952			75-09-2	Methylene Chloride	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026952			91-20-3	Naphthalene	NGS	100	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	U
S16T026952			98-95-3	Nitrobenzene	NGS	110	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	U
S16T026952			110-59-8	Pentanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026952			107-12-0	Propanenitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026952			110-86-1	Pyridine	NGS	120	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026952			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026952			127-18-4	Tetrachloroethene	NGS	110	<1.8	85	n/a	n/a	n/a	n/a	1.8	n/a	
S16T026952			108-88-3	Toluene	NGS	99	<2.2	2.9	n/a	n/a	n/a	n/a	2.2	n/a	J

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162526  
SDG Number:  
Customer Sample ID: 16-07654-2-B2  
Customer Sample ID: 16-07654-2-B2

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026952			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026952			75-69-4	Trichlorofluoromethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026952			10061-01-5	cis-1,3-Dichloropropene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026952			123-86-4	n-Butyl acetate	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026952			142-92-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026952			10061-02-6	trans-1,3-Dichloropropene	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162526

SDG Number:

Customer Sample ID: 16-07654-2-C2

Customer Sample ID: 16-07654-2-C2

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026956			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	U
S16T026956			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	U
S16T026956			75-34-3	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026956			75-35-4	1,1-Dichloroethene	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026956			107-06-2	1,2-Dichloroethane	NGS	110	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026956			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026956			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026956			123-91-1	1,4-Dioxane	NGS	110	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026956			71-36-3	1-Butanol	NGS	110	<4.3	5.5	n/a	n/a	n/a	n/a	4.3	n/a	J
S16T026956			111-70-6	1-Heptanol	NGS	93	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	U
S16T026956			71-23-8	1-Propanol	NGS	100	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	U
S16T026956			108-47-4	2,4-Dimethylpyridine	NGS	110	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026956			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026956			78-93-3	2-Butanone	NGS	100	<3.1	6.0	n/a	n/a	n/a	n/a	3.1	n/a	J
S16T026956			110-43-0	2-Heptanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026956			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026956			534-22-5	2-Methylfuran	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026956			78-94-4	3-Buten-2-one	NGS	96	<1.9	2.2	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026956			106-35-4	3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026956			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026956			105-42-0	4-Methyl-2-hexanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026956			108-10-1	4-Methyl-2-Pentanone	NGS	100	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026956			67-64-1	Acetone	NGS	99	3.1	27	n/a	n/a	n/a	n/a	2.8	n/a	B
S16T026956			75-05-8	Acetonitrile	NGS	100	<1.6	720	n/a	n/a	n/a	n/a	1.6	n/a	E
S16T026956			98-86-2	Acetophenone	NGS	110	<6.2	27	n/a	n/a	n/a	n/a	6.2	n/a	L
S16T026956			107-13-1	Acrylonitrile	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026956			107-18-6	Allyl Alcohol	NGS	100	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	U

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162526  
SDG Number:  
Customer Sample ID: 16-07654-2-C2  
Customer Sample ID: 16-07654-2-C2

Sample#	R	AP	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026956			107-05-1	Allyl Chloride	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026956			71-43-2	Benzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026956			100-47-0	Benzonitrile	NGS	110	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	U
S16T026956			123-72-8	Butanal	NGS	110	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026956			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026956			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026956			108-90-7	Chlorobenzene	NGS	110	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026956			75-00-3	Chloroethane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026956			67-66-3	Chloroform	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026956			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026956			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026956			84-17-5	Ethanol	NGS	110	4.0	20	n/a	n/a	n/a	n/a	3.7	n/a	BJ
S16T026956			141-78-6	Ethyl acetate	NGS	89	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026956			100-41-4	Ethylbenzene	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026956			110-00-9	Furan	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026956			110-54-3	Hexane	NGS	100	<1.3	1.4	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T026956			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026956			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026956			75-09-2	Methylene Chloride	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026956			91-20-3	Naphthalene	NGS	100	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	U
S16T026956			98-95-3	Nitrobenzene	NGS	110	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	U
S16T026956			110-59-8	Pentanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026956			107-12-0	Propanenitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026956			110-86-1	Pyridine	NGS	120	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026956			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026956			127-18-4	Tetrachloroethene	NGS	110	<1.8	84	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026956			108-88-3	Toluene	NGS	99	<2.2	3.0	n/a	n/a	n/a	n/a	2.2	n/a	J

E - Outside Calibration Range  
T - Tentatively Identified Compound  
B - Blank Contamination  
J - Estimated  
U - Less Than Detection Limit  
N - Named TIC  
NA = Not Analyzed, ND = Not Detected  
L - LLS Outside Range

# Cartridge Evaluation Data Summary Report

Sample Group: 20162526

SDG Number:

Customer Sample ID: 16-07654-2-C2

Customer Sample ID: 16-07654-2-C2

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026956			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026956			75-69-4	Trichlorofluoromethane	NGS	100	<1.9	3.2	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026956			10061-01-5	cis-1,3-Dichloropropene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026956			123-86-4	n-Butyl acetate	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026956			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026956			10061-02-6	trans-1,3-Dichloropropene	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U

E - Outside Calibration Range  
T - Tentatively Identified Compound

B - Blank Contamination  
J - Estimated

U - Less Than Detection Limit  
N - Named TIC

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



# Cartridge Evaluation Data Summary Report

Sample Group: 20162526  
SDG Number:  
Customer Sample ID: 16-07654-2-D2  
Customer Sample ID: 16-07654-2-D2

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026958			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	U
S16T026958			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	U
S16T026958			75-34-3	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026958			75-35-4	1,1-Dichloroethene	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026958			107-06-2	1,2-Dichloroethane	NGS	110	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026958			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026958			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026958			123-91-1	1,4-Dioxane	NGS	110	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026958			71-36-3	1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	U
S16T026958			111-70-6	1-Heptanol	NGS	93	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	U
S16T026958			71-23-8	1-Propanol	NGS	100	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	U
S16T026958			108-47-4	2,4-Dimethylpyridine	NGS	110	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026958			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026958			78-93-3	2-Butanone	NGS	100	<3.1	4.4	n/a	n/a	n/a	n/a	3.1	n/a	J
S16T026958			110-43-0	2-Heptanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026958			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026958			534-22-5	2-Methylfuran	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026958			78-94-4	3-Buten-2-one	NGS	96	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026958			106-35-4	3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026958			106-88-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026958			105-42-0	4-Methyl-2-hexanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026958			108-10-1	4-Methyl-2-Pentanone	NGS	100	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026958			67-64-1	Acetone	NGS	99	3.1	22	n/a	n/a	n/a	n/a	2.8	n/a	B
S16T026958			75-05-8	Acetonitrile	NGS	100	<1.6	39	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026958			98-86-2	Acetophenone	NGS	110	<6.2	21	n/a	n/a	n/a	n/a	6.2	n/a	L
S16T026958			107-13-1	Acrylonitrile	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026958			107-18-6	Allyl Alcohol	NGS	100	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	U

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Cartridge Evaluation  
 Data Summary Report

Sample Group: 20162526  
 SDG Number:  
 Customer Sample ID: 16-07654-2-D2  
 Customer Sample ID: 16-07654-2-D2

Sample#	R	AW	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026958			107-05-1	Allyl Chloride	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026958			71-43-2	Benzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026958			100-47-0	Benzonitrile	NGS	110	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	U
S16T026958			123-72-8	Butanal	NGS	110	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026958			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026958			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026958			108-90-7	Chlorobenzene	NGS	110	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026958			75-00-3	Chloroethane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026958			87-66-3	Chloroform	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026958			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026958			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026958			84-17-5	Ethanol	NGS	110	4.0	19	n/a	n/a	n/a	n/a	3.7	n/a	BJ
S16T026958			141-78-6	Ethyl acetate	NGS	89	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026958			100-41-4	Ethylbenzene	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026958			110-00-9	Furan	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026958			110-54-3	Hexane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026958			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026958			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026958			75-09-2	Methylene Chloride	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026958			91-20-3	Naphthalene	NGS	100	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	U
S16T026958			98-95-3	Nitrobenzene	NGS	110	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	U
S16T026958			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026958			107-12-0	Propanenitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026958			110-86-1	Pyridine	NGS	120	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026958			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026958			127-18-4	Tetrachloroethene	NGS	110	<1.8	73	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026958			108-88-3	Toluene	NGS	99	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U

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 L - LLS Outside Range

# Cartridge Evaluation Data Summary Report

Sample Group: 20162526

SDG Number:

Customer Sample ID: 16-07654-2-D2

Customer Sample ID: 16-07654-2-D2

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026958			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026958			75-69-4	Trichlorofluoromethane	NGS	100	<1.9	5.7	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026958			10061-01-5	cis-1,3-Dichloropropene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026958			123-86-4	n-Butyl acetate	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026958			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026958			10061-02-6	trans-1,3-Dichloropropene	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U

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 L - LLS Outside Range

Cartridge Evaluation  
 Data Summary Report

Sample Group: 20162526  
 SDG Number:  
 Customer Sample ID: 16-07654-2-E2  
 Customer Sample ID: 16-07654-2-E2

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026960			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	U
S16T026960			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	U
S16T026960			75-34-3	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026960			75-35-4	1,1-Dichloroethene	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026960			107-06-2	1,2-Dichloroethane	NGS	110	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026960			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026960			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026960			123-91-1	1,4-Dioxane	NGS	110	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026960			71-36-3	1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	U
S16T026960			111-70-6	1-Heptanol	NGS	93	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	U
S16T026960			71-23-8	1-Propanol	NGS	100	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	U
S16T026960			108-47-4	2,4-Dimethylpyridine	NGS	110	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026960			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026960			78-93-3	2-Butanone	NGS	100	<3.1	<3.1	n/a	n/a	n/a	n/a	3.1	n/a	U
S16T026960			110-43-0	2-Heptanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026960			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026960			534-22-5	2-Methylfuran	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026960			78-94-4	3-Buten-2-one	NGS	96	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026960			106-35-4	3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026960			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026960			105-42-0	4-Methyl-2-hexanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026960			108-10-1	4-Methyl-2-Pentanone	NGS	100	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026960			67-64-1	Acetone	NGS	99	3.1	15	n/a	n/a	n/a	n/a	2.8	n/a	B
S16T026960			75-05-8	Acetonitrile	NGS	100	<1.6	35	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026960			98-86-2	Acetophenone	NGS	110	<6.2	11	n/a	n/a	n/a	n/a	6.2	n/a	UL
S16T026960			107-13-1	Acrylonitrile	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026960			107-18-6	Allyl Alcohol	NGS	100	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	U

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162526

SDG Number:

Customer Sample ID: 16-07654-2-E2

Customer Sample ID: 16-07654-2-E2

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026960			107-05-1	Allyl Chloride	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026960			71-43-2	Benzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026960			100-47-0	Benzonitrile	NGS	110	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	U
S16T026960			123-72-8	Butanal	NGS	110	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026960			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026960			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026960			108-90-7	Chlorobenzene	NGS	110	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026960			75-00-3	Chloroethane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026960			67-66-3	Chloroform	NGS	110	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026960			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026960			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026960			64-17-5	Ethanol	NGS	110	4.0	22	n/a	n/a	n/a	n/a	3.7	n/a	BU
S16T026960			141-78-6	Ethyl acetate	NGS	89	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026960			100-41-4	Ethylbenzene	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026960			110-00-9	Furan	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026960			110-54-3	Hexane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026960			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026960			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026960			75-09-2	Methylene Chloride	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026960			91-20-3	Naphthalene	NGS	100	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	U
S16T026960			98-95-3	Nitrobenzene	NGS	110	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	U
S16T026960			110-59-8	Pentanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026960			107-12-0	Propanenitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026960			110-86-1	Pyridine	NGS	120	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026960			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026960			127-18-4	Tetrachloroethene	NGS	110	<1.8	50	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026960			108-88-3	Toluene	NGS	99	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U

E - Outside Calibration Range  
T - Tentatively Identified Compound  
B - Blank Contamination  
J - Estimated  
U - Less Than Detection Limit  
N - Named TIC  
NA = Not Analyzed, ND = Not Detected  
L - LLS Outside Range

# Cartridge Evaluation Data Summary Report

Sample Group: 20162526

SDG Number:

Customer Sample ID: 16-07654-2-E2

Customer Sample ID: 16-07654-2-E2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026960			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026960			75-69-4	Trichlorofluoromethane	NGS	100	<1.9	6.7	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026960			10061-01-5	cis-1,3-Dichloropropene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026960			123-86-4	n-Butyl acetate	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026960			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026960			10061-02-6	trans-1,3-Dichloropropene	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U

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L - LLS Outside Range

# Cartridge Evaluation Data Summary Report

Sample Group: 20162526  
SDG Number:  
Customer Sample ID: 16-07654-2-F2  
Customer Sample ID: 16-07654-2-F2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026963			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	U
S16T026963			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	U
S16T026963			75-34-3	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026963			75-35-4	1,1-Dichloroethene	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026963			107-06-2	1,2-Dichloroethane	NGS	110	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026963			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026963			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026963			123-91-1	1,4-Dioxane	NGS	110	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026963			71-36-3	1-Butanol	NGS	110	<4.3	5.9	n/a	n/a	n/a	n/a	4.3	n/a	J
S16T026963			111-70-6	1-Heptanol	NGS	93	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	U
S16T026963			71-23-8	1-Propanol	NGS	100	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	U
S16T026963			108-47-4	2,4-Dimethylpyridine	NGS	110	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026963			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026963			78-93-3	2-Butanone	NGS	100	<3.1	<3.1	n/a	n/a	n/a	n/a	3.1	n/a	U
S16T026963			110-43-0	2-Heptanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026963			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026963			534-22-5	2-Methylfuran	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026963			78-94-4	3-Buten-2-one	NGS	96	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026963			106-35-4	3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026963			106-88-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026963			105-42-0	4-Methyl-2-hexanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026963			108-10-1	4-Methyl-2-Pentanone	NGS	100	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026963			67-64-1	Acetone	NGS	99	3.1	15	n/a	n/a	n/a	n/a	2.8	n/a	B
S16T026963			75-05-8	Acetonitrile	NGS	100	<1.6	170	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026963			98-86-2	Acetophenone	NGS	110	<6.2	9.0	n/a	n/a	n/a	n/a	6.2	n/a	JL
S16T026963			107-13-1	Acrylonitrile	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026963			107-18-6	Allyl Alcohol	NGS	100	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	U

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Cartridge Evaluation  
 Data Summary Report

Sample Group: 20162526  
 SDG Number:  
 Customer Sample ID: 16-07654-2-F2  
 Customer Sample ID: 16-07654-2-F2

Sample#	R	AF	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026963			107-05-1	Allyl Chloride	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026963			71-43-2	Benzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026963			100-47-0	Benzonitrile	NGS	110	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	U
S16T026963			123-72-8	Butanal	NGS	110	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026963			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026963			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026963			108-90-7	Chlorobenzene	NGS	110	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026963			75-00-3	Chloroethane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026963			67-66-3	Chloroform	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026963			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026963			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026963			64-17-5	Ethanol	NGS	110	4.0	35	n/a	n/a	n/a	n/a	3.7	n/a	B
S16T026963			141-78-6	Ethyl acetate	NGS	89	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026963			100-41-4	Ethylbenzene	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026963			110-00-9	Furan	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026963			110-54-3	Hexane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026963			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026963			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026963			75-09-2	Methylene Chloride	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026963			91-20-3	Naphthalene	NGS	100	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	U
S16T026963			98-95-3	Nitrobenzene	NGS	110	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	U
S16T026963			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026963			107-12-0	Propanenitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026963			110-86-1	Pyridine	NGS	120	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026963			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026963			127-18-4	Tetrachloroethene	NGS	110	<1.8	35	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026963			108-88-3	Toluene	NGS	99	<2.2	2.6	n/a	n/a	n/a	n/a	2.2	n/a	J

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162526  
SDG Number:  
Customer Sample ID: 16-07654-2-F2  
Customer Sample ID: 16-07654-2-F2

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026963			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026963			75-69-4	Trichlorofluoromethane	NGS	100	<1.9	7.8	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026963			10061-01-5	cis-1,3-Dichloropropene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026963			123-86-4	n-Butyl acetate	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026963			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026963			10061-02-6	trans-1,3-Dichloropropene	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162526  
SDG Number:  
Customer Sample ID: 16-07654-2-G2  
Customer Sample ID: 16-07654-2-G2

Sample#	R	AS	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026965			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	U
S16T026965			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	U
S16T026965			75-34-3	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026965			75-35-4	1,1-Dichloroethene	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026965			107-06-2	1,2-Dichloroethane	NGS	110	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026965			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026965			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026965			123-91-1	1,4-Dioxane	NGS	110	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026965			71-36-3	1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	U
S16T026965			111-70-6	1-Heptanol	NGS	93	<8.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	U
S16T026965			71-23-8	1-Propanol	NGS	100	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	U
S16T026965			108-47-4	2,4-Dimethylpyridine	NGS	110	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026965			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026965			78-93-3	2-Butanone	NGS	100	<3.1	<3.1	n/a	n/a	n/a	n/a	3.1	n/a	U
S16T026965			110-43-0	2-Heptanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026965			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026965			534-22-5	2-Methylfuran	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026965			78-94-4	3-Buten-2-one	NGS	96	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026965			106-35-4	3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026965			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026965			105-42-0	4-Methyl-2-hexanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026965			108-10-1	4-Methyl-2-Pentanone	NGS	100	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026965			67-64-1	Acetone	NGS	99	3.1	12	n/a	n/a	n/a	n/a	2.8	n/a	B
S16T026965			75-05-8	Acetonitrile	NGS	100	<1.6	150	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026965			98-86-2	Acetophenone	NGS	110	<6.2	7.3	n/a	n/a	n/a	n/a	6.2	n/a	JL
S16T026965			107-13-1	Acrylonitrile	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026965			107-18-6	Allyl Alcohol	NGS	100	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	U

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Cartridge Evaluation  
 Data Summary Report

Sample Group: 20162526  
 SDG Number:  
 Customer Sample ID: 16-07654-2-G2  
 Customer Sample ID: 16-07654-2-G2

Sample#	R	AW	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026965			107-05-1	Allyl Chloride	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026965			71-43-2	Benzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026965			100-47-0	Benzonitrile	NGS	110	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	U
S16T026965			123-72-8	Butanal	NGS	110	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026965			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026965			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026965			108-90-7	Chlorobenzene	NGS	110	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026965			75-00-3	Chloroethane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026965			87-86-3	Chloroform	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026965			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026965			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026965			84-17-5	Ethanol	NGS	110	4.0	4.5	n/a	n/a	n/a	n/a	3.7	n/a	B
S16T026965			141-78-6	Ethyl acetate	NGS	89	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026965			100-41-4	Ethylbenzene	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026965			110-00-9	Furan	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026965			110-54-3	Hexane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026965			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026965			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026965			75-09-2	Methylene Chloride	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026965			91-20-3	Naphthalene	NGS	100	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	U
S16T026965			98-95-3	Nitrobenzene	NGS	110	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	U
S16T026965			110-59-8	Penanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026965			107-12-0	Propanenitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026965			110-86-1	Pyridine	NGS	120	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026965			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026965			127-18-4	Tetrachloroethene	NGS	110	<1.8	36	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026965			108-88-3	Toluene	NGS	99	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U

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 N - Named TIC  
 NA = Not Analyzed, ND = Not Detected  
 L - LLS Outside Range

# Cartridge Evaluation Data Summary Report

Sample Group: 20162526  
SDG Number:  
Customer Sample ID: 16-07654-2-G2  
Customer Sample ID: 16-07654-2-G2

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026965			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026965			75-69-4	Trichlorofluoromethane	NGS	100	<1.9	12	n/a	n/a	n/a	n/a	1.9	n/a	
S16T026965			10061-01-5	dis-1,3-Dichloropropene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026965			123-86-4	n-Butyl acetate	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026965			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026965			10061-02-6	trans-1,3-Dichloropropene	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162526  
SDG Number:  
Customer Sample ID: 16-07654-2-H1  
Customer Sample ID: 16-07654-2-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															
S16T026966			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	U
S16T026966			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	U
S16T026966			75-34-3	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026966			75-35-4	1,1-Dichloroethene	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026966			107-06-2	1,2-Dichloroethane	NGS	110	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026966			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026966			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026966			123-91-1	1,4-Dioxane	NGS	110	<2.0	2.8	n/a	n/a	n/a	n/a	2.0	n/a	J
S16T026966			71-36-3	1-Butanol	NGS	110	<4.3	3.9	n/a	n/a	n/a	n/a	4.3	n/a	
S16T026966			111-70-6	1-Heptanol	NGS	93	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	U
S16T026966			71-23-3	1-Propanol	NGS	100	<8.9	15	n/a	n/a	n/a	n/a	8.9	n/a	J
S16T026966			108-47-4	2,4-Dimethylpyridine	NGS	110	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026966			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026966			78-93-3	2-Butanone	NGS	100	<3.1	13	n/a	n/a	n/a	n/a	3.1	n/a	
S16T026966			110-43-0	2-Heptanone	NGS	110	<2.6	3.0	n/a	n/a	n/a	n/a	2.6	n/a	J
S16T026966			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026966			534-22-5	2-Methylfuran	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026966			78-94-4	3-Buten-2-one	NGS	96	<1.9	3.5	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026966			106-35-4	3-Heptanone	NGS	110	<2.7	4.6	n/a	n/a	n/a	n/a	2.7	n/a	J
S16T026966			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026966			105-42-0	4-Methyl-2-hexanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026966			108-10-1	4-Methyl-2-Pentanone	NGS	100	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026966			67-64-1	Acetone	NGS	99	3.1	280	n/a	n/a	n/a	n/a	2.8	n/a	B
S16T026966			75-05-8	Acetonitrile	NGS	100	<1.6	240	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026966			98-86-2	Acetophenone	NGS	110	<6.2	<6.2	n/a	n/a	n/a	n/a	6.2	n/a	LU
S16T026966			107-13-1	Acrylonitrile	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026966			107-18-6	Allyl Alcohol	NGS	100	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	U

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162526  
 SDG Number:  
 Customer Sample ID: 16-07654-2-H1  
 Customer Sample ID: 16-07654-2-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															
S16T026966			107-05-1	Allyl Chloride	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026966			71-43-2	Benzene	NGS	100	<1.5	2.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026966			100-47-0	Benzonitrile	NGS	110	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	U
S16T026966			123-72-8	Butanal	NGS	110	<3.0	7.7	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026966			109-74-0	Butanenitrile	NGS	110	<2.1	6.0	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026966			56-23-5	Carbon tetrachloride	NGS	100	<1.5	1.7	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026966			108-90-7	Chlorobenzene	NGS	110	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026966			75-00-3	Chloroethane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026966			87-66-3	Chloroform	NGS	110	<1.8	14	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026966			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026966			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026966			84-17-5	Ethanol	NGS	110	4.0	110	n/a	n/a	n/a	n/a	3.7	n/a	B
S16T026966			141-78-6	Ethyl acetate	NGS	89	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026966			100-41-4	Ethylbenzene	NGS	100	<2.4	3.0	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026966			110-00-9	Furan	NGS	100	<1.6	5.8	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026966			110-54-3	Hexane	NGS	100	<1.3	2.8	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026966			828-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026966			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026966			75-09-2	Methylene Chloride	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026966			91-20-3	Naphthalene	NGS	100	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	U
S16T026966			98-95-3	Nitrobenzene	NGS	110	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	U
S16T026966			110-59-8	Pentanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026966			107-12-0	Propanenitrile	NGS	110	<1.8	4.9	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026966			110-86-1	Pyridine	NGS	120	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026966			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026966			127-18-4	Tetrachloroethene	NGS	110	<1.8	35	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026966			108-88-3	Toluene	NGS	99	<2.2	3.4	n/a	n/a	n/a	n/a	2.2	n/a	U

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162526  
SDG Number:  
Customer Sample ID: 16-07654-2-H1  
Customer Sample ID: 16-07654-2-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															
S16T026966			79-01-5	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026966			75-69-4	Trichlorofluoromethane	NGS	100	<1.9	580	n/a	n/a	n/a	n/a	1.9	n/a	E
S16T026966			10061-01-5	cis-1,3-Dichloropropene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026966			123-86-4	n-Butyl acetate	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026966			142-92-5	n-Heptane	NGS	110	<1.6	2.0	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026966			10061-02-6	trans-1,3-Dichloropropene	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162526  
SDG Number:  
Customer Sample ID: 16-07654-2-H2  
Customer Sample ID: 16-07654-2-H2

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026967			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	U
S16T026967			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	U
S16T026967			75-34-3	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026967			75-35-4	1,1-Dichloroethene	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026967			107-06-2	1,2-Dichloroethane	NGS	110	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026967			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026967			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026967			123-91-1	1,4-Dioxane	NGS	110	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026967			71-36-3	1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	U
S16T026967			111-70-6	1-Heptanol	NGS	93	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	U
S16T026967			71-23-8	1-Propanol	NGS	100	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	U
S16T026967			108-47-4	2,4-Dimethylpyridine	NGS	110	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026967			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026967			78-93-3	2-Butanone	NGS	100	<3.1	<3.1	n/a	n/a	n/a	n/a	3.1	n/a	U
S16T026967			110-43-0	2-Heptanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026967			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026967			534-22-5	2-Methylfuran	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026967			78-94-4	3-Buten-2-one	NGS	96	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026967			106-35-4	3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026967			106-88-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026967			105-42-0	4-Methyl-2-hexanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026967			108-10-1	4-Methyl-2-Pentanone	NGS	100	<2.2	3.3	n/a	n/a	n/a	n/a	2.2	n/a	J
S16T026967			67-64-1	Acetone	NGS	99	3.1	7.7	n/a	n/a	n/a	n/a	2.8	n/a	B
S16T026967			75-05-8	Acetonitrile	NGS	100	<1.6	130	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026967			98-86-2	Acetophenone	NGS	110	<6.2	<6.2	n/a	n/a	n/a	n/a	6.2	n/a	LU
S16T026967			107-13-1	Acrylonitrile	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026967			107-18-6	Allyl Alcohol	NGS	100	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	U

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162526  
SDG Number:  
Customer Sample ID: 16-07654-2-H2  
Customer Sample ID: 16-07654-2-H2

Sample#	R	AW	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026967			107-05-1	Allyl Chloride	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026967			71-43-2	Benzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026967			100-47-0	Benzonitrile	NGS	110	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	U
S16T026967			123-72-8	Butanal	NGS	110	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026967			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026967			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026967			108-90-7	Chlorobenzene	NGS	110	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026967			75-00-3	Chloroethane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026967			87-66-3	Chloroform	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026967			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026967			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026967			84-17-5	Ethanol	NGS	110	4.0	34	n/a	n/a	n/a	n/a	3.7	n/a	B
S16T026967			141-78-6	Ethyl acetate	NGS	89	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026967			100-41-4	Ethylbenzene	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026967			110-00-9	Furan	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026967			110-54-3	Hexane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026967			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026967			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026967			75-09-2	Methylene Chloride	NGS	100	<4.1	30	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026967			91-20-3	Naphthalene	NGS	100	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	U
S16T026967			98-95-3	Nitrobenzene	NGS	110	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	U
S16T026967			110-59-8	Pentanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026967			107-12-0	Propanenitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026967			110-86-1	Pyridine	NGS	120	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026967			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026967			127-18-4	Tetrachloroethene	NGS	110	<1.8	27	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026967			108-88-3	Toluene	NGS	99	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U

E - Outside Calibration Range  
T - Tentatively Identified Compound  
B - Blank Contamination  
J - Estimated  
U - Less Than Detection Limit  
N - Named TIC  
NA = Not Analyzed, ND = Not Detected  
L - LLS Outside Range

# Cartridge Evaluation Data Summary Report

Sample Group: 20162526  
SDG Number:  
Customer Sample ID: 16-07654-2-H2  
Customer Sample ID: 16-07654-2-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															
S16T026967			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026967			75-69-4	Trichlorofluoromethane	NGS	100	<1.9	11	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026967			10061-01-5	dis-1,3-Dichloropropene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026967			123-86-4	n-Butyl acetate	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026967			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026967			10061-02-6	trans-1,3-Dichloropropene	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U

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

Cartridge Evaluation  
Data Summary Report

*James*  
11/9/16

Sample Group: 20162526

SDG Number:

Customer Sample ID: 16-07654-2-A1

Customer Sample ID: 16-07654-2-A1

Sample#	R	Alt	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T026949				Acetic acid	64-19-7	9.29	NGS	27 JNT	
S16T026949				Tetrahydrofuran	109-99-9	11.95	NGS	53 JNT	
S16T026949				Formamide	75-12-7	13.99	NGS	110 JNT	
S16T026949				N-Nitrosodimethylamine	62-75-9	15.63	NGS	5.2 JNT	
S16T026949				Hexanal	66-25-1	16.76	NGS	29 JNT	
S16T026949				Hexanoic acid	142-62-1	19.95	NGS	45 JNT	
S16T026949				Benzaldehyde	100-52-7	20.82	NGS	27 JNT	
S16T026949				Benzyl alcohol	100-51-6	22.53	NGS	48 JNT	
S16T026949				Unknown-1	-	22.55	NGS	28 JT	
S16T026949				Heptanoic acid	111-14-8	22.64	NGS	58 JNT	
S16T026949				Heptanoic acid, 2-ethyl-	3274-29-1	23.63	NGS	51 JNT	
S16T026949				Benzenemethanol, 7,7-dimethyl-	617-94-7	23.78	NGS	170 JNT	
S16T026949				Undecanal	112-44-7	23.91	NGS	29 JNT	
S16T026949				Unknown-2	-	24.18	NGS	82 JT	
S16T026949				Dodecane	112403	25.21	NGS	27 JNT	
S16T026949				Ethanol, 2-phenoxy-	122-99-6	25.79	NGS	31 JNT	
S16T026949				Benzothiazole	95-16-9	26.29	NGS	65 JNT	
S16T026949				Dodecane, 4,6-dimethyl-	61141728	26.38	NGS	19 JNT	
S16T026949				Tridecane	629505	26.53	NGS	15 JNT	
S16T026949				Unknown-3	-	26.96	NGS	22 JT	
S16T026949				Tetradecane	629594	26.96	NGS	22 JNT	

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N - Named TIC

B - Blank Contamination  
J - Estimated

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T - Tentatively Identified Compound

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162526

SDG Number:

Customer Sample ID: 16-07654-2-A2

Customer Sample ID: 16-07654-2-A2

Sample#	R	As	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T026950				Ethene, fluoro-	75-02-5	6.35	NGS	28 JNT	
S16T026950				Acetic acid	64-19-7	9.25	NGS	14 JNT	
S16T026950				Formamide	75-12-7	13.99	NGS	100 JNT	
S16T026950				Cyclohexene, 1-methyl-4-(1-met	7705-14-8	22.58	NGS	33 JNT	
S16T026950				Decane, 2,4,6-trimethyl-	62108-27-4	22.95	NGS	18 JNT	
S16T026950				Undecane, 5,7-dimethyl-	17312-83-3	23.79	NGS	39 JNT	
S16T026950				Undecane, 4-methyl-	2980-69-0	23.90	NGS	39 JNT	
S16T026950				Unknown-1	-	24.19	NGS	110 JT	
S16T026950				Dodecane	112-40-3	25.21	NGS	48 JNT	
S16T026950				Ethylene diacrylate	2274-11-5	25.35	NGS	29 JNT	
S16T026950				9-Hexadecenoic acid	2081-29-4	25.97	NGS	29 JNT	
S16T026950				Benzo[h]azolo	95-16-9	26.30	NGS	190 JNT	
S16T026950				Dodecane, 4,6-dimethyl-	61141728	26.39	NGS	50 JNT	
S16T026950				Tridecane	629505	26.53	NGS	16 JNT	
S16T026950				Phytol	150-86-7	26.70	NGS	38 JNT	
S16T026950				Tetradecane	629594	26.97	NGS	37 JNT	

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162526

SDG Number:

Customer Sample ID: 16-07654-2-B2

Customer Sample ID: 16-07654-2-B2

Sample#	R	AS	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T026952				Ethene, fluoro-	75-02-5	6.33	NGS	26 JNT	
S16T026952				Acetic acid	64-19-7	9.24	NGS	16 JNT	
S16T026952				Formamide	75-12-7	13.97	NGS	76 JNT	
S16T026952				Decane, 2,4,6-trimethyl-	62108-27-4	22.94	NGS	24 JNT	
S16T026952				Undecane	1120214	23.68	NGS	12 JNT	
S16T026952				Undecane, 5,7-dimethyl-	17312-83-3	23.79	NGS	48 JNT	
S16T026952				Hydroxylamine, O-decyl-	29812-79-1	23.90	NGS	47 JNT	
S16T026952				Unknown-1	-	24.19	NGS	81 JT	
S16T026952				Dodecane	112403	25.21	NGS	51 JNT	
S16T026952				2-Propenoic acid, octyl ester	2499-59-4	25.35	NGS	48 JNT	
S16T026952				4-Undecene, 4-methyl-	61142-40-3	25.96	NGS	60 JNT	
S16T026952				Benzothiazole	95-16-9	26.29	NGS	170 JNT	
S16T026952				Dodecane, 4,6-dimethyl-	61141728	26.39	NGS	58 JNT	
S16T026952				Tridecane	629505	26.53	NGS	21 JNT	
S16T026952				Dodecane, 2,7,10-trimethyl-	74645980	26.96	NGS	37 JNT	

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T - Tentatively Identified Compound

B - Blank Contamination  
J - Estimated

U - Less Than Detection Limit  
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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162526

SDG Number:

Customer Sample ID: 16-07654-2-C2

Customer Sample ID: 16-07654-2-C2

Sample#	R	Ad	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T026956				Unknown-1	-	9.23	NGS	14 JT	
S16T026956				Formamide	75-12-7	13.98	NGS	85 JNT	
S16T026956				Cyclotetrasiloxane, octamethyl	556-87-2	20.38	NGS	26 JNT	
S16T026956				Decane, 2,4,6-trimethyl-	82108-27-4	22.94	NGS	21 JNT	
S16T026956				Undecane	1120214	23.68	NGS	19 JNT	
S16T026956				Undecane, 4-methyl-	2980-69-0	23.79	NGS	38 JNT	
S16T026956				Hydroxylamine, O-decyl-	29812-79-1	23.90	NGS	48 JNT	
S16T026956				Unknown-2	-	24.19	NGS	150 JT	
S16T026956				Dodecane	112-40-3	25.21	NGS	83 JNT	
S16T026956				Ethylene diacrylate	2274-11-5	25.96	NGS	34 JNT	
S16T026956				Benzothiazole	95-16-9	26.29	NGS	210 JNT	
S16T026956				Dodecane, 4,6-dimethyl-	61141728	26.39	NGS	63 JNT	
S16T026956				Tridecane	629505	26.53	NGS	29 JNT	
S16T026956				Unknown-3	-	26.58	NGS	31 JT	
S16T026956				Dodecane, 2,7,10-trimethyl-	74645980	26.96	NGS	39 JNT	

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B - Blank Contamination  
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# Cartridge Evaluation Data Summary Report

Sample Group: 20162526

SDG Number:

Customer Sample ID: 16-07654-2-D2

Customer Sample ID: 16-07654-2-D2

Sample#	R	As	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T026958				Unknown-1	-	9.22	NGS	8.7 JT	
S16T026958				Formamide	75-12-7	13.98	NGS	43 JNT	
S16T026958				Unknown-2	-	24.19	NGS	50 JT	
S16T026958				Dodecane	112403	25.21	NGS	18 JNT	
S16T026958				Benzothiazole	95-16-9	26.30	NGS	95 JNT	
S16T026958				Dodecane, 4,6-dimethyl-	61141728	26.39	NGS	26 JNT	
S16T026958				Tetradecane	628594	26.97	NGS	22 JNT	

E - Outside Calibration Range  
T - Tentatively Identified Compound

B - Blank Contamination  
J - Estimated

U - Less Than Detection Limit  
N - Named TIC

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

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162526

SDG Number:

Customer Sample ID: 16-07654-2-E2

Customer Sample ID: 16-07654-2-E2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T026960				Formamide	75-12-7	13.98	NGS	30 JNT	
S16T026960				Decane, 2,4,6-trimethyl-	82108-27-4	22.94	NGS	5.6 JNT	
S16T026960				Undecane, 5,7-dimethyl-	17312-83-3	23.79	NGS	14 JNT	
S16T026960				Unknown-1	--	24.19	NGS	66 JT	
S16T026960				Dodecane	112-40-3	25.21	NGS	30 JNT	
S16T026960				Benzothiazole	95-16-9	26.29	NGS	140 JNT	
S16T026960				Dodecane, 4,6-dimethyl-	81141728	26.39	NGS	34 JNT	
S16T026960				Tetradecane	829594	26.96	NGS	24 JNT	

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T - Tentatively Identified Compound

B - Blank Contamination  
J - Estimated

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162526

SDG Number:

Customer Sample ID: 16-07654-2-F2

Customer Sample ID: 16-07654-2-F2

Sample#	R	Alt	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T026963				Formamide	75-12-7	13.97	NGS	39 JNT	
S16T026963				Cyclotetrasiloxane, octamethyl	556-87-2	20.37	NGS	27 JNT	
S16T026963				Decane, 2,4,6-trimethyl-	62108-27-4	22.94	NGS	22 JNT	
S16T026963				Undecane	1120-21-4	23.69	NGS	16 JNT	
S16T026963				Undecane, 4,7-dimethyl-	17301-32-5	23.79	NGS	34 JNT	
S16T026963				Hydroxylamine, O-decyl-	29812-79-1	23.90	NGS	33 JNT	
S16T026963				Unknown-1	-	24.18	NGS	110 JT	
S16T026963				Dodecane	112-40-3	25.21	NGS	34 JNT	
S16T026963				Ethylene diacrylate	2274-11-5	25.96	NGS	26 JNT	
S16T026963				Methanamine	100-97-0	26.18	NGS	63 JNT	
S16T026963				Benzothiazole	95-16-9	26.29	NGS	110 JNT	
S16T026963				Dodecane, 4,6-dimethyl-	61141728	26.38	NGS	23 JNT	
S16T026963				Dodecane, 2,6,11-trimethyl-	31295564	26.96	NGS	16 JNT	

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162526

SDG Number:

Customer Sample ID: 16-07654-2-G2

Customer Sample ID: 16-07654-2-G2

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T026965				Formamide	75-12-7	13.98	NGS	31 JNT	
S16T026965				Cyclotetrasiloxane, octamethyl	556-67-2	20.36	NGS	27 JNT	
S16T026965				Decane, 2,4,6-trimethyl-	82108-27-4	22.94	NGS	24 JNT	
S16T026965				Undecane	1120214	23.68	NGS	15 JNT	
S16T026965				Undecane, 5,7-dimethyl-	17312-83-3	23.79	NGS	36 JNT	
S16T026965				Unknown-1	-	24.18	NGS	110 JT	
S16T026965				Dodecane	112-40-3	25.21	NGS	27 JNT	
S16T026965				Methenamine	100-97-0	26.18	NGS	41 JNT	
S16T026965				Benzothiazole	95-16-9	26.29	NGS	62 JNT	
S16T026965				Dodecane, 4,6-dimethyl-	81141728	26.38	NGS	23 JNT	
S16T026965				Tetradecane	829594	26.96	NGS	12 JNT	

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162526

SDG Number:

Customer Sample ID: 16-07654-2-H1

Customer Sample ID: 16-07654-2-H1

Sample#	R	As	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T026966				Unknown-1	-	8.13	NGS	29 JT	
S16T026966				Tetrahydrofuran	109-99-9	11.95	NGS	46 JNT	
S16T026966				Formamide	75-12-7	13.98	NGS	34 JNT	
S16T026966				N-Nitrosodimethylamine	62-75-9	15.63	NGS	5.5 JNT	
S16T026966				Decane, 2,4,6-trimethyl-	62108-27-4	22.94	NGS	7.5 JNT	
S16T026966				Undecane	1120-21-4	23.69	NGS	25 JNT	
S16T026966				Unknown-2	-	24.19	NGS	59 JT	
S16T026966				Dodecane	112-40-3	25.21	NGS	30 JNT	
S16T026966				Methanamine	100-97-0	26.17	NGS	170 JNT	
S16T026966				1,2-Benzisothiazole	272-16-2	26.29	NGS	83 JNT	
S16T026966				Dodecane, 4,6-dimethyl-	61141728	26.38	NGS	11 JNT	
S16T026966				Tetradecane	629594	26.96	NGS	7.3 JNT	

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162526

SDG Number:

Customer Sample ID: 16-07654-2-H2

Customer Sample ID: 16-07654-2-H2

Sample#	R	AS	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
VAPOR-TDU VOA #2									
S16T026967				Unknown-1	-	8.11	NGS	58	JT
S16T026967				Formamide	75-12-7	13.99	NGS	26	JNT
S16T026967				Cyclotetrasiloxane, octamethyl	556-87-2	20.37	NGS	29	JNT
S16T026967				Decane, 2,4,6-trimethyl-	62108-27-4	22.94	NGS	5.1	JNT
S16T026967				Undecane	1120214	23.68	NGS	5.4	JNT
S16T026967				Unknown-2	-	24.18	NGS	47	JT
S16T026967				Dodecane	112-40-3	25.21	NGS	14	JNT
S16T026967				Methanamine	100-97-0	26.17	NGS	120	JNT
S16T026967				Benzothiazole	95-16-9	26.29	NGS	63	JNT
S16T026967				Dodecane, 4,6-dimethyl-	61141728	26.39	NGS	11	JNT
S16T026967				Unknown-3	-	26.68	NGS	42	JT
S16T026967				Tetradecane	629594	26.96	NGS	6.4	JNT

E - Outside Calibration Range  
T - Tentatively Identified Compound  
B - Blank Contamination  
J - Estimated  
NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit  
L - LLS Outside Range  
N - Named TIC

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162536

SDG Number:

Customer Sample ID: 16-07645-2-B1

Customer Sample ID: 16-07645-2-B1

*John Duf*  
11/9/16

Sample#	R	AF	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026931			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	U
S16T026931			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	U
S16T026931			75-34-3	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026931			75-35-4	1,1-Dichloroethene	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026931			107-06-2	1,2-Dichloroethane	NGS	110	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026931			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026931			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	QU
S16T026931			123-91-1	1,4-Dioxane	NGS	110	<2.0	4.9	n/a	n/a	n/a	n/a	2.0	n/a	J
S16T026931			71-36-3	1-Butanol	NGS	110	<4.3	110	n/a	n/a	n/a	n/a	4.3	n/a	
S16T026931			111-70-6	1-Heptanol	NGS	93	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	QU
S16T026931			71-23-8	1-Propanol	NGS	100	<8.9	31	n/a	n/a	n/a	n/a	8.9	n/a	
S16T026931			108-47-4	2,4-Dimethylpyridine	NGS	110	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026931			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026931			78-93-3	2-Butanone	NGS	100	<3.1	29	n/a	n/a	n/a	n/a	3.1	n/a	
S16T026931			110-43-0	2-Heptanone	NGS	110	<2.6	3.2	n/a	n/a	n/a	n/a	2.6	n/a	J
S16T026931			591-78-6	2-Hexanone	NGS	100	<2.5	3.6	n/a	n/a	n/a	n/a	2.5	n/a	J
S16T026931			534-22-5	2-Methylfuran	NGS	100	<1.3	2.0	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T026931			78-94-4	3-Buten-2-one	NGS	96	<1.9	7.2	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026931			106-35-4	3-Heptanone	NGS	110	<2.7	3.5	n/a	n/a	n/a	n/a	2.7	n/a	J
S16T026931			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	QU
S16T026931			105-42-0	4-Methyl-2-hexanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026931			108-10-1	4-Methyl-2-pentanone	NGS	100	<2.2	16	n/a	n/a	n/a	n/a	2.2	n/a	
S16T026931			67-64-1	Acetone	NGS	99	3.1	550	n/a	n/a	n/a	n/a	2.8	n/a	BE
S16T026931			75-05-8	Acetonitrile	NGS	100	<1.6	31	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026931			98-86-2	Acetophenone	NGS	110	<6.2	13	n/a	n/a	n/a	n/a	6.2	n/a	LQ
S16T026931			107-13-1	Acrylonitrile	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026931			107-18-6	Allyl Alcohol	NGS	100	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	U

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Q - Qualitative  
J - Estimated

B - Blank Contamination  
T - Tentatively Identified Compound

E - Outside Calibration Range  
L - LLS Outside Range

Cartridge Evaluation  
 Data Summary Report

Sample Group: 20162536  
 SDG Number:  
 Customer Sample ID: 16-07645-2-B1  
 Customer Sample ID: 16-07645-2-B1

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026931			107-05-1	Allyl Chloride	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026931			71-43-2	Benzene	NGS	100	<1.5	6.1	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026931			100-47-0	Benzonitrile	NGS	110	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	QU
S16T026931			123-72-8	Butanal	NGS	110	<3.0	15	n/a	n/a	n/a	n/a	3.0	n/a	
S16T026931			109-74-0	Butanenitrile	NGS	110	<2.1	7.7	n/a	n/a	n/a	n/a	2.1	n/a	J
S16T026931			56-23-5	Carbon tetrachloride	NGS	100	<1.5	2.4	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026931			108-90-7	Chlorobenzene	NGS	110	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026931			75-00-3	Chloroethane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026931			67-66-3	Chloroform	NGS	110	<1.8	40	n/a	n/a	n/a	n/a	1.8	n/a	
S16T026931			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026931			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	QU
S16T026931			84-17-5	Ethanol	NGS	110	4.0	160	n/a	n/a	n/a	n/a	3.7	n/a	B
S16T026931			141-78-6	Ethyl acetate	NGS	89	<1.8	2.4	n/a	n/a	n/a	n/a	1.8	n/a	J
S16T026931			100-41-4	Ethylbenzene	NGS	100	<2.4	4.1	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T026931			110-00-9	Furan	NGS	100	<1.6	1.9	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026931			110-54-3	Hexane	NGS	100	<1.3	7.3	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T026931			628-73-9	Hexanenitrile	NGS	110	<2.6	3.7	n/a	n/a	n/a	n/a	2.6	n/a	J
S16T026931			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026931			75-09-2	Methylene Chloride	NGS	100	<4.1	4.8	n/a	n/a	n/a	n/a	4.1	n/a	J
S16T026931			91-20-3	Naphthalene	NGS	100	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	QU
S16T026931			98-95-3	Nitrobenzene	NGS	110	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	QU
S16T026931			110-59-8	Pentanitrile	NGS	110	<2.6	3.6	n/a	n/a	n/a	n/a	2.6	n/a	J
S16T026931			107-12-0	Propanenitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026931			110-86-1	Pyridine	NGS	120	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026931			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026931			127-18-4	Tetrachloroethene	NGS	110	<1.8	390	n/a	n/a	n/a	n/a	1.8	n/a	
S16T026931			108-88-3	Toluene	NGS	99	<2.2	34	n/a	n/a	n/a	n/a	2.2	n/a	

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162536  
SDG Number:  
Customer Sample ID: 16-07645-2-B1  
Customer Sample ID: 16-07645-2-B1

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026931			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026931			75-69-4	Trichlorofluoromethane	NGS	100	<1.9	660	n/a	n/a	n/a	n/a	1.9	n/a	E
S16T026931			10061-01-5	cis-1,3-Dichloropropene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026931			123-86-4	n-Butyl acetate	NGS	88	<2.4	2.4	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T026931			142-82-5	n-Heptane	NGS	110	<1.6	3.1	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026931			10061-02-6	trans-1,3-Dichloropropene	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162536

SDG Number:

Customer Sample ID: 16-07645-2-BLANK

Customer Sample ID: 16-07645-2-BLANK

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026933			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	U
S16T026933			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	U
S16T026933			75-34-3	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026933			75-35-4	1,1-Dichloroethene	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026933			107-06-2	1,2-Dichloroethane	NGS	110	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026933			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026933			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026933			123-91-1	1,4-Dioxane	NGS	110	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026933			71-36-3	1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	U
S16T026933			111-70-6	1-Heptanol	NGS	93	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	U
S16T026933			71-23-8	1-Propanol	NGS	100	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	U
S16T026933			108-47-4	2,4-Dimethylpyridine	NGS	110	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026933			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026933			78-93-3	2-Butanone	NGS	100	<3.1	<3.1	n/a	n/a	n/a	n/a	3.1	n/a	U
S16T026933			110-43-0	2-Heptanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026933			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026933			534-22-5	2-Methylfuran	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026933			78-94-4	3-Buten-2-one	NGS	96	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026933			106-35-4	3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026933			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026933			105-42-0	4-Methyl-2-hexanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026933			108-10-1	4-Methyl-2-Pentanone	NGS	100	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026933			67-64-1	Acetone	NGS	99	3.1	4.5	n/a	n/a	n/a	n/a	2.8	n/a	BU
S16T026933			75-05-8	Acetonitrile	NGS	100	<1.6	240	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026933			98-86-2	Acetophenone	NGS	110	<6.2	<6.2	n/a	n/a	n/a	n/a	6.2	n/a	LU
S16T026933			107-13-1	Acrylonitrile	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026933			107-18-6	Allyl Alcohol	NGS	100	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	U

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N - Named TIC



Cartridge Evaluation  
Data Summary Report

Sample Group: 20162536

SDG Number:

Customer Sample ID: 16-07645-2-BLANK

Customer Sample ID: 16-07645-2-BLANK

Sample#	R	Ad	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026933			107-05-1	Allyl Chloride	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026933			71-43-2	Benzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026933			100-47-0	Benzonitrile	NGS	110	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	U
S16T026933			123-72-8	Butanal	NGS	110	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026933			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026933			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026933			108-90-7	Chlorobenzene	NGS	110	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026933			75-00-3	Chloroethane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026933			67-66-3	Chloroform	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026933			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026933			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026933			64-17-5	Ethanol	NGS	110	4.0	14	n/a	n/a	n/a	n/a	3.7	n/a	BJ
S16T026933			141-78-6	Ethyl acetate	NGS	89	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026933			100-41-4	Ethylbenzene	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026933			110-00-9	Furan	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026933			110-54-3	Hexane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026933			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026933			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026933			75-09-2	Methylene Chloride	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026933			91-20-3	Naphthalene	NGS	100	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	U
S16T026933			98-95-3	Nitrobenzene	NGS	110	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	U
S16T026933			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026933			107-12-0	Propanenitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026933			110-86-1	Pyridine	NGS	120	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026933			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026933			127-18-4	Tetrachloroethene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026933			108-88-3	Toluene	NGS	99	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U

E - Outside Calibration Range  
L - LLS Outside Range  
B - Blank Contamination  
T - Tentatively Identified Compound  
Q - Qualitative  
J - Estimated  
NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit  
N - Named TIC

# Cartridge Evaluation Data Summary Report

Sample Group: 20162536

SDG Number:

Customer Sample ID: 16-07645-2-BLANK

Customer Sample ID: 16-07645-2-BLANK

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026933			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026933			75-69-4	Trichlorofluoromethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026933			10061-01-5	cis-1,3-Dichloropropene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026933			123-86-4	n-Butyl acetate	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026933			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026933			10061-02-6	trans-1,3-Dichloropropene	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U

NA = Not Analyzed, ND = Not Detected  
 U - Less Than Detection Limit  
 N - Named TIC

Q - Qualitative  
 J - Estimated

B - Blank Contamination  
 T - Tentatively Identified Compound

E - Outside Calibration Range  
 L - LLS Outside Range

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162536

SDG Number:

Customer Sample ID: 16-07645-2-BLANK2

Customer Sample ID: 16-07645-2-BLANK2

Sample#	R	AI#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026934			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	U
S16T026934			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	U
S16T026934			75-34-3	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026934			75-35-4	1,1-Dichloroethene	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026934			107-06-2	1,2-Dichloroethane	NGS	110	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026934			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026934			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026934			123-91-1	1,4-Dioxane	NGS	110	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026934			71-36-3	1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	U
S16T026934			111-70-6	1-Heptanol	NGS	93	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	U
S16T026934			71-23-8	1-Propanol	NGS	100	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	U
S16T026934			108-47-4	2,4-Dimethylpyridine	NGS	110	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026934			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026934			78-93-3	2-Butanone	NGS	100	<3.1	<3.1	n/a	n/a	n/a	n/a	3.1	n/a	U
S16T026934			110-43-0	2-Heptanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026934			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026934			534-22-5	2-Methylfuran	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026934			78-94-4	3-Buten-2-one	NGS	96	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026934			106-35-4	3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026934			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026934			105-42-0	4-Methyl-2-hexanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026934			108-10-1	4-Methyl-2-Pentanone	NGS	100	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026934			67-64-1	Acetone	NGS	99	3.1	4.6	n/a	n/a	n/a	n/a	2.8	n/a	BJ
S16T026934			75-05-8	Acetonitrile	NGS	100	<1.6	13	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026934			98-86-2	Acetophenone	NGS	110	<6.2	<6.2	n/a	n/a	n/a	n/a	6.2	n/a	LU
S16T026934			107-13-1	Acrylonitrile	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026934			107-18-6	Allyl Alcohol	NGS	100	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	U

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N - Named TIC

Q - Qualitative  
J - Estimated

B - Blank Contamination  
T - Tentatively Identified Compound

E - Outside Calibration Range  
L - LLS Outside Range

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162536

SDG Number:

Customer Sample ID: 16-07645-2-BLANK2

Customer Sample ID: 16-07645-2-BLANK2

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026934			107-05-1	Allyl Chloride	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026934			71-43-2	Benzene	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026934			100-47-0	Benzonitrile	NGS	110	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	U
S16T026934			123-72-8	Butanal	NGS	110	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026934			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026934			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026934			108-90-7	Chlorobenzene	NGS	110	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026934			75-00-3	Chloroethane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026934			87-66-3	Chloroform	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026934			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026934			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026934			84-17-5	Ethanol	NGS	110	4.0	9.2	n/a	n/a	n/a	n/a	3.7	n/a	BJ
S16T026934			141-78-6	Ethyl acetate	NGS	89	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026934			100-41-4	Ethylbenzene	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026934			110-00-9	Furan	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026934			110-54-3	Hexane	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026934			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026934			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026934			75-09-2	Methylene Chloride	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026934			91-20-3	Naphthalene	NGS	100	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	U
S16T026934			98-95-3	Nitrobenzene	NGS	110	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	U
S16T026934			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026934			107-12-0	Propanenitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026934			110-86-1	Pyridine	NGS	120	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026934			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026934			127-18-4	Tetrachloroethene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026934			108-88-3	Toluene	NGS	99	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U

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B - Blank Contamination  
T - Tentatively Identified Compound

E - Outside Calibration Range  
L - LLS Outside Range

# Cartridge Evaluation Data Summary Report

Sample Group: 20162536

SDG Number:

Customer Sample ID: 16-07645-2-BLANK2

Customer Sample ID: 16-07645-2-BLANK2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026934			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026934			75-69-4	Trichlorofluoromethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026934			10061-01-5	cis-1,3-Dichloropropene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026934			123-86-4	n-Butyl acetate	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026934			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026934			10061-02-6	trans-1,3-Dichloropropene	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U

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L - LLS Outside Range

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162536  
SDG Number:  
Customer Sample ID: 16-07645-2-C1  
Customer Sample ID: 16-07645-2-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															
S16T026935			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	U
S16T026935			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	U
S16T026935			75-34-3	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026935			75-35-4	1,1-Dichloroethene	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026935			107-06-2	1,2-Dichloroethane	NGS	110	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026935			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026935			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026935			123-91-1	1,4-Dioxane	NGS	110	<2.0	3.5	n/a	n/a	n/a	n/a	2.0	n/a	J
S16T026935			71-36-3	1-Butanol	NGS	110	<4.3	72	n/a	n/a	n/a	n/a	4.3	n/a	U
S16T026935			111-70-6	1-Heptanol	NGS	93	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	U
S16T026935			71-23-8	1-Propanol	NGS	100	<8.9	22	n/a	n/a	n/a	n/a	8.9	n/a	J
S16T026935			108-47-4	2,4-Dimethylpyridine	NGS	110	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026935			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026935			78-93-3	2-Butanone	NGS	100	<3.1	20	n/a	n/a	n/a	n/a	3.1	n/a	U
S16T026935			110-43-0	2-Heptanone	NGS	110	<2.6	7.4	n/a	n/a	n/a	n/a	2.6	n/a	J
S16T026935			591-78-6	2-Hexanone	NGS	100	<2.5	2.7	n/a	n/a	n/a	n/a	2.5	n/a	J
S16T026935			534-22-5	2-Methylfuran	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026935			78-94-4	3-Buten-2-one	NGS	96	<1.9	5.9	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026935			106-35-4	3-Heptanone	NGS	110	<2.7	7.6	n/a	n/a	n/a	n/a	2.7	n/a	J
S16T026935			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026935			105-42-0	4-Methyl-2-hexanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026935			108-10-1	4-Methyl-2-pentanone	NGS	100	<2.2	11	n/a	n/a	n/a	n/a	2.2	n/a	J
S16T026935			57-64-1	Acetone	NGS	99	3.1	480	n/a	n/a	n/a	n/a	2.8	n/a	BE
S16T026935			75-05-8	Acetonitrile	NGS	100	<1.6	32	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026935			98-86-2	Acetophenone	NGS	110	<6.2	40	n/a	n/a	n/a	n/a	6.2	n/a	L
S16T026935			107-13-1	Acrylonitrile	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026935			107-18-6	Allyl Alcohol	NGS	100	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	U

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N - Named TIC

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162536  
SDG Number:  
Customer Sample ID: 16-07645-2-C1  
Customer Sample ID: 16-07645-2-C1

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Roc %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026935			107-05-1	Allyl Chloride	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026935			71-43-2	Benzene	NGS	100	<1.5	4.6	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026935			100-47-0	Benzonitrile	NGS	110	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	U
S16T026935			123-72-8	Butanal	NGS	110	<3.0	8.6	n/a	n/a	n/a	n/a	3.0	n/a	J
S16T026935			109-74-0	Butanenitrile	NGS	110	<2.1	6.3	n/a	n/a	n/a	n/a	2.1	n/a	J
S16T026935			56-23-5	Carbon tetrachloride	NGS	100	<1.5	1.8	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026935			108-90-7	Chlorobenzene	NGS	110	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026935			75-00-3	Chloroethane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026935			87-66-3	Chloroform	NGS	110	<1.8	35	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026935			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026935			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026935			84-17-5	Ethanol	NGS	110	4.0	140	n/a	n/a	n/a	n/a	3.7	n/a	B
S16T026935			141-78-6	Ethyl acetate	NGS	89	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026935			100-41-4	Ethylbenzene	NGS	100	<2.4	5.4	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T026935			110-00-9	Furan	NGS	100	<1.6	1.6	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026935			110-54-3	Hexane	NGS	100	<1.3	5.7	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T026935			628-73-9	Hexanenitrile	NGS	110	<2.6	3.0	n/a	n/a	n/a	n/a	2.6	n/a	J
S16T026935			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026935			75-09-2	Methylene Chloride	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026935			91-20-3	Naphthalene	NGS	100	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	U
S16T026935			98-95-3	Nitrobenzene	NGS	110	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	U
S16T026935			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026935			107-12-0	Propanenitrile	NGS	110	<1.8	5.3	n/a	n/a	n/a	n/a	1.8	n/a	J
S16T026935			110-86-1	Pyridine	NGS	120	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026935			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026935			127-18-4	Tetrachloroethene	NGS	110	<1.8	230	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026935			108-88-3	Toluene	NGS	99	<2.2	19	n/a	n/a	n/a	n/a	2.2	n/a	U

E - Outside Calibration Range  
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 Q - Qualitative  
 J - Estimated  
 NA = Not Analyzed, ND = Not Detected  
 U - Less Than Detection Limit  
 N - Named TIC

# Cartridge Evaluation Data Summary Report

Sample Group: 20162536  
SDG Number:  
Customer Sample ID: 16-07645-2-C1  
Customer Sample ID: 16-07645-2-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															
S16T026935			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026935			75-69-4	Trichlorofluoromethane	NGS	100	<1.9	580	n/a	n/a	n/a	n/a	1.9	n/a	E
S16T026935			10061-01-5	cis-1,3-Dichloropropene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026935			123-86-4	n-Butyl acetate	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026935			142-82-5	n-Heptane	NGS	110	<1.6	2.6	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026935			10061-02-6	trans-1,3-Dichloropropene	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162536  
SDG Number:  
Customer Sample ID: 16-07645-2-D1  
Customer Sample ID: 16-07645-2-D1

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026937			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	U
S16T026937			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	U
S16T026937			75-34-3	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026937			75-35-4	1,1-Dichloroethene	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026937			107-06-2	1,2-Dichloroethane	NGS	110	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026937			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026937			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026937			123-91-1	1,4-Dioxane	NGS	110	<2.0	3.9	n/a	n/a	n/a	n/a	2.0	n/a	J
S16T026937			71-36-3	1-Butanol	NGS	110	<4.3	92	n/a	n/a	n/a	n/a	4.3	n/a	
S16T026937			111-70-6	1-Heptanol	NGS	93	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	U
S16T026937			71-23-8	1-Propanol	NGS	100	<8.9	30	n/a	n/a	n/a	n/a	8.9	n/a	
S16T026937			108-47-4	2,4-Dimethylpyridine	NGS	110	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026937			1706-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026937			78-93-3	2-Butanone	NGS	100	<3.1	22	n/a	n/a	n/a	n/a	3.1	n/a	
S16T026937			110-43-0	2-Heptanone	NGS	110	<2.6	7.4	n/a	n/a	n/a	n/a	2.6	n/a	J
S16T026937			591-78-6	2-Hexanone	NGS	100	<2.5	2.9	n/a	n/a	n/a	n/a	2.5	n/a	J
S16T026937			534-22-5	2-Methylfuran	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026937			78-94-4	3-Buten-2-one	NGS	96	<1.9	6.3	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026937			106-35-4	3-Heptanone	NGS	110	<2.7	7.9	n/a	n/a	n/a	n/a	2.7	n/a	J
S16T026937			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026937			105-42-0	4-Methyl-2-hexanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026937			108-10-1	4-Methyl-2-pentanone	NGS	100	<2.2	9.6	n/a	n/a	n/a	n/a	2.2	n/a	J
S16T026937			67-64-1	Acetone	NGS	99	3.1	580	n/a	n/a	n/a	n/a	2.8	n/a	BE
S16T026937			75-05-8	Acetonitrile	NGS	100	<1.6	32	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026937			98-86-2	Acetophenone	NGS	110	<6.2	22	n/a	n/a	n/a	n/a	6.2	n/a	L
S16T026937			107-13-1	Acrylonitrile	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026937			107-18-6	Allyl Alcohol	NGS	100	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	U

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L - LLS Outside Range

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162536  
SDG Number:  
Customer Sample ID: 16-07645-2-D1  
Customer Sample ID: 16-07645-2-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															
S16T026937			107-05-1	Allyl Chloride	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026937			71-43-2	Benzene	NGS	100	<1.5	5.2	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026937			100-47-0	Benzonitrile	NGS	110	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	U
S16T026937			123-72-8	Butanal	NGS	110	<3.0	7.5	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026937			109-74-0	Butanenitrile	NGS	110	<2.1	7.4	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026937			56-23-5	Carbon tetrachloride	NGS	100	<1.5	2.2	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026937			108-90-7	Chlorobenzene	NGS	110	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026937			75-00-3	Chloroethane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026937			67-66-3	Chloroform	NGS	110	<1.8	4.7	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026937			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	n/a	n/a	U
S16T026937			124-18-5	Decane	NGS	110	<3.3	8.0	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026937			64-17-5	Ethanol	NGS	110	4.0	180	n/a	n/a	n/a	n/a	3.7	n/a	B
S16T026937			141-78-6	Ethyl acetate	NGS	89	<1.8	2.2	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026937			100-41-4	Ethylbenzene	NGS	100	<2.4	5.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026937			110-00-9	Furan	NGS	100	<1.6	2.7	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026937			110-54-3	Hexane	NGS	100	<1.3	5.8	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026937			628-73-9	Hexanenitrile	NGS	110	<2.6	3.2	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026937			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026937			75-09-2	Methylene Chloride	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026937			91-20-3	Naphthalene	NGS	100	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	U
S16T026937			98-95-3	Nitrobenzene	NGS	110	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	U
S16T026937			110-59-8	Pentanenitrile	NGS	110	<2.6	3.0	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026937			107-12-0	Propanenitrile	NGS	110	<1.8	6.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026937			110-86-1	Pyridine	NGS	120	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026937			100-42-5	Styrene	NGS	110	<2.7	3.8	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026937			127-18-4	Tetrachloroethene	NGS	110	<1.8	190	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026937			108-88-3	Toluene	NGS	99	<2.2	16	n/a	n/a	n/a	n/a	2.2	n/a	U

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162536  
 SDG Number:  
 Customer Sample ID: 16-07645-2-D1  
 Customer Sample ID: 16-07645-2-D1

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026937			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026937			75-69-4	Trichlorofluoromethane	NGS	100	<1.9	760	n/a	n/a	n/a	n/a	1.9	n/a	E
S16T026937			10061-01-5	cis-1,3-Dichloropropene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026937			123-86-4	n-Butyl acetate	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026937			142-92-5	n-Heptane	NGS	110	<1.6	3.1	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026937			10061-02-6	trans-1,3-Dichloropropene	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162536  
SDG Number:  
Customer Sample ID: 16-07645-2-E1  
Customer Sample ID: 16-07645-2-E1

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026939			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	U
S16T026939			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	U
S16T026939			75-34-3	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026939			75-35-4	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026939			107-06-2	1,2-Dichloroethane	NGS	110	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026939			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026939			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026939			123-91-1	1,4-Dioxane	NGS	110	<2.0	2.9	n/a	n/a	n/a	n/a	2.0	n/a	J
S16T026939			71-36-3	1-Butanol	NGS	93	<4.3	8.3	n/a	n/a	n/a	n/a	4.3	n/a	
S16T026939			111-70-6	1-Heptanol	NGS	100	<8.9	18	n/a	n/a	n/a	n/a	9.1	n/a	U
S16T026939			71-23-8	1-Propanol	NGS	110	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026939			108-47-4	2,4-Dimethylpyridine	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026939			1708-29-8	2,5-Dihydrofuran	NGS	100	<3.1	16	n/a	n/a	n/a	n/a	3.1	n/a	
S16T026939			78-93-3	2-Butanone	NGS	110	<2.6	4.1	n/a	n/a	n/a	n/a	2.6	n/a	J
S16T026939			110-43-0	2-Heptanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026939			591-78-6	2-Hexanone	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026939			534-22-5	2-Methylfuran	NGS	96	<1.9	4.1	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026939			78-94-4	3-Buten-2-one	NGS	110	<2.7	5.6	n/a	n/a	n/a	n/a	2.7	n/a	J
S16T026939			106-35-4	3-Heptanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026939			106-88-3	3-Octanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026939			105-42-0	4-Methyl-2-hexanone	NGS	100	<2.2	4.5	n/a	n/a	n/a	n/a	2.2	n/a	J
S16T026939			108-10-1	4-Methyl-2-Pentanone	NGS	99	3.1	470	n/a	n/a	n/a	n/a	2.8	n/a	BE
S16T026939			67-64-1	Acetone	NGS	100	<1.6	260	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026939			75-05-8	Acetonitrile	NGS	110	<6.2	8.9	n/a	n/a	n/a	n/a	6.2	n/a	JL
S16T026939			98-86-2	Acetophenone	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026939			107-13-1	Acrylonitrile	NGS	100	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	U
S16T026939			107-18-6	Allyl Alcohol	NGS	100									

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162536  
SDG Number:  
Customer Sample ID: 16-07645-2-E1  
Customer Sample ID: 16-07645-2-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															
S16T026939			107-05-1	Allyl Chloride	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026939			71-43-2	Benzene	NGS	100	<1.5	3.2	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026939			100-47-0	Benzonitrile	NGS	110	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	U
S16T026939			123-72-8	Butanal	NGS	110	<3.0	6.4	n/a	n/a	n/a	n/a	3.0	n/a	J
S16T026939			109-74-0	Butanenitrile	NGS	110	<2.1	5.6	n/a	n/a	n/a	n/a	2.1	n/a	J
S16T026939			56-23-5	Carbon tetrachloride	NGS	100	<1.5	2.0	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026939			108-90-7	Chlorobenzene	NGS	110	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026939			75-00-3	Chloroethane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026939			67-66-3	Chloroform	NGS	110	<1.8	37	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026939			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026939			124-18-5	Decane	NGS	110	<3.3	6.2	n/a	n/a	n/a	n/a	3.3	n/a	J
S16T026939			84-17-5	Ethanol	NGS	110	4.0	160	n/a	n/a	n/a	n/a	3.7	n/a	B
S16T026939			141-78-6	Ethyl acetate	NGS	89	<1.8	1.9	n/a	n/a	n/a	n/a	1.8	n/a	J
S16T026939			100-41-4	Ethylbenzene	NGS	100	<2.4	3.6	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T026939			110-00-9	Furan	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026939			110-54-3	Hexane	NGS	100	<1.3	4.6	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T026939			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026939			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026939			75-09-2	Methylene Chloride	NGS	100	<4.1	5.0	n/a	n/a	n/a	n/a	4.1	n/a	J
S16T026939			91-20-3	Naphthalene	NGS	100	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	U
S16T026939			98-95-3	Nitrobenzene	NGS	110	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	U
S16T026939			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026939			107-12-0	Propanenitrile	NGS	110	<1.8	5.4	n/a	n/a	n/a	n/a	1.8	n/a	J
S16T026939			110-86-1	Pyridine	NGS	120	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026939			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026939			127-18-4	Tetrachloroethene	NGS	110	<1.8	87	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026939			108-88-3	Toluene	NGS	99	<2.2	8.9	n/a	n/a	n/a	n/a	2.2	n/a	J

E - Outside Calibration Range  
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T - Tentatively Identified Compound  
Q - Qualitative  
J - Estimated  
NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit  
N - Named TIC

# Cartridge Evaluation Data Summary Report

Sample Group: 20162536  
SDG Number:  
Customer Sample ID: 16-07645-2-E1  
Customer Sample ID: 16-07645-2-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															
S16T026939			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026939			75-69-4	Trichlorofluoromethane	NGS	100	<1.9	600	n/a	n/a	n/a	n/a	1.9	n/a	E
S16T026939			10061-01-5	cis-1,3-Dichloropropene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026939			123-86-4	n-Butyl acetate	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026939			142-82-5	n-Heptane	NGS	110	<1.6	2.3	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026939			10061-02-6	trans-1,3-Dichloropropene	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U

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B - Blank Contamination  
T - Tentatively Identified Compound

E - Outside Calibration Range  
L - LLS Outside Range

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162536  
SDG Number:  
Customer Sample ID: 16-07645-2-EFF-BASE  
Customer Sample ID: 16-07645-2-EFF-BASE

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026941			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	U
S16T026941			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	U
S16T026941			75-34-3	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026941			75-35-4	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026941			107-06-2	1,2-Dichloroethane	NGS	110	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026941			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026941			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026941			123-91-1	1,4-Dioxane	NGS	110	<2.0	<2.0	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026941			71-36-3	1-Butanol	NGS	110	<4.3	<4.3	n/a	n/a	n/a	n/a	4.3	n/a	U
S16T026941			111-70-6	1-Heptanol	NGS	93	<8.9	<8.9	n/a	n/a	n/a	n/a	9.1	n/a	U
S16T026941			71-23-8	1-Propanol	NGS	100	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	U
S16T026941			108-47-4	2,4-Dimethylpyridine	NGS	110	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026941			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026941			78-93-3	2-Butanone	NGS	100	<3.1	5.2	n/a	n/a	n/a	n/a	3.1	n/a	J
S16T026941			110-43-0	2-Heptanone	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026941			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026941			534-22-5	2-Methylfuran	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026941			78-94-4	3-Buten-2-one	NGS	96	<1.9	4.0	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026941			106-35-4	3-Heptanone	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026941			106-88-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026941			105-42-0	4-Methyl-2-hexanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026941			108-10-1	4-Methyl-2-Pentanone	NGS	100	<2.2	2.3	n/a	n/a	n/a	n/a	2.2	n/a	J
S16T026941			67-64-1	Acetone	NGS	99	3.1	29	n/a	n/a	n/a	n/a	2.8	n/a	B
S16T026941			75-05-8	Acetonitrile	NGS	100	<1.6	33	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026941			98-86-2	Acetophenone	NGS	110	<6.2	12	n/a	n/a	n/a	n/a	6.2	n/a	L
S16T026941			107-13-1	Acrylonitrile	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026941			107-18-6	Allyl Alcohol	NGS	100	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	U

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162536  
SDG Number:  
Customer Sample ID: 16-07645-2-EFF-BASE  
Customer Sample ID: 16-07645-2-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															
S16T026941			107-05-1	Allyl Chloride	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026941			71-43-2	Benzene	NGS	100	<1.5	2.0	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026941			100-47-0	Benzonitrile	NGS	110	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	U
S16T026941			123-72-8	Butanal	NGS	110	<3.0	<3.0	n/a	n/a	n/a	n/a	3.0	n/a	U
S16T026941			109-74-0	Butanenitrile	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026941			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026941			108-90-7	Chlorobenzene	NGS	110	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026941			75-00-3	Chloroethane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026941			67-66-3	Chloroform	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026941			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026941			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026941			84-17-5	Ethanol	NGS	110	4.0	15	n/a	n/a	n/a	n/a	3.7	n/a	BJ
S16T026941			141-78-6	Ethyl acetate	NGS	89	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026941			100-41-4	Ethylbenzene	NGS	100	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026941			110-00-9	Furan	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026941			110-54-3	Hexane	NGS	100	<1.3	1.7	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T026941			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026941			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026941			75-09-2	Methylene Chloride	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026941			91-20-3	Naphthalene	NGS	100	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	U
S16T026941			98-95-3	Nitrobenzene	NGS	110	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	U
S16T026941			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026941			107-12-0	Propanenitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026941			110-86-1	Pyridine	NGS	120	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026941			100-42-5	Styrene	NGS	110	<2.7	4.2	n/a	n/a	n/a	n/a	2.7	n/a	J
S16T026941			127-18-4	Tetrachloroethene	NGS	110	<1.8	110	n/a	n/a	n/a	n/a	1.8	n/a	
S16T026941			108-88-3	Toluene	NGS	99	<2.2	8.6	n/a	n/a	n/a	n/a	2.2	n/a	J

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# Cartridge Evaluation Data Summary Report

Sample Group: 20162536  
SDG Number:  
Customer Sample ID: 16-07645-2-EFF-BASE  
Customer Sample ID: 16-07645-2-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															
S16T026941			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026941			75-69-4	Trichlorofluoromethane	NGS	100	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026941			10061-01-5	cis-1,3-Dichloropropene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026941			123-86-4	n-Butyl acetate	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026941			142-82-5	n-Heptane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026941			10061-02-6	trans-1,3-Dichloropropene	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162536  
SDG Number:  
Customer Sample ID: 16-07645-2-F1  
Customer Sample ID: 16-07645-2-F1

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026942			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	U
S16T026942			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	U
S16T026942			75-34-3	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026942			75-35-4	1,1-Dichloroethene	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026942			107-06-2	1,2-Dichloroethane	NGS	110	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026942			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026942			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026942			123-91-1	1,4-Dioxane	NGS	110	<2.0	3.1	n/a	n/a	n/a	n/a	2.0	n/a	J
S16T026942			71-36-3	1-Butanol	NGS	110	<4.3	54	n/a	n/a	n/a	n/a	4.3	n/a	
S16T026942			111-70-6	1-Heptanol	NGS	93	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	U
S16T026942			71-23-8	1-Propanol	NGS	100	<8.9	13	n/a	n/a	n/a	n/a	8.9	n/a	J
S16T026942			108-47-4	2,4-Dimethylpyridine	NGS	110	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026942			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026942			78-93-3	2-Butanone	NGS	100	<3.1	16	n/a	n/a	n/a	n/a	3.1	n/a	
S16T026942			110-43-0	2-Heptanone	NGS	110	<2.6	4.6	n/a	n/a	n/a	n/a	2.6	n/a	J
S16T026942			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026942			534-22-5	2-Methylfuran	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026942			78-94-4	3-Buten-2-one	NGS	96	<1.9	4.2	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026942			106-35-4	3-Heptanone	NGS	110	<2.7	6.6	n/a	n/a	n/a	n/a	2.7	n/a	J
S16T026942			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026942			105-42-0	4-Methyl-2-hexanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026942			108-10-1	4-Methyl-2-pentanone	NGS	100	<2.2	3.9	n/a	n/a	n/a	n/a	2.2	n/a	J
S16T026942			57-64-1	Acetone	NGS	99	3.1	490	n/a	n/a	n/a	n/a	2.8	n/a	BE
S16T026942			75-05-8	Acetonitrile	NGS	100	<1.6	41	n/a	n/a	n/a	n/a	1.6	n/a	
S16T026942			98-86-2	Acetophenone	NGS	110	<6.2	17	n/a	n/a	n/a	n/a	6.2	n/a	L
S16T026942			107-13-1	Acrylonitrile	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026942			107-18-6	Allyl Alcohol	NGS	100	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	U

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L - LLS Outside Range

Cartridge Evaluation  
Data Summary Report

Sample Group: 20162536  
SDG Number:  
Customer Sample ID: 16-07645-2-F1  
Customer Sample ID: 16-07645-2-F1

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026942			107-05-1	Allyl Chloride	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026942			71-43-2	Benzene	NGS	100	<1.5	3.2	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026942			100-47-0	Benzonitrile	NGS	110	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	U
S16T026942			123-72-8	Butanal	NGS	110	<3.0	5.4	n/a	n/a	n/a	n/a	3.0	n/a	J
S16T026942			109-74-0	Butanenitrile	NGS	110	<2.1	6.3	n/a	n/a	n/a	n/a	2.1	n/a	J
S16T026942			36-23-5	Carbon tetrachloride	NGS	100	<1.5	2.1	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026942			108-90-7	Chlorobenzene	NGS	110	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026942			75-00-3	Chloroethane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026942			67-66-3	Chloroform	NGS	110	<1.8	39	n/a	n/a	n/a	n/a	1.8	n/a	
S16T026942			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026942			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026942			64-17-5	Ethanol	NGS	110	4.0	170	n/a	n/a	n/a	n/a	3.7	n/a	B
S16T026942			141-78-6	Ethyl acetate	NGS	89	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026942			100-41-4	Ethylbenzene	NGS	100	<2.4	4.1	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T026942			110-00-9	Furan	NGS	100	<1.6	1.9	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026942			110-54-3	Hexane	NGS	100	<1.3	3.9	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T026942			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026942			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026942			75-09-2	Methylene Chloride	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026942			91-20-3	Naphthalene	NGS	100	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	U
S16T026942			98-95-3	Nitrobenzene	NGS	110	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	U
S16T026942			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026942			107-12-0	Propanenitrile	NGS	110	<1.8	5.7	n/a	n/a	n/a	n/a	1.8	n/a	J
S16T026942			110-86-1	Pyridine	NGS	120	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026942			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026942			127-18-4	Tetrachloroethene	NGS	110	<1.8	83	n/a	n/a	n/a	n/a	1.8	n/a	
S16T026942			108-88-3	Toluene	NGS	99	<2.2	7.7	n/a	n/a	n/a	n/a	2.2	n/a	J

E - Outside Calibration Range  
L - LLS Outside Range  
B - Blank Contamination  
T - Tentatively Identified Compound  
Q - Qualitative  
J - Estimated  
NA = Not Analyzed, ND = Not Detected  
U - Less Than Detection Limit  
N - Named TIC

# Cartridge Evaluation Data Summary Report

Sample Group: 20162536  
SDG Number:  
Customer Sample ID: 16-07645-2-F1  
Customer Sample ID: 16-07645-2-F1

Sample#	R	AI#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026942			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026942			75-69-4	Trichlorofluoromethane	NGS	100	<1.9	620	n/a	n/a	n/a	n/a	1.9	n/a	E
S16T026942			10061-01-5	cis-1,3-Dichloropropene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026942			123-86-4	n-Butyl acetate	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026942			142-82-5	n-Heptane	NGS	110	<1.6	2.6	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026942			10061-02-6	trans-1,3-Dichloropropene	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162536

SDG Number:

Customer Sample ID: 16-07645-2-G1

Customer Sample ID: 16-07645-2-G1

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR: TDU VOA #2															
S16T026944			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	n/a U
S16T026944			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	n/a U
S16T026944			75-34-3	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	n/a U
S16T026944			75-35-4	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	n/a U
S16T026944			107-06-2	1,2-Dichloroethane	NGS	110	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	n/a U
S16T026944			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	n/a U
S16T026944			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	n/a U
S16T026944			123-91-1	1,4-Dioxane	NGS	110	<2.0	3.4	n/a	n/a	n/a	n/a	2.0	n/a	n/a U
S16T026944			71-36-3	1-Butanol	NGS	110	<4.3	59	n/a	n/a	n/a	n/a	4.3	n/a	n/a U
S16T026944			111-70-6	1-Heptanol	NGS	93	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	n/a U
S16T026944			71-23-8	1-Propanol	NGS	100	<8.9	15	n/a	n/a	n/a	n/a	8.9	n/a	n/a U
S16T026944			108-47-4	2,4-Dimethylpyridine	NGS	110	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	n/a U
S16T026944			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	n/a U
S16T026944			78-93-3	2-Butanone	NGS	100	<3.1	15	n/a	n/a	n/a	n/a	3.1	n/a	n/a U
S16T026944			110-43-0	2-Heptanone	NGS	110	<2.6	4.0	n/a	n/a	n/a	n/a	2.6	n/a	n/a U
S16T026944			591-78-6	2-Hexanone	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	n/a U
S16T026944			534-22-5	2-Methylfuran	NGS	100	<1.3	<1.3	n/a	n/a	n/a	n/a	1.3	n/a	n/a U
S16T026944			78-94-4	3-Buten-2-one	NGS	96	<1.9	3.9	n/a	n/a	n/a	n/a	1.9	n/a	n/a U
S16T026944			106-35-4	3-Heptanone	NGS	110	<2.7	6.0	n/a	n/a	n/a	n/a	2.7	n/a	n/a U
S16T026944			106-68-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	n/a U
S16T026944			105-42-0	4-Methyl-2-hexanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	n/a U
S16T026944			108-10-1	4-Methyl-2-pentanone	NGS	100	<2.2	3.0	n/a	n/a	n/a	n/a	2.2	n/a	n/a U
S16T026944			67-64-1	Acetone	NGS	99	3.1	450	n/a	n/a	n/a	n/a	2.8	n/a	n/a BE
S16T026944			75-05-8	Acetonitrile	NGS	100	<1.6	29	n/a	n/a	n/a	n/a	1.6	n/a	n/a U
S16T026944			98-86-2	Acetophenone	NGS	110	<6.2	15	n/a	n/a	n/a	n/a	6.2	n/a	n/a L
S16T026944			107-13-1	Acrylonitrile	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	n/a U
S16T026944			107-18-6	Allyl Alcohol	NGS	100	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	n/a U

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162536  
SDG Number:  
Customer Sample ID: 16-07645-2-G1  
Customer Sample ID: 16-07645-2-G1

Sample#	R	AI#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026944			107-05-1	Allyl Chloride	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026944			71-43-2	Benzene	NGS	100	<1.5	3.1	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026944			100-47-0	Benzonitrile	NGS	110	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	U
S16T026944			123-72-8	Butanal	NGS	110	<3.0	4.0	n/a	n/a	n/a	n/a	3.0	n/a	J
S16T026944			109-74-0	Butanenitrile	NGS	110	<2.1	6.4	n/a	n/a	n/a	n/a	2.1	n/a	J
S16T026944			56-23-5	Carbon tetrachloride	NGS	100	<1.5	1.9	n/a	n/a	n/a	n/a	1.5	n/a	J
S16T026944			108-90-7	Chlorobenzene	NGS	110	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026944			75-00-3	Chloroethane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026944			67-66-3	Chloroform	NGS	110	<1.8	39	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026944			110-82-7	Cyclohexane	NGS	100	<1.4	<1.4	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026944			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026944			84-17-5	Ethanol	NGS	110	4.0	150	n/a	n/a	n/a	n/a	3.7	n/a	B
S16T026944			141-78-6	Ethyl acetate	NGS	89	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026944			100-41-4	Ethylbenzene	NGS	100	<2.4	3.7	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T026944			110-00-9	Furan	NGS	100	<1.6	2.6	n/a	n/a	n/a	n/a	1.6	n/a	J
S16T026944			110-54-3	Hexane	NGS	100	<1.3	3.4	n/a	n/a	n/a	n/a	1.3	n/a	J
S16T026944			628-73-9	Hexanenitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026944			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026944			75-09-2	Methylene Chloride	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026944			91-20-3	Naphthalene	NGS	100	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	U
S16T026944			98-95-3	Nitrobenzene	NGS	110	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	U
S16T026944			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026944			107-12-0	Propanenitrile	NGS	110	<1.8	5.7	n/a	n/a	n/a	n/a	1.8	n/a	J
S16T026944			110-86-1	Pyridine	NGS	120	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026944			100-42-5	Styrene	NGS	110	<2.7	<2.7	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026944			127-18-4	Tetrachloroethene	NGS	110	<1.8	73	n/a	n/a	n/a	n/a	1.8	n/a	J
S16T026944			108-88-3	Toluene	NGS	99	<2.2	6.9	n/a	n/a	n/a	n/a	2.2	n/a	J

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Cartridge Evaluation  
 Data Summary Report

Sample Group: 20162536  
 SDG Number:  
 Customer Sample ID: 16-07645-2-G1  
 Customer Sample ID: 16-07645-2-G1

Sample#	R	AI	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026944			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026944			75-69-4	Trichlorofluoromethane	NGS	100	<1.9	620	n/a	n/a	n/a	n/a	1.9	n/a	E
S16T026944			10061-01-5	cis-1,3-Dichloropropene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026944			123-86-4	n-Butyl acetate	NGS	88	<2.4	<2.4	n/a	n/a	n/a	n/a	2.4	n/a	U
S16T026944			142-82-5	n-Heptane	NGS	110	<1.6	2.4	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026944			10061-02-6	trans-1,3-Dichloropropene	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U

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Cartridge Evaluation  
Data Summary Report

Sample Group: 20162536  
SDG Number:  
Customer Sample ID: 16-07645-2-IN-BASE  
Customer Sample ID: 16-07645-2-IN-BASE

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Roc %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026948			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	U
S16T026948			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	U
S16T026948			75-34-3	1,1-Dichloroethane	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026948			75-35-4	1,1-Dichloroethene	NGS	100	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026948			107-06-2	1,2-Dichloroethane	NGS	110	<1.7	<1.7	n/a	n/a	n/a	n/a	1.7	n/a	U
S16T026948			542-75-6	1,3-Dichloropropene (Total)	NGS	n/a	n/a	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026948			106-46-7	1,4-Dichlorobenzene	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026948			123-91-1	1,4-Dioxane	NGS	110	<2.0	3.4	n/a	n/a	n/a	n/a	2.0	n/a	U
S16T026948			71-36-3	1-Butanol	NGS	110	<4.3	88	n/a	n/a	n/a	n/a	4.3	n/a	U
S16T026948			111-70-6	1-Heptanol	NGS	93	<9.1	<9.1	n/a	n/a	n/a	n/a	9.1	n/a	U
S16T026948			71-23-8	1-Propanol	NGS	100	<8.9	<8.9	n/a	n/a	n/a	n/a	8.9	n/a	U
S16T026948			108-47-4	2,4-Dimethylpyridine	NGS	110	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026948			1708-29-8	2,5-Dihydrofuran	NGS	110	<2.2	<2.2	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026948			78-93-3	2-Butanone	NGS	100	<3.1	15	n/a	n/a	n/a	n/a	3.1	n/a	U
S16T026948			110-43-0	2-Heptanone	NGS	110	<2.6	6.4	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026948			591-78-6	2-Hexanone	NGS	100	<2.5	2.6	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026948			534-22-5	2-Methylfuran	NGS	100	<1.3	3.3	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026948			78-94-4	3-Buten-2-one	NGS	96	<1.9	<1.9	n/a	n/a	n/a	n/a	1.9	n/a	U
S16T026948			106-35-4	3-Heptanone	NGS	110	<2.7	3.8	n/a	n/a	n/a	n/a	2.7	n/a	U
S16T026948			106-88-3	3-Octanone	NGS	100	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026948			105-42-0	4-Methyl-2-hexanone	NGS	100	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026948			108-10-1	4-Methyl-2-pentanone	NGS	100	<2.2	33	n/a	n/a	n/a	n/a	2.2	n/a	U
S16T026948			87-64-1	Acetone	NGS	99	3.1	87	n/a	n/a	n/a	n/a	2.8	n/a	B
S16T026948			75-05-8	Acetonitrile	NGS	100	<1.6	13	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026948			98-86-2	Acetophenone	NGS	110	<6.2	<6.2	n/a	n/a	n/a	n/a	6.2	n/a	LU
S16T026948			107-13-1	Acrylonitrile	NGS	100	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U
S16T026948			107-18-6	Allyl Alcohol	NGS	100	<2.3	<2.3	n/a	n/a	n/a	n/a	2.3	n/a	U

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



Cartridge Evaluation  
Data Summary Report

Sample Group: 20162536  
SDG Number:  
Customer Sample ID: 16-07645-2-IN-BASE  
Customer Sample ID: 16-07645-2-IN-BASE

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Roc %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026948			107-05-1	Allyl Chloride	NGS	100	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026948			71-43-2	Benzene	NGS	100	<1.5	17	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026948			100-47-0	Benzonitrile	NGS	110	<4.2	<4.2	n/a	n/a	n/a	n/a	4.2	n/a	U
S16T026948			123-72-8	Butanal	NGS	110	<3.0	7.9	n/a	n/a	n/a	n/a	3.0	n/a	J
S16T026948			109-74-0	Butanenitrile	NGS	110	<2.1	11	n/a	n/a	n/a	n/a	2.1	n/a	J
S16T026948			56-23-5	Carbon tetrachloride	NGS	100	<1.5	<1.5	n/a	n/a	n/a	n/a	1.5	n/a	U
S16T026948			108-90-7	Chlorobenzene	NGS	110	<2.5	<2.5	n/a	n/a	n/a	n/a	2.5	n/a	U
S16T026948			75-00-3	Chloroethane	NGS	110	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026948			87-66-3	Chloroform	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026948			110-82-7	Cyclohexane	NGS	100	<1.4	17	n/a	n/a	n/a	n/a	1.4	n/a	U
S16T026948			124-18-5	Decane	NGS	110	<3.3	<3.3	n/a	n/a	n/a	n/a	3.3	n/a	U
S16T026948			64-17-5	Ethanol	NGS	110	4.0	240	n/a	n/a	n/a	n/a	3.7	n/a	B
S16T026948			141-78-6	Ethyl acetate	NGS	89	<1.8	3.8	n/a	n/a	n/a	n/a	1.8	n/a	J
S16T026948			100-41-4	Ethylbenzene	NGS	100	<2.4	9.1	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T026948			110-00-9	Furan	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026948			110-54-3	Hexane	NGS	100	<1.3	47	n/a	n/a	n/a	n/a	1.3	n/a	U
S16T026948			628-73-9	Hexanenitrile	NGS	110	<2.6	4.1	n/a	n/a	n/a	n/a	2.6	n/a	J
S16T026948			126-98-7	Methacrylonitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026948			75-09-2	Methylene Chloride	NGS	100	<4.1	<4.1	n/a	n/a	n/a	n/a	4.1	n/a	U
S16T026948			91-20-3	Naphthalene	NGS	100	<5.3	<5.3	n/a	n/a	n/a	n/a	5.3	n/a	U
S16T026948			98-95-3	Nitrobenzene	NGS	110	<4.7	<4.7	n/a	n/a	n/a	n/a	4.7	n/a	U
S16T026948			110-59-8	Pentanitrile	NGS	110	<2.6	<2.6	n/a	n/a	n/a	n/a	2.6	n/a	U
S16T026948			107-12-0	Propanenitrile	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026948			110-86-1	Pyridine	NGS	120	<2.8	<2.8	n/a	n/a	n/a	n/a	2.8	n/a	U
S16T026948			100-42-5	Styrene	NGS	110	<2.7	4.4	n/a	n/a	n/a	n/a	2.7	n/a	J
S16T026948			127-18-4	Tetrachloroethene	NGS	110	<1.8	590	n/a	n/a	n/a	n/a	1.8	n/a	E
S16T026948			108-88-3	Toluene	NGS	99	<2.2	98	n/a	n/a	n/a	n/a	2.2	n/a	U

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U - Less Than Detection Limit  
N - Named TIC

# Cartridge Evaluation Data Summary Report

Sample Group: 20162536  
SDG Number:  
Customer Sample ID: 16-07645-2-IN-BASE  
Customer Sample ID: 16-07645-2-IN-BASE

Sample#	R	A/J	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VAPOR-TDU VOA #2															
S16T026948			79-01-6	Trichloroethene	NGS	100	<1.6	<1.6	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026948			75-69-4	Trichlorofluoromethane	NGS	100	<1.9	4.6	n/a	n/a	n/a	n/a	1.9	n/a	J
S16T026948			10061-01-5	cis-1,3-Dichloropropene	NGS	110	<1.8	<1.8	n/a	n/a	n/a	n/a	1.8	n/a	U
S16T026948			123-86-4	n-Butyl acetate	NGS	88	<2.4	2.7	n/a	n/a	n/a	n/a	2.4	n/a	J
S16T026948			142-82-5	n-Heptane	NGS	110	<1.6	32	n/a	n/a	n/a	n/a	1.6	n/a	U
S16T026948			10061-02-6	trans-1,3-Dichloropropene	NGS	110	<2.1	<2.1	n/a	n/a	n/a	n/a	2.1	n/a	U

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N - Named TIC

# C.3.3 Furans

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## Cartridge Evaluation Data Summary of All Results

*Cartridge Eval*  
9/28/16

Sample Group: 20162521  
SDG Number:  
Customer Sample ID: 16-07645-3-A1  
Customer Sample ID: 16-07645-3-A1

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															
S16T026849			1191-99-7	2,3-Dihydrofuran	NGS	73	<0.18	0.59	n/a	n/a	n/a	n/a	0.18	n/a	J
S16T026849			1708-29-8	2,5-Dihydrofuran	NGS	86	<0.23	2.3	n/a	n/a	n/a	n/a	0.23	n/a	J
S16T026849			625-86-5	2,5-Dimethylfuran	NGS	69	<0.43	<0.43	n/a	n/a	n/a	n/a	0.43	n/a	U
S16T026849			3777-71-7	2-Heptylfuran	NGS	75	<0.27	<0.27	n/a	n/a	n/a	n/a	0.27	n/a	U
S16T026849			534-22-5	2-Methylfuran	NGS	71	<0.23	3.1	n/a	n/a	n/a	n/a	0.23	n/a	J
S16T026849			3777-69-3	2-Pentylfuran	NGS	70	<0.34	0.90	n/a	n/a	n/a	n/a	0.34	n/a	J
S16T026849			4229-91-8	2-Propylfuran	NGS	73	<0.44	<0.44	n/a	n/a	n/a	n/a	0.44	n/a	U
S16T026849			110-00-9	Furan	NGS	69	<0.090	0.96	n/a	n/a	n/a	n/a	0.090	n/a	J
S16T026849			109-99-9	Tetrahydrofuran	NGS	92	<0.10	27	n/a	n/a	n/a	n/a	0.10	n/a	

NA = Not Analyzed, ND = Not Detected

U - Less Than Detection Limit

J - Estimated

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162521  
SDG Number:  
Customer Sample ID: 16-07645-3-A2  
Customer Sample ID: 16-07645-3-A2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spt Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T026850			1191-99-7	2,3-Dihydrofuran	NGS	73	<0.18	<0.18	n/a	n/a	n/a	n/a	0.18	n/a	U
S16T026850			1708-29-8	2,5-Dihydrofuran	NGS	86	<0.23	0.75	n/a	n/a	n/a	n/a	0.23	n/a	J
S16T026850			625-86-5	2,5-Dimethylfuran	NGS	69	<0.43	<0.43	n/a	n/a	n/a	n/a	0.43	n/a	U
S16T026850			3777-71-7	2-Heptylfuran	NGS	75	<0.27	<0.27	n/a	n/a	n/a	n/a	0.27	n/a	U
S16T026850			534-22-5	2-Methylfuran	NGS	71	<0.23	0.98	n/a	n/a	n/a	n/a	0.23	n/a	J
S16T026850			3777-89-3	2-Pentylfuran	NGS	70	<0.34	0.35	n/a	n/a	n/a	n/a	0.34	n/a	J
S16T026850			4229-91-8	2-Propylfuran	NGS	73	<0.44	<0.44	n/a	n/a	n/a	n/a	0.44	n/a	U
S16T026850			110-00-9	Furan	NGS	69	<0.090	0.41	n/a	n/a	n/a	n/a	0.090	n/a	J
S16T026850			109-99-9	Tetrahydrofuran	NGS	92	<0.10	<0.10	n/a	n/a	n/a	n/a	0.10	n/a	U

J - Estimated

U - Less Than Detection Limit

NA = Not Analyzed, ND = Not Detected

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162521  
SDG Number:  
Customer Sample ID: 16-07645-3-B1  
Customer Sample ID: 16-07645-3-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															
S16T028851			1191-99-7	2,3-Dihydrofuran	NGS	73	<0.18	0.63	n/a	n/a	n/a	n/a	0.18	n/a	J
S16T028851			1708-29-8	2,5-Dihydrofuran	NGS	86	<0.23	0.36	n/a	n/a	n/a	n/a	0.23	n/a	J
S16T028851			625-86-5	2,5-Dimethylfuran	NGS	69	<0.43	<0.43	n/a	n/a	n/a	n/a	0.43	n/a	U
S16T028851			3777-71-7	2-Heptylfuran	NGS	75	<0.27	<0.27	n/a	n/a	n/a	n/a	0.27	n/a	U
S16T028851			534-22-5	2-Methylfuran	NGS	71	<0.23	0.61	n/a	n/a	n/a	n/a	0.23	n/a	J
S16T028851			3777-69-3	2-Pentylfuran	NGS	70	<0.34	1.1	n/a	n/a	n/a	n/a	0.34	n/a	J
S16T028851			4229-91-8	2-Propylfuran	NGS	73	<0.44	<0.44	n/a	n/a	n/a	n/a	0.44	n/a	U
S16T028851			110-00-9	Furan	NGS	69	<0.090	0.15	n/a	n/a	n/a	n/a	0.090	n/a	J
S16T028851			109-99-9	Tetrahydrofuran	NGS	92	<0.10	24	n/a	n/a	n/a	n/a	0.10	n/a	

NA = Not Analyzed, ND = Not Detected

U - Less Than Detection Limit

J - Estimated

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162521  
SDG Number:  
Customer Sample ID: 16-07645-3-B2  
Customer Sample ID: 16-07645-3-B2

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															
S16T028852			1191-99-7	2,3-Dihydrofuran	NGS	73	<0.18	<0.18	n/a	n/a	n/a	n/a	0.18		n/a U
S16T028852			1708-29-8	2,5-Dihydrofuran	NGS	86	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23		n/a U
S16T028852			625-86-5	2,5-Dimethylfuran	NGS	69	<0.43	<0.43	n/a	n/a	n/a	n/a	0.43		n/a U
S16T028852			3777-71-7	2-Heptylfuran	NGS	75	<0.27	<0.27	n/a	n/a	n/a	n/a	0.27		n/a U
S16T028852			534-22-5	2-Methylfuran	NGS	71	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23		n/a U
S16T028852			3777-69-3	2-Pentylfuran	NGS	70	<0.34	<0.34	n/a	n/a	n/a	n/a	0.34		n/a U
S16T028852			4229-91-8	2-Propylfuran	NGS	73	<0.44	<0.44	n/a	n/a	n/a	n/a	0.44		n/a U
S16T028852			110-00-9	Furan	NGS	69	<0.090	0.10	n/a	n/a	n/a	n/a	0.090		n/a J
S16T028852			109-99-9	Tetrahydrofuran	NGS	92	<0.10	<0.10	n/a	n/a	n/a	n/a	0.10		n/a U

J - Estimated

U - Less Than Detection Limit

NA = Not Analyzed, ND = Not Detected

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162521  
SDG Number:  
Customer Sample ID: 16-07645-3-BLANK  
Customer Sample ID: 16-07645-3-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															
S16T026853			1191-99-7	2,3-Dihydrofuran	NGS	73	<0.18	<0.18	n/a	n/a	n/a	n/a	0.18	n/a	U
S16T026853			1708-29-8	2,5-Dihydrofuran	NGS	86	<0.23	0.79	n/a	n/a	n/a	n/a	0.23	n/a	J
S16T026853			625-86-5	2,5-Dimethylfuran	NGS	69	<0.43	<0.43	n/a	n/a	n/a	n/a	0.43	n/a	U
S16T026853			3777-71-7	2-Heptylfuran	NGS	75	<0.27	<0.27	n/a	n/a	n/a	n/a	0.27	n/a	U
S16T026853			534-22-5	2-Methylfuran	NGS	71	<0.23	0.24	n/a	n/a	n/a	n/a	0.23	n/a	J
S16T026853			3777-69-3	2-Pentylfuran	NGS	70	<0.34	<0.34	n/a	n/a	n/a	n/a	0.34	n/a	U
S16T026853			4229-91-8	2-Propylfuran	NGS	73	<0.44	<0.44	n/a	n/a	n/a	n/a	0.44	n/a	U
S16T026853			110-00-9	Furan	NGS	69	<0.090	0.13	n/a	n/a	n/a	n/a	0.090	n/a	J
S16T026853			109-99-9	Tetrahydrofuran	NGS	92	<0.10	<0.10	n/a	n/a	n/a	n/a	0.10	n/a	U

J - Estimated

U - Less Than Detection Limit

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Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162521  
SDG Number:  
Customer Sample ID: 16-07645-3-BLANK2  
Customer Sample ID: 16-07645-3-BLANK2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spt Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T028854			1191-99-7	2,3-Dihydrofuran	NGS	73	<0.18	<0.18	n/a	n/a	n/a	n/a	0.18	n/a	U
S16T028854			1708-29-8	2,5-Dihydrofuran	NGS	86	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	U
S16T028854			625-86-5	2,5-Dimethylfuran	NGS	69	<0.43	<0.43	n/a	n/a	n/a	n/a	0.43	n/a	U
S16T028854			3777-71-7	2-Heptylfuran	NGS	75	<0.27	<0.27	n/a	n/a	n/a	n/a	0.27	n/a	U
S16T028854			534-22-5	2-Methylfuran	NGS	71	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	U
S16T028854			3777-69-3	2-Pentylfuran	NGS	70	<0.34	<0.34	n/a	n/a	n/a	n/a	0.34	n/a	U
S16T028854			4229-91-8	2-Propylfuran	NGS	73	<0.44	<0.44	n/a	n/a	n/a	n/a	0.44	n/a	U
S16T028854			110-00-9	Furan	NGS	69	<0.090	<0.090	n/a	n/a	n/a	n/a	0.090	n/a	U
S16T028854			109-99-9	Tetrahydrofuran	NGS	92	<0.10	<0.10	n/a	n/a	n/a	n/a	0.10	n/a	U

J - Estimated

U - Less Than Detection Limit

NA = Not Analyzed, ND = Not Detected



Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162521  
SDG Number:  
Customer Sample ID: 16-07645-3-C1  
Customer Sample ID: 16-07645-3-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															
S16T026855			1191-99-7	2,3-Dihydrofuran	NGS	73	<0.18	0.38	n/a	n/a	n/a	n/a	0.18	n/a	J
S16T026855			1708-29-8	2,5-Dihydrofuran	NGS	86	<0.23	0.29	n/a	n/a	n/a	n/a	0.23	n/a	J
S16T026855			625-86-5	2,5-Dimethylfuran	NGS	69	<0.43	<0.43	n/a	n/a	n/a	n/a	0.43	n/a	U
S16T026855			3777-71-7	2-Heptylfuran	NGS	75	<0.27	<0.27	n/a	n/a	n/a	n/a	0.27	n/a	U
S16T026855			534-22-5	2-Methylfuran	NGS	71	<0.23	0.43	n/a	n/a	n/a	n/a	0.23	n/a	J
S16T026855			3777-69-3	2-Pentylfuran	NGS	70	<0.34	0.96	n/a	n/a	n/a	n/a	0.34	n/a	J
S16T026855			4229-91-8	2-Propylfuran	NGS	73	<0.44	<0.44	n/a	n/a	n/a	n/a	0.44	n/a	U
S16T026855			110-00-9	Furan	NGS	69	<0.090	0.13	n/a	n/a	n/a	n/a	0.090	n/a	J
S16T026855			109-99-9	Tetrahydrofuran	NGS	92	<0.10	28	n/a	n/a	n/a	n/a	0.10	n/a	J

J - Estimated

U - Less Than Detection Limit

NA = Not Analyzed, ND = Not Detected

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162521  
SDG Number:  
Customer Sample ID: 16-07645-3-C2  
Customer Sample ID: 16-07645-3-C2

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															
S16T028856			1191-99-7	2,3-Dihydrofuran	NGS	73	<0.18	<0.18	n/a	n/a	n/a	n/a	0.18	n/a	U
S16T028856			1708-29-8	2,5-Dihydrofuran	NGS	86	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	U
S16T028856			625-86-5	2,5-Dimethylfuran	NGS	69	<0.43	<0.43	n/a	n/a	n/a	n/a	0.43	n/a	U
S16T028856			3777-71-7	2-Heptylfuran	NGS	75	<0.27	<0.27	n/a	n/a	n/a	n/a	0.27	n/a	U
S16T028856			534-22-5	2-Methylfuran	NGS	71	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	U
S16T028856			3777-69-3	2-Pentylfuran	NGS	70	<0.34	<0.34	n/a	n/a	n/a	n/a	0.34	n/a	U
S16T028856			4229-91-8	2-Propylfuran	NGS	73	<0.44	<0.44	n/a	n/a	n/a	n/a	0.44	n/a	U
S16T028856			110-00-9	Furan	NGS	69	<0.090	0.090	n/a	n/a	n/a	n/a	0.090	n/a	J
S16T028856			109-99-9	Tetrahydrofuran	NGS	92	<0.10	<0.10	n/a	n/a	n/a	n/a	0.10	n/a	U

J - Estimated

U - Less Than Detection Limit

NA = Not Analyzed, ND = Not Detected

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162521  
SDG Number:  
Customer Sample ID: 16-07645-3-D1  
Customer Sample ID: 16-07645-3-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															
S16T028857			1191-99-7	2,3-Dihydrofuran	NGS	73	<0.18	0.54	n/a	n/a	n/a	n/a	0.18	n/a	J
S16T028857			1708-29-8	2,5-Dihydrofuran	NGS	86	<0.23	0.24	n/a	n/a	n/a	n/a	0.23	n/a	J
S16T028857			625-86-5	2,5-Dimethylfuran	NGS	69	<0.43	<0.43	n/a	n/a	n/a	n/a	0.43	n/a	U
S16T028857			3777-71-7	2-Heptylfuran	NGS	75	<0.27	<0.27	n/a	n/a	n/a	n/a	0.27	n/a	U
S16T028857			534-22-5	2-Methylfuran	NGS	71	<0.23	0.28	n/a	n/a	n/a	n/a	0.23	n/a	J
S16T028857			3777-69-3	2-Pentylfuran	NGS	70	<0.34	0.68	n/a	n/a	n/a	n/a	0.34	n/a	J
S16T028857			4229-91-8	2-Propylfuran	NGS	73	<0.44	<0.44	n/a	n/a	n/a	n/a	0.44	n/a	U
S16T028857			110-00-9	Furan	NGS	69	<0.090	0.11	n/a	n/a	n/a	n/a	0.090	n/a	J
S16T028857			109-99-9	Tetrahydrofuran	NGS	92	<0.10	28	n/a	n/a	n/a	n/a	0.10	n/a	

J - Estimated

U - Less Than Detection Limit

NA = Not Analyzed, ND = Not Detected

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162521  
SDG Number:  
Customer Sample ID: 16-07645-3-D2  
Customer Sample ID: 16-07645-3-D2

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															
S16T026858			1191-99-7	2,3-Dihydrofuran	NGS	73	<0.18	<0.18	n/a	n/a	n/a	n/a	0.18	n/a	U
S16T026858			1708-29-8	2,5-Dihydrofuran	NGS	86	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	U
S16T026858			625-86-5	2,5-Dimethylfuran	NGS	69	<0.43	<0.43	n/a	n/a	n/a	n/a	0.43	n/a	U
S16T026858			3777-71-7	2-Heptylfuran	NGS	75	<0.27	<0.27	n/a	n/a	n/a	n/a	0.27	n/a	U
S16T026858			534-22-5	2-Methylfuran	NGS	71	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	U
S16T026858			3777-69-3	2-Pentylfuran	NGS	70	<0.34	<0.34	n/a	n/a	n/a	n/a	0.34	n/a	U
S16T026858			4229-91-8	2-Propylfuran	NGS	73	<0.44	<0.44	n/a	n/a	n/a	n/a	0.44	n/a	U
S16T026858			110-00-9	Furan	NGS	69	<0.090	<0.090	n/a	n/a	n/a	n/a	0.090	n/a	U
S16T026858			109-99-9	Tetrahydrofuran	NGS	92	<0.10	<0.10	n/a	n/a	n/a	n/a	0.10	n/a	U

J - Estimated

U - Less Than Detection Limit

NA = Not Analyzed, ND = Not Detected

*Signature*  
9/28/16

**Cartridge Evaluation  
Data Summary of All Results**

Sample Group: 20162522  
SDG Number:  
Customer Sample ID: 16-07654-3-A1  
Customer Sample ID: 16-07654-3-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															
S16T026869			1191-99-7	2,3-Dihydrofuran	NGS	73	<0.18	0.42	n/a	n/a	n/a	n/a	0.18	n/a	J
S16T026869			1708-29-8	2,5-Dihydrofuran	NGS	86	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	U
S16T026869			625-86-5	2,5-Dimethylfuran	NGS	69	<0.43	<0.43	n/a	n/a	n/a	n/a	0.43	n/a	U
S16T026869			3777-71-7	2-Heptylfuran	NGS	75	<0.27	<0.27	n/a	n/a	n/a	n/a	0.27	n/a	U
S16T026869			534-22-5	2-Methylfuran	NGS	71	<0.23	0.28	n/a	n/a	n/a	n/a	0.23	n/a	J
S16T026869			3777-69-3	2-Pentylfuran	NGS	70	<0.34	0.57	n/a	n/a	n/a	n/a	0.34	n/a	J
S16T026869			4229-91-8	2-Propylfuran	NGS	73	<0.44	<0.44	n/a	n/a	n/a	n/a	0.44	n/a	U
S16T026869			110-00-9	Furan	NGS	69	<0.090	0.12	n/a	n/a	n/a	n/a	0.090	n/a	J
S16T026869			109-99-9	Tetrahydrofuran	NGS	92	<0.10	26	n/a	n/a	n/a	n/a	0.10	n/a	n/a

NA = Not Analyzed, ND = Not Detected

U - Less Than Detection Limit

J - Estimated

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162522  
SDG Number:  
Customer Sample ID: 16-07654-3-A2  
Customer Sample ID: 16-07654-3-A2

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															
S16T026870			1191-99-7	2,3-Dihydrofuran	NGS	73	<0.18	<0.18	n/a	n/a	n/a	n/a	0.18		n/a
S16T026870			1708-29-8	2,5-Dihydrofuran	NGS	86	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23		n/a U
S16T026870			625-86-5	2,5-Dimethylfuran	NGS	69	<0.43	<0.43	n/a	n/a	n/a	n/a	0.43		n/a U
S16T026870			3777-71-7	2-Heptylfuran	NGS	75	<0.27	<0.27	n/a	n/a	n/a	n/a	0.27		n/a U
S16T026870			534-22-5	2-Methylfuran	NGS	71	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23		n/a U
S16T026870			3777-69-3	2-Pentylfuran	NGS	70	<0.34	<0.34	n/a	n/a	n/a	n/a	0.34		n/a U
S16T026870			4229-91-8	2-Propylfuran	NGS	73	<0.44	<0.44	n/a	n/a	n/a	n/a	0.44		n/a U
S16T026870			110-00-9	Furan	NGS	69	<0.090	0.090	n/a	n/a	n/a	n/a	0.090		n/a J
S16T026870			109-99-9	Tetrahydrofuran	NGS	92	<0.10	0.18	n/a	n/a	n/a	n/a	0.10		n/a J

J - Estimated

U - Less Than Detection Limit

NA = Not Analyzed, ND = Not Detected

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162522  
SDG Number:  
Customer Sample ID: 16-07654-3-B1  
Customer Sample ID: 16-07654-3-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															
S16T026871			1191-99-7	2,3-Dihydrofuran	NGS	73	<0.18	0.35	n/a	n/a	n/a	n/a	0.18	n/a	J
S16T026871			1708-29-8	2,5-Dihydrofuran	NGS	86	<0.23	0.30	n/a	n/a	n/a	n/a	0.23	n/a	J
S16T026871			625-86-5	2,5-Dimethylfuran	NGS	69	<0.43	<0.43	n/a	n/a	n/a	n/a	0.43	n/a	U
S16T026871			3777-71-7	2-Heptylfuran	NGS	75	<0.27	<0.27	n/a	n/a	n/a	n/a	0.27	n/a	U
S16T026871			534-22-5	2-Methylfuran	NGS	71	<0.23	0.29	n/a	n/a	n/a	n/a	0.23	n/a	J
S16T026871			3777-69-3	2-Pentylfuran	NGS	70	<0.34	0.70	n/a	n/a	n/a	n/a	0.34	n/a	J
S16T026871			4229-91-8	2-Propylfuran	NGS	73	<0.44	<0.44	n/a	n/a	n/a	n/a	0.44	n/a	U
S16T026871			110-00-9	Furan	NGS	69	<0.090	0.12	n/a	n/a	n/a	n/a	0.090	n/a	J
S16T026871			109-99-9	Tetrahydrofuran	NGS	92	<0.10	29	n/a	n/a	n/a	n/a	0.10	n/a	

J - Estimated

U - Less Than Detection Limit

NA = Not Analyzed, ND = Not Detected

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162522  
SDG Number:  
Customer Sample ID: 16-07654-3-B2  
Customer Sample ID: 16-07654-3-B2

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															
S16T026872			1191-99-7	2,3-Dihydrofuran	NGS	73	<0.18	<0.18	n/a	n/a	n/a	n/a	0.18		n/a U
S16T026872			1708-29-8	2,5-Dihydrofuran	NGS	86	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23		n/a U
S16T026872			625-86-5	2,5-Dimethylfuran	NGS	69	<0.43	<0.43	n/a	n/a	n/a	n/a	0.43		n/a U
S16T026872			3777-71-7	2-Heptylfuran	NGS	75	<0.27	<0.27	n/a	n/a	n/a	n/a	0.27		n/a U
S16T026872			534-22-5	2-Methylfuran	NGS	71	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23		n/a U
S16T026872			3777-69-3	2-Pentylfuran	NGS	70	<0.34	<0.34	n/a	n/a	n/a	n/a	0.34		n/a U
S16T026872			4229-91-8	2-Propylfuran	NGS	73	<0.44	<0.44	n/a	n/a	n/a	n/a	0.44		n/a U
S16T026872			110-00-9	Furan	NGS	69	<0.090	0.13	n/a	n/a	n/a	n/a	0.090		n/a J
S16T026872			109-99-9	Tetrahydrofuran	NGS	92	<0.10	<0.10	n/a	n/a	n/a	n/a	0.10		n/a U

J - Estimated

U - Less Than Detection Limit

NA = Not Analyzed, ND = Not Detected



Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162522

SDG Number:

Customer Sample ID: 16-07654-3-BLANK

Customer Sample ID: 16-07654-3-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															
S16T026873			1191-99-7	2,3-Dihydrofuran	NGS	73	<0.18	<0.18	n/a	n/a	n/a	n/a	0.18		n/a U
S16T026873			1708-29-8	2,5-Dihydrofuran	NGS	86	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23		n/a U
S16T026873			625-88-5	2,5-Dimethylfuran	NGS	69	<0.43	<0.43	n/a	n/a	n/a	n/a	0.43		n/a U
S16T026873			3777-71-7	2-Heptylfuran	NGS	75	<0.27	<0.27	n/a	n/a	n/a	n/a	0.27		n/a U
S16T026873			534-22-5	2-Methylfuran	NGS	71	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23		n/a U
S16T026873			3777-69-3	2-Pentylfuran	NGS	70	<0.34	0.62	n/a	n/a	n/a	n/a	0.34		n/a J
S16T026873			4229-91-8	2-Propylfuran	NGS	73	<0.44	<0.44	n/a	n/a	n/a	n/a	0.44		n/a U
S16T026873			110-00-9	Furan	NGS	69	<0.090	0.090	n/a	n/a	n/a	n/a	0.090		n/a J
S16T026873			109-99-9	Tetrahydrofuran	NGS	92	<0.10	<0.10	n/a	n/a	n/a	n/a	0.10		n/a U

J - Estimated

U - Less Than Detection Limit

NA = Not Analyzed, ND = Not Detected

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162522

SDG Number:

Customer Sample ID: 16-07654-3-BLANK2

Customer Sample ID: 16-07654-3-BLANK2

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															
S16T026874			1191-99-7	2,3-Dihydrofuran	NGS	73	<0.18	<0.18	n/a	n/a	n/a	n/a	0.18	n/a	U
S16T026874			1708-29-8	2,5-Dihydrofuran	NGS	86	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	U
S16T026874			625-96-5	2,5-Dimethylfuran	NGS	69	<0.43	<0.43	n/a	n/a	n/a	n/a	0.43	n/a	U
S16T026874			3777-71-7	2-Heptylfuran	NGS	75	<0.27	<0.27	n/a	n/a	n/a	n/a	0.27	n/a	U
S16T026874			534-22-5	2-Methylfuran	NGS	71	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	U
S16T026874			3777-69-3	2-Pentylfuran	NGS	70	<0.34	<0.34	n/a	n/a	n/a	n/a	0.34	n/a	U
S16T026874			4229-91-8	2-Propylfuran	NGS	73	<0.44	<0.44	n/a	n/a	n/a	n/a	0.44	n/a	U
S16T026874			110-00-9	Furan	NGS	69	<0.090	<0.090	n/a	n/a	n/a	n/a	0.090	n/a	U
S16T026874			109-99-9	Tetrahydrofuran	NGS	92	<0.10	<0.10	n/a	n/a	n/a	n/a	0.10	n/a	U

J - Estimated

U - Less Than Detection Limit

NA = Not Analyzed, ND = Not Detected

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162522  
SDG Number:  
Customer Sample ID: 16-07654-3-C1  
Customer Sample ID: 16-07654-3-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															
S16T026875			1191-99-7	2,3-Dihydrofuran	NGS	73	<0.18	0.33	n/a	n/a	n/a	n/a	0.18	n/a	J
S16T026875			1708-29-8	2,5-Dihydrofuran	NGS	86	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	U
S16T026875			625-38-5	2,5-Dimethylfuran	NGS	69	<0.43	<0.43	n/a	n/a	n/a	n/a	0.43	n/a	U
S16T026875			3777-71-7	2-Hepylfuran	NGS	75	<0.27	<0.27	n/a	n/a	n/a	n/a	0.27	n/a	U
S16T026875			534-22-5	2-Methylfuran	NGS	71	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	U
S16T026875			3777-69-3	2-Pentylfuran	NGS	70	<0.34	0.63	n/a	n/a	n/a	n/a	0.34	n/a	J
S16T026875			4229-91-8	2-Propylfuran	NGS	73	<0.44	<0.44	n/a	n/a	n/a	n/a	0.44	n/a	U
S16T026875			110-00-9	Furan	NGS	69	<0.090	0.10	n/a	n/a	n/a	n/a	0.090	n/a	J
S16T026875			109-99-9	Tetrahydrofuran	NGS	92	<0.10	23	n/a	n/a	n/a	n/a	0.10	n/a	

J - Estimated

U - Less Than Detection Limit

NA = Not Analyzed, ND = Not Detected

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162522  
SDG Number:  
Customer Sample ID: 16-07654-3-C2  
Customer Sample ID: 16-07654-3-C2

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															
S16T026876			1191-99-7	2,3-Dihydrofuran	NGS	73	<0.18	<0.18	n/a	n/a	n/a	n/a	0.18		n/a U
S16T026876			1708-29-8	2,5-Dihydrofuran	NGS	86	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23		n/a U
S16T026876			625-86-5	2,5-Dimethylfuran	NGS	69	<0.43	<0.43	n/a	n/a	n/a	n/a	0.43		n/a U
S16T026876			3777-71-7	2-Heptylfuran	NGS	75	<0.27	<0.27	n/a	n/a	n/a	n/a	0.27		n/a U
S16T026876			534-22-5	2-Methylfuran	NGS	71	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23		n/a U
S16T026876			3777-69-3	2-Pentylfuran	NGS	70	<0.34	0.40	n/a	n/a	n/a	n/a	0.34		n/a J
S16T026876			4229-91-8	2-Propylfuran	NGS	73	<0.44	<0.44	n/a	n/a	n/a	n/a	0.44		n/a U
S16T026876			110-00-9	Furan	NGS	69	<0.090	0.14	n/a	n/a	n/a	n/a	0.090		n/a J
S16T026876			109-99-9	Tetrahydrofuran	NGS	92	<0.10	<0.10	n/a	n/a	n/a	n/a	0.10		n/a U

J - Estimated

U - Less Than Detection Limit

NA = Not Analyzed, ND = Not Detected

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162522  
SDG Number:  
Customer Sample ID: 16-07654-3-D1  
Customer Sample ID: 16-07654-3-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															
S16T026877			1191-99-7	2,3-Dihydrofuran	NGS	73	<0.18	<0.18	n/a	n/a	n/a	n/a	0.18		n/a U
S16T026877			1708-29-8	2,5-Dihydrofuran	NGS	86	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23		n/a U
S16T026877			625-86-5	2,5-Dimethylfuran	NGS	69	<0.43	<0.43	n/a	n/a	n/a	n/a	0.43		n/a U
S16T026877			3777-71-7	2-Heptylfuran	NGS	75	<0.27	<0.27	n/a	n/a	n/a	n/a	0.27		n/a U
S16T026877			534-22-5	2-Methylfuran	NGS	71	<0.23	0.24	n/a	n/a	n/a	n/a	0.23		n/a J
S16T026877			3777-69-3	2-Pentylfuran	NGS	70	<0.34	0.40	n/a	n/a	n/a	n/a	0.34		n/a J
S16T026877			4229-91-8	2-Propylfuran	NGS	73	<0.44	<0.44	n/a	n/a	n/a	n/a	0.44		n/a U
S16T026877			110-00-9	Furan	NGS	69	<0.090	0.11	n/a	n/a	n/a	n/a	0.090		n/a J
S16T026877			109-99-9	Tetrahydrofuran	NGS	92	<0.10	35	n/a	n/a	n/a	n/a	0.10		n/a

J - Estimated

U - Less Than Detection Limit

NA = Not Analyzed, ND = Not Detected

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162522  
SDG Number:  
Customer Sample ID: 16-07654-3-D2  
Customer Sample ID: 16-07654-3-D2

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															
S16T026878			1191-99-7	2,3-Dihydrofuran	NGS	73	<0.18	<0.18	n/a	n/a	n/a	n/a	0.18	n/a	U
S16T026878			1708-29-8	2,5-Dihydrofuran	NGS	86	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	U
S16T026878			625-86-5	2,5-Dimethylfuran	NGS	69	<0.43	<0.43	n/a	n/a	n/a	n/a	0.43	n/a	U
S16T026878			3777-71-7	2-Heptylfuran	NGS	75	<0.27	<0.27	n/a	n/a	n/a	n/a	0.27	n/a	U
S16T026878			534-22-5	2-Methylfuran	NGS	71	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	U
S16T026878			3777-69-3	2-Pentylfuran	NGS	70	<0.34	<0.34	n/a	n/a	n/a	n/a	0.34	n/a	U
S16T026878			4229-91-8	2-Propylfuran	NGS	73	<0.44	<0.44	n/a	n/a	n/a	n/a	0.44	n/a	U
S16T026878			110-00-9	Furan	NGS	69	<0.090	0.10	n/a	n/a	n/a	n/a	0.090	n/a	J
S16T026878			109-99-9	Tetrahydrofuran	NGS	92	<0.10	<0.10	n/a	n/a	n/a	n/a	0.10	n/a	U

J - Estimated

U - Less Than Detection Limit

NA = Not Analyzed, ND = Not Detected

*Quintus*  
9/29/16

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162541  
SDG Number:  
Customer Sample ID: 16-07645-3-E1  
Customer Sample ID: 16-07645-3-E1

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															
S16T026859			1191-99-7	2,3-Dihydrofuran	NGS	79	<0.32	<0.32	n/a	n/a	n/a	n/a	0.32		n/a U
S16T026859			1708-29-8	2,5-Dihydrofuran	NGS	92	<0.45	<0.45	n/a	n/a	n/a	n/a	0.45		n/a U
S16T026859			625-86-5	2,5-Dimethylfuran	NGS	81	<0.26	<0.26	n/a	n/a	n/a	n/a	0.26		n/a U
S16T026859			3777-71-7	2-Heptylfuran	NGS	100	<0.38	0.66	n/a	n/a	n/a	n/a	0.38		n/a J
S16T026859			534-22-5	2-Methylfuran	NGS	80	<0.15	0.15	n/a	n/a	n/a	n/a	0.15		n/a J
S16T026859			3777-69-3	2-Pentylfuran	NGS	97	<0.29	0.75	n/a	n/a	n/a	n/a	0.29		n/a J
S16T026859			4229-91-8	2-Propylfuran	NGS	87	<0.21	<0.21	n/a	n/a	n/a	n/a	0.21		n/a U
S16T026859			110-00-9	Furan	NGS	73	<0.58	<0.58	n/a	n/a	n/a	n/a	0.58		n/a U
S16T026859			109-99-9	Tetrahydrofuran	NGS	91	<0.31	25	n/a	n/a	n/a	n/a	0.31		n/a

Q - Qualitative

U - Less Than Detection Limit

J - Estimated

NA = Not Analyzed, ND = Not Detected

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162541  
SDG Number:  
Customer Sample ID: 16-07645-3-E2  
Customer Sample ID: 16-07645-3-E2

Sample#	R	AS	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T026860			1191-99-7	2,3-Dihydrofuran	NGS	79	<0.32	<0.32	n/a	n/a	n/a	n/a	0.32	n/a	QU
S16T026860			1708-29-8	2,5-Dihydrofuran	NGS	92	<0.45	<0.45	n/a	n/a	n/a	n/a	0.45	n/a	QU
S16T026860			825-96-5	2,5-Dimethylfuran	NGS	81	<0.26	<0.26	n/a	n/a	n/a	n/a	0.26	n/a	QU
S16T026860			3777-71-7	2-Heptylfuran	NGS	100	<0.38	<0.38	n/a	n/a	n/a	n/a	0.38	n/a	QU
S16T026860			534-22-5	2-Methylfuran	NGS	80	<0.15	<0.15	n/a	n/a	n/a	n/a	0.15	n/a	QU
S16T026860			3777-69-3	2-Pentylfuran	NGS	97	<0.29	0.52	n/a	n/a	n/a	n/a	0.29	n/a	QU
S16T026860			4229-91-8	2-Propylfuran	NGS	87	<0.21	<0.21	n/a	n/a	n/a	n/a	0.21	n/a	QU
S16T026860			110-00-9	Furan	NGS	73	<0.58	<0.58	n/a	n/a	n/a	n/a	0.58	n/a	QU
S16T026860			109-99-9	Tetrahydrofuran	NGS	91	<0.31	<0.31	n/a	n/a	n/a	n/a	0.31	n/a	QU

Q - Qualitative

U - Less Than Detection Limit

J - Estimated

NA = Not Analyzed, ND = Not Detected



Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162541  
SDG Number:  
Customer Sample ID: 16-07645-3-EFF-BASE  
Customer Sample ID: 16-07645-3-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															
S16T026861			1191-99-7	2,3-Dihydrofuran	NGS	79	<0.32	<0.32	n/a	n/a	n/a	n/a	0.32		n/a U
S16T026861			1708-29-8	2,5-Dihydrofuran	NGS	92	<0.45	<0.45	n/a	n/a	n/a	n/a	0.45		n/a U
S16T026861			625-86-5	2,5-Dimethylfuran	NGS	81	<0.26	<0.26	n/a	n/a	n/a	n/a	0.26		n/a U
S16T026861			3777-71-7	2-Heptylfuran	NGS	100	<0.38	<0.38	n/a	n/a	n/a	n/a	0.38		n/a U
S16T026861			534-22-5	2-Methylfuran	NGS	80	<0.15	<0.15	n/a	n/a	n/a	n/a	0.15		n/a U
S16T026861			3777-69-3	2-Pentylfuran	NGS	97	<0.29	0.34	n/a	n/a	n/a	n/a	0.29		n/a U
S16T026861			4229-91-8	2-Propylfuran	NGS	87	<0.21	<0.21	n/a	n/a	n/a	n/a	0.21		n/a U
S16T026861			110-00-9	Furan	NGS	73	<0.58	<0.58	n/a	n/a	n/a	n/a	0.58		n/a U
S16T026861			109-99-9	Tetrahydrofuran	NGS	91	<0.31	<0.31	n/a	n/a	n/a	n/a	0.31		n/a U

Q - Qualitative

U - Less Than Detection Limit

J - Estimated

NA = Not Analyzed, ND = Not Detected

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162541  
SDG Number:  
Customer Sample ID: 16-07645-3-F1  
Customer Sample ID: 16-07645-3-F1

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T026862			1191-99-7	2,3-Dihydrofuran	NGS	79	<0.32	<0.32	n/a	n/a	n/a	n/a	0.32	n/a	U
S16T026862			1708-29-8	2,5-Dihydrofuran	NGS	92	<0.45	<0.45	n/a	n/a	n/a	n/a	0.45	n/a	U
S16T026862			625-86-5	2,5-Dimethylfuran	NGS	81	<0.26	<0.26	n/a	n/a	n/a	n/a	0.26	n/a	U
S16T026862			3777-71-7	2-Heptylfuran	NGS	100	<0.38	<0.38	n/a	n/a	n/a	n/a	0.38	n/a	U
S16T026862			534-22-5	2-Methylfuran	NGS	80	<0.15	<0.15	n/a	n/a	n/a	n/a	0.15	n/a	U
S16T026862			3777-69-3	2-Pentylfuran	NGS	97	<0.29	0.56	n/a	n/a	n/a	n/a	0.29	n/a	U
S16T026862			4229-91-8	2-Propylfuran	NGS	87	<0.21	<0.21	n/a	n/a	n/a	n/a	0.21	n/a	U
S16T026862			110-00-9	Furan	NGS	73	<0.58	<0.58	n/a	n/a	n/a	n/a	0.58	n/a	U
S16T026862			109-98-9	Tetrahydrofuran	NGS	91	<0.31	35	n/a	n/a	n/a	n/a	0.31	n/a	U

Q - Qualitative

U - Less Than Detection Limit

J - Estimated

NA = Not Analyzed, ND = Not Detected

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162541  
SDG Number:  
Customer Sample ID: 16-07645-3-F2  
Customer Sample ID: 16-07645-3-F2

Sample#	R	Ad#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T026863			1191-99-7	2,3-Dihydrofuran	NGS	79	<0.32	<0.32	n/a	n/a	n/a	n/a	0.32	n/a	U
S16T026863			1708-29-8	2,5-Dihydrofuran	NGS	92	<0.45	<0.45	n/a	n/a	n/a	n/a	0.45	n/a	U
S16T026863			625-86-5	2,5-Dimethylfuran	NGS	81	<0.26	<0.26	n/a	n/a	n/a	n/a	0.26	n/a	U
S16T026863			3777-71-7	2-Heptylfuran	NGS	100	<0.38	<0.38	n/a	n/a	n/a	n/a	0.38	n/a	U
S16T026863			534-22-5	2-Methylfuran	NGS	80	<0.15	<0.15	n/a	n/a	n/a	n/a	0.15	n/a	U
S16T026863			3777-69-3	2-Pentylfuran	NGS	97	<0.29	<0.29	n/a	n/a	n/a	n/a	0.29	n/a	U
S16T026863			4229-91-8	2-Propylfuran	NGS	87	<0.21	<0.21	n/a	n/a	n/a	n/a	0.21	n/a	U
S16T026863			110-00-9	Furan	NGS	73	<0.58	<0.58	n/a	n/a	n/a	n/a	0.58	n/a	U
S16T026863			109-99-9	Tetrahydrofuran	NGS	91	<0.31	<0.31	n/a	n/a	n/a	n/a	0.31	n/a	U

Q - Qualitative

U - Less Than Detection Limit

J - Estimated

NA = Not Analyzed, ND = Not Detected

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162541  
SDG Number:  
Customer Sample ID: 16-07645-3-G1  
Customer Sample ID: 16-07645-3-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															
S16T026864			1191-99-7	2,3-Dihydrofuran	NGS	79	<0.32	<0.32	n/a	n/a	n/a	n/a	0.32	n/a	U
S16T026864			1708-29-8	2,5-Dihydrofuran	NGS	92	<0.45	<0.45	n/a	n/a	n/a	n/a	0.45	n/a	U
S16T026864			625-86-5	2,5-Dimethylfuran	NGS	81	<0.26	<0.26	n/a	n/a	n/a	n/a	0.26	n/a	U
S16T026864			3777-71-7	2-Heptylfuran	NGS	100	<0.38	<0.38	n/a	n/a	n/a	n/a	0.38	n/a	U
S16T026864			534-22-5	2-Methylfuran	NGS	80	<0.15	<0.15	n/a	n/a	n/a	n/a	0.15	n/a	U
S16T026864			3777-69-3	2-Pentylfuran	NGS	97	<0.29	0.50	n/a	n/a	n/a	n/a	0.29	n/a	U
S16T026864			4229-91-8	2-Propylfuran	NGS	87	<0.21	<0.21	n/a	n/a	n/a	n/a	0.21	n/a	U
S16T026864			110-00-9	Furan	NGS	73	<0.58	<0.58	n/a	n/a	n/a	n/a	0.58	n/a	U
S16T026864			109-99-9	Tetrahydrofuran	NGS	91	<0.31	39	n/a	n/a	n/a	n/a	0.31	n/a	U

Q - Qualitative

U - Less Than Detection Limit

J - Estimated

NA = Not Analyzed, ND = Not Detected

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162541  
SDG Number:  
Customer Sample ID: 16-07645-3-G2  
Customer Sample ID: 16-07645-3-G2

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															
S16T026865			1191-99-7	2,3-Dihydrofuran	NGS	79	<0.32	<0.32	n/a	n/a	n/a	n/a	0.32	n/a	U
S16T026865			1708-29-8	2,5-Dihydrofuran	NGS	92	<0.45	<0.45	n/a	n/a	n/a	n/a	0.45	n/a	U
S16T026865			625-86-5	2,5-Dimethylfuran	NGS	81	<0.26	<0.26	n/a	n/a	n/a	n/a	0.26	n/a	U
S16T026865			3777-71-7	2-Heptylfuran	NGS	100	<0.38	<0.38	n/a	n/a	n/a	n/a	0.38	n/a	U
S16T026865			534-22-5	2-Methylfuran	NGS	80	<0.15	<0.15	n/a	n/a	n/a	n/a	0.15	n/a	U
S16T026865			3777-69-3	2-Pentylfuran	NGS	97	<0.29	<0.29	n/a	n/a	n/a	n/a	0.29	n/a	U
S16T026865			4229-91-8	2-Propylfuran	NGS	87	<0.21	<0.21	n/a	n/a	n/a	n/a	0.21	n/a	U
S16T026865			110-00-9	Furan	NGS	73	<0.58	<0.58	n/a	n/a	n/a	n/a	0.58	n/a	U
S16T026865			109-99-9	Tetrahydrofuran	NGS	91	<0.31	<0.31	n/a	n/a	n/a	n/a	0.31	n/a	U

NA = Not Analyzed, ND = Not Detected

Q - Qualitative

U - Less Than Detection Limit

J - Estimated

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162541  
SDG Number:  
Customer Sample ID: 16-07645-3-H1  
Customer Sample ID: 16-07645-3-H1

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rac %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T026866			1191-99-7	2,3-Dihydrofuran	NGS	79	<0.32	<0.32	n/a	n/a	n/a	n/a	0.32	n/a	U
S16T026866			1708-29-8	2,5-Dihydrofuran	NGS	92	<0.45	<0.45	n/a	n/a	n/a	n/a	0.45	n/a	U
S16T026866			625-86-5	2,5-Dimethylfuran	NGS	81	<0.26	<0.26	n/a	n/a	n/a	n/a	0.26	n/a	U
S16T026866			3777-71-7	2-Heptylfuran	NGS	100	<0.38	<0.38	n/a	n/a	n/a	n/a	0.38	n/a	U
S16T026866			534-22-5	2-Methylfuran	NGS	80	<0.15	<0.15	n/a	n/a	n/a	n/a	0.15	n/a	U
S16T026866			3777-69-3	2-Pentylfuran	NGS	97	<0.29	<0.29	n/a	n/a	n/a	n/a	0.29	n/a	U
S16T026866			4229-91-8	2-Propylfuran	NGS	87	<0.21	<0.21	n/a	n/a	n/a	n/a	0.21	n/a	U
S16T026866			110-00-9	Furan	NGS	73	<0.58	<0.58	n/a	n/a	n/a	n/a	0.58	n/a	U
S16T026866			109-99-9	Tetrahydrofuran	NGS	91	<0.31	30	n/a	n/a	n/a	n/a	0.31	n/a	U

NA = Not Analyzed, ND = Not Detected

Q - Qualitative

U - Less Than Detection Limit

J - Estimated

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162541  
SDG Number:  
Customer Sample ID: 16-07645-3-H2  
Customer Sample ID: 16-07645-3-H2

Sample#	R	Alt	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rac %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T026867			1191-99-7	2,3-Dihydrofuran	NGS	79	<0.32	<0.32	n/a	n/a	n/a	n/a	0.32	n/a	U
S16T026867			1708-29-8	2,5-Dihydrofuran	NGS	92	<0.45	<0.45	n/a	n/a	n/a	n/a	0.45	n/a	U
S16T026867			625-85-5	2,5-Dimethylfuran	NGS	81	<0.26	<0.26	n/a	n/a	n/a	n/a	0.26	n/a	U
S16T026867			3777-71-7	2-Heptylfuran	NGS	100	<0.38	<0.38	n/a	n/a	n/a	n/a	0.38	n/a	U
S16T026867			534-22-5	2-Methylfuran	NGS	80	<0.15	<0.15	n/a	n/a	n/a	n/a	0.15	n/a	U
S16T026867			3777-69-3	2-Pentylfuran	NGS	97	<0.29	<0.29	n/a	n/a	n/a	n/a	0.29	n/a	U
S16T026867			4229-91-8	2-Propylfuran	NGS	87	<0.21	<0.21	n/a	n/a	n/a	n/a	0.21	n/a	U
S16T026867			110-00-9	Furan	NGS	73	<0.58	<0.58	n/a	n/a	n/a	n/a	0.58	n/a	U
S16T026867			109-99-9	Tetrahydrofuran	NGS	91	<0.31	<0.31	n/a	n/a	n/a	n/a	0.31	n/a	U

Q - Qualitative

U - Less Than Detection Limit

J - Estimated

NA = Not Analyzed, ND = Not Detected

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162541  
SDG Number:  
Customer Sample ID: 16-07645-3-IN-BASE  
Customer Sample ID: 16-07645-3-IN-BASE

Sample#	R	Ad#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T026868			1191-99-7	2,3-Dihydrofuran	NGS	79	<0.32	<0.32	n/a	n/a	n/a	n/a	0.32	n/a	U
S16T026868			1708-29-8	2,5-Dihydrofuran	NGS	92	<0.45	<0.45	n/a	n/a	n/a	n/a	0.45	n/a	U
S16T026868			625-86-5	2,5-Dimethylfuran	NGS	81	<0.26	<0.26	n/a	n/a	n/a	n/a	0.26	n/a	U
S16T026868			3777-71-7	2-Heptylfuran	NGS	100	<0.38	<0.38	n/a	n/a	n/a	n/a	0.38	n/a	U
S16T026868			534-22-5	2-Methylfuran	NGS	80	<0.15	0.85	n/a	n/a	n/a	n/a	0.15	n/a	J
S16T026868			3777-69-3	2-Pentylfuran	NGS	97	<0.29	0.45	n/a	n/a	n/a	n/a	0.29	n/a	J
S16T026868			4229-91-8	2-Propylfuran	NGS	87	<0.21	<0.21	n/a	n/a	n/a	n/a	0.21	n/a	U
S16T026868			110-00-9	Furan	NGS	73	<0.58	<0.58	n/a	n/a	n/a	n/a	0.58	n/a	U
S16T026868			109-99-9	Tetrahydrofuran	NGS	91	<0.31	<0.31	n/a	n/a	n/a	n/a	0.31	n/a	U

Q - Qualitative

U - Less Than Detection Limit

J - Estimated

NA = Not Analyzed, ND = Not Detected



*John D. [Signature]*  
10/6/16

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162542

SDG Number:

Customer Sample ID: 16-07654-3-E1

Customer Sample ID: 16-07654-3-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															
S16T026879			1191-99-7	2,3-Dihydrofuran	NGS	81	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	
S16T026879			1708-29-8	2,5-Dihydrofuran	NGS	94	<0.33	<0.33	n/a	n/a	n/a	n/a	0.33	n/a	
S16T026879			625-86-5	2,5-Dimethylfuran	NGS	81	<0.75	<0.75	n/a	n/a	n/a	n/a	0.75	n/a	
S16T026879			3777-71-7	2-Heptylfuran	NGS	100	<0.86	<0.86	n/a	n/a	n/a	n/a	0.86	n/a	
S16T026879			534-22-5	2-Methylfuran	NGS	80	<0.46	<0.46	n/a	n/a	n/a	n/a	0.46	n/a	
S16T026879			3777-69-3	2-Pentylfuran	NGS	99	<0.90	1.0	n/a	n/a	n/a	n/a	0.90	n/a	J
S16T026879			4229-91-8	2-Propylfuran	NGS	88	<0.62	<0.62	n/a	n/a	n/a	n/a	0.62	n/a	
S16T026879			110-00-9	Furan	NGS	73	<0.37	<0.37	n/a	n/a	n/a	n/a	0.37	n/a	
S16T026879			109-99-9	Tetrahydrofuran	NGS	99	<0.23	41	n/a	n/a	n/a	n/a	0.23	n/a	

J - Estimated

E - Outside Calibration Range

NA = Not Analyzed, ND = Not Detected

Cartridge Evaluation  
 Data Summary of All Results

Sample Group: 20162542  
 SDG Number:  
 Customer Sample ID: 16-07654-3-E2  
 Customer Sample ID: 16-07654-3-E2

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spt Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T026880			1191-99-7	2,3-Dihydrofuran	NGS	81	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	
S16T026880			1708-29-8	2,5-Dihydrofuran	NGS	94	<0.33	<0.33	n/a	n/a	n/a	n/a	0.33	n/a	
S16T026880			625-86-5	2,5-Dimethylfuran	NGS	81	<0.75	<0.75	n/a	n/a	n/a	n/a	0.75	n/a	
S16T026880			3777-71-7	2-Heptylfuran	NGS	100	<0.86	<0.86	n/a	n/a	n/a	n/a	0.86	n/a	
S16T026880			534-22-5	2-Methylfuran	NGS	80	<0.46	<0.46	n/a	n/a	n/a	n/a	0.46	n/a	
S16T026880			3777-69-3	2-Pentylfuran	NGS	99	<0.90	<0.90	n/a	n/a	n/a	n/a	0.90	n/a	
S16T026880			4229-91-8	2-Propylfuran	NGS	88	<0.62	<0.62	n/a	n/a	n/a	n/a	0.62	n/a	
S16T026880			110-00-9	Furan	NGS	73	<0.37	<0.37	n/a	n/a	n/a	n/a	0.37	n/a	
S16T026880			109-99-9	Tetrahydrofuran	NGS	99	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	

NA = Not Analyzed, ND = Not Detected

E - Outside Calibration Range

J - Estimated

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162542  
SDG Number:  
Customer Sample ID: 16-07654-3-EFF-BASE  
Customer Sample ID: 16-07654-3-EFF-BASE

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spt Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T026881			1191-99-7	2,3-Dihydrofuran	NGS	81	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	
S16T026881			1708-29-8	2,5-Dihydrofuran	NGS	94	<0.33	<0.33	n/a	n/a	n/a	n/a	0.33	n/a	
S16T026881			625-86-5	2,5-Dimethylfuran	NGS	81	<0.75	<0.75	n/a	n/a	n/a	n/a	0.75	n/a	
S16T026881			3777-71-7	2-Heptylfuran	NGS	100	<0.86	<0.86	n/a	n/a	n/a	n/a	0.86	n/a	
S16T026881			534-22-5	2-Methylfuran	NGS	80	<0.46	<0.46	n/a	n/a	n/a	n/a	0.46	n/a	
S16T026881			3777-69-3	2-Pentylfuran	NGS	99	<0.90	<0.90	n/a	n/a	n/a	n/a	0.90	n/a	
S16T026881			4229-91-8	2-Propylfuran	NGS	88	<0.62	<0.62	n/a	n/a	n/a	n/a	0.62	n/a	
S16T026881			110-00-9	Furan	NGS	73	<0.37	<0.37	n/a	n/a	n/a	n/a	0.37	n/a	
S16T026881			109-99-9	Tetrahydrofuran	NGS	99	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	

J - Estimated

E - Outside Calibration Range

NA = Not Analyzed, ND = Not Detected

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162542  
SDG Number:  
Customer Sample ID: 16-07654-3-F1  
Customer Sample ID: 16-07654-3-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															
S16T026882			1191-99-7	2,3-Dihydrofuran	NGS	81	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	
S16T026882			1708-29-8	2,5-Dihydrofuran	NGS	94	<0.33	<0.33	n/a	n/a	n/a	n/a	0.33	n/a	
S16T026882			625-86-5	2,5-Dimethylfuran	NGS	81	<0.75	<0.75	n/a	n/a	n/a	n/a	0.75	n/a	
S16T026882			3777-71-7	2-Heptylfuran	NGS	100	<0.86	<0.86	n/a	n/a	n/a	n/a	0.86	n/a	
S16T026882			534-22-5	2-Methylfuran	NGS	80	<0.46	<0.46	n/a	n/a	n/a	n/a	0.46	n/a	
S16T026882			3777-69-3	2-Pentylfuran	NGS	99	<0.90	<0.90	n/a	n/a	n/a	n/a	0.90	n/a	
S16T026882			4229-91-8	2-Propylfuran	NGS	88	<0.62	<0.62	n/a	n/a	n/a	n/a	0.62	n/a	
S16T026882			110-00-9	Furan	NGS	73	<0.37	<0.37	n/a	n/a	n/a	n/a	0.37	n/a	
S16T026882			109-99-9	Tetrahydrofuran	NGS	99	<0.23	51	n/a	n/a	n/a	n/a	0.23	n/a	E

J - Estimated

E - Outside Calibration Range

NA = Not Analyzed, ND = Not Detected

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162542  
SDG Number:  
Customer Sample ID: 16-07654-3-F2  
Customer Sample ID: 16-07654-3-F2

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															
S16T026883			1191-99-7	2,3-Dihydrofuran	NGS	81	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	
S16T026883			1708-29-8	2,5-Dihydrofuran	NGS	94	<0.33	<0.33	n/a	n/a	n/a	n/a	0.33	n/a	
S16T026883			625-86-5	2,5-Dimethylfuran	NGS	81	<0.75	<0.75	n/a	n/a	n/a	n/a	0.75	n/a	
S16T026883			3777-71-7	2-Heptylfuran	NGS	100	<0.86	<0.86	n/a	n/a	n/a	n/a	0.86	n/a	
S16T026883			534-22-5	2-Methylfuran	NGS	80	<0.46	<0.46	n/a	n/a	n/a	n/a	0.46	n/a	
S16T026883			3777-69-3	2-Pentylfuran	NGS	99	<0.90	<0.90	n/a	n/a	n/a	n/a	0.90	n/a	
S16T026883			4229-91-8	2-Propylfuran	NGS	88	<0.62	<0.62	n/a	n/a	n/a	n/a	0.62	n/a	
S16T026883			110-00-9	Furan	NGS	73	<0.37	<0.37	n/a	n/a	n/a	n/a	0.37	n/a	
S16T026883			109-99-9	Tetrahydrofuran	NGS	99	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	

J - Estimated

E - Outside Calibration Range

NA = Not Analyzed, ND = Not Detected

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162542  
SDG Number:  
Customer Sample ID: 16-07654-3-G1  
Customer Sample ID: 16-07654-3-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															
S16T026884			1191-99-7	2,3-Dihydrofuran	NGS	81	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	
S16T026884			1708-29-8	2,5-Dihydrofuran	NGS	94	<0.33	<0.33	n/a	n/a	n/a	n/a	0.33	n/a	
S16T026884			625-86-5	2,5-Dimethylfuran	NGS	81	<0.75	<0.75	n/a	n/a	n/a	n/a	0.75	n/a	
S16T026884			3777-71-7	2-Heptylfuran	NGS	100	<0.86	<0.86	n/a	n/a	n/a	n/a	0.86	n/a	
S16T026884			534-22-5	2-Methylfuran	NGS	80	<0.46	<0.46	n/a	n/a	n/a	n/a	0.46	n/a	
S16T026884			3777-69-3	2-Pentylfuran	NGS	99	<0.90	<0.90	n/a	n/a	n/a	n/a	0.90	n/a	
S16T026884			4229-91-8	2-Propylfuran	NGS	88	<0.62	<0.62	n/a	n/a	n/a	n/a	0.62	n/a	
S16T026884			110-00-9	Furan	NGS	73	<0.37	<0.37	n/a	n/a	n/a	n/a	0.37	n/a	
S16T026884			109-99-9	Tetrahydrofuran	NGS	99	<0.23	56	n/a	n/a	n/a	n/a	0.23	n/a	E

J - Estimated

E - Outside Calibration Range

NA = Not Analyzed, ND = Not Detected

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162542  
SDG Number:  
Customer Sample ID: 16-07654-3-G2  
Customer Sample ID: 16-07654-3-G2

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															
S16T026885			1191-99-7	2,3-Dihydrofuran	NGS	81	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	
S16T026885			1708-29-8	2,5-Dihydrofuran	NGS	94	<0.33	<0.33	n/a	n/a	n/a	n/a	0.33	n/a	
S16T026885			625-86-5	2,5-Dimethylfuran	NGS	81	<0.75	<0.75	n/a	n/a	n/a	n/a	0.75	n/a	
S16T026885			3777-71-7	2-Heptylfuran	NGS	100	<0.86	<0.86	n/a	n/a	n/a	n/a	0.86	n/a	
S16T026885			534-22-5	2-Methylfuran	NGS	80	<0.46	<0.46	n/a	n/a	n/a	n/a	0.46	n/a	
S16T026885			3777-69-3	2-Pentylfuran	NGS	99	<0.90	<0.90	n/a	n/a	n/a	n/a	0.90	n/a	
S16T026885			4229-91-8	2-Propylfuran	NGS	88	<0.62	<0.62	n/a	n/a	n/a	n/a	0.62	n/a	
S16T026885			110-00-9	Furan	NGS	73	<0.37	<0.37	n/a	n/a	n/a	n/a	0.37	n/a	
S16T026885			109-99-9	Tetrahydrofuran	NGS	99	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	

J - Estimated

E - Outside Calibration Range

NA = Not Analyzed, ND = Not Detected

# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162542  
SDG Number:  
Customer Sample ID: 16-07654-3-H1  
Customer Sample ID: 16-07654-3-H1

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															
S16T026886			1191-99-7	2,3-Dihydrofuran	NGS	81	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	
S16T026886			1708-29-8	2,5-Dihydrofuran	NGS	94	<0.33	<0.33	n/a	n/a	n/a	n/a	0.33	n/a	
S16T026886			625-86-5	2,5-Dimethylfuran	NGS	81	<0.75	<0.75	n/a	n/a	n/a	n/a	0.75	n/a	
S16T026886			3777-71-7	2-Heptylfuran	NGS	100	<0.86	<0.86	n/a	n/a	n/a	n/a	0.86	n/a	
S16T026886			534-22-5	2-Methylfuran	NGS	80	<0.46	<0.46	n/a	n/a	n/a	n/a	0.46	n/a	
S16T026886			3777-69-3	2-Pentylfuran	NGS	99	<0.90	<0.90	n/a	n/a	n/a	n/a	0.90	n/a	
S16T026886			4229-91-8	2-Propylfuran	NGS	88	<0.62	<0.62	n/a	n/a	n/a	n/a	0.62	n/a	
S16T026886			110-00-9	Furan	NGS	73	<0.37	<0.37	n/a	n/a	n/a	n/a	0.37	n/a	
S16T026886			109-99-9	Tetrahydrofuran	NGS	99	<0.23	51	n/a	n/a	n/a	n/a	0.23	n/a	E

J - Estimated

E - Outside Calibration Range

NA = Not Analyzed, ND = Not Detected



# Cartridge Evaluation Data Summary of All Results

Sample Group: 20162542  
SDG Number:  
Customer Sample ID: 16-07654-3-H2  
Customer Sample ID: 16-07654-3-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															
S16T026887			1191-99-7	2,3-Dihydrofuran	NGS	81	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	
S16T026887			1708-29-8	2,5-Dihydrofuran	NGS	94	<0.33	<0.33	n/a	n/a	n/a	n/a	0.33	n/a	
S16T026887			625-86-5	2,5-Dimethylfuran	NGS	81	<0.75	<0.75	n/a	n/a	n/a	n/a	0.75	n/a	
S16T026887			3777-71-7	2-Heptylfuran	NGS	100	<0.86	<0.86	n/a	n/a	n/a	n/a	0.86	n/a	
S16T026887			534-22-5	2-Methylfuran	NGS	80	<0.46	<0.46	n/a	n/a	n/a	n/a	0.46	n/a	
S16T026887			3777-69-3	2-Pentylfuran	NGS	99	<0.90	<0.90	n/a	n/a	n/a	n/a	0.90	n/a	
S16T026887			4229-91-8	2-Propylfuran	NGS	88	<0.62	<0.62	n/a	n/a	n/a	n/a	0.62	n/a	
S16T026887			110-00-9	Furan	NGS	73	<0.37	<0.37	n/a	n/a	n/a	n/a	0.37	n/a	
S16T026887			109-98-9	Tetrahydrofuran	NGS	99	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	

NA = Not Analyzed, ND = Not Detected

E - Outside Calibration Range

J - Estimated

Cartridge Evaluation  
Data Summary of All Results

Sample Group: 20162542  
SDG Number:  
Customer Sample ID: 16-07654-3-IN-BASE  
Customer Sample ID: 16-07654-3-IN-BASE

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spt Rec %	Det Limit	Cnt Err %	Qual Flags
Furans in Vapor Samples by SIM															
S16T026888			1191-99-7	2,3-Dihydrofuran	NGS	81	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	
S16T026888			1708-29-8	2,5-Dihydrofuran	NGS	94	<0.33	<0.33	n/a	n/a	n/a	n/a	0.33	n/a	
S16T026888			625-86-5	2,5-Dimethylfuran	NGS	81	<0.75	<0.75	n/a	n/a	n/a	n/a	0.75	n/a	
S16T026888			3777-71-7	2-Heptylfuran	NGS	100	<0.86	<0.86	n/a	n/a	n/a	n/a	0.86	n/a	
S16T026888			534-22-5	2-Methylfuran	NGS	80	<0.46	<0.46	n/a	n/a	n/a	n/a	0.46	n/a	
S16T026888			3777-69-3	2-Pentylfuran	NGS	99	<0.90	<0.90	n/a	n/a	n/a	n/a	0.90	n/a	
S16T026888			4229-91-8	2-Propylfuran	NGS	88	<0.62	<0.62	n/a	n/a	n/a	n/a	0.62	n/a	
S16T026888			110-00-9	Furan	NGS	73	<0.37	<0.37	n/a	n/a	n/a	n/a	0.37	n/a	
S16T026888			109-99-9	Tetrahydrofuran	NGS	99	<0.23	<0.23	n/a	n/a	n/a	n/a	0.23	n/a	

NA = Not Analyzed, ND = Not Detected

J - Estimated

E - Outside Calibration Range

## C.3.4 Amines



### ANALYTICAL REPORT

Report Date: September 07, 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

20162527

Workorder: 34-1624549

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

#### Analytical Results

Sample ID: S16T026969		Collected: 08/26/2016		
Lab ID: 1624549001		Received: 09/01/2016		
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		
		Analyzed: 09/06/2016		
		Sampling Parameter: Air Volume Not Provided		
Analyte	Result (ug/sample)	Result (mg/m³)	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: S16T026970		Collected: 08/26/2016		
Lab ID: 1624549002		Received: 09/01/2016		
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	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: S16T026971		Collected: 08/26/2016		
Lab ID: 1624549003		Received: 09/01/2016		
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	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

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## ANALYTICAL REPORT

Workorder: **34-1624549**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T026972		Collected: 08/26/2016		
Lab ID: 1624549004		Received: 09/01/2016		
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (ug/sample)	Result (mg/m³)	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: S16T026973		Collected: 08/26/2016		
Lab ID: 1624549005		Received: 09/01/2016		
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (ug/sample)	Result (mg/m³)	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: S16T026974		Collected: 08/26/2016		
Lab ID: 1624549006		Received: 09/01/2016		
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	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: S16T026975		Collected: 08/26/2016		
Lab ID: 1624549007		Received: 09/01/2016		
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (ug/sample)	Result (mg/m³)	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: **34-1624549**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T026976		Collected: 08/26/2016		
Lab ID: 1624549008		Received: 09/01/2016		
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	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: <b>S16T026977</b>		Collected: 08/26/2016		
Lab ID: 1624549009		Received: 09/01/2016		
Method: <b>Amines-VOA Aliphatic VAA-1</b>		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		
		Analyzed: 09/06/2016		
Sampling Parameter: <b>Air Volume Not Provided</b>				
Analyte	Result (ug/sample)	Result (mg/m³)	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: <b>S16T026978</b>		Collected: 08/26/2016		
Lab ID: 1624549010		Received: 09/01/2016		
Method: <b>Amines-VOA Aliphatic VAA-1</b>		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		
		Analyzed: 09/06/2016		
Sampling Parameter: <b>Air Volume Not Provided</b>				
Analyte	Result (ug/sample)	Result (mg/m³)	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: S16T026979		Collected: 08/26/2016		
Lab ID: 1624549011	Sampling Location: CARTRIDGE EVALUATION		Received: 09/01/2016	
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]	Analyzed: 09/06/2016	
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	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: **34-1624549**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T026980		Collected: 08/26/2016		
Lab ID: 1624549012	Sampling Location: CARTRIDGE EVALUATION		Received: 09/01/2016	
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]	Analyzed: 09/06/2016	
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	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: S16T026981		Collected: 08/26/2016		
Lab ID: 1624549013		Received: 09/01/2016		
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	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: S16T026982		Collected: 08/26/2016		
Lab ID: 1624549014		Received: 09/01/2016		
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	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: S16T026983		Collected: 08/26/2016		
Lab ID: 1624549015	Sampling Location: CARTRIDGE EVALUATION		Received: 09/01/2016	
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]	Analyzed: 09/06/2016	
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	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: **34-1624549**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T026984		Collected: 08/26/2016		
Lab ID: 1624549016		Received: 09/01/2016		
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	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: S16T026985		Collected: 08/26/2016		
Lab ID: 1624549017		Received: 09/01/2016		
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	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: S16T026986		Collected: 08/26/2016		
Lab ID: 1624549018		Received: 09/01/2016		
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	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: S16T026987		Collected: 08/26/2016		
Lab ID: 1624549019	Sampling Location: CARTRIDGE EVALUATION		Received: 09/01/2016	
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]	Analyzed: 09/06/2016	
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	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: **34-1624549**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T026988		Collected: 08/26/2016		
Lab ID: 1624549020		Received: 09/01/2016		
Sampling Location: CARTRIDGE EVALUATION				
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	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

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

Method	Analyst	Peer Review
Amines-VOA Aliphatic VAA-1	/S/ Thomas Bosch 09/07/2016 10:43	/S/ Read A. Fritts 09/07/2016 15:19

### Laboratory Contact Information

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

Phone: (801) 266-7700  
Email: [alslt.lab@ALSGlobal.com](mailto:alslt.lab@ALSGlobal.com)  
Web: [www.alssl.com](http://www.alssl.com)





## ANALYTICAL REPORT

Workorder: **34-1624549**

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	ANAB (DoD ELAP)	ADE-1420	<a href="http://www.anab.org/accredited-organizations/">http://www.anab.org/accredited-organizations/</a>
	Utah (NELAC)	DATA 1	<a href="http://health.utah.gov/lab/labimp/">http://health.utah.gov/lab/labimp/</a>
	Nevada	UT00009	<a href="http://ndep.nv.gov/bsdwl/labservice.htm">http://ndep.nv.gov/bsdwl/labservice.htm</a>
	Oklahoma	UT00009	<a href="http://www.deq.state.ok.us/CSDnew/">http://www.deq.state.ok.us/CSDnew/</a>
	Iowa	IA# 376	<a href="http://www.iowadnr.gov/insideDNR/RegulatoryWater.aspx">http://www.iowadnr.gov/insideDNR/RegulatoryWater.aspx</a>
	Texas (TNI)	T 104704456-11-1	<a href="http://www.tceq.texas.gov/field/qalab_accred_certif.html">http://www.tceq.texas.gov/field/qalab_accred_certif.html</a>
	Washington	C596-16	<a href="http://www.ecy.wa.gov/programs/eap/labs/index.html">http://www.ecy.wa.gov/programs/eap/labs/index.html</a>
	Kansas	E-10416	<a href="http://www.kdheks.gov/lipo/index.html">http://www.kdheks.gov/lipo/index.html</a>
Industrial Hygiene	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
	Washington	C596-16	<a href="http://www.ecy.wa.gov/programs/eap/labs/index.html">http://www.ecy.wa.gov/programs/eap/labs/index.html</a>
Lead Testing:			
CPSC	ANAB (ISO 17025, CPSC)	ADE-1420	<a href="http://www.anab.org/accredited-organizations/">http://www.anab.org/accredited-organizations/</a>
Soil, Dust, Paint, Air	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
Dietary Supplements	ACLASS (ISO 17025)	ADE-1420	<a href="http://www.aiclasscorp.com">http://www.aiclasscorp.com</a>

### 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: **1624549**

Limits: Historical/Performance

Basis: ALS Laboratory Group

Preparation: NA

Batch: NA

Prepared By: NA

Analysis: IH Aliphatic Amines

Batch: ILC/12581 (HBN: 176066)

Analyzed By: Thomas Bosch

### Blank

LMB: 516635

Analyzed: 09/06/2016 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: 516636

Analyzed: 09/06/2016 00:00

Dilution: 1

Units: ug/sample

LCSD: 516637

Analyzed: 09/06/2016 00:00

Dilution: 1

Units: ug/sample

Analyte	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Dimethylamine	4.35	4.00	109	60.4	134.6	4.43	111	1.82	0.0	20.0
Ethylamine	4.25	4.00	106	40.0	160.0	4.40	110	3.47	0.0	20.0
Methylamine	4.20	4.00	105	40.0	160.0	4.20	105	0.0238	0.0	20.0

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

Analyst	Peer Review
/S/ Thomas Bosch	/S/ Read A. Fritts
09/07/2016 10:43	09/07/2016 15:10

### 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



1624549

1624549

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST									
C.O.C. No. 20162527					Page 1 of 2				
Assembler N/A		Telephone No. 373-8861 MSIN 76-05 FAX 372-1878							
Collector JONES		Sample Origin CARL ROYAL IV							
SAF No. N/A		Purchase Order/Charge Code 202706/CE20							
Project Title CARTRIDGE EVALUATION		Logbook/Work Package No. N/A							
Shipped To (Lab) ALS		Ice Chest No. <u>WTS-033</u> Temp. <u>00-100</u>							
Protocol N/A		Bill of Lading/Air Bill No. <u>8599 0424 0140</u>							
Data Turnaround 10 DAYS		Parts and Return No. <u>41238</u>							
Sample Analysis									
Sample No.	Lab ID	Date	Time	No./Type Container	AMINES	16-07645-4-A1	1	Preservative	N/A
	S16T026969	VA	8/26/16	XAD-7-NBD	AMINES	16-07645-4-A2	1	N/A	N/A
	S16T026970	VA	8/26/16	XAD-7-NBD	AMINES	16-07645-4-B1	1	N/A	N/A
	S16T026971	VA	8/26/16	XAD-7-NBD	AMINES	16-07645-4-B2	1	N/A	N/A
	S16T026972	VA	8/26/16	XAD-7-NBD	AMINES	16-07645-4-BLANK	1	N/A	N/A
	S16T026973	VA	8/26/16	XAD-7-NBD	AMINES	16-07645-4-BLANK2	1	N/A	N/A
	S16T026974	VA	8/26/16	XAD-7-NBD	AMINES	16-07645-4-C1	1	N/A	N/A
	S16T026975	VA	8/26/16	XAD-7-NBD	AMINES	16-07645-4-C2	1	N/A	N/A
	S16T026976	VA	8/26/16	XAD-7-NBD	AMINES	16-07645-4-D1	1	N/A	N/A
	S16T026977	VA	8/26/16	XAD-7-NBD	AMINES	16-07645-4-D2	1	N/A	N/A
	S16T026978	VA	8/26/16	XAD-7-NBD	AMINES	16-07645-4-D2	1	N/A	N/A
SPECIAL INSTRUCTIONS Send Results to: Carl Royal IV & Greg Moore Email: carl.royal@va.gov and greg.moore@va.gov see "SOW" for email CONTRACT 55502 RELEASE 9									
Hold Time									
POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes) MSDS <input type="radio"/> Yes <input checked="" type="radio"/> No									
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix*	
Sharon Holders	Muller	8/26/16	0800	WRPS	Julie Gradisher	8/31/16	0500	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids	DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation VA = Vapor X = Other
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time		
WRPS	Julie Gradisher	8/31/16	1400	WRPS	Julie Gradisher	8/31/16	0500		
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time		
WRPS	Julie Gradisher	8/31/16	1400	WRPS	Julie Gradisher	8/31/16	0500		
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time		
WRPS	Julie Gradisher	8/31/16	1400	WRPS	Julie Gradisher	8/31/16	0500		
Disposal Method (e.g., Return to customer, per lab procedure, used in process)									
Tom Bess									
Date/Time 09.06.16 18:00									

A-6003-962 (03/05)





## ANALYTICAL REPORT

Report Date: September 08, 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

20162528

Workorder: 34-1624550

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T026989		Collected: 08/27/2016		
Lab ID: 1624550001		Received: 09/01/2016		
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube		
		50/100mg [(NBD) Chloride]		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/07/2016		
Analyte	Result (ug/sample)	Result (mg/m³)	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: S16T026990		Collected: 08/27/2016		
Lab ID: 1624550002		Received: 09/01/2016		
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		
		Analyzed: 09/07/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	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: S16T026991		Collected: 08/27/2016		
Lab ID: 1624550003		Received: 09/01/2016		
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		
		Analyzed: 09/07/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	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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## ANALYTICAL REPORT

Workorder: **34-1624550**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: <b>S16T026992</b>		Collected: 08/27/2016	
Lab ID: 1624550004		Received: 09/01/2016	
Method: <b>Amines-VOA Aliphatic VAA-1</b>		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]	
		Sampling Parameter: <b>Air Volume Not Provided</b>	
Analyzed: 09/07/2016			
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	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: <b>S16T026993</b>		Collected: 08/27/2016	
Lab ID: 1624550005		Received: 09/01/2016	
Method: <b>Amines-VOA Aliphatic VAA-1</b>		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]	
		Sampling Parameter: <b>Air Volume Not Provided</b>	
Analyzed: 09/07/2016			
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	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: <b>S16T026994</b>		Collected: 08/27/2016	
Lab ID: 1624550006		Received: 09/01/2016	
Method: <b>Amines-VOA Aliphatic VAA-1</b>		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]	
		Sampling Parameter: <b>Air Volume Not Provided</b>	
Analyzed: 09/07/2016			
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	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: <b>S16T026995</b>		Collected: 08/27/2016	
Lab ID: 1624550007		Received: 09/01/2016	
Method: <b>Amines-VOA Aliphatic VAA-1</b>		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]	
		Sampling Parameter: <b>Air Volume Not Provided</b>	
Analyzed: 09/07/2016			
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	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: **34-1624550**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: <b>S16T026996</b>		Collected: 08/27/2016	
Lab ID: 1624550008		Received: 09/01/2016	
Method: <b>Amines-VOA Aliphatic VAA-1</b>		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]	
		Sampling Parameter: <b>Air Volume Not Provided</b>	
Analyzed: 09/07/2016			
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	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: <b>S16T026997</b>		Collected: 08/27/2016	
Lab ID: 1624550009		Received: 09/01/2016	
Method: <b>Amines-VOA Aliphatic VAA-1</b>		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]	
		Sampling Parameter: <b>Air Volume Not Provided</b>	
Analyzed: 09/07/2016			
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	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: <b>S16T026998</b>		Collected: 08/27/2016	
Lab ID: 1624550010		Received: 09/01/2016	
Method: <b>Amines-VOA Aliphatic VAA-1</b>		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]	
		Sampling Parameter: <b>Air Volume Not Provided</b>	
Analyzed: 09/07/2016			
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	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: <b>S16T026999</b>		Collected: 08/27/2016	
Lab ID: 1624550011		Received: 09/01/2016	
Method: <b>Amines-VOA Aliphatic VAA-1</b>		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]	
		Sampling Parameter: <b>Air Volume Not Provided</b>	
Analyzed: 09/07/2016			
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	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: **34-1624550**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: <b>S16T027000</b>		Collected: 08/27/2016	
Lab ID: 1624550012		Received: 09/01/2016	
Method: <b>Amines-VOA Aliphatic VAA-1</b>		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]	
		Sampling Parameter: <b>Air Volume Not Provided</b>	
Analyte		Result (ug/sample)	Result (mg/m <sup>3</sup> )
Dimethylamine		<0.10	NA
Ethylamine		<0.10	NA
Methylamine		<0.10	NA

Sample ID: <b>S16T027001</b>		Collected: 08/27/2016	
Lab ID: 1624550013		Received: 09/01/2016	
Method: <b>Amines-VOA Aliphatic VAA-1</b>		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]	
		Sampling Parameter: <b>Air Volume Not Provided</b>	
Analyte		Result (ug/sample)	Result (mg/m <sup>3</sup> )
Dimethylamine		<0.10	NA
Ethylamine		<0.10	NA
Methylamine		<0.10	NA

Sample ID: <b>S16T027002</b>		Collected: 08/27/2016	
Lab ID: 1624550014		Received: 09/01/2016	
Method: <b>Amines-VOA Aliphatic VAA-1</b>		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]	
		Sampling Parameter: <b>Air Volume Not Provided</b>	
Analyte		Result (ug/sample)	Result (mg/m <sup>3</sup> )
Dimethylamine		<0.10	NA
Ethylamine		<0.10	NA
Methylamine		<0.10	NA

Sample ID: <b>S16T027003</b>		Collected: 08/27/2016	
Lab ID: 1624550015		Received: 09/01/2016	
Method: <b>Amines-VOA Aliphatic VAA-1</b>		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]	
		Sampling Parameter: <b>Air Volume Not Provided</b>	
Analyte		Result (ug/sample)	Result (mg/m <sup>3</sup> )
Dimethylamine		<0.10	NA
Ethylamine		<0.10	NA
Methylamine		<0.10	NA





## ANALYTICAL REPORT

Workorder: **34-1624550**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027004		Collected: 08/27/2016		
Lab ID: 1624550016		Received: 09/01/2016		
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		
		Analyzed: 09/07/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	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: S16T027005		Collected: 08/27/2016	
Lab ID: 1624550017		Received: 09/01/2016	
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]	
		Analyzed: 09/07/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	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: S16T027006		Collected: 08/27/2016		
Lab ID: 1624550018		Received: 09/01/2016		
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		
		Analyzed: 09/07/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	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: S16T027007		Collected: 08/27/2016		
Lab ID: 1624550019	Sampling Location: CARTRIDGE EVALUATION		Received: 09/01/2016	
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]	Analyzed: 09/07/2016	
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	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: **34-1624550**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027008		Collected: 08/27/2016		
Lab ID: 1624550020		Received: 09/01/2016		
Sampling Location: CARTRIDGE EVALUATION				
Method: Amines-VOA Aliphatic VAA-1		Media: SKC 226-96, XAD-7 Tube 50/100mg [(NBD) Chloride]		
Analyzed: 09/07/2016				
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	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

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

Method	Analyst	Peer Review
Amines-VOA Aliphatic VAA-1	/S/ Thomas Bosch 09/08/2016 10:31	/S/ Read A. Fritts 09/08/2016 16:38

### Laboratory Contact Information

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

Phone: (801) 266-7700  
Email: [alslt.lab@ALSGlobal.com](mailto:alslt.lab@ALSGlobal.com)  
Web: [www.alssl.com](http://www.alssl.com)



## ANALYTICAL REPORT

Workorder: **34-1624550**

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	ANAB (DoD ELAP)	ADE-1420	<a href="http://www.anab.org/accredited-organizations/">http://www.anab.org/accredited-organizations/</a>
	Utah (NELAC)	DATA 1	<a href="http://health.utah.gov/lab/labimp/">http://health.utah.gov/lab/labimp/</a>
	Nevada	UT00009	<a href="http://ndep.nv.gov/bsdwl/labservice.htm">http://ndep.nv.gov/bsdwl/labservice.htm</a>
	Oklahoma	UT00009	<a href="http://www.deq.state.ok.us/CSDnew/">http://www.deq.state.ok.us/CSDnew/</a>
	Iowa	IA# 376	<a href="http://www.iowadnr.gov/insideDNR/RegulatoryWater.aspx">http://www.iowadnr.gov/insideDNR/RegulatoryWater.aspx</a>
	Texas (TNI)	T 104704456-11-1	<a href="http://www.tceq.texas.gov/field/qalab_accred_certif.html">http://www.tceq.texas.gov/field/qalab_accred_certif.html</a>
	Washington	C596-16	<a href="http://www.ecy.wa.gov/programs/eap/labs/index.html">http://www.ecy.wa.gov/programs/eap/labs/index.html</a>
	Kansas	E-10416	<a href="http://www.kdheks.gov/lipo/index.html">http://www.kdheks.gov/lipo/index.html</a>
Industrial Hygiene	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
	Washington	C596-16	<a href="http://www.ecy.wa.gov/programs/eap/labs/index.html">http://www.ecy.wa.gov/programs/eap/labs/index.html</a>
Lead Testing:			
CPSC	ANAB (ISO 17025, CPSC)	ADE-1420	<a href="http://www.anab.org/accredited-organizations/">http://www.anab.org/accredited-organizations/</a>
Soil, Dust, Paint, Air	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
Dietary Supplements	ACLASS (ISO 17025)	ADE-1420	<a href="http://www.aiclasscorp.com">http://www.aiclasscorp.com</a>

### 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: 1624550

Limits: Historical/Performance

Basis: ALS Laboratory Group

Preparation: NA

Batch: NA

Prepared By: NA

Analysis: IH Aliphatic Amines

Batch: ILC/12586 (HBN: 176131)

Analyzed By: Thomas Bosch

### Blank

LMB: 516817

Analyzed: 09/07/2016 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: 516818

Analyzed: 09/07/2016 00:00

Dilution: 1

Units: ug/sample

LCSD: 516819

Analyzed: 09/07/2016 00:00

Dilution: 1

Units: ug/sample

Analyte	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Dimethylamine	5.15	4.00	129	60.4	134.6	4.98	124	3.30	0.0	20.0
Ethylamine	4.42	4.00	111	40.0	160.0	4.50	113	1.79	0.0	20.0
Methylamine	4.31	4.00	108	40.0	160.0	4.32	108	0.232	0.0	20.0

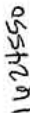
### QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Analyst	Peer Review
/S/ Thomas Bosch	/S/ Read A. Fritts
09/08/2016 10:31	09/08/2016 16:38

### 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



1624550

A-6003-962 (03/05)

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST										C.O.C. No. 20162528	
										Page 2 of 2	
Assembler N/A		Telephone No. 373-6861 MSIN 26-05 FAX 372-1878									
Collector JONES		Contact/Requestor CARL HOWARD IV									
SAF No. N/A		Sample Origin CARTRIDGE EVALUATION									
Project Title CARTRIDGE EVALUATION		Logbook/ Work Package No. N/A									
Shipped To (Lab) ALS		Method of Shipment N/A									
Protocol N/A		Data Turnaround 10 DAYS									
Sample No.		Lab ID	Date	Time	No./Type Container	Sample Analysis				Preservative	
	S16T026999	VA	8/27/16		XAD-7-NBD	AMINES 16-07654-4-E1				N/A	
	S16T027000	VA	8/27/16		XAD-7-NBD	AMINES 16-07654-4-E2				N/A	
	S16T027001	VA	8/27/16		XAD-7-NBD	AMINES 16-07654-4-EFF-BASE				N/A	
	S16T027002	VA	8/27/16		XAD-7-NBD	AMINES 16-07654-4-E1				N/A	
	S16T027003	VA	8/27/16		XAD-7-NBD	AMINES 16-07654-4-E2				N/A	
	S16T027004	VA	8/27/16		XAD-7-NBD	AMINES 16-07654-4-G1				N/A	
	S16T027005	VA	8/27/16		XAD-7-NBD	AMINES 16-07654-4-G2				N/A	
	S16T027006	VA	8/27/16		XAD-7-NBD	AMINES 16-07654-4-H1				N/A	
	S16T027007	VA	8/27/16		XAD-7-NBD	AMINES 16-07654-4-R2				N/A	
	S16T027008	VA	8/27/16		XAD-7-NBD	AMINES 16-07654-4-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 Send Results to Carl Howard IV &amp; Greg Moore Carl W Howard@rl.gov and Greg_S_Moore@rl.gov see SW for email CONTRACT 55502 RELEASE 9</p>											
Relinquished By DIANNE TURNER	Print Signature	Sign 8/31/16	Date/Time 8/31/16 0900	Received By WRPS	Print Signature	Sign 8/31/16	Date/Time 8/31/16 0900	Matrix*			
Relinquished By WRPS	Print Signature	Sign 8/31/16	Date/Time 8/31/16 1400	Received By WRPS	Print Signature	Sign 8/31/16	Date/Time 8/31/16 1400	Matrix*			
Relinquished By WRPS	Print Signature	Sign 8/31/16	Date/Time 8/31/16 1400	Received By WRPS	Print Signature	Sign 8/31/16	Date/Time 8/31/16 1400	Matrix*			
Relinquished By WRPS	Print Signature	Sign 8/31/16	Date/Time 8/31/16 1400	Received By WRPS	Print Signature	Sign 8/31/16	Date/Time 8/31/16 1400	Matrix*			
Disposal Method (e.g., Return to customer, per lab procedure, used in process)								Date/Time			
Disposed By Tom Bush								09.07.16 17:00			

A-6003-962 (03/05)

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

### C.3.5 Acetonitrile



#### ANALYTICAL REPORT

Report Date: September 08, 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

20162529

Workorder: 34-1624551

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

#### Analytical Results

Sample ID: S16T027009		Collected: 08/26/2016	
Lab ID: 1624551001		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/02/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm) RL (mg/sample)
Acetonitrile	<0.010	NA	NA 0.010

Sample ID: S16T027010		Collected: 08/26/2016	
Lab ID: 1624551002		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/02/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm) RL (mg/sample)
Acetonitrile	<0.010	NA	NA 0.010

Sample ID: S16T027011		Collected: 08/26/2016	
Lab ID: 1624551003		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/02/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	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  
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## ANALYTICAL REPORT

Workorder: **34-1624551**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027012		Collected: 08/26/2016	
Lab ID: 1624551004		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/02/2016	
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm) RL (mg/sample)
Acetonitrile	<0.010	NA	NA 0.010

Sample ID: <b>S16T027013</b>		Collected: 08/26/2016	
Lab ID: 1624551005		Received: 09/01/2016	
Method: <b>NIOSH 1606</b>		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/02/2016	
Sampling Parameter: <b>Air Volume Not Provided</b>			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)    RL (mg/sample)
Acetonitrile	<0.010	NA	NA    0.010

Sample ID: <b>S16T027014</b>		Collected: 08/26/2016		
Lab ID: 1624551006		Received: 09/01/2016		
Method: <b>NIOSH 1606</b>		Media: SKC 226-09, Charcoal Tube 400/200mg		
		Analyzed: 09/02/2016		
Sampling Parameter: <b>Air Volume Not Provided</b>				
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
Acetonitrile	<0.010	NA	NA	0.010

Sample ID: S16T027015		Collected: 08/26/2016	
Lab ID: 1624551007		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/02/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)    RL (mg/sample)
Acetonitrile	<0.010	NA	NA    0.010

Sample ID: <b>S16T027016</b>		Collected: 08/26/2016	
Lab ID: 1624551008		Received: 09/01/2016	
Method: <b>NIOSH 1606</b>		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/02/2016	
Sampling Parameter: <b>Air Volume Not Provided</b>			
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)    RL (mg/sample)
Acetonitrile	<0.010	NA	NA    0.010





## ANALYTICAL REPORT

Workorder: **34-1624551**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027017		Collected: 08/26/2016	
Lab ID: 1624551009		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/02/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm) RL (mg/sample)
Acetonitrile	<0.010	NA	NA 0.010

Sample ID: <b>S16T027018</b>		Collected: 08/26/2016	
Lab ID: 1624551010		Received: 09/01/2016	
Method: <b>NIOSH 1606</b>		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/02/2016	
Sampling Parameter: <b>Air Volume Not Provided</b>			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)    RL (mg/sample)
Acetonitrile	<0.010	NA	NA    0.010

Sample ID: <b>S16T027019</b>		Collected: 08/26/2016		
Lab ID: 1624551011		Received: 09/01/2016		
Method: <b>NIOSH 1606</b>		Media: SKC 226-09, Charcoal Tube 400/200mg		
		Analyzed: 09/02/2016		
Sampling Parameter: <b>Air Volume Not Provided</b>				
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
Acetonitrile	<0.010	NA	NA	0.010

Sample ID: S16T027020		Collected: 08/26/2016	
Lab ID: 1624551012		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/02/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)    RL (mg/sample)
Acetonitrile	0.011	NA	NA    0.010

Sample ID: <b>S16T027021</b>		Collected: 08/26/2016	
Lab ID: 1624551013		Received: 09/01/2016	
Method: <b>NIOSH 1606</b>		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/02/2016	
Sampling Parameter: <b>Air Volume Not Provided</b>			
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)    RL (mg/sample)
Acetonitrile	<0.010	NA	NA    0.010



## ANALYTICAL REPORT

Workorder: **34-1624551**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027022		Collected: 08/26/2016	
Lab ID: 1624551014		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/02/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)    RL (mg/sample)
Acetonitrile	<0.010	NA	NA    0.010

Sample ID: <b>S16T027023</b>		Collected: 08/26/2016	
Lab ID: 1624551015		Received: 09/01/2016	
Method: <b>NIOSH 1606</b>		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/02/2016	
Sampling Parameter: <b>Air Volume Not Provided</b>			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)    RL (mg/sample)
Acetonitrile	<0.010	NA	NA    0.010

Sample ID: <b>S16T027024</b>		Collected: 08/26/2016	
Lab ID: 1624551016		Received: 09/01/2016	
Method: <b>NIOSH 1606</b>		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/03/2016	
Sampling Parameter: <b>Air Volume Not Provided</b>			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)    RL (mg/sample)
Acetonitrile	<0.010	NA	NA    0.010

Sample ID: S16T027025		Collected: 08/26/2016	
Lab ID: 1624551017		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/03/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)    RL (mg/sample)
Acetonitrile	<0.010	NA	NA    0.010

Sample ID: S16T027026		Collected: 08/26/2016	
Lab ID: 1624551018		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/03/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)    RL (mg/sample)
Acetonitrile	<0.010	NA	NA    0.010



## ANALYTICAL REPORT

Workorder: **34-1624551**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027027		Collected: 08/26/2016	
Lab ID: 1624551019		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/03/2016	
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)    RL (mg/sample)
Acetonitrile	<0.010	NA	NA    0.010

Sample ID: S16T027028		Collected: 08/26/2016	
Lab ID: 1624551020		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/03/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)    RL (mg/sample)
Acetonitrile	<0.010	NA	NA    0.010

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

Method	Analyst	Peer Review
<b>NIOSH 1606</b>	/S/ Young Hee Yoon 09/08/2016 11:36	/S/ Steven J. Sagers 09/08/2016 15:56

### Laboratory Contact Information

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

Phone: (801) 266-7700  
Email: [alslt.lab@ALSGlobal.com](mailto:alslt.lab@ALSGlobal.com)  
Web: [www.alslsc.com](http://www.alslsc.com)



## ANALYTICAL REPORT

Workorder: **34-1624551**

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	ANAB (DoD ELAP)	ADE-1420	<a href="http://www.anab.org/accredited-organizations/">http://www.anab.org/accredited-organizations/</a>
	Utah (NELAC)	DATA 1	<a href="http://health.utah.gov/lab/labimp/">http://health.utah.gov/lab/labimp/</a>
	Nevada	UT00009	<a href="http://ndep.nv.gov/bsdwl/labservice.htm">http://ndep.nv.gov/bsdwl/labservice.htm</a>
	Oklahoma	UT00009	<a href="http://www.deq.state.ok.us/CSDnew/">http://www.deq.state.ok.us/CSDnew/</a>
	Iowa	IA# 376	<a href="http://www.iowadnr.gov/insideDNR/RegulatoryWater.aspx">http://www.iowadnr.gov/insideDNR/RegulatoryWater.aspx</a>
	Texas (TNI)	T 104704456-11-1	<a href="http://www.tceq.texas.gov/field/qalab_accred_certif.html">http://www.tceq.texas.gov/field/qalab_accred_certif.html</a>
	Washington	C596-16	<a href="http://www.ecy.wa.gov/programs/eap/labs/index.html">http://www.ecy.wa.gov/programs/eap/labs/index.html</a>
	Kansas	E-10416	<a href="http://www.kdheks.gov/lipo/index.html">http://www.kdheks.gov/lipo/index.html</a>
Industrial Hygiene	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
	Washington	C596-16	<a href="http://www.ecy.wa.gov/programs/eap/labs/index.html">http://www.ecy.wa.gov/programs/eap/labs/index.html</a>
Lead Testing:			
CPSC	ANAB (ISO 17025, CPSC)	ADE-1420	<a href="http://www.anab.org/accredited-organizations/">http://www.anab.org/accredited-organizations/</a>
Soil, Dust, Paint, Air	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
Dietary Supplements	ACLASS (ISO 17025)	ADE-1420	<a href="http://www.aiclasscorp.com">http://www.aiclasscorp.com</a>

### 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: 1624551

Limits: Historical/Performance  
Basis: ALS Laboratory Group

Preparation: NA  
Batch: NA  
Prepared By: NA

Analysis: IH GC-FID QC  
Batch: IFID/7725 (HBN: 175985)  
Analyzed By: Young Hee Yoon

### Blank

MB: 516460 Analyzed: 09/02/2016 00:00 Units: mg/sample			
Analyte	Result	MDL	RL
Acetonitrile	ND	NA	0.0100

MB: 516463 Analyzed: 09/02/2016 00:00 Units: mg/sample			
Analyte	Result	MDL	RL
Acetonitrile	ND	NA	0.0100

### Laboratory Control Sample - Laboratory Control Sample Duplicate

LCS: 516461 Analyzed: 09/02/2016 00:00 Dilution: 1 Units: mg/sample					LCSD: 516462 Analyzed: 09/02/2016 00:00 Dilution: 1 Units: mg/sample				
Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
Acetonitrile	0.322	0.312	103	86.6 115.3	0.311	99.7	3.48	0.0 20.0	

LCS: 516464 Analyzed: 09/02/2016 00:00 Dilution: 1 Units: mg/sample					LCSD: 516465 Analyzed: 09/02/2016 00:00 Dilution: 1 Units: mg/sample				
Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
Acetonitrile	0.249	0.250	99.8	86.6 115.3	0.267	107	6.98	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 09/08/2016 11:36	/S/ Steven J. Sagers 09/08/2016 15:56

### 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



1624551

Assembler  
N/A

Collector  
JONES

SAF No.  
N/A

Project Title  
CARTRIDGE EVALUATION

Shipped To (Lab)  
ALS

Protocol  
N/A

Chain of Custody/Sample Analysis Request

Telephone No. 373-6861  
Purchase Order/Charge Code 202706/CB20

MSIN 76-02 FAX 372-1878

Is Chest No. 415-033 temp. 910 JEE

Bill of Lading/Air Bill No. 8599 0124 0140

Parts and Return No. 41238

Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis	Preservative
S16T027009	VA	8/26/16		CHARCOAL TUBE	Acetonitrile 16-07645-5-A11	N/A
S16T027010	VA	8/26/16		CHARCOAL TUBE	Acetonitrile 16-07645-5-A21	N/A
S16T027011	VA	8/26/16		CHARCOAL TUBE	Acetonitrile 16-07645-5-B11	N/A
S16T027012	VA	8/26/16		CHARCOAL TUBE	Acetonitrile 16-07645-5-B21	N/A
S16T027013	VA	8/26/16		CHARCOAL TUBE	Acetonitrile 16-07645-5-BLANK	N/A
S16T027014	VA	8/26/16		CHARCOAL TUBE	Acetonitrile 16-07645-5-BLANK2	N/A
S16T027015	VA	8/26/16		CHARCOAL TUBE	Acetonitrile 16-07645-5-C11	N/A
S16T027016	VA	8/26/16		CHARCOAL TUBE	Acetonitrile 16-07645-5-C21	N/A
S16T027017	VA	8/26/16		CHARCOAL TUBE	Acetonitrile 16-07645-5-D11	N/A
S16T027018	VA	8/26/16		CHARCOAL TUBE	Acetonitrile 16-07645-5-D21	N/A

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

SPECIAL INSTRUCTIONS  
Send Results to Carl Rowald IV & Greg Moore  
Carl N Rowald@rl.gov and Gregory S Moore@rl.gov for email

RELEASE 9  
Reference Contract # 55502

Held Time

Relinquished By Sharon L. Veltre	Print JA Gradisher	Sign Sharon L. Veltre	Date/Time 8/31/16 0900	Received By WRPS	Print JA Gradisher	Sign Julia Gradisher	Date/Time 8/31/16 0900	Matrix* S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids
Relinquished By WRPS	Print JA Gradisher	Sign WRPS	Date/Time 8/31/16 1400	Received By WRPS	Print FEDEX	Sign FEDEX	Date/Time 9/1/16 0900	DL = Drum Liquids T = Tissue WL = Waste L = Liquid V = Vegetation VA = Vapor X = Other
Relinquished By WRPS	Print WRPS	Sign WRPS	Date/Time 8/31/16 1400	Received By WRPS	Print WRPS	Sign WRPS	Date/Time 8/31/16 1400	

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

Disposed By  
Gregory S Moore

Date/Time  
Sept 3, 2016 2:20 PM

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

A-5003-962 (03/05)





## ANALYTICAL REPORT

Report Date: September 08, 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](mailto:robert_w_sosa@rl.gov)  
20162530

Workorder: **34-1624552**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027029		Collected: 08/27/2016		
Lab ID: 1624552001		Received: 09/01/2016		
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/03/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
Acetonitrile	<0.010	NA	NA	0.010

Sample ID: S16T027030		Collected: 08/27/2016		
Lab ID: 1624552002		Received: 09/01/2016		
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/03/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
Acetonitrile	<0.010	NA	NA	0.010

Sample ID: <b>S16T027031</b>		Collected: 08/27/2016		
Lab ID: 1624552003		Received: 09/01/2016		
Method: <b>NIOSH 1606</b>		Media: SKC 226-09, Charcoal Tube 400/200mg		
Sampling Parameter: <b>Air Volume Not Provided</b>		Analyzed: 09/03/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	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

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Environmental 

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## ANALYTICAL REPORT

Workorder: 34-1624552

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027032		Collected: 08/27/2016	
Lab ID: 1624552004		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/03/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm) RL (mg/sample)
Acetonitrile	<0.010	NA	NA 0.010

Sample ID: S16T027033		Collected: 08/27/2016	
Lab ID: 1624552005		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/03/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)    RL (mg/sample)
Acetonitrile	<0.010	NA	NA    0.010

Sample ID: S16T027034		Collected: 08/27/2016		
Lab ID: 1624552006		Received: 09/01/2016		
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/03/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
Acetonitrile	<0.010	NA	NA	0.010

Sample ID: S16T027035		Collected: 08/27/2016	
Lab ID: 1624552007		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/03/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)    RL (mg/sample)
Acetonitrile	<0.010	NA	NA    0.010

Sample ID: S16T027036		Collected: 08/27/2016	
Lab ID: 1624552008		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/03/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)    RL (mg/sample)
Acetonitrile	<0.010	NA	NA    0.010



## ANALYTICAL REPORT

Workorder: **34-1624552**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027037		Collected: 08/27/2016	
Lab ID: 1624552009		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/03/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)    RL (mg/sample)
Acetonitrile	<0.010	NA	NA    0.010

Sample ID: <b>S16T027038</b>		Collected: 08/27/2016	
Lab ID: 1624552010		Received: 09/01/2016	
Method: <b>NIOSH 1606</b>		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/03/2016	
Sampling Parameter: <b>Air Volume Not Provided</b>			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)    RL (mg/sample)
Acetonitrile	<0.010	NA	NA    0.010

Sample ID: <b>S16T027039</b>		Collected: 08/27/2016	
Lab ID: 1624552011		Received: 09/01/2016	
Method: <b>NIOSH 1606</b>		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/03/2016	
Sampling Parameter: <b>Air Volume Not Provided</b>			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)    RL (mg/sample)
Acetonitrile	<0.010	NA	NA    0.010

Sample ID: S16T027040		Collected: 08/27/2016	
Lab ID: 1624552012		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/03/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)    RL (mg/sample)
Acetonitrile	0.042	NA	NA    0.010

Sample ID: <b>S16T027041</b>		Collected: 08/27/2016	
Lab ID: 1624552013		Received: 09/01/2016	
Method: <b>NIOSH 1606</b>		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/03/2016	
Sampling Parameter: <b>Air Volume Not Provided</b>			
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)    RL (mg/sample)
Acetonitrile	<0.010	NA	NA    0.010



## ANALYTICAL REPORT

Workorder: 34-1624552

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027042		Collected: 08/27/2016		
Lab ID: 1624552014		Received: 09/01/2016		
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/03/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
Acetonitrile	<0.010	NA	NA	0.010

Sample ID: S16T027043		Collected: 08/27/2016	
Lab ID: 1624552015		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/03/2016	
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm) RL (mg/sample)
Acetonitrile	<0.010	NA	NA 0.010

Sample ID: S16T027044		Collected: 08/27/2016	
Lab ID: 1624552016		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/03/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm) RL (mg/sample)
Acetonitrile	0.024	NA	NA 0.010

Sample ID: S16T027045		Collected: 08/27/2016	
Lab ID: 1624552017		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/03/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm) RL (mg/sample)
Acetonitrile	<0.010	NA	NA 0.010

Sample ID: S16T027046		Collected: 08/27/2016	
Lab ID: 1624552018		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/03/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm) RL (mg/sample)
Acetonitrile	<0.010	NA	NA 0.010



## ANALYTICAL REPORT

Workorder: **34-1624552**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027047		Collected: 08/27/2016	
Lab ID: 1624552019		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/03/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm) RL (mg/sample)
Acetonitrile	<0.010	NA	NA 0.010

Sample ID: S16T027048		Collected: 08/27/2016	
Lab ID: 1624552020		Received: 09/01/2016	
Method: NIOSH 1606		Media: SKC 226-09, Charcoal Tube 400/200mg	
		Analyzed: 09/03/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)    RL (mg/sample)
Acetonitrile	0.016	NA	NA    0.010

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

Method	Analyst	Peer Review
<b>NIOSH 1606</b>	/S/ Young Hee Yoon 09/08/2016 11:36	/S/ Steven J. Sagers 09/08/2016 15:56

### Laboratory Contact Information

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

Phone: (801) 266-7700  
Email: [alslt.lab@ALSGlobal.com](mailto:alslt.lab@ALSGlobal.com)  
Web: [www.alsl.com](http://www.alsl.com)



## ANALYTICAL REPORT

Workorder: **34-1624552**

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	ANAB (DoD ELAP)	ADE-1420	<a href="http://www.anab.org/accredited-organizations/">http://www.anab.org/accredited-organizations/</a>
	Utah (NELAC)	DATA 1	<a href="http://health.utah.gov/lab/labimp/">http://health.utah.gov/lab/labimp/</a>
	Nevada	UT00009	<a href="http://ndep.nv.gov/bsdwl/labservice.htm">http://ndep.nv.gov/bsdwl/labservice.htm</a>
	Oklahoma	UT00009	<a href="http://www.deq.state.ok.us/CSDnew/">http://www.deq.state.ok.us/CSDnew/</a>
	Iowa	IA# 376	<a href="http://www.iowadnr.gov/insideDNR/RegulatoryWater.aspx">http://www.iowadnr.gov/insideDNR/RegulatoryWater.aspx</a>
	Texas (TNI)	T 104704456-11-1	<a href="http://www.tceq.texas.gov/field/qalab_accred_certif.html">http://www.tceq.texas.gov/field/qalab_accred_certif.html</a>
	Washington	C596-16	<a href="http://www.ecy.wa.gov/programs/eap/labs/index.html">http://www.ecy.wa.gov/programs/eap/labs/index.html</a>
	Kansas	E-10416	<a href="http://www.kdheks.gov/lipo/index.html">http://www.kdheks.gov/lipo/index.html</a>
Industrial Hygiene	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
	Washington	C596-16	<a href="http://www.ecy.wa.gov/programs/eap/labs/index.html">http://www.ecy.wa.gov/programs/eap/labs/index.html</a>
Lead Testing:			
CPSC	ANAB (ISO 17025, CPSC)	ADE-1420	<a href="http://www.anab.org/accredited-organizations/">http://www.anab.org/accredited-organizations/</a>
Soil, Dust, Paint, Air	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
Dietary Supplements	ACLASS (ISO 17025)	ADE-1420	<a href="http://www.aiclasscorp.com">http://www.aiclasscorp.com</a>

### 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: 1624552

Limits: Historical/Performance  
Basis: ALS Laboratory Group

Preparation: NA  
Batch: NA  
Prepared By: NA

Analysis: IH GC-FID QC  
Batch: IFID/7725 (HBN: 175985)  
Analyzed By: Young Hee Yoon

### Blank

MB: 516460 Analyzed: 09/02/2016 00:00 Units: mg/sample			
Analyte	Result	MDL	RL
Acetonitrile	ND	NA	0.0100

MB: 516463 Analyzed: 09/02/2016 00:00 Units: mg/sample			
Analyte	Result	MDL	RL
Acetonitrile	ND	NA	0.0100

### Laboratory Control Sample - Laboratory Control Sample Duplicate

LCS: 516461 Analyzed: 09/02/2016 00:00 Dilution: 1 Units: mg/sample					LCSD: 516462 Analyzed: 09/02/2016 00:00 Dilution: 1 Units: mg/sample				
Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
Acetonitrile	0.322	0.312	103	86.6 115.3	0.311	99.7	3.48	0.0 20.0	

LCS: 516464 Analyzed: 09/02/2016 00:00 Dilution: 1 Units: mg/sample					LCSD: 516465 Analyzed: 09/02/2016 00:00 Dilution: 1 Units: mg/sample				
Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
Acetonitrile	0.249	0.250	99.8	86.6 115.3	0.267	107	6.98	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 09/08/2016 11:36	/S/ Steven J. Sagers 09/08/2016 15:56

### 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







### C.3.6 Mercury

20162509 Rev. 0

## FINAL REPORT ON MERCURY VAPOR TUBES FOR CARTRIDGE EVALUATION COLLECTED AUGUST 26 - 27, 2016

Document No.: 20162509 Rev. 0

Michael A. Purcell  
WAI Hanford Laboratory

Date Published  
September 12, 2016



Prepared for:


Prepared by:

LAB #184777



Joyce A. Caldwell  
Washington River Protection  
Solutions, Inc.  
P.O. Box 850  
Richland, WA 99352  
509-376-0737

WAI Hanford Laboratory  
1955 Jadwin Ave, Suite 330  
Richland, WA 99354  
509-373-3240

 September 12, 2016  
Michael A. Purcell, WHL Project Coordinator

## NARRATIVE

**FINAL REPORT ON MERCURY VAPOR TUBES  
FOR CARTRIDGE EVALUATION  
COLLECTED AUGUST 26 – 27, 2016**

This final report presents the results of forty mercury vapor tubes received at the 222-S Laboratory on August 29, 2016, in good condition and with adequate paperwork. The mercury vapor tubes were logged into sample delivery group 20162509.

**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. 2-4	LA-325-109, Rev. 2-4

**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 9473 and 10187 were below the detection limit; therefore, no blank correction was required. Sixteen of the forty mercury results for sample group 20162509 were above the reporting limit of 0.05 µg per sample. For these samples, the total result includes the contribution from the back glass wool portion even though the back glass wool portion result is lower than the reporting limit (see Attachment 1).

20162509 Rev. 0

Attachment 1

## DATA SUMMARY REPORT

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## DATA SUMMARY REPORT FOR SAMPLE GROUP 20162509

Customer Sample ID	Vapor Tube Portion	Laboratory Sample ID	Analyte	Result Unit	Standard % Recovery	Blank	Result	Reporting Limit
16-07645-6-A1	Total	S16T026683	Mercury	ug/sample	n/a	<0.0500	0.536	0.0500
16-07645-6-A1	Resin	S16T026684	Mercury	ug/sample	95.0	<0.0500	0.531	0.0500
16-07645-6-A1	Glass Wool	S16T026685	Mercury	ug/sample	95.0	<0.0500	<0.0500	0.0500
16-07645-6-A2	Total	S16T026686	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07645-6-A2	Resin	S16T026687	Mercury	ug/sample	95.0	<0.0500	<0.0500	0.0500
16-07645-6-A2	Glass Wool	S16T026688	Mercury	ug/sample	95.0	<0.0500	<0.0500	0.0500
16-07645-6-B1	Total	S16T026689	Mercury	ug/sample	n/a	<0.0500	0.526	0.0500
16-07645-6-B1	Resin	S16T026690	Mercury	ug/sample	95.0	<0.0500	0.521	0.0500
16-07645-6-B1	Glass Wool	S16T026691	Mercury	ug/sample	95.0	<0.0500	<0.0500	0.0500
16-07645-6-B2	Total	S16T026692	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07645-6-B2	Resin	S16T026693	Mercury	ug/sample	95.0	<0.0500	<0.0500	0.0500
16-07645-6-B2	Glass Wool	S16T026694	Mercury	ug/sample	95.0	<0.0500	<0.0500	0.0500
16-07645-6-BLANK	Total	S16T026695	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07645-6-BLANK	Resin	S16T026696	Mercury	ug/sample	95.0	<0.0500	<0.0500	0.0500
16-07645-6-BLANK	Glass Wool	S16T026697	Mercury	ug/sample	95.0	<0.0500	<0.0500	0.0500
16-07645-6-BLANK2	Total	S16T026698	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07645-6-BLANK2	Resin	S16T026699	Mercury	ug/sample	95.0	<0.0500	<0.0500	0.0500
16-07645-6-BLANK2	Glass Wool	S16T026700	Mercury	ug/sample	95.0	<0.0500	<0.0500	0.0500
16-07645-6-C1	Total	S16T026701	Mercury	ug/sample	n/a	<0.0500	0.510	0.0500
16-07645-6-C1	Resin	S16T026702	Mercury	ug/sample	95.0	<0.0500	0.506	0.0500
16-07645-6-C1	Glass Wool	S16T026703	Mercury	ug/sample	95.0	<0.0500	<0.0500	0.0500
16-07645-6-C2	Total	S16T026704	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07645-6-C2	Resin	S16T026705	Mercury	ug/sample	95.0	<0.0500	<0.0500	0.0500
16-07645-6-C2	Glass Wool	S16T026706	Mercury	ug/sample	95.0	<0.0500	<0.0500	0.0500
16-07645-6-D1	Total	S16T026707	Mercury	ug/sample	n/a	<0.0500	0.536	0.0500
16-07645-6-D1	Resin	S16T026708	Mercury	ug/sample	95.0	<0.0500	0.530	0.0500
16-07645-6-D1	Glass Wool	S16T026709	Mercury	ug/sample	95.0	<0.0500	<0.0500	0.0500
16-07645-6-D2	Total	S16T026710	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07645-6-D2	Resin	S16T026711	Mercury	ug/sample	95.0	<0.0500	<0.0500	0.0500
16-07645-6-D2	Glass Wool	S16T026712	Mercury	ug/sample	95.0	<0.0500	<0.0500	0.0500
16-07645-6-E1	Total	S16T026713	Mercury	ug/sample	n/a	<0.0500	0.542	0.0500
16-07645-6-E1	Resin	S16T026714	Mercury	ug/sample	93.8	<0.0500	0.536	0.0500
16-07645-6-E1	Glass Wool	S16T026715	Mercury	ug/sample	93.8	<0.0500	<0.0500	0.0500
16-07645-6-E2	Total	S16T026716	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07645-6-E2	Resin	S16T026717	Mercury	ug/sample	93.8	<0.0500	<0.0500	0.0500
16-07645-6-E2	Glass Wool	S16T026718	Mercury	ug/sample	93.8	<0.0500	<0.0500	0.0500
16-07645-6-EFF-BASE	Total	S16T026725	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07645-6-EFF-BASE	Resin	S16T026726	Mercury	ug/sample	93.8	<0.0500	<0.0500	0.0500
16-07645-6-EFF-BASE	Glass Wool	S16T026727	Mercury	ug/sample	93.8	<0.0500	<0.0500	0.0500
16-07645-6-F1	Total	S16T026728	Mercury	ug/sample	n/a	<0.0500	0.548	0.0500
16-07645-6-F1	Resin	S16T026730	Mercury	ug/sample	93.8	<0.0500	0.542	0.0500
16-07645-6-F1	Glass Wool	S16T026731	Mercury	ug/sample	93.8	<0.0500	<0.0500	0.0500
16-07645-6-F2	Total	S16T026735	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07645-6-F2	Resin	S16T026738	Mercury	ug/sample	93.8	<0.0500	<0.0500	0.0500
16-07645-6-F2	Glass Wool	S16T026739	Mercury	ug/sample	93.8	<0.0500	<0.0500	0.0500
16-07645-6-G1	Total	S16T026740	Mercury	ug/sample	n/a	<0.0500	0.558	0.0500
16-07645-6-G1	Resin	S16T026741	Mercury	ug/sample	93.8	<0.0500	0.552	0.0500
16-07645-6-G1	Glass Wool	S16T026742	Mercury	ug/sample	93.8	<0.0500	<0.0500	0.0500

## DATA SUMMARY REPORT FOR SAMPLE GROUP 20162509

Customer Sample ID	Vapor Tube Portion	Laboratory Sample ID	Analyte	Result Unit	Standard % Recovery	Blank	Result	Reporting Limit
16-07645-6-G2	Total	S16T026744	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07645-6-G2	Resin	S16T026747	Mercury	ug/sample	93.8	<0.0500	<0.0500	0.0500
16-07645-6-G2	Glass Wool	S16T026748	Mercury	ug/sample	93.8	<0.0500	<0.0500	0.0500
16-07645-6-H1	Total	S16T026750	Mercury	ug/sample	n/a	<0.0500	0.555	0.0500
16-07645-6-H1	Resin	S16T026751	Mercury	ug/sample	93.8	<0.0500	0.550	0.0500
16-07645-6-H1	Glass Wool	S16T026752	Mercury	ug/sample	93.8	<0.0500	<0.0500	0.0500
16-07645-6-H2	Total	S16T026755	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07645-6-H2	Resin	S16T026756	Mercury	ug/sample	93.8	<0.0500	<0.0500	0.0500
16-07645-6-H2	Glass Wool	S16T026757	Mercury	ug/sample	93.8	<0.0500	<0.0500	0.0500
16-07645-6-IN-BASE	Total	S16T026758	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07645-6-IN-BASE	Resin	S16T026759	Mercury	ug/sample	93.8	<0.0500	<0.0500	0.0500
16-07645-6-IN-BASE	Glass Wool	S16T026760	Mercury	ug/sample	93.8	<0.0500	<0.0500	0.0500
16-07654-6-A1	Total	S16T026777	Mercury	ug/sample	n/a	<0.0500	0.580	0.0500
16-07654-6-A1	Resin	S16T026778	Mercury	ug/sample	100	<0.0500	0.576	0.0500
16-07654-6-A1	Glass Wool	S16T026779	Mercury	ug/sample	100	<0.0500	<0.0500	0.0500
16-07654-6-A2	Total	S16T026780	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07654-6-A2	Resin	S16T026781	Mercury	ug/sample	100	<0.0500	<0.0500	0.0500
16-07654-6-A2	Glass Wool	S16T026782	Mercury	ug/sample	100	<0.0500	<0.0500	0.0500
16-07654-6-B1	Total	S16T026783	Mercury	ug/sample	n/a	<0.0500	0.536	0.0500
16-07654-6-B1	Resin	S16T026787	Mercury	ug/sample	100	<0.0500	0.530	0.0500
16-07654-6-B1	Glass Wool	S16T026788	Mercury	ug/sample	100	<0.0500	<0.0500	0.0500
16-07654-6-B2	Total	S16T026790	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07654-6-B2	Resin	S16T026793	Mercury	ug/sample	100	<0.0500	<0.0500	0.0500
16-07654-6-B2	Glass Wool	S16T026794	Mercury	ug/sample	100	<0.0500	<0.0500	0.0500
16-07654-6-BLANK	Total	S16T026795	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07654-6-BLANK	Resin	S16T026796	Mercury	ug/sample	100	<0.0500	<0.0500	0.0500
16-07654-6-BLANK	Glass Wool	S16T026797	Mercury	ug/sample	100	<0.0500	<0.0500	0.0500
16-07654-6-BLANK2	Total	S16T026801	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07654-6-BLANK2	Resin	S16T026805	Mercury	ug/sample	100	<0.0500	<0.0500	0.0500
16-07654-6-BLANK2	Glass Wool	S16T026806	Mercury	ug/sample	100	<0.0500	<0.0500	0.0500
16-07654-6-C1	Total	S16T026807	Mercury	ug/sample	n/a	<0.0500	0.556	0.0500
16-07654-6-C1	Resin	S16T026808	Mercury	ug/sample	100	<0.0500	0.550	0.0500
16-07654-6-C1	Glass Wool	S16T026809	Mercury	ug/sample	100	<0.0500	<0.0500	0.0500
16-07654-6-C2	Total	S16T026810	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07654-6-C2	Resin	S16T026811	Mercury	ug/sample	100	<0.0500	<0.0500	0.0500
16-07654-6-C2	Glass Wool	S16T026812	Mercury	ug/sample	100	<0.0500	<0.0500	0.0500
16-07654-6-D1	Total	S16T026813	Mercury	ug/sample	n/a	<0.0500	0.522	0.0500
16-07654-6-D1	Resin	S16T026814	Mercury	ug/sample	100	<0.0500	0.517	0.0500
16-07654-6-D1	Glass Wool	S16T026815	Mercury	ug/sample	100	<0.0500	<0.0500	0.0500
16-07654-6-D2	Total	S16T026816	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07654-6-D2	Resin	S16T026817	Mercury	ug/sample	100	<0.0500	<0.0500	0.0500
16-07654-6-D2	Glass Wool	S16T026818	Mercury	ug/sample	100	<0.0500	<0.0500	0.0500
16-07654-6-E1	Total	S16T026819	Mercury	ug/sample	n/a	<0.0500	0.546	0.0500
16-07654-6-E1	Resin	S16T026820	Mercury	ug/sample	102	<0.0500	0.540	0.0500
16-07654-6-E1	Glass Wool	S16T026821	Mercury	ug/sample	102	<0.0500	<0.0500	0.0500
16-07654-6-E2	Total	S16T026822	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07654-6-E2	Resin	S16T026823	Mercury	ug/sample	102	<0.0500	<0.0500	0.0500
16-07654-6-E2	Glass Wool	S16T026824	Mercury	ug/sample	102	<0.0500	<0.0500	0.0500

**DATA SUMMARY REPORT FOR SAMPLE GROUP 20162509**

Customer Sample ID	Vapor Tube Portion	Laboratory Sample ID	Analyte	Result Unit	Standard % Recovery	Blank	Result	Reporting Limit
16-07654-6-EFF-BASE	Total	S16T026825	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07654-6-EFF-BASE	Resin	S16T026826	Mercury	ug/sample	102	<0.0500	<0.0500	0.0500
16-07654-6-EFF-BASE	Glass Wool	S16T026827	Mercury	ug/sample	102	<0.0500	<0.0500	0.0500
16-07654-6-F1	Total	S16T026828	Mercury	ug/sample	n/a	<0.0500	0.536	0.0500
16-07654-6-F1	Resin	S16T026829	Mercury	ug/sample	102	<0.0500	0.530	0.0500
16-07654-6-F1	Glass Wool	S16T026830	Mercury	ug/sample	102	<0.0500	<0.0500	0.0500
16-07654-6-F2	Total	S16T026831	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07654-6-F2	Resin	S16T026832	Mercury	ug/sample	102	<0.0500	<0.0500	0.0500
16-07654-6-F2	Glass Wool	S16T026833	Mercury	ug/sample	102	<0.0500	<0.0500	0.0500
16-07654-6-G1	Total	S16T026834	Mercury	ug/sample	n/a	<0.0500	0.468	0.0500
16-07654-6-G1	Resin	S16T026835	Mercury	ug/sample	102	<0.0500	0.462	0.0500
16-07654-6-G1	Glass Wool	S16T026836	Mercury	ug/sample	102	<0.0500	<0.0500	0.0500
16-07654-6-G2	Total	S16T026837	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07654-6-G2	Resin	S16T026838	Mercury	ug/sample	102	<0.0500	<0.0500	0.0500
16-07654-6-G2	Glass Wool	S16T026839	Mercury	ug/sample	102	<0.0500	<0.0500	0.0500
16-07654-6-H1	Total	S16T026840	Mercury	ug/sample	n/a	<0.0500	0.541	0.0500
16-07654-6-H1	Resin	S16T026841	Mercury	ug/sample	102	<0.0500	0.536	0.0500
16-07654-6-H1	Glass Wool	S16T026842	Mercury	ug/sample	102	<0.0500	<0.0500	0.0500
16-07654-6-H2	Total	S16T026843	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07654-6-H2	Resin	S16T026844	Mercury	ug/sample	102	<0.0500	<0.0500	0.0500
16-07654-6-H2	Glass Wool	S16T026845	Mercury	ug/sample	102	<0.0500	<0.0500	0.0500
16-07654-6-IN-BASE	Total	S16T026846	Mercury	ug/sample	n/a	<0.0500	<0.0500	0.0500
16-07654-6-IN-BASE	Resin	S16T026847	Mercury	ug/sample	102	<0.0500	<0.0500	0.0500
16-07654-6-IN-BASE	Glass Wool	S16T026848	Mercury	ug/sample	102	<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 20162509

Laboratory Sample ID	Customer Sample ID	Method	Preparation Date	Analysis Date
S16T026684	16-07645-6-A1	Mercury	08/30/2016 07:35	08/30/2016 11:04
S16T026685	16-07645-6-A1	Mercury	08/30/2016 07:35	08/30/2016 11:06
S16T026687	16-07645-6-A2	Mercury	08/30/2016 07:35	08/30/2016 11:07
S16T026688	16-07645-6-A2	Mercury	08/30/2016 07:35	08/30/2016 11:09
S16T026690	16-07645-6-B1	Mercury	08/30/2016 07:35	08/30/2016 11:11
S16T026691	16-07645-6-B1	Mercury	08/30/2016 07:35	08/30/2016 11:13
S16T026693	16-07645-6-B2	Mercury	08/30/2016 07:35	08/30/2016 11:18
S16T026694	16-07645-6-B2	Mercury	08/30/2016 07:35	08/30/2016 11:20
S16T026696	16-07645-6-BLANK	Mercury	08/30/2016 07:35	08/30/2016 11:21
S16T026697	16-07645-6-BLANK	Mercury	08/30/2016 07:35	08/30/2016 11:23
S16T026699	16-07645-6-BLANK2	Mercury	08/30/2016 07:35	08/30/2016 11:24
S16T026700	16-07645-6-BLANK2	Mercury	08/30/2016 07:35	08/30/2016 11:26
S16T026702	16-07645-6-C1	Mercury	08/30/2016 07:35	08/30/2016 11:27
S16T026703	16-07645-6-C1	Mercury	08/30/2016 07:35	08/30/2016 11:29
S16T026705	16-07645-6-C2	Mercury	08/30/2016 07:35	08/30/2016 11:31
S16T026706	16-07645-6-C2	Mercury	08/30/2016 07:35	08/30/2016 11:33
S16T026708	16-07645-6-D1	Mercury	08/30/2016 07:35	08/30/2016 11:38
S16T026709	16-07645-6-D1	Mercury	08/30/2016 07:35	08/30/2016 11:39
S16T026711	16-07645-6-D2	Mercury	08/30/2016 07:35	08/30/2016 11:41
S16T026712	16-07645-6-D2	Mercury	08/30/2016 07:35	08/30/2016 11:43
S16T026714	16-07645-6-E1	Mercury	08/30/2016 07:35	08/30/2016 11:50
S16T026715	16-07645-6-E1	Mercury	08/30/2016 07:35	08/30/2016 11:52
S16T026717	16-07645-6-E2	Mercury	08/30/2016 07:35	08/30/2016 11:57
S16T026718	16-07645-6-E2	Mercury	08/30/2016 07:35	08/30/2016 11:59
S16T026726	16-07645-6-EFF-BASE	Mercury	08/30/2016 07:35	08/30/2016 12:00
S16T026727	16-07645-6-EFF-BASE	Mercury	08/30/2016 07:35	08/30/2016 12:02
S16T026730	16-07645-6-F1	Mercury	08/30/2016 07:35	08/30/2016 12:03
S16T026731	16-07645-6-F1	Mercury	08/30/2016 07:35	08/30/2016 12:05
S16T026738	16-07645-6-F2	Mercury	08/30/2016 07:35	08/30/2016 12:07
S16T026739	16-07645-6-F2	Mercury	08/30/2016 07:35	08/30/2016 12:09
S16T026741	16-07645-6-G1	Mercury	08/30/2016 07:35	08/30/2016 12:10
S16T026742	16-07645-6-G1	Mercury	08/30/2016 07:35	08/30/2016 12:12
S16T026747	16-07645-6-G2	Mercury	08/30/2016 07:35	08/30/2016 12:17
S16T026748	16-07645-6-G2	Mercury	08/30/2016 07:35	08/30/2016 12:19
S16T026751	16-07645-6-H1	Mercury	08/30/2016 07:35	08/30/2016 12:20
S16T026752	16-07645-6-H1	Mercury	08/30/2016 07:35	08/30/2016 12:22
S16T026756	16-07645-6-H2	Mercury	08/30/2016 07:35	08/30/2016 12:24
S16T026757	16-07645-6-H2	Mercury	08/30/2016 07:35	08/30/2016 12:26
S16T026759	16-07645-6-IN-BASE	Mercury	08/30/2016 07:35	08/30/2016 12:27
S16T026760	16-07645-6-IN-BASE	Mercury	08/30/2016 07:35	08/30/2016 12:29
S16T026778	16-07654-6-A1	Mercury	08/31/2016 07:45	08/31/2016 10:45
S16T026779	16-07654-6-A1	Mercury	08/31/2016 07:45	08/31/2016 10:47
S16T026781	16-07654-6-A2	Mercury	08/31/2016 07:45	08/31/2016 10:48
S16T026782	16-07654-6-A2	Mercury	08/31/2016 07:45	08/31/2016 10:50
S16T026787	16-07654-6-B1	Mercury	08/31/2016 07:45	08/31/2016 10:51
S16T026788	16-07654-6-B1	Mercury	08/31/2016 07:45	08/31/2016 10:53

## ANALYSIS DATE REPORT FOR SAMPLE GROUP 20162509

Laboratory Sample ID	Customer Sample ID	Method	Preparation Date	Analysis Date
S16T026793	16-07654-6-B2	Mercury	08/31/2016 07:45	08/31/2016 10:59
S16T026794	16-07654-6-B2	Mercury	08/31/2016 07:45	08/31/2016 11:00
S16T026796	16-07654-6-BLANK	Mercury	08/31/2016 07:45	08/31/2016 11:02
S16T026797	16-07654-6-BLANK	Mercury	08/31/2016 07:45	08/31/2016 11:04
S16T026805	16-07654-6-BLANK2	Mercury	08/31/2016 07:45	08/31/2016 11:05
S16T026806	16-07654-6-BLANK2	Mercury	08/31/2016 07:45	08/31/2016 11:07
S16T026808	16-07654-6-C1	Mercury	08/31/2016 07:45	08/31/2016 11:08
S16T026809	16-07654-6-C1	Mercury	08/31/2016 07:45	08/31/2016 11:10
S16T026811	16-07654-6-C2	Mercury	08/31/2016 07:45	08/31/2016 11:12
S16T026812	16-07654-6-C2	Mercury	08/31/2016 07:45	08/31/2016 11:14
S16T026814	16-07654-6-D1	Mercury	08/31/2016 07:45	08/31/2016 11:19
S16T026815	16-07654-6-D1	Mercury	08/31/2016 07:45	08/31/2016 11:21
S16T026817	16-07654-6-D2	Mercury	08/31/2016 07:45	08/31/2016 11:22
S16T026818	16-07654-6-D2	Mercury	08/31/2016 07:45	08/31/2016 11:24
S16T026820	16-07654-6-E1	Mercury	08/31/2016 07:45	08/31/2016 11:31
S16T026821	16-07654-6-E1	Mercury	08/31/2016 07:45	08/31/2016 11:33
S16T026823	16-07654-6-E2	Mercury	08/31/2016 07:45	08/31/2016 11:38
S16T026824	16-07654-6-E2	Mercury	08/31/2016 07:45	08/31/2016 11:40
S16T026826	16-07654-6-EFF-BASE	Mercury	08/31/2016 07:45	08/31/2016 11:42
S16T026827	16-07654-6-EFF-BASE	Mercury	08/31/2016 07:45	08/31/2016 11:43
S16T026829	16-07654-6-F1	Mercury	08/31/2016 07:45	08/31/2016 11:45
S16T026830	16-07654-6-F1	Mercury	08/31/2016 07:45	08/31/2016 11:47
S16T026832	16-07654-6-F2	Mercury	08/31/2016 07:45	08/31/2016 11:49
S16T026833	16-07654-6-F2	Mercury	08/31/2016 07:45	08/31/2016 11:50
S16T026835	16-07654-6-G1	Mercury	08/31/2016 07:45	08/31/2016 11:52
S16T026836	16-07654-6-G1	Mercury	08/31/2016 07:45	08/31/2016 11:54
S16T026838	16-07654-6-G2	Mercury	08/31/2016 07:45	08/31/2016 11:59
S16T026839	16-07654-6-G2	Mercury	08/31/2016 07:45	08/31/2016 12:01
S16T026841	16-07654-6-H1	Mercury	08/31/2016 07:45	08/31/2016 12:03
S16T026842	16-07654-6-H1	Mercury	08/31/2016 07:45	08/31/2016 12:04
S16T026844	16-07654-6-H2	Mercury	08/31/2016 07:45	08/31/2016 12:06
S16T026845	16-07654-6-H2	Mercury	08/31/2016 07:45	08/31/2016 12:08
S16T026847	16-07654-6-IN-BASE	Mercury	08/31/2016 07:45	08/31/2016 12:10
S16T026848	16-07654-6-IN-BASE	Mercury	08/31/2016 07:45	08/31/2016 12:12

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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 DG-1
Date Samples Received: <u>8/29/16</u> Total Number of Samples: <u>480</u> Group #: <u>2062509</u>				
Sample Custodian: <u>Dianne Turner</u> IH Technician: _____				
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>4°C</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>yes</u> PC/SC Initials <u>DLX</u> Date <u>8/29/16</u>				
If No, comment on communication and resolution: <u>WRPS SHIP 280</u> <u>CWH</u> <u>8/29/16</u>				
<u>RUN 120</u>				
<u>WHL Run -80 (40NH<sub>3</sub>, 40 Hg)</u>				
<u>40 Acetonitrile</u>				
Number of IH Samples Received: _____				
Aldehyde Screen: <u>40</u>	Amines: <u>40</u>	Ammonia: <u>40</u>	Aromatic HC: _____	Asbestos: _____
Beryllium: _____	Be-Bulk: _____	Be-Filter: _____	Be-Wipe: _____	1,3-Butadiene: <u>30</u>
Formaldehyde: _____	Furans: <u>40</u>	Mercury: <u>40</u>	Methanol: _____	Nitrosamines: <u>40</u>
Nitrous Oxide: _____	Pyridines: <u>40</u>	SVOA: <u>40</u>	VOA: <u>40</u>	Other-IH: _____

A-8005-302 (REV 4)

## INDUSTRIAL HYGIENE CHAIN OF CUSTODY AND LABORATORY REQUEST

Contractor: Washington River Protection Solutions		Date Sampled: 08/26/2016	
CACN: <del>202067</del> 202706 <sup>746</sup> <sub>2-29-16</sub>	COA: CB20	Survey No.: 16-07645 - Respirator Cartridge Testing	
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
SI6T026683 ✓	16-07645-6-A1 / Hydrar (SKC 226-17-1A) SI6T026684 SI6T026685	Hg-Elemental
SI6T026686 ✓	16-07645-6-A2 / Hydrar (SKC 226-17-1A) SI6T026687 SI6T026688	Hg-Elemental
SI6T026689 ✓	16-07645-6-B1 / Hydrar (SKC 226-17-1A) SI6T026690 SI6T026691	Hg-Elemental
SI6T026692 ✓	16-07645-6-B2 / Hydrar (SKC 226-17-1A) SI6T026693 SI6T026694	Hg-Elemental
SI6T026695 ✓	16-07645-6-BLANK / Hydrar (SKC 226-17-1A) SI6T026696 SI6T026697	Hg-Elemental
SI6T026698 ✓	16-07645-6-BLANK2 / Hydrar (SKC 226-17-1A) SI6T026699 SI6T026700	Hg-Elemental
SI6T026701 ✓	16-07645-6-C1 / Hydrar (SKC 226-17-1A) SI6T026702 SI6T026703	Hg-Elemental
SI6T026704 ✓	16-07645-6-C2 / Hydrar (SKC 226-17-1A) SI6T026705 SI6T026706	Hg-Elemental

Special Instructions:

	Signature	Printed Name	Location	Date	Time
Delivered to Storage:	<i>Emmie Wheeler</i>	Emmie Wheeler	8704 HV #104	08-27-2016	0507
Retrieved from Storage:	<i>Dell Spaulding</i>	Dell Spaulding		8-29-16	0820

	Signature	Printed Name	Date	Time
Relinquished By:	<i>Dell Spaulding</i>	Dell Spaulding	8-29-16	1130
Received By:	<i>Leslie Diaz</i>	Leslie Diaz	8/29/16	11:30
Relinquished By:				
Received By:				
Relinquished By:				
Received By:				

Additional Comments:

## INDUSTRIAL HYGIENE CHAIN OF CUSTODY AND LABORATORY REQUEST

Contractor: Washington River Protection Solutions		Date Sampled: 08/26/2016	
CACN: <del>202267</del> 202706 <del>2-29-16</del>	COA: CB20	Survey No.: 16-07645 - Respirator Cartridge Testing	
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	
516T026707 ✓	16-07645-6-D1 / Hydrar (SKC 226-17-1A) 516T026708 516T026709	Hg-Elemental	
516T026710 ✓	16-07645-6-D2 / Hydrar (SKC 226-17-1A) 516T026711 516T026712	Hg-Elemental	
516T026713 ✓	16-07645-6-E1 / Hydrar (SKC 226-17-1A) 516T026714 516T026715	Hg-Elemental	
516T026716 ✓	16-07645-6-E2 / Hydrar (SKC 226-17-1A) 516T026717 516T026718	Hg-Elemental	
516T026725 ✓	16-07645-6-EFF-BASE / Hydrar (SKC 226-17-1A) 516T026726 516T026727	Hg-Elemental	
516T026728 ✓	16-07645-6-F1 / Hydrar (SKC 226-17-1A) 516T026730 516T026731	Hg-Elemental	
516T026739 ✓	16-07645-6-F2 / Hydrar (SKC 226-17-1A) 516T026738 516T026739	Hg-Elemental	
516T026740 ✓	16-07645-6-G1 / Hydrar (SKC 226-17-1A) 516T026741 516T026742	Hg-Elemental	
Special Instructions:			
	Signature	Printed Name	Location
Delivered to Storage:	<i>Erica Wheeler</i>	Erica Wheeler	2704 HV H104
Retrieved from Storage:	<i>Dell Spaulding</i>	Dell Spaulding	8-29-16 0820
	Signature	Printed Name	Date
Relinquished By:	<i>Dell Spaulding</i>	Dell Spaulding	8-29-16
Received By:	<i>L. Shick</i>	L. Shick	8/29/16
Relinquished By:			
Received By:			
Relinquished By:			
Received By:			
Additional Comments:			

## INDUSTRIAL HYGIENE CHAIN OF CUSTODY AND LABORATORY REQUEST

<b>Contractor:</b> Washington River Protection Solutions				<b>Date Sampled:</b> 08/26/2016	
<b>CACN:</b> 202706 <sup>8-27-16</sup>		<b>COA:</b> CB20		<b>Survey No.:</b> 16-07845 - Respirator Cartridge Testing	
<b>Contact Name:</b> Jones, Parker L		<b>Phone:</b> (509)373-4966		<b>Turnaround:</b> N/A	
<b>Return Report To:</b> Caldwell, Joyce A				<b>MSIN:</b> R1-06	<b>Phone:</b> (509)376-0737
<b>Laboratory Log No.</b> <sup>8-28-16</sup>	<b>Sample ID/Type/Description</b>			<b>Required Analysis</b>	
516T026 747 516T026 748 516T026 750 516T026 755 516T026 758	16-07845-6-G2 / Hydrar (SKC 226-17-1A) 516T026 747 516T026 748			Hg-Elemental	
	16-07845-6-H1 / Hydrar (SKC 226-17-1A) 516T026 751 516T026 752			Hg-Elemental	
	16-07845-6-H2 / Hydrar (SKC 226-17-1A) 516T026 756 516T026 757			Hg-Elemental	
	16-07845-6-IN-BASE / Hydrar (SKC 226-17-1A) 516T026 759 516T026 760			Hg-Elemental	
16-07845-7-A1 / CISA (SKC 226-29)			NH3		
16-07845-7-A2 / CISA (SKC 226-29)			NH3		
16-07845-7-B1 / CISA (SKC 226-29)			NH3		
16-07845-7-B2 / CISA (SKC 226-29)			NH3		
<b>Special Instructions:</b>					
	<b>Signature</b>	<b>Printed Name</b>	<b>Location</b>	<b>Date</b>	<b>Time</b>
Delivered to Storage:	<i>Eric Wheeler</i>	Eric Wheeler	2704 HV H104	08-27-2016	0507
Retrieved from Storage:	<i>Dell Spaulding</i>	Dell Spaulding		8-29-16	0820
	<b>Signature</b>	<b>Printed Name</b>	<b>Date</b>	<b>Time</b>	
Relinquished By:	<i>Dell Spaulding</i>	Dell Spaulding	8-29-16	1150	
Received By:	<i>Leshe Diaz</i>	Leshe Diaz	8/29/16	11:30	
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
<b>Additional Comments:</b>					



SWIHD - Chain of Custody

## INDUSTRIAL HYGIENE CHAIN OF CUSTODY AND LABORATORY REQUEST

Contractor: Washington River Protection Solutions				Date Sampled: 08/27/2016	
CACN: 202367 202706 8-29-16		COA: CB20	Survey No.: 16-07854 - Respirator Cartridge Testing		
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	
516T026777	16-07654-6-A1 / Hydrar (SKC 226-17-1A) 516T026778 516T026779			Hg-Elemental	
516T026780	16-07654-6-A2 / Hydrar (SKC 226-17-1A) 516T026781 516T026782			Hg-Elemental	
516T026783	16-07654-6-B1 / Hydrar (SKC 226-17-1A) 516T026787 516T026788			Hg-Elemental	
516T026790	16-07654-6-B2 / Hydrar (SKC 226-17-1A) 516T026793 516T026794			Hg-Elemental	
516T026795	16-07654-6-BLANK / Hydrar (SKC 226-17-1A) 516T026796 516T026797			Hg-Elemental	
516T026802 801	16-07654-6-BLANK2 / Hydrar (SKC 226-17-1A) 516T026805 516T026806			Hg-Elemental	
516T026807	16-07654-6-C1 / Hydrar (SKC 226-17-1A) 516T026808 516T026809			Hg-Elemental	
516T026810	16-07654-6-C2 / Hydrar (SKC 226-17-1A) 516T026811 516T026812			Hg-Elemental	
Special Instructions:					
	Signature	Printed Name	Location	Date	Time
Delivered to Storage:	<i>Eric Wheeler</i>	Eric Wheeler	2704 HV H104	08-28-2016	0405
Retrieved from Storage:	<i>Dell Spaulding</i>	Dell Spaulding		8-29-16	0815
	Signature	Printed Name	Date	Time	
Relinquished By:	<i>Dell Spaulding</i>	Dell Spaulding	8-29-16	1130	
Received By:	<i>Lester Diaz</i>	Lester Diaz	8/29/16	11:30	
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Additional Comments:					



## INDUSTRIAL HYGIENE CHAIN OF CUSTODY AND LABORATORY REQUEST

Contractor: Washington River Protection Solutions				Date Sampled: 08/27/2016	
CACN: <del>202362</del> 202706 8-27-16		COA: CB20	Survey No.: 16-07654 - Respirator Cartridge Testing		
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	
5167026813	16-07654-6-D1 / Hydrar (SKC 226-17-1A) 5167026814 5167026815			Hg-Elemental	
5167026816	16-07654-6-D2 / Hydrar (SKC 226-17-1A) 5167026817 5167026818			Hg-Elemental	
5167026819	16-07654-6-E1 / Hydrar (SKC 226-17-1A) 5167026820 5167026821			Hg-Elemental	
5167026822	16-07654-6-E2 / Hydrar (SKC 226-17-1A) 5167026823 5167026824			Hg-Elemental	
5167026825	16-07654-6-EFF-BASE / Hydrar (SKC 226-17-1A) 5167026826 5167026827			Hg-Elemental	
5167026828	16-07654-6-F1 / Hydrar (SKC 226-17-1A) 5167026829 5167026830			Hg-Elemental	
5167026831	16-07654-6-F2 / Hydrar (SKC 226-17-1A) 5167026832 5167026833			Hg-Elemental	
5167026834	16-07654-6-G1 / Hydrar (SKC 226-17-1A) 5167026835 5167026836			Hg-Elemental	
Special Instructions:					
	Signature	Printed Name	Location	Date	Time
Delivered to Storage:	<i>Enza Wheeler</i>	Enza Wheeler	2704 HV 4104	08-28-2016	0405
Retrieved from Storage:	<i>DeL Spaulding</i>	DeL Spaulding		8-29-16	0815
	Signature	Printed Name	Date	Time	
Relinquished By:	<i>DeL Spaulding</i>	DeL Spaulding	8-29-16	1130	
Received By:	<i>Reshelle Diaz</i>	Reshelle Diaz	8/29/16	11:30	
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Additional Comments:					

## INDUSTRIAL HYGIENE CHAIN OF CUSTODY AND LABORATORY REQUEST

Contractor: Washington River Protection Solutions		Date Sampled: 08/27/2016	
CACN: 202367 202706 8-29-16	COA: CB20	Survey No.: 16-07654 - Respirator Cartridge Testing	
Contact Name: Jones, Parker L.	Phone: (509)373-4968	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
516T026837	16-07654-6-G2 / Hydrar (SKC 226-17-1A) 516T026838 516T026839	Hg-Elemental
516T026840	16-07654-6-H1 / Hydrar (SKC 226-17-1A) 516T026841 516T026842	Hg-Elemental
516T026843	16-07654-6-H2 / Hydrar (SKC 226-17-1A) 516T026844 516T026845	Hg-Elemental
516T026846	16-07654-6-IN-BASE / Hydrar (SKC 226-17-1A) 516T026847 516T026848	Hg-Elemental
	16-07654-7-A1 / CISA (SKC 226-29)	NH3
	16-07654-7-A2 / CISA (SKC 226-29)	NH3
	16-07654-7-B1 / CISA (SKC 226-29)	NH3
	16-07654-7-B2 / CISA (SKC 226-29)	NH3

Special Instructions:

	Signature	Printed Name	Location	Date	Time
Delivered to Storage:	Eric Wheeler	Eric Wheeler	2704 HV H104	08-28-2016	0405
Retrieved from Storage:	DeL Spaulding	DeL Spaulding		8-29-16	0815

	Signature	Printed Name	Date	Time
Relinquished By:	DeL Spaulding	DeL Spaulding	8-29-16	1130
Received By:	Leslie Diaz	Leslie Diaz	8/29/16	11:30
Relinquished By:				
Received By:				
Relinquished By:				
Received By:				

Additional Comments:

### C.3.7 Ammonia

20162508 Rev. 0

## FINAL REPORT ON AMMONIA VAPOR TUBES FOR CARTRIDGE EVALUATION COLLECTED AUGUST 26 – 27, 2016

Document No.: 20162508 Rev. 0

**Michael A. Purcell**  
WAI Hanford Laboratory

**Date Published**  
September 13, 2016



LAB # 184777

Prepared for:


Prepared by:



Joyce A. Caldwell  
Washington River Protection  
Solutions, Inc.  
P.O. Box 850  
Richland, WA 99352  
509-376-0737



WAI Hanford Laboratory  
1955 Jadwin Ave, Suite 330  
Richland, WA 99354  
509-373-3240

September 13, 2016  
Michael A. Purcell, WHL Project Coordinator

## NARRATIVE

**FINAL REPORT ON AMMONIA VAPOR TUBES  
FOR CARTRIDGE EVALUATION  
COLLECTED AUGUST 26 – 27, 2016**

This final report presents the results of forty ammonia vapor tubes received at the 222-S Laboratory on August 29, 2016, in good condition and with adequate paperwork. The samples were logged into sample delivery group 20162508.

**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-533-117, Rev. 3-1

**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 89 - 111%, 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. Twenty-five of the forty ammonia results for sample group 20162508 were above the reporting limit of 10 µg per sample. 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).

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Attachment 1

## DATA SUMMARY REPORT

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## DATA SUMMARY REPORT FOR SAMPLE GROUP 20162508

Customer Sample ID	Vapor Tube Portion	Laboratory Sample ID	Analyte	Result Unit	Standard % Recovery	Blank	Result	Reporting Limit
16-07645-7-A1	Total	S16T026438	Ammonia	µg/sample	n/a	<10.0	276	100
16-07645-7-A1	Front Resin	S16T026439	Ammonia	µg/sample	99.1	<10.0	275	100
16-07645-7-A1	Back Resin	S16T026440	Ammonia	µg/sample	99.1	<10.0	<10.0	10.0
16-07645-7-A2	Total	S16T026441	Ammonia	µg/sample	n/a	<10.0	<10.0	10.0
16-07645-7-A2	Front Resin	S16T026442	Ammonia	µg/sample	99.1	<10.0	<10.0	10.0
16-07645-7-A2	Back Resin	S16T026443	Ammonia	µg/sample	99.1	<10.0	<10.0	10.0
16-07645-7-B1	Total	S16T026444	Ammonia	µg/sample	n/a	<10.0	282	100
16-07645-7-B1	Front Resin	S16T026445	Ammonia	µg/sample	99.1	<10.0	281	100
16-07645-7-B1	Back Resin	S16T026446	Ammonia	µg/sample	99.1	<10.0	<10.0	10.0
16-07645-7-B2	Total	S16T026447	Ammonia	µg/sample	n/a	<10.0	<10.0	10.0
16-07645-7-B2	Front Resin	S16T026448	Ammonia	µg/sample	99.1	<10.0	<10.0	10.0
16-07645-7-B2	Back Resin	S16T026449	Ammonia	µg/sample	99.1	<10.0	<10.0	10.0
16-07645-7-BLANK	Total	S16T026450	Ammonia	µg/sample	n/a	<10.0	<10.0	10.0
16-07645-7-BLANK	Front Resin	S16T026451	Ammonia	µg/sample	99.1	<10.0	<10.0	10.0
16-07645-7-BLANK	Back Resin	S16T026452	Ammonia	µg/sample	99.1	<10.0	<10.0	10.0
16-07645-7-BLANK2	Total	S16T026453	Ammonia	µg/sample	n/a	<10.0	<10.0	10.0
16-07645-7-BLANK2	Front Resin	S16T026454	Ammonia	µg/sample	99.1	<10.0	<10.0	10.0
16-07645-7-BLANK2	Back Resin	S16T026455	Ammonia	µg/sample	99.1	<10.0	<10.0	10.0
16-07645-7-C1	Total	S16T026456	Ammonia	µg/sample	n/a	<10.0	275	100
16-07645-7-C1	Front Resin	S16T026457	Ammonia	µg/sample	99.1	<10.0	274	100
16-07645-7-C1	Back Resin	S16T026458	Ammonia	µg/sample	99.1	<10.0	<10.0	10.0
16-07645-7-C2	Total	S16T026459	Ammonia	µg/sample	n/a	<10.0	<10.0	10.0
16-07645-7-C2	Front Resin	S16T026460	Ammonia	µg/sample	99.1	<10.0	<10.0	10.0
16-07645-7-C2	Back Resin	S16T026461	Ammonia	µg/sample	99.1	<10.0	<10.0	10.0
16-07645-7-D1	Total	S16T026462	Ammonia	µg/sample	n/a	<10.0	290	100
16-07645-7-D1	Front Resin	S16T026469	Ammonia	µg/sample	99.1	<10.0	289	100
16-07645-7-D1	Back Resin	S16T026470	Ammonia	µg/sample	99.1	<10.0	<10.0	10.0
16-07645-7-D2	Total	S16T026471	Ammonia	µg/sample	n/a	<10.0	<10.0	10.0
16-07645-7-D2	Front Resin	S16T026472	Ammonia	µg/sample	101	<10.0	<10.0	10.0
16-07645-7-D2	Back Resin	S16T026473	Ammonia	µg/sample	101	<10.0	<10.0	10.0
16-07645-7-E1	Total	S16T026480	Ammonia	µg/sample	n/a	<10.0	288	100
16-07645-7-E1	Front Resin	S16T026481	Ammonia	µg/sample	101	<10.0	287	100
16-07645-7-E1	Back Resin	S16T026482	Ammonia	µg/sample	101	<10.0	<10.0	10.0
16-07645-7-E2	Total	S16T026493	Ammonia	µg/sample	n/a	<10.0	13.5	10.0
16-07645-7-E2	Front Resin	S16T026527	Ammonia	µg/sample	101	<10.0	12.5	10.0
16-07645-7-E2	Back Resin	S16T026529	Ammonia	µg/sample	101	<10.0	<10.0	10.0
16-07645-7-EFF-BASE	Total	S16T026556	Ammonia	µg/sample	n/a	<10.0	<10.0	10.0
16-07645-7-EFF-BASE	Front Resin	S16T026558	Ammonia	µg/sample	101	<10.0	<10.0	10.0
16-07645-7-EFF-BASE	Back Resin	S16T026559	Ammonia	µg/sample	101	<10.0	<10.0	10.0
16-07645-7-F1	Total	S16T026564	Ammonia	µg/sample	n/a	<10.0	291	100
16-07645-7-F1	Front Resin	S16T026565	Ammonia	µg/sample	101	<10.0	290	100
16-07645-7-F1	Back Resin	S16T026566	Ammonia	µg/sample	101	<10.0	<10.0	10.0
16-07645-7-F2	Total	S16T026567	Ammonia	µg/sample	n/a	<10.0	26.7	10.0
16-07645-7-F2	Front Resin	S16T026568	Ammonia	µg/sample	101	<10.0	25.6	10.0
16-07645-7-F2	Back Resin	S16T026569	Ammonia	µg/sample	101	<10.0	<10.0	10.0
16-07645-7-G1	Total	S16T026594	Ammonia	µg/sample	n/a	<10.0	290	100
16-07645-7-G1	Front Resin	S16T026595	Ammonia	µg/sample	101	<10.0	289	100
16-07645-7-G1	Back Resin	S16T026596	Ammonia	µg/sample	101	<10.0	<10.0	10.0

## DATA SUMMARY REPORT FOR SAMPLE GROUP 20162508

Customer Sample ID	Vapor Tube Portion	Laboratory Sample ID	Analyte	Result Unit	Standard % Recovery	Blank	Result	Reporting Limit
16-07645-7-G2	Total	S16T026597	Ammonia	µg/sample	n/a	<10.0	44.7	10.0
16-07645-7-G2	Front Resin	S16T026598	Ammonia	µg/sample	101	<10.0	43.8	10.0
16-07645-7-G2	Back Resin	S16T026599	Ammonia	µg/sample	101	<10.0	<10.0	10.0
16-07645-7-H1	Total	S16T026600	Ammonia	µg/sample	n/a	<10.0	294	100
16-07645-7-H1	Front Resin	S16T026601	Ammonia	µg/sample	101	<10.0	293	100
16-07645-7-H1	Back Resin	S16T026602	Ammonia	µg/sample	101	<10.0	<10.0	10.0
16-07645-7-H2	Total	S16T026603	Ammonia	µg/sample	n/a	<10.0	56.2	10.0
16-07645-7-H2	Front Resin	S16T026604	Ammonia	µg/sample	97.0	<10.0	55.3	10.0
16-07645-7-H2	Back Resin	S16T026605	Ammonia	µg/sample	97.0	<10.0	<10.0	10.0
16-07645-7-IN-BASE	Total	S16T026606	Ammonia	µg/sample	n/a	<10.0	17.0	10.0
16-07645-7-IN-BASE	Front Resin	S16T026607	Ammonia	µg/sample	97.0	<10.0	16.0	10.0
16-07645-7-IN-BASE	Back Resin	S16T026608	Ammonia	µg/sample	97.0	<10.0	<10.0	10.0
16-07654-7-A1	Total	S16T026677	Ammonia	µg/sample	n/a	<10.0	261	100
16-07654-7-A1	Front Resin	S16T026680	Ammonia	µg/sample	97.0	<10.0	260	100
16-07654-7-A1	Back Resin	S16T026681	Ammonia	µg/sample	97.0	<10.0	<10.0	10.0
16-07654-7-A2	Total	S16T027069	Ammonia	µg/sample	n/a	<10.0	<10.0	10.0
16-07654-7-A2	Front Resin	S16T027070	Ammonia	µg/sample	97.0	<10.0	<10.0	10.0
16-07654-7-A2	Back Resin	S16T027071	Ammonia	µg/sample	97.0	<10.0	<10.0	10.0
16-07654-7-B1	Total	S16T027072	Ammonia	µg/sample	n/a	<10.0	283	100
16-07654-7-B1	Front Resin	S16T027073	Ammonia	µg/sample	97.0	<10.0	282	100
16-07654-7-B1	Back Resin	S16T027074	Ammonia	µg/sample	97.0	<10.0	<10.0	10.0
16-07654-7-B2	Total	S16T027092	Ammonia	µg/sample	n/a	<10.0	<10.0	10.0
16-07654-7-B2	Front Resin	S16T027096	Ammonia	µg/sample	97.0	<10.0	<10.0	10.0
16-07654-7-B2	Back Resin	S16T027097	Ammonia	µg/sample	97.0	<10.0	<10.0	10.0
16-07654-7-BLANK	Total	S16T027098	Ammonia	µg/sample	n/a	<10.0	<10.0	10.0
16-07654-7-BLANK	Front Resin	S16T027099	Ammonia	µg/sample	97.0	<10.0	<10.0	10.0
16-07654-7-BLANK	Back Resin	S16T027100	Ammonia	µg/sample	97.0	<10.0	<10.0	10.0
16-07654-7-BLANK2	Total	S16T027101	Ammonia	µg/sample	n/a	<10.0	<10.0	10.0
16-07654-7-BLANK2	Front Resin	S16T027102	Ammonia	µg/sample	97.0	<10.0	<10.0	10.0
16-07654-7-BLANK2	Back Resin	S16T027103	Ammonia	µg/sample	97.0	<10.0	<10.0	10.0
16-07654-7-C1	Total	S16T027104	Ammonia	µg/sample	n/a	<10.0	274	100
16-07654-7-C1	Front Resin	S16T027105	Ammonia	µg/sample	97.0	<10.0	273	100
16-07654-7-C1	Back Resin	S16T027106	Ammonia	µg/sample	97.0	<10.0	<10.0	10.0
16-07654-7-C2	Total	S16T027107	Ammonia	µg/sample	n/a	<10.0	<10.0	10.0
16-07654-7-C2	Front Resin	S16T027148	Ammonia	µg/sample	97.0	<10.0	<10.0	10.0
16-07654-7-C2	Back Resin	S16T027149	Ammonia	µg/sample	97.0	<10.0	<10.0	10.0
16-07654-7-D1	Total	S16T027150	Ammonia	µg/sample	n/a	<10.0	274	100
16-07654-7-D1	Front Resin	S16T027151	Ammonia	µg/sample	98.6	<10.0	274	100
16-07654-7-D1	Back Resin	S16T027152	Ammonia	µg/sample	98.6	<10.0	<10.0	10.0
16-07654-7-D2	Total	S16T027153	Ammonia	µg/sample	n/a	<10.0	<10.0	10.0
16-07654-7-D2	Front Resin	S16T027154	Ammonia	µg/sample	98.6	<10.0	<10.0	10.0
16-07654-7-D2	Back Resin	S16T027155	Ammonia	µg/sample	98.6	<10.0	<10.0	10.0
16-07654-7-E1	Total	S16T027156	Ammonia	µg/sample	n/a	<10.0	275	100
16-07654-7-E1	Front Resin	S16T027157	Ammonia	µg/sample	98.6	<10.0	274	100
16-07654-7-E1	Back Resin	S16T027158	Ammonia	µg/sample	98.6	<10.0	<10.0	10.0
16-07654-7-E2	Total	S16T027159	Ammonia	µg/sample	n/a	<10.0	<10.0	10.0
16-07654-7-E2	Front Resin	S16T027160	Ammonia	µg/sample	98.6	<10.0	<10.0	10.0
16-07654-7-E2	Back Resin	S16T027161	Ammonia	µg/sample	98.6	<10.0	<10.0	10.0



## DATA SUMMARY REPORT FOR SAMPLE GROUP 20162508

Customer Sample ID	Vapor Tube Portion	Laboratory Sample ID	Analyte	Result Unit	Standard % Recovery	Blank	Result	Reporting Limit
16-07654-7-EFF-BASE	Total	S16T027162	Ammonia	µg/sample	n/a	<10.0	<10.0	10.0
16-07654-7-EFF-BASE	Front Resin	S16T027244	Ammonia	µg/sample	98.6	<10.0	<10.0	10.0
16-07654-7-EFF-BASE	Back Resin	S16T027245	Ammonia	µg/sample	98.6	<10.0	<10.0	10.0
16-07654-7-F1	Total	S16T027246	Ammonia	µg/sample	n/a	<10.0	292	100
16-07654-7-F1	Front Resin	S16T027247	Ammonia	µg/sample	98.6	<10.0	291	100
16-07654-7-F1	Back Resin	S16T027248	Ammonia	µg/sample	98.6	<10.0	<10.0	10.0
16-07654-7-F2	Total	S16T027249	Ammonia	µg/sample	n/a	<10.0	22.4	10.0
16-07654-7-F2	Front Resin	S16T027250	Ammonia	µg/sample	98.6	<10.0	21.5	10.0
16-07654-7-F2	Back Resin	S16T027251	Ammonia	µg/sample	98.6	<10.0	<10.0	10.0
16-07654-7-G1	Total	S16T027252	Ammonia	µg/sample	n/a	<10.0	287	100
16-07654-7-G1	Front Resin	S16T027253	Ammonia	µg/sample	98.6	<10.0	286	100
16-07654-7-G1	Back Resin	S16T027254	Ammonia	µg/sample	98.6	<10.0	<10.0	10.0
16-07654-7-G2	Total	S16T027255	Ammonia	µg/sample	n/a	<10.0	33.9	10.0
16-07654-7-G2	Front Resin	S16T027256	Ammonia	µg/sample	98.6	<10.0	33.1	10.0
16-07654-7-G2	Back Resin	S16T027257	Ammonia	µg/sample	98.6	<10.0	<10.0	10.0
16-07654-7-H1	Total	S16T027258	Ammonia	µg/sample	n/a	<10.0	299	100
16-07654-7-H1	Front Resin	S16T027259	Ammonia	µg/sample	98.5	<10.0	298	100
16-07654-7-H1	Back Resin	S16T027260	Ammonia	µg/sample	98.5	<10.0	<10.0	10.0
16-07654-7-H2	Total	S16T027261	Ammonia	µg/sample	n/a	<10.0	36.9	10.0
16-07654-7-H2	Front Resin	S16T027262	Ammonia	µg/sample	98.5	<10.0	36.0	10.0
16-07654-7-H2	Back Resin	S16T027263	Ammonia	µg/sample	98.5	<10.0	<10.0	10.0
16-07654-7-IN-BASE	Total	S16T027264	Ammonia	µg/sample	n/a	<10.0	15.2	10.0
16-07654-7-IN-BASE	Front Resin	S16T027265	Ammonia	µg/sample	98.5	<10.0	14.2	10.0
16-07654-7-IN-BASE	Back Resin	S16T027266	Ammonia	µg/sample	98.5	<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 20162508

Laboratory Sample ID	Customer Sample ID	Method	Preparation Date	Analysis Date
S16T026439	16-07645-7-A1	Ammonia	08/30/2016 08:15	09/02/2016 13:11
S16T026440	16-07645-7-A1	Ammonia	08/30/2016 08:15	08/30/2016 13:10
S16T026442	16-07645-7-A2	Ammonia	08/30/2016 08:15	08/30/2016 13:28
S16T026443	16-07645-7-A2	Ammonia	08/30/2016 08:15	08/30/2016 13:46
S16T026445	16-07645-7-B1	Ammonia	08/30/2016 08:15	09/02/2016 13:30
S16T026446	16-07645-7-B1	Ammonia	08/30/2016 08:15	08/30/2016 15:16
S16T026448	16-07645-7-B2	Ammonia	08/30/2016 08:15	08/30/2016 15:34
S16T026449	16-07645-7-B2	Ammonia	08/30/2016 08:15	08/30/2016 15:53
S16T026451	16-07645-7-BLANK	Ammonia	08/30/2016 08:15	08/30/2016 16:11
S16T026452	16-07645-7-BLANK	Ammonia	08/30/2016 08:15	08/30/2016 16:29
S16T026454	16-07645-7-BLANK2	Ammonia	08/30/2016 08:15	08/30/2016 16:47
S16T026455	16-07645-7-BLANK2	Ammonia	08/30/2016 08:15	08/30/2016 17:05
S16T026457	16-07645-7-C1	Ammonia	08/30/2016 08:15	09/02/2016 13:48
S16T026458	16-07645-7-C1	Ammonia	08/30/2016 08:15	08/30/2016 17:41
S16T026460	16-07645-7-C2	Ammonia	08/30/2016 08:15	08/30/2016 18:53
S16T026461	16-07645-7-C2	Ammonia	08/30/2016 08:15	08/30/2016 19:12
S16T026469	16-07645-7-D1	Ammonia	08/30/2016 08:15	09/02/2016 14:06
S16T026470	16-07645-7-D1	Ammonia	08/30/2016 08:15	08/30/2016 19:48
S16T026472	16-07645-7-D2	Ammonia	08/30/2016 08:15	08/30/2016 22:12
S16T026473	16-07645-7-D2	Ammonia	08/30/2016 08:15	08/30/2016 22:31
S16T026481	16-07645-7-E1	Ammonia	08/30/2016 08:15	09/02/2016 14:24
S16T026482	16-07645-7-E1	Ammonia	08/30/2016 08:15	08/30/2016 23:07
S16T026527	16-07645-7-E2	Ammonia	08/30/2016 08:15	08/30/2016 23:25
S16T026529	16-07645-7-E2	Ammonia	08/30/2016 08:15	08/30/2016 23:43
S16T026558	16-07645-7-EFF-BASE	Ammonia	08/30/2016 08:15	08/31/2016 00:55
S16T026559	16-07645-7-EFF-BASE	Ammonia	08/30/2016 08:15	08/31/2016 01:13
S16T026565	16-07645-7-F1	Ammonia	08/30/2016 08:15	09/02/2016 14:42
S16T026566	16-07645-7-F1	Ammonia	08/30/2016 08:15	08/31/2016 01:50
S16T026568	16-07645-7-F2	Ammonia	08/30/2016 08:15	08/31/2016 02:08
S16T026569	16-07645-7-F2	Ammonia	08/30/2016 08:15	08/31/2016 02:26
S16T026595	16-07645-7-G1	Ammonia	08/30/2016 08:15	09/02/2016 15:00
S16T026596	16-07645-7-G1	Ammonia	08/30/2016 08:15	08/31/2016 03:02
S16T026598	16-07645-7-G2	Ammonia	08/30/2016 08:15	08/31/2016 03:20
S16T026599	16-07645-7-G2	Ammonia	08/30/2016 08:15	08/31/2016 03:38
S16T026601	16-07645-7-H1	Ammonia	08/30/2016 08:15	09/02/2016 15:18
S16T026602	16-07645-7-H1	Ammonia	08/30/2016 08:15	08/31/2016 05:09
S16T026604	16-07645-7-H2	Ammonia	09/01/2016 09:25	09/01/2016 16:59
S16T026605	16-07645-7-H2	Ammonia	09/01/2016 09:25	09/01/2016 17:18
S16T026607	16-07645-7-IN-BASE	Ammonia	09/01/2016 09:25	09/01/2016 17:36
S16T026608	16-07645-7-IN-BASE	Ammonia	09/01/2016 09:25	09/01/2016 17:54
S16T026680	16-07654-7-A1	Ammonia	09/01/2016 09:25	09/02/2016 10:11
S16T026681	16-07654-7-A1	Ammonia	09/01/2016 09:25	09/01/2016 18:30
S16T027070	16-07654-7-A2	Ammonia	09/01/2016 09:25	09/01/2016 19:42
S16T027071	16-07654-7-A2	Ammonia	09/01/2016 09:25	09/01/2016 20:00
S16T027073	16-07654-7-B1	Ammonia	09/01/2016 09:25	09/02/2016 10:29
S16T027074	16-07654-7-B1	Ammonia	09/01/2016 09:25	09/01/2016 20:37

## ANALYSIS DATE REPORT FOR SAMPLE GROUP 20162508

Laboratory Sample ID	Customer Sample ID	Method	Preparation Date	Analysis Date
S16T027096	16-07654-7-B2	Ammonia	09/01/2016 09:25	09/01/2016 20:55
S16T027097	16-07654-7-B2	Ammonia	09/01/2016 09:25	09/01/2016 21:13
S16T027099	16-07654-7-BLANK	Ammonia	09/01/2016 09:25	09/01/2016 21:31
S16T027100	16-07654-7-BLANK	Ammonia	09/01/2016 09:25	09/01/2016 21:49
S16T027102	16-07654-7-BLANK2	Ammonia	09/01/2016 09:25	09/01/2016 22:07
S16T027103	16-07654-7-BLANK2	Ammonia	09/01/2016 09:25	09/01/2016 22:25
S16T027105	16-07654-7-C1	Ammonia	09/01/2016 09:25	09/02/2016 10:47
S16T027106	16-07654-7-C1	Ammonia	09/01/2016 09:25	09/01/2016 23:56
S16T027148	16-07654-7-C2	Ammonia	09/01/2016 09:25	09/02/2016 00:14
S16T027149	16-07654-7-C2	Ammonia	09/01/2016 09:25	09/02/2016 00:32
S16T027151	16-07654-7-D1	Ammonia	09/01/2016 09:25	09/02/2016 11:05
S16T027152	16-07654-7-D1	Ammonia	09/01/2016 09:25	09/02/2016 03:15
S16T027154	16-07654-7-D2	Ammonia	09/01/2016 09:25	09/02/2016 03:33
S16T027155	16-07654-7-D2	Ammonia	09/01/2016 09:25	09/02/2016 03:51
S16T027157	16-07654-7-E1	Ammonia	09/01/2016 09:25	09/02/2016 11:23
S16T027158	16-07654-7-E1	Ammonia	09/01/2016 09:25	09/02/2016 04:27
S16T027160	16-07654-7-E2	Ammonia	09/01/2016 09:25	09/02/2016 05:39
S16T027161	16-07654-7-E2	Ammonia	09/01/2016 09:25	09/02/2016 05:57
S16T027244	16-07654-7-EFF-BASE	Ammonia	09/01/2016 09:25	09/02/2016 06:15
S16T027245	16-07654-7-EFF-BASE	Ammonia	09/01/2016 09:25	09/02/2016 06:33
S16T027247	16-07654-7-F1	Ammonia	09/01/2016 09:25	09/02/2016 11:41
S16T027248	16-07654-7-F1	Ammonia	09/01/2016 09:25	09/02/2016 07:10
S16T027250	16-07654-7-F2	Ammonia	09/01/2016 09:25	09/02/2016 07:28
S16T027251	16-07654-7-F2	Ammonia	09/01/2016 09:25	09/02/2016 07:46
S16T027253	16-07654-7-G1	Ammonia	09/01/2016 09:25	09/02/2016 11:59
S16T027254	16-07654-7-G1	Ammonia	09/01/2016 09:25	09/02/2016 08:22
S16T027256	16-07654-7-G2	Ammonia	09/01/2016 09:25	09/02/2016 09:34
S16T027257	16-07654-7-G2	Ammonia	09/01/2016 09:25	09/02/2016 09:52
S16T027259	16-07654-7-H1	Ammonia	09/02/2016 09:00	09/03/2016 01:33
S16T027260	16-07654-7-H1	Ammonia	09/02/2016 09:00	09/02/2016 19:13
S16T027262	16-07654-7-H2	Ammonia	09/02/2016 09:00	09/02/2016 19:31
S16T027263	16-07654-7-H2	Ammonia	09/02/2016 09:00	09/02/2016 19:49
S16T027265	16-07654-7-IN-BASE	Ammonia	09/02/2016 09:00	09/02/2016 20:07
S16T027266	16-07654-7-IN-BASE	Ammonia	09/02/2016 09:00	09/02/2016 20:26

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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 DG-1
Date Samples Received: <u>8/29/16</u>		Total Number of Samples: <u>480</u>		Group #: <u>20162508 CE NH3</u>
Sample Custodian: <u>Dianne Turner</u>		IH Technician: _____		
Sample Custodian to Complete:				
Action	Yes	No	N/A	Comments
RSR provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Verify GKI is complete	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> In Project File
Received from an alpha facility?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Contact PC for approval to release
Check that outer custody seal is intact, if present	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Record cooler temperature in centigrade, as appropriate	<u>4°C</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Check if no cooler and/or no ice
Samples are intact and in good condition	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input 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"/>	<input type="checkbox"/>	<input type="checkbox"/>	
• Date and time of sampling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
• Sampling location or origin	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
• Container type, size, and number	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
• Preservatives (if used) noted on the COC/RSA and sample bottles	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Analysis request is clear	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
• Signature of persons relinquishing and receiving samples	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
• Date and/or time of sample custody exchange	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Verify that sample numbers on containers match the COC and/or RSA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Samples stored properly (e.g., refrigeration)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input 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>yes</u> PC/SC initials <u>dux</u> Date <u>8/29/16</u>				
If No, comment on communication and resolution: <u>WRPS SHIP 280</u> <u>RUN 120</u> <u>WHL Run -80 (40NH<sub>3</sub>, 40 Hg)</u> <u>40 Acetonitrile</u>				
Number of IH Samples Received: _____				
Aldehyde Screen: <u>40</u>	Amines: <u>40</u>	Ammonia: <u>40</u>	Aromatic HC: _____	Asbestos: _____
Beryllium: _____	Be-Bulk: _____	Be-Filter: _____	Be-Wipe _____	1,3-Butadiene: <u>70</u>
Formaldehyde: _____	Furans: <u>40</u>	Mercury: <u>40</u>	Methanol: _____	Nitrosamines: <u>40</u>
Nitrous Oxide: _____	Pyridines: <u>40</u>	SVOA: <u>40</u>	VOA: <u>40</u>	Other-IH: _____

A-8005-302 (REV 4)

## INDUSTRIAL HYGIENE CHAIN OF CUSTODY AND LABORATORY REQUEST

Contractor: Washington River Protection Solutions		Date Sampled: 08/26/2016	
CACN: <del>202267</del> 202706 <sup>556</sup> 7-27-16	COA: CB20	Survey No.: 16-07645 - Respirator Cartridge Testing	
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
	16-07645-6-G2 / Hydrar (SKC 226-17-1A) 	Hg-Elemental
	16-07645-6-H1 / Hydrar (SKC 226-17-1A) 	Hg-Elemental
	16-07645-6-H2 / Hydrar (SKC 226-17-1A) 	Hg-Elemental
	16-07645-6-IN-BASE / Hydrar (SKC 226-17-1A) 	Hg-Elemental
5167026438 ✓	16-07645-7-A1 / CISA (SKC 226-29) <i>5167026439</i>  <i>5167026440</i>	NH3
5167026441 ✓	16-07645-7-A2 / CISA (SKC 226-29) <i>5167026442</i>  <i>5167026443</i>	NH3
5167026444 ✓	16-07645-7-B1 / CISA (SKC 226-29) <i>5167026445</i>  <i>5167026446</i>	NH3
5167026447 ✓	16-07645-7-B2 / CISA (SKC 226-29) <i>5167026448</i>  <i>5167026449</i>	NH3

Special Instructions:

	Signature	Printed Name	Location	Date	Time
Delivered to Storage:	<i>Erin Wheeler</i>	Erin Wheeler	2704 HV H104	08-27-2016	0511
Retrieved from Storage:	<i>DeL Spaulding</i>	DeL Spaulding		8-29-16	0837

	Signature	Printed Name	Date	Time
Relinquished By:	<i>DeL Spaulding</i>	DeL Spaulding	8-29-16	1130
Received By:	<i>Leslie DRAE</i>	Leslie DRAE	8/29/16	11:30
Relinquished By:				
Received By:				
Relinquished By:				
Received By:				

Additional Comments:

## INDUSTRIAL HYGIENE CHAIN OF CUSTODY AND LABORATORY REQUEST

Contractor: Washington River Protection Solutions		Date Sampled: 08/26/2016	
CACN: 202267 202706 8-29-16	COA: CB20	Survey No.: 16-07645 - Respirator Cartridge Testing	
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
5167026450 ✓	16-07645-7-BLANK / CISA (SKC 226-29) 5167026451 5167026452	NH3
5167026453 ✓	16-07645-7-BLANK2 / CISA (SKC 226-29) 5167026454 5167026455	NH3
5167026456 ✓	16-07645-7-C1 / CISA (SKC 226-29) 5167026457 5167026458	NH3
5167026459 ✓	16-07645-7-C2 / CISA (SKC 226-29) 5167026460 5167026461	NH3
5167026462 ✓	16-07645-7-D1 / CISA (SKC 226-29) 5167026469 5167026470	NH3
5167026471 ✓	16-07645-7-D2 / CISA (SKC 226-29) 5167026472 5167026473	NH3
5167026480 ✓	16-07645-7-E1 / CISA (SKC 226-29) 5167026481 5167026482	NH3
5167026493 ✓	16-07645-7-E2 / CISA (SKC 226-29) 5167026527 5167026529	NH3

Special Instructions:

	Signature	Printed Name	Location	Date	Time
Delivered to Storage:	Eric Wheeler	Eric Wheeler	3704 HV H104	08-27-2016	0511
Retrieved from Storage:	Dell Spaulding	Dell Spaulding		8-29-16	0837

	Signature	Printed Name	Date	Time
Relinquished By:	Dell Spaulding	Dell Spaulding	8-29-16	1130
Received By:	Leslie Diaz	Leslie Diaz	8/29/16	11:30
Relinquished By:				
Received By:				
Relinquished By:				
Received By:				

Additional Comments:



## INDUSTRIAL HYGIENE CHAIN OF CUSTODY AND LABORATORY REQUEST

Contractor: Washington River Protection Solutions		Date Sampled: 08/26/2016	
CACN: <del>202007</del> 202106 8-29-16	COA: CB20	Survey No.: 16-07645 - Respirator Cartridge Testing	
Contact Name: Jones, Parker L	Phone: (509)373-4968	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
5167026556 ✓	16-07645-7-EFF-BASE / CISA (SKC 226-29) 5167026558 5167026559	NH3
5167026564 ✓	16-07645-7-F1 / CISA (SKC 226-29) 5167026565 5167026566	NH3
5167026567 ✓	16-07645-7-F2 / CISA (SKC 226-29) 5167026568 5167026569	NH3
5167026594 ✓	16-07645-7-G1 / CISA (SKC 226-29) 5167026595 5167026596	NH3
5167026597 ✓	16-07645-7-G2 / CISA (SKC 226-29) 5167026598 5167026599	NH3
5167026600 ✓	16-07645-7-H1 / CISA (SKC 226-29) 5167026601 5167026602	NH3
5167026603 ✓	16-07645-7-H2 / CISA (SKC 226-29) 5167026604 5167026605	NH3
5167026606 ✓	16-07645-7-IN-BASE / CISA (SKC 226-29) 5167026607 5167026608	NH3

Special Instructions:

	Signature	Printed Name	Location	Date	Time
Delivered to Storage:	<i>Eric Wheeler</i>	Eric Wheeler	2704 HV H104	08-27-2016	0511
Retrieved from Storage:	<i>Dell Spaulding</i>	Dell Spaulding		8-29-16	0837

	Signature	Printed Name	Date	Time
Relinquished By:	<i>Dell Spaulding</i>	Dell Spaulding	8-29-16	1130
Received By:	<i>Keslie Diaz</i>	Keslie Diaz	8/29/16	11:30
Relinquished By:				
Received By:				
Relinquished By:				
Received By:				

Additional Comments:

## INDUSTRIAL HYGIENE CHAIN OF CUSTODY AND LABORATORY REQUEST

Contractor: Washington River Protection Solutions		Date Sampled: 08/27/2016	
CACN: 2022067 202106 8-29-16	COA: CB20	Survey No.: 16-07654 - Respirator Cartridge Testing	
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
	16-07654-6-G2 / Hydrar (SKC 226-17-1A) ████████████████████████████████████████	Hg-Elemental
	16-07654-6-H1 / Hydrar (SKC 226-17-1A) ████████████████████████████████████████	Hg-Elemental
	16-07654-6-H2 / Hydrar (SKC 226-17-1A) ████████████████████████████████████████	Hg-Elemental
	16-07654-6-IN-BASE / Hydrar (SKC 226-17-1A) ████████████████████████████████████████	Hg-Elemental
SLW 8/30/16 SL6T0270677 ✓	16-07654-7-A1 / CISA (SKC 226-29) SL6T0270680 ████████████████████████████████████████ SL6T0270681	NH3
SL6T027069 ✓	16-07654-7-A2 / CISA (SKC 226-29) SL6T027070 ████████████████████████████████████████ SL6T027071	NH3
SL6T027072 ✓	16-07654-7-B1 / CISA (SKC 226-29) SL6T027073 ████████████████████████████████████████ SL6T027074	NH3
SL6T027098 ✓	16-07654-7-B2 / CISA (SKC 226-29) SL6T027096 ████████████████████████████████████████ SL6T027097	NH3

Special Instructions:

	Signature	Printed Name	Location	Date	Time
Delivered to Storage:	<i>Eric Wheeler</i>	Eric Wheeler	2704 HV H104	08-28-2016	0401
Retrieved from Storage:	<i>Deil Spaulding</i>	Deil Spaulding		8-29-16	0855

	Signature	Printed Name	Date	Time
Relinquished By:	<i>Deil Spaulding</i>	Deil Spaulding	8-29-16	1130
Received By:	<i>Shana Wokh</i>	Shana Wokh	8-29-16	1130
Relinquished By:				
Received By:				
Relinquished By:				
Received By:				

Additional Comments:

## INDUSTRIAL HYGIENE CHAIN OF CUSTODY AND LABORATORY REQUEST

Contractor: Washington River Protection Solutions				Date Sampled: 08/27/2016	
CAGN: 202267202706 8-27-16		COA: CB20		Survey No.: 16-07654 - Respirator Cartridge Testing	
Contact Name: Jones, Parker L		Phone: (509)373-4968		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	
5167027098 ✓	16-07654-7-BLANK / CISA (SKC 226-29) ; 5167027099 5167027100			NH3	
5167027101 ✓	16-07654-7-BLANK2 / CISA (SKC 226-29) ; 5167027102 5167027103			NH3	
5167027104 ✓	16-07654-7-C1 / CISA (SKC 226-29) ; 5167027105 5167027106			NH3	
5167027107 ✓	16-07654-7-C2 / CISA (SKC 226-29) ; 5167027148 5167027149			NH3	
5167027150 ✓	16-07654-7-D1 / CISA (SKC 226-29) ; 5167027151 5167027152 SLH 8-30-16			NH3	
5167027153 ✓ SLH 8-30-16 5167027154 5167027155 SLH 8-30-16	16-07654-7-D2 / CISA (SKC 226-29) ; 5167027153 154 5167027154 155 SLH 8-30-16			NH3	
5167027156 ✓	16-07654-7-E1 / CISA (SKC 226-29) ; 5167027157 5167027158			NH3	
5167027159 ✓	16-07654-7-E2 / CISA (SKC 226-29) ; 5167027160 5167027161			NH3	
Special Instructions:					
	Signature	Printed Name	Location	Date	Time
Delivered to Storage:	Erica Wheeler	Erica Wheeler	2704 HV #104	08-28-2016	0401
Retrieved from Storage:	Deell Spaulding	Deell Spaulding		8-29-16	0855
	Signature	Printed Name	Date	Time	
Relinquished By:	Deell Spaulding	Deell Spaulding	8-29-16	1130	
Received By:	Sharon L Holden	Sharon L Holden	8-29-16	1130	
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: 08/27/2016		
CACN: <del>202067</del> 202706 <sup>74</sup>		COA: CB20	Survey No.: 16-07654 - Respirator Cartridge Testing		
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			
516T027162 ✓	16-07654-7-EFF-BASE / CISA (SKC 226-29) • 516T027244 516T027245	NH3			
516T027246 ✓	16-07654-7-F1 / CISA (SKC 226-29) • 516T027247 516T027248	NH3			
516T027249 ✓	16-07654-7-F2 / CISA (SKC 226-29) • 516T027250 516T027251	NH3			
516T027252 ✓	16-07654-7-G1 / CISA (SKC 226-29) • 516T027253 516T027254	NH3			
516T027255 ✓	16-07654-7-G2 / CISA (SKC 226-29) • 516T027256 516T027257	NH3			
516T027258 ✓	16-07654-7-H1 / CISA (SKC 226-29) • 516T027259 516T027260	NH3			
516T027261 ✓	16-07654-7-H2 / CISA (SKC 226-29) • 516T027262 516T027263	NH3			
516T027264 ✓	16-07654-7-IN-BASE / CISA (SKC 226-29) • 516T027265 516T027266	NH3			
Special Instructions:					
	Signature	Printed Name	Location	Date	Time
Delivered to Storage:	<i>Eric Wheeler</i>	Eric Wheeler	2704 HV H104	08-28-2016	0401
Retrieved from Storage:	<i>Dell Spaulding</i>	Dell Spaulding		8-29-16	0855
	Signature	Printed Name	Date	Time	
Relinquished By:	<i>Dell Spaulding</i>	Dell Spaulding	8-29-16	1130	
Received By:	<i>Sharon Holden</i>	Sharon Holden	8-29-16	1130	
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Additional Comments:					

## C.3.8 Aldehydes



### ANALYTICAL REPORT

Report Date: September 09, 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

Workorder: 34-1624553

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

#### Analytical Results

Sample ID: S16T027049		Collected: 08/26/2016		
Lab ID: 1624553001		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Sampling Location: CARTRIDGE EVALUATION				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Formaldehyde	0.13	NA	NA	0.050
Acetaldehyde	0.58	NA	NA	0.050
Acetone	3.6	NA	NA	0.050
Acrolein	<0.050	NA	NA	0.050
Propionaldehyde	0.083	NA	NA	0.050
Crotonaldehyde	<0.050	NA	NA	0.050
Butyraldehyde	0.14	NA	NA	0.050
Benzaldehyde	0.080	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	0.15	NA	NA	0.050
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050

Sample ID: S16T027050		Collected: 08/26/2016		
Lab ID: 1624553002		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Sampling Location: CARTRIDGE EVALUATION				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Formaldehyde	0.076	NA	NA	0.050
Acetaldehyde	0.18	NA	NA	0.050

Results Continued on Next Page

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## ANALYTICAL REPORT

Workorder: 34-1624553

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027050		Collected: 08/26/2016		
Lab ID: 1624553002		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Acetone	0.44	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: S16T027051		Collected: 08/26/2016		
Lab ID: 1624553003		Sampling Location: CARTRIDGE EVALUATION		Received: 09/01/2016
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		Analyzed: 09/06/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Formaldehyde	0.12	NA	NA	0.050
Acetaldehyde	0.53	NA	NA	0.050
Acetone	2.9	NA	NA	0.050
Acrolein	<0.050	NA	NA	0.050
Propionaldehyde	0.082	NA	NA	0.050
Crotonaldehyde	<0.050	NA	NA	0.050
Butyraldehyde	0.11	NA	NA	0.050
Benzaldehyde	0.062	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	0.15	NA	NA	0.050
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050



## ANALYTICAL REPORT

Workorder: **34-1624553**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027052		Collected: 08/26/2016		
Lab ID: 1624553004		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Formaldehyde	0.079	NA	NA	0.050
Acetaldehyde	0.36	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: S16T027053		Collected: 08/26/2016		
Lab ID: 1624553005		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/06/2016		
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	<0.050	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
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: 34-1624553

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027053		Collected: 08/26/2016		
Lab ID: 1624553005		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050

Sample ID: S16T027054		Collected: 08/26/2016		
Lab ID: 1624553006		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/06/2016		
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	<0.050	NA	NA	0.050
Acetone	0.088	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: S16T027055		Collected: 08/26/2016		
Lab ID: 1624553007		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Formaldehyde	0.14	NA	NA	0.050
Acetaldehyde	0.54	NA	NA	0.050
Acetone	2.9	NA	NA	0.050
Acrolein	<0.050	NA	NA	0.050
Propionaldehyde	0.079	NA	NA	0.050

Results Continued on Next Page





## ANALYTICAL REPORT

Workorder: 34-1624553

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027055		Collected: 08/26/2016		
Lab ID: 1624553007		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
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	0.14	NA	NA	0.050
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050

Sample ID: S16T027056		Collected: 08/26/2016		
Lab ID: 1624553008		Sampling Location: CARTRIDGE EVALUATION		Received: 09/01/2016
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		Analyzed: 09/06/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Formaldehyde	0.087	NA	NA	0.050
Acetaldehyde	0.35	NA	NA	0.050
Acetone	0.070	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



## ANALYTICAL REPORT

Workorder: 34-1624553

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027057		Collected: 08/26/2016		
Lab ID: 1624553009		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Formaldehyde	0.11	NA	NA	0.050
Acetaldehyde	0.50	NA	NA	0.050
Acetone	2.9	NA	NA	0.050
Acrolein	<0.050	NA	NA	0.050
Propionaldehyde	0.076	NA	NA	0.050
Crotonaldehyde	<0.050	NA	NA	0.050
Butyraldehyde	0.11	NA	NA	0.050
Benzaldehyde	<0.050	NA	NA	0.050
Isovaleraldehyde	0.051	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	0.13	NA	NA	0.050
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050

Sample ID: S16T027058		Collected: 08/26/2016		
Lab ID: 1624553010		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/06/2016		
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	0.20	NA	NA	0.050
Acetone	0.074	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: 34-1624553

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027058		Collected: 08/26/2016		
Lab ID: 1624553010		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050

Sample ID: S16T027059		Collected: 08/26/2016		
Lab ID: 1624553011		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Formaldehyde	0.090	NA	NA	0.050
Acetaldehyde	0.48	NA	NA	0.050
Acetone	3.0	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: S16T027060		Collected: 08/26/2016		
Lab ID: 1624553012		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/06/2016		
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	0.34	NA	NA	0.050
Acetone	0.082	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: 34-1624553

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027060		Collected: 08/26/2016		
Lab ID: 1624553012		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
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: S16T027061		Collected: 08/26/2016		
Lab ID: 1624553013		Sampling Location: CARTRIDGE EVALUATION		Received: 09/01/2016
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		Analyzed: 09/06/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Formaldehyde	0.080	NA	NA	0.050
Acetaldehyde	0.13	NA	NA	0.050
Acetone	0.59	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



## ANALYTICAL REPORT

Workorder: 34-1624553

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027062		Collected: 08/26/2016		
Lab ID: 1624553014		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Formaldehyde	0.083	NA	NA	0.050
Acetaldehyde	0.49	NA	NA	0.050
Acetone	2.9	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	0.090	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: S16T027063		Collected: 08/26/2016		
Lab ID: 1624553015		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Formaldehyde	0.051	NA	NA	0.050
Acetaldehyde	0.30	NA	NA	0.050
Acetone	0.22	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: 34-1624553

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027063		Collected: 08/26/2016		
Lab ID: 1624553015		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050

Sample ID: S16T027064		Collected: 08/26/2016		
Lab ID: 1624553016		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Formaldehyde	0.067	NA	NA	0.050
Acetaldehyde	0.47	NA	NA	0.050
Acetone	2.8	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	0.089	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: S16T027065		Collected: 08/26/2016		
Lab ID: 1624553017		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/06/2016		
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	0.30	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: 34-1624553

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027065		Collected: 08/26/2016		
Lab ID: 1624553017		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
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: S16T027066		Collected: 08/26/2016		
Lab ID: 1624553018		Sampling Location: CARTRIDGE EVALUATION		Received: 09/01/2016
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		Analyzed: 09/06/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Formaldehyde	0.091	NA	NA	0.050
Acetaldehyde	0.48	NA	NA	0.050
Acetone	3.1	NA	NA	0.050
Acrolein	<0.050	NA	NA	0.050
Propionaldehyde	0.052	NA	NA	0.050
Crotonaldehyde	<0.050	NA	NA	0.050
Butyraldehyde	0.12	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	0.059	NA	NA	0.050
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050



## ANALYTICAL REPORT

Workorder: **34-1624553**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027067		Collected: 08/26/2016		
Lab ID: 1624553019		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Formaldehyde	<0.050	NA	NA	0.050
Acetaldehyde	0.31	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: <b>S16T027068</b>		Collected: 08/26/2016		
Lab ID: 1624553020		Received: 09/01/2016		
Method: <b>EPA TO-11A</b>		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/06/2016		
Sampling Parameter: <b>Air Volume Not Provided</b>				
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Formaldehyde	0.19	NA	NA	0.050
Acetaldehyde	0.22	NA	NA	0.050
Acetone	0.70	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	0.14	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	0.22	NA	NA	0.050

Results Continued on Next Page





## ANALYTICAL REPORT

Workorder: **34-1624553**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027068		Collected: 08/26/2016	
Lab ID: 1624553020		Received: 09/01/2016	
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)
2,5-Dimethylbenzaldehyde	<0.050	NA	NA
			RL (ug/sample)
			0.050

### Comments

Quality Control: EPA TO-11A - (HBN: 176003)

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/ Emilie Pratt 09/08/2016 13:33	/S/ Christopher Winter 09/09/2016 15:43

### Laboratory Contact Information

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

Phone: (801) 266-7700  
Email: [alst.lab@ALSGlobal.com](mailto:alst.lab@ALSGlobal.com)  
Web: [www.alsslc.com](http://www.alsslc.com)



## ANALYTICAL REPORT

Workorder: **34-1624553**

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	ANAB (DoD ELAP)	ADE-1420	<a href="http://www.anab.org/accredited-organizations/">http://www.anab.org/accredited-organizations/</a>
	Utah (NELAC)	DATA 1	<a href="http://health.utah.gov/lab/labimp/">http://health.utah.gov/lab/labimp/</a>
	Nevada	UT00009	<a href="http://ndep.nv.gov/bsdwl/labservice.htm">http://ndep.nv.gov/bsdwl/labservice.htm</a>
	Oklahoma	UT00009	<a href="http://www.deq.state.ok.us/CSDnew/">http://www.deq.state.ok.us/CSDnew/</a>
	Iowa	IA# 376	<a href="http://www.iowadnr.gov/insideDNR/RegulatoryWater.aspx">http://www.iowadnr.gov/insideDNR/RegulatoryWater.aspx</a>
	Texas (TNI)	T 104704456-11-1	<a href="http://www.tceq.texas.gov/field/qalab_accred_certif.html">http://www.tceq.texas.gov/field/qalab_accred_certif.html</a>
	Washington	C596-16	<a href="http://www.ecy.wa.gov/programs/eap/labs/index.html">http://www.ecy.wa.gov/programs/eap/labs/index.html</a>
	Kansas	E-10416	<a href="http://www.kdheks.gov/lipo/index.html">http://www.kdheks.gov/lipo/index.html</a>
Industrial Hygiene	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
	Washington	C596-16	<a href="http://www.ecy.wa.gov/programs/eap/labs/index.html">http://www.ecy.wa.gov/programs/eap/labs/index.html</a>
Lead Testing:			
CPSC	ANAB (ISO 17025, CPSC)	ADE-1420	<a href="http://www.anab.org/accredited-organizations/">http://www.anab.org/accredited-organizations/</a>
Soil, Dust, Paint, Air	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
Dietary Supplements	ACLASS (ISO 17025)	ADE-1420	<a href="http://www.aiclasscorp.com">http://www.aiclasscorp.com</a>

### 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: 1624553**

Limits: Historical/Performance

Basis: ALS Laboratory Group

Preparation: NA

Batch: NA

Prepared By: NA

Analysis: EPA TO-11A

Batch: ILC/12580 (HBN: 176003)

Analyzed By: Emilie Pratt

### Blank

LMB: 516491			
Analyzed: 09/06/2016 00:00			
Units: ug/sample			
Analyte	Result	MDL	RL
Formaldehyde	ND	NA	0.0500
Acetaldehyde	ND	NA	0.0500
Acetone	0.175	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

### Laboratory Control Sample - Laboratory Control Sample Duplicate

LCS: 516492						LCSD: 516493				
Analyzed: 09/06/2016 00:00						Analyzed: 09/06/2016 00:00				
Dilution: 1						Dilution: 1				
Units: ug/sample						Units: ug/sample				
Analyte	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Formaldehyde	2.84	3.00	94.7	87.8	116.8	2.89	96.3	1.75	0.0	20.0
Acetaldehyde	2.92	3.00	97.3	94.7	110.5	2.95	98.3	1.02	0.0	20.0
Acetone	2.61	3.00	87.0	69.2	119.9	2.65	88.2	1.33	0.0	20.0
Acrolein	2.79	3.00	93.0	83.5	120.2	2.86	95.3	2.48	0.0	20.0
Propionaldehyde	2.98	3.00	99.3	92.2	117.2	3.05	102	2.32	0.0	20.0
Crotonaldehyde	2.86	3.00	95.3	93.1	114.8	2.87	95.7	0.349	0.0	20.0
Butyraldehyde	2.94	3.00	98.0	86.6	120.8	2.95	98.3	0.340	0.0	20.0
Benzaldehyde	2.91	3.00	97.0	96.0	112.3	2.94	98.0	1.03	0.0	20.0
Isovaleraldehyde	2.99	3.00	99.7	95.4	121.6	3.00	100	0.301	0.0	20.0
Valeraldehyde	2.84	3.00	94.7	85.3	120.4	2.90	96.7	2.09	0.0	20.0
m-Tolualdehyde	3.09	3.00	103	80.9	118.6	3.24	108	4.74	0.0	20.0
p-Tolualdehyde	2.57	3.00	85.7	83.5	122.2	2.65	88.3	3.07	0.0	20.0
o-Tolualdehyde	2.77	3.00	92.3	91.6	111.4	2.81	93.7	1.43	0.0	20.0
Hexanal	2.80	3.00	93.3	85.4	127.6	2.81	93.7	0.357	0.0	20.0
2,5-Dimethylbenzaldehyde	3.00	3.00	99.9	99.6	118.7	3.10	103	3.41	0.0	20.0



## Quality Control Sample Batch Report

### Analysis Information

Workorder: 1624553

Limits: Historical/Performance

Basis: ALS Laboratory Group

Preparation: NA

Batch: NA

Prepared By: NA

Analysis: EPA TO-11A

Batch: ILC/12580 (HBN: 176003)

Analyzed By: Emilie Pratt

### Comments

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

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

Analyst	Peer Review
/S/ Emilie Pratt 09/08/2016 13:33	/S/ Christopher Winter 09/09/2016 15:43

### 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



1624553

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST										
Assembler N/A		C.O.C. No. 20162531 Page 1 of 2								
Collector Jones		Telephone No. 373-6861 MSIN 76-05 FAX 372-1878								
SAF No.		Purchase Order/Charge Code 202706/020								
Project Title CORROSION EVALUATION		Ice Chest No. 475-033 ON INE								
Shipped To (Lab)		Bill of Lading/Air Bill No. 8399 0424 0140								
Protocol N/A		Parts and Return No. 41238								
Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis					Preservative
1	S16T027049	VA 8/26/16		SILICA GEL	Aldehyde 16-07645-8-A1					25C or 10w
2	S16T027050	VA 8/26/16		SILICA GEL	Aldehyde 16-07645-8-A2					25C or 10w
3	S16T027051	VA 8/26/16		SILICA GEL	Aldehyde 16-07645-8-B1					25C or 10w
4	S16T027052	VA 8/26/16		SILICA GEL	Aldehyde 16-07645-8-B2					25C or 10w
5	S16T027053	VA 8/26/16		SILICA GEL	Aldehyde 16-07645-8-BLANK					25C or 10w
6	S16T027054	VA 8/26/16		SILICA GEL	Aldehyde 16-07645-8-BLANK2					25C or 10w
7	S16T027055	VA 8/26/16		SILICA GEL	Aldehyde 16-07645-8-C1					25C or 10w
8	S16T027056	VA 8/26/16		SILICA GEL	Aldehyde 16-07645-8-C2					25C or 10w
9	S16T027057	VA 8/26/16		SILICA GEL	Aldehyde 16-07645-8-D1					25C or 10w
10	S16T027058	VA 8/26/16		SILICA GEL	Aldehyde 16-07645-8-D2					25C or 10w
POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes) MSDS <input type="radio"/> Yes <input checked="" type="radio"/> No EPA 70-11A SPECIAL INSTRUCTIONS Send Results to Carl Howard IV and Greg Howard Carl H. Howard@sl.gov and Gregory S. Moore@sl.gov see 90% for email Release 9 Reference Contract # 55502 NIOSH 2016 W02										
Relinquished By	Print	Sign	Date/Time	Received By	Sign	Date/Time	Matrix			
Sharon White			8/31/16 0900	WRPS	Jules Graham	8/31/16 0900	S = Soil	DL = Drum Liquids		
Relinquished By	Print	Sign	Date/Time	Received By	Sign	Date/Time	SE = Sediment	T = Tissue		
WRPS			8/31/16 1400	WRPS	Jules Graham	8/31/16 1400	SO = Solid	WM = Wipe		
Relinquished By	Print	Sign	Date/Time	Received By	Sign	Date/Time	SL = Sludge	L = Liquid		
WRPS			8/31/16 1400	WRPS	Jules Graham	8/31/16 1400	W = Water	V = Vegetation		
Relinquished By	Print	Sign	Date/Time	Received By	Sign	Date/Time	O = Oil	VA = Vapor		
WRPS			8/31/16 1400	WRPS	Jules Graham	8/31/16 1400	A = Air	X = Other		
Relinquished By	Print	Sign	Date/Time	Received By	Sign	Date/Time	DS = Drum Solids			
WRPS			8/31/16 1400	WRPS	Jules Graham	8/31/16 1400				
Disposal Method (e.g., Return to customer, per lab procedures used in process)							Date/Time			
Final Sample Disposition							9/2/16 15:45			

A-6003-562 (03/05)





## ANALYTICAL REPORT

Report Date: September 09, 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

Workorder: 34-1624554

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027075		Collected: 08/27/2016		
Lab ID: 1624554001		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		Analyzed: 09/08/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Formaldehyde	0.21	NA	NA	0.050
Acetaldehyde	0.57	NA	NA	0.050
Acetone	2.9	NA	NA	0.050
Acrolein	<0.050	NA	NA	0.050
Propionaldehyde	0.094	NA	NA	0.050
Crotonaldehyde	<0.050	NA	NA	0.050
Butyraldehyde	0.13	NA	NA	0.050
Benzaldehyde	<0.050	NA	NA	0.050
Isovaleraldehyde	<0.050	NA	NA	0.050
Valeraldehyde	0.11	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	0.46	NA	NA	0.050
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050

Sample ID: S16T027076		Collected: 08/27/2016		
Lab ID: 1624554002		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/08/2016		
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Formaldehyde	0.083	NA	NA	0.050
Acetaldehyde	0.22	NA	NA	0.050

Results Continued on Next Page

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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## ANALYTICAL REPORT

Workorder: **34-1624554**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027076		Collected: 08/27/2016		
Lab ID: 1624554002		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/08/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
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: <b>S16T027077</b>		Collected: <b>08/27/2016</b>		
Lab ID: 1624554003		Received: <b>09/01/2016</b>		
Method: <b>EPA TO-11A</b>		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: <b>09/08/2016</b>		
Sampling Parameter: <b>Air Volume Not Provided</b>				
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Formaldehyde	0.13	NA	NA	0.050
Acetaldehyde	0.51	NA	NA	0.050
Acetone	2.7	NA	NA	0.050
Acrolein	<0.050	NA	NA	0.050
Propionaldehyde	0.097	NA	NA	0.050
Crotonaldehyde	<0.050	NA	NA	0.050
Butyraldehyde	0.077	NA	NA	0.050
Benzaldehyde	<0.050	NA	NA	0.050
Isovaleraldehyde	<0.050	NA	NA	0.050
Valeraldehyde	0.092	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	0.23	NA	NA	0.050
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050





## ANALYTICAL REPORT

Workorder: **34-1624554**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027078		Collected: 08/27/2016		
Lab ID: 1624554004		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/08/2016		
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Formaldehyde	0.076	NA	NA	0.050
Acetaldehyde	0.40	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: <b>S16T027079</b>		Collected: 08/27/2016		
Lab ID: 1624554005		Received: 09/01/2016		
Method: <b>EPA TO-11A</b>		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/08/2016		
Sampling Parameter: <b>Air Volume Not Provided</b>				
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Formaldehyde	0.11	NA	NA	0.050
Acetaldehyde	<0.050	NA	NA	0.050
Acetone	0.64	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: 34-1624554

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027079		Collected: 08/27/2016		
Lab ID: 1624554005		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/08/2016		
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050

Sample ID: S16T027080		Collected: 08/27/2016		
Lab ID: 1624554006		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/08/2016		
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	<0.050	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
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: S16T027081		Collected: 08/27/2016		
Lab ID: 1624554007		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/08/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Formaldehyde	0.24	NA	NA	0.050
Acetaldehyde	0.57	NA	NA	0.050
Acetone	3.3	NA	NA	0.050
Acrolein	<0.050	NA	NA	0.050
Propionaldehyde	0.11	NA	NA	0.050

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## ANALYTICAL REPORT

Workorder: **34-1624554**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: <b>S16T027081</b>		Collected: 08/27/2016		
Lab ID: 1624554007		Received: 09/01/2016		
Sampling Location: CARTRIDGE EVALUATION				
Method: <b>EPA TO-11A</b>		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Sampling Parameter: <b>Air Volume Not Provided</b>		Analyzed: 09/08/2016		
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Crotonaldehyde	<0.050	NA	NA	0.050
Butyraldehyde	<b>0.11</b>	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	<b>0.43</b>	NA	NA	0.050
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050

Sample ID: S16T027082		Collected: 08/27/2016		
Lab ID: 1624554008		Received: 09/01/2016		
Sampling Location: CARTRIDGE EVALUATION				
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		Analyzed: 09/08/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Formaldehyde	0.066	NA	NA	0.050
Acetaldehyde	0.46	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



## ANALYTICAL REPORT

Workorder: **34-1624554**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027083		Collected: 08/27/2016		
Lab ID: 1624554009		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/08/2016		
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Formaldehyde	0.17	NA	NA	0.050
Acetaldehyde	0.48	NA	NA	0.050
Acetone	2.7	NA	NA	0.050
Acrolein	<0.050	NA	NA	0.050
Propionaldehyde	0.091	NA	NA	0.050
Crotonaldehyde	<0.050	NA	NA	0.050
Butyraldehyde	0.12	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	0.25	NA	NA	0.050
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050

Sample ID: S16T027084		Collected: 08/27/2016		
Lab ID: 1624554010		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/08/2016		
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	0.39	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

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## ANALYTICAL REPORT

Workorder: 34-1624554

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027084		Collected: 08/27/2016		
Lab ID: 1624554010		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/08/2016		
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050

Sample ID: S16T027085		Collected: 08/27/2016		
Lab ID: 1624554011		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/08/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Formaldehyde	0.078	NA	NA	0.050
Acetaldehyde	0.46	NA	NA	0.050
Acetone	2.6	NA	NA	0.050
Acrolein	<0.050	NA	NA	0.050
Propionaldehyde	0.071	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	0.15	NA	NA	0.050
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050

Sample ID: S16T027086		Collected: 08/27/2016		
Lab ID: 1624554012		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/08/2016		
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	0.35	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: **34-1624554**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: <b>S16T027086</b>		Collected: 08/27/2016		
Lab ID: 1624554012		Received: 09/01/2016		
Method: <b>EPA TO-11A</b>		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/08/2016		
Sampling Parameter: <b>Air Volume Not Provided</b>				
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
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: S16T027087		Collected: 08/27/2016		
Lab ID: 1624554013		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		Analyzed: 09/08/2016
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Formaldehyde	0.051	NA	NA	0.050
Acetaldehyde	0.12	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



## ANALYTICAL REPORT

Workorder: **34-1624554**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027088		Collected: 08/27/2016		
Lab ID: 1624554014		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/08/2016		
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Formaldehyde	0.064	NA	NA	0.050
Acetaldehyde	0.46	NA	NA	0.050
Acetone	2.6	NA	NA	0.050
Acrolein	<0.050	NA	NA	0.050
Propionaldehyde	0.075	NA	NA	0.050
Crotonaldehyde	<0.050	NA	NA	0.050
Butyraldehyde	0.11	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	0.074	NA	NA	0.050
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050

Sample ID: S16T027089		Collected: 08/27/2016		
Lab ID: 1624554015		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/08/2016		
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	0.37	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

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## ANALYTICAL REPORT

Workorder: 34-1624554

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027089		Collected: 08/27/2016		
Lab ID: 1624554015		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/08/2016		
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
2,5-Dimethylbenzaldehyde	<0.050	NA	NA	0.050

Sample ID: S16T027090		Collected: 08/27/2016		
Lab ID: 1624554016		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/08/2016		
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	0.44	NA	NA	0.050
Acetone	2.5	NA	NA	0.050
Acrolein	<0.050	NA	NA	0.050
Propionaldehyde	0.062	NA	NA	0.050
Crotonaldehyde	<0.050	NA	NA	0.050
Butyraldehyde	0.086	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: S16T027091		Collected: 08/27/2016		
Lab ID: 1624554017		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/08/2016		
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	0.35	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: **34-1624554**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: <b>S16T027091</b>		Collected: 08/27/2016		
Lab ID: 1624554017		Received: 09/01/2016		
Method: <b>EPA TO-11A</b>		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
		Analyzed: 09/08/2016		
Sampling Parameter: <b>Air Volume Not Provided</b>				
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
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: S16T027093		Collected: 08/27/2016		
Lab ID: 1624554018		Sampling Location: CARTRIDGE EVALUATION		Received: 09/01/2016
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		Analyzed: 09/08/2016
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	0.41	NA	NA	0.050
Acetone	2.5	NA	NA	0.050
Acrolein	<0.050	NA	NA	0.050
Propionaldehyde	0.072	NA	NA	0.050
Crotonaldehyde	<0.050	NA	NA	0.050
Butyraldehyde	0.092	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



## ANALYTICAL REPORT

Workorder: **34-1624554**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027094		Collected: 08/27/2016		
Lab ID: 1624554019		Received: 09/01/2016		
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/08/2016		
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Formaldehyde	<0.050	NA	NA	0.050
Acetaldehyde	0.32	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: <b>S16T027095</b>		Collected: <b>08/27/2016</b>		
Lab ID: <b>1624554020</b>		Received: <b>09/01/2016</b>		
Method: <b>EPA TO-11A</b>		Media: <b>SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)</b>		
		Analyzed: <b>09/08/2016</b>		
Sampling Parameter: <b>Air Volume Not Provided</b>				
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Formaldehyde	<b>0.29</b>	NA	NA	0.050
Acetaldehyde	<b>0.20</b>	NA	NA	0.050
Acetone	<b>0.11</b>	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	<b>0.30</b>	NA	NA	0.050

Results Continued on Next Page



## ANALYTICAL REPORT

Workorder: **34-1624554**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027095		Collected: 08/27/2016		
Lab ID: 1624554020		Sampling Location: CARTRIDGE EVALUATION		Received: 09/01/2016
Method: EPA TO-11A		Media: SKC 226-119, Silica Gel (2,4-Dinitrophenylhydrazine)		Analyzed: 09/08/2016
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

### Comments

#### Quality Control: EPA TO-11A - (HBN: 176195)

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

RPD of Acetone outside of limits due to unstable nature of known acetone contamination present with media type (SKC 226-119 DNPH treated silica gel tubes). no further action taken.

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

Method	Analyst	Peer Review
EPA TO-11A	/S/ Emilie Pratt 09/09/2016 12:22	/S/ Christopher Winter 09/09/2016 17:27

### Laboratory Contact Information

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

Phone: (801) 266-7700  
Email: [alstt.lab@ALSGlobal.com](mailto:alstt.lab@ALSGlobal.com)  
Web: [www.alsslc.com](http://www.alsslc.com)



## ANALYTICAL REPORT

Workorder: **34-1624554**

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	ANAB (DoD ELAP)	ADE-1420	<a href="http://www.anab.org/accredited-organizations/">http://www.anab.org/accredited-organizations/</a>
	Utah (NELAC)	DATA 1	<a href="http://health.utah.gov/lab/labimp/">http://health.utah.gov/lab/labimp/</a>
	Nevada	UT00009	<a href="http://ndep.nv.gov/bsdwl/labservice.htm">http://ndep.nv.gov/bsdwl/labservice.htm</a>
	Oklahoma	UT00009	<a href="http://www.deq.state.ok.us/CSDnew/">http://www.deq.state.ok.us/CSDnew/</a>
	Iowa	IA# 376	<a href="http://www.iowadnr.gov/insideDNR/RegulatoryWater.aspx">http://www.iowadnr.gov/insideDNR/RegulatoryWater.aspx</a>
	Texas (TNI)	T 104704456-11-1	<a href="http://www.tceq.texas.gov/field/qalab_accred_certif.html">http://www.tceq.texas.gov/field/qalab_accred_certif.html</a>
	Washington	C596-16	<a href="http://www.ecy.wa.gov/programs/eap/labs/index.html">http://www.ecy.wa.gov/programs/eap/labs/index.html</a>
	Kansas	E-10416	<a href="http://www.kdheks.gov/lipo/index.html">http://www.kdheks.gov/lipo/index.html</a>
Industrial Hygiene	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
	Washington	C596-16	<a href="http://www.ecy.wa.gov/programs/eap/labs/index.html">http://www.ecy.wa.gov/programs/eap/labs/index.html</a>
Lead Testing:			
CPSC	ANAB (ISO 17025, CPSC)	ADE-1420	<a href="http://www.anab.org/accredited-organizations/">http://www.anab.org/accredited-organizations/</a>
Soil, Dust, Paint, Air	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
Dietary Supplements	ACLASS (ISO 17025)	ADE-1420	<a href="http://www.aiclasscorp.com">http://www.aiclasscorp.com</a>

### 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: 1624554**

Limits: Historical/Performance  
Basis: ALS Laboratory Group

Preparation: NA  
Batch: NA  
Prepared By: NA

Analysis: EPA TO-11A  
Batch: ILC/12593 (HBN: 176195)  
Analyzed By: Emilie Pratt

### Blank

LMB: 517045			
Analyzed: 09/08/2016 00:00			
Units: ug/sample			
Analyte	Result	MDL	RL
Formaldehyde	ND	NA	0.0500
Acetaldehyde	ND	NA	0.0500
Acetone	0.331	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

### Laboratory Control Sample - Laboratory Control Sample Duplicate

LCS: 517046					LCSD: 517047			
Analyzed: 09/08/2016 00:00					Analyzed: 09/08/2016 00:00			
Dilution: 1					Dilution: 1			
Units: ug/sample					Units: ug/sample			
Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits
Formaldehyde	2.91	3.00	97.0	87.8 116.8	3.09	103	6.00	0.0 20.0
Acetaldehyde	2.85	3.00	95.0	94.7 110.5	3.05	102	6.78	0.0 20.0
Acetone	2.57	3.00	85.6	69.2 119.9	3.27	109 #	24.0	0.0 20.0
Acrolein	2.92	3.00	97.3	83.5 120.2	2.95	98.3	1.02	0.0 20.0
Propionaldehyde	3.09	3.00	103	92.2 117.2	3.12	104	0.966	0.0 20.0
Crotonaldehyde	2.93	3.00	97.7	93.1 114.8	2.95	98.3	0.680	0.0 20.0
Butyraldehyde	3.14	3.00	105	86.6 120.8	3.03	101	3.57	0.0 20.0
Benzaldehyde	3.04	3.00	101	96.0 112.3	2.90	96.7	4.68	0.0 20.0
Isovaleraldehyde	3.09	3.00	103	95.4 121.6	3.02	101	2.23	0.0 20.0
Valeraldehyde	3.03	3.00	101	85.3 120.4	2.99	99.7	1.20	0.0 20.0
m-Tolualdehyde	3.34	3.00	111	80.9 118.6	3.37	112	0.896	0.0 20.0
p-Tolualdehyde	2.73	3.00	91.1	83.5 122.2	2.63	87.5	4.03	0.0 20.0
o-Tolualdehyde	3.21	3.00	107	91.6 111.4	3.13	104	2.56	0.0 20.0
Hexanal	2.91	3.00	97.0	85.4 127.6	3.35	112	14.1	0.0 20.0
2,5-Dimethylbenzaldehyde	3.07	3.00	102	99.6 118.7	3.26	109	6.00	0.0 20.0



## Quality Control Sample Batch Report

### Analysis Information

Workorder: **1624554**

Limits: Historical/Performance

Basis: ALS Laboratory Group

Preparation: NA

Batch: NA

Prepared By: NA

Analysis: EPA TO-11A

Batch: ILC/12593 (HBN: 176195)

Analyzed By: Emilie Pratt

### Comments

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

RPD of Acetone outside of limits due to unstable nature of known acetone contamination present with media type (SKC 226-119 DNPH treated silica gel tubes). no further action taken.

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

Analyst	Peer Review
/S/ Emilie Pratt 09/09/2016 12:22	/S/ Christopher Winter 09/09/2016 17:27

### 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

A-6003-962 (03/05)

Assembler		C.O.G. No.	
N/A		20162532	
		Page 2 of 2	
Collector		Telephone No. 373-6861	
JONES		MSIN 16-05 FAX 372-1378	
SAF No.		Purchase Order/Charge Code	
N/A		222107/5250	
Project Title		Ice Chest No. <u>WTS-033</u> Temp. <u>ONICE</u>	
CARTRIDGE EVALUATION		Bill of Lading/Air Bill No. <u>8599 0424 OHO</u>	
Shipped To (Lab)		Parts and Return No. <u>41238</u>	
ALS			
Protocol			
N/A			

Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis	Preservative
11	S165027085	VA	8/27/16	SILICA GEL	Aldehyde 16-07654-8-E1	25C or 10w
12	S165027086	VA	8/27/16	SILICA GEL	Aldehyde 16-07654-8-E2	25C or 10w
13	S165027087	VA	8/27/16	SILICA GEL	Aldehyde 16-07654-8-EFF-BASE	25C or 10w
14	S165027088	VA	8/27/16	SILICA GEL	Aldehyde 16-07654-8-E1	25C or 10w
15	S165027089	VA	8/27/16	SILICA GEL	Aldehyde 16-07654-8-E2	25C or 10w
16	S165027090	VA	8/27/16	SILICA GEL	Aldehyde 16-07654-8-E1	25C or 10w
17	S165027091	VA	8/27/16	SILICA GEL	Aldehyde 16-07654-8-E2	25C or 10w
18	S165027093	VA	8/27/16	SILICA GEL	Aldehyde 16-07654-8-E1	25C or 10w
19	S165027094	VA	8/27/16	SILICA GEL	Aldehyde 16-07654-8-E2	25C or 10w
20	S165027095	VA	8/27/16	SILICA GEL	Aldehyde 16-07654-8-IM-BASE	25C or 10w

POSSIBLE SAMPLE HAZARDS/REMARKS (List all brown wastes) MSDS ☐ Yes ☒ No

Send Results to Carl Rowald IV and Greg Moore  
 Carl W Rowald@del-jer and Gregory S Moore@del-jer See SCW for email  
 Release 9  
 Reference Contract # 55502  
 Release 2016 2016 2016

SPECIAL INSTRUCTIONS  
 Hold Time

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix*
Debbie Turner	Debbie Turner	Turner	8/31/16 0900	WRPS	Julia Grady	Grady	8/31/16 0900	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids
Relinquished By	WRPS	Julia Grady	8/31/16 1400	Received By	WRPS	Julia Grady	8/31/16 1400	DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation VA = Vapor X = Other
Relinquished By	WRPS	Julia Grady	8/31/16 1400	Received By	WRPS	Julia Grady	8/31/16 1400	

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)	Date/Time
DT	CONSUMED	8/31/16 1715

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



## C.3.9 1, 3-Butadiene



### ANALYTICAL REPORT

Report Date: September 07, 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

20162538

Workorder: 34-1624557

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

#### Analytical Results

Sample ID: S16T027163		Collected: 08/27/2016		
Lab ID: 1624557001	Sampling Location: CARTRIDGE EVALUATION		Received: 09/01/2016	
Method: NIOSH 1024	Media: SKC 226-37 Sorbent Tube		Analyzed: 09/06/2016	
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027164		Collected: 08/27/2016	
Lab ID: 1624557002	Sampling Location: CARTRIDGE EVALUATION		Received: 09/01/2016
Method: NIOSH 1024	Media: SKC 226-37 Sorbent Tube		Analyzed: 09/06/2016
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm) RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA 0.0010

Sample ID: S16T027165		Collected: 08/27/2016	
Lab ID: 1624557003	Sampling Location: CARTRIDGE EVALUATION		Received: 09/01/2016
Method: NIOSH 1024	Media: SKC 226-37 Sorbent Tube		Analyzed: 09/06/2016
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm) RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA 0.0010

Sample ID: S16T027166		Collected: 08/27/2016		
Lab ID: 1624557004	Sampling Location: CARTRIDGE EVALUATION		Received: 09/01/2016	
Method: NIOSH 1024	Media: SKC 226-37 Sorbent Tube		Analyzed: 09/06/2016	
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

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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www.alsglobal.com

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## ANALYTICAL REPORT

Workorder: 34-1624557

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027167		Collected: 08/27/2016		
Lab ID: 1624557005		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027168		Collected: 08/27/2016		
Lab ID: 1624557006		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027169		Collected: 08/27/2016		
Lab ID: 1624557007		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027170		Collected: 08/27/2016		
Lab ID: 1624557008		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027171		Collected: 08/27/2016		
Lab ID: 1624557009		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010



## ANALYTICAL REPORT

Workorder: 34-1624557

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027172		Collected: 08/27/2016		
Lab ID: 1624557010		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027173		Collected: 08/27/2016		
Lab ID: 1624557011		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027174		Collected: 08/27/2016		
Lab ID: 1624557012		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027175		Collected: 08/27/2016		
Lab ID: 1624557013		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027176		Collected: 08/27/2016		
Lab ID: 1624557014		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010



## ANALYTICAL REPORT

Workorder: 34-1624557

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027177		Collected: 08/27/2016		
Lab ID: 1624557015		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027178		Collected: 08/27/2016		
Lab ID: 1624557016		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027179		Collected: 08/27/2016		
Lab ID: 1624557017		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027180		Collected: 08/27/2016		
Lab ID: 1624557018		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027181		Collected: 08/27/2016		
Lab ID: 1624557019		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010



## ANALYTICAL REPORT

Workorder: 34-1624557

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027182		Collected: 08/27/2016		
Lab ID: 1624557020		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027183		Collected: 08/27/2016		
Lab ID: 1624557021		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027184		Collected: 08/27/2016		
Lab ID: 1624557022		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027185		Collected: 08/27/2016		
Lab ID: 1624557023		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027186		Collected: 08/27/2016		
Lab ID: 1624557024		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010



## ANALYTICAL REPORT

Workorder: 34-1624557

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027187		Collected: 08/27/2016	
Lab ID: 1624557025		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm) RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA 0.0010

Sample ID: S16T027188		Collected: 08/27/2016	
Lab ID: 1624557026		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm) RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA 0.0010

Sample ID: S16T027189		Collected: 08/27/2016	
Lab ID: 1624557027		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm) RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA 0.0010

Sample ID: S16T027190		Collected: 08/27/2016	
Lab ID: 1624557028		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm) RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA 0.0010

Sample ID: S16T027191		Collected: 08/27/2016	
Lab ID: 1624557029		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm) RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA 0.0010



## ANALYTICAL REPORT

Workorder: 34-1624557

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027192		Collected: 08/27/2016		
Lab ID: 1624557030		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027193		Collected: 08/27/2016		
Lab ID: 1624557031		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027194		Collected: 08/27/2016		
Lab ID: 1624557032		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027195		Collected: 08/27/2016		
Lab ID: 1624557033		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027196		Collected: 08/27/2016		
Lab ID: 1624557034		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010



## ANALYTICAL REPORT

Workorder: 34-1624557

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027197		Collected: 08/27/2016		
Lab ID: 1624557035		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027198		Collected: 08/27/2016		
Lab ID: 1624557036		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027199		Collected: 08/27/2016		
Lab ID: 1624557037		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027200		Collected: 08/27/2016		
Lab ID: 1624557038		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027201		Collected: 08/27/2016		
Lab ID: 1624557039		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010





## ANALYTICAL REPORT

Workorder: **34-1624557**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027202		Collected: 08/27/2016		
Lab ID: 1624557040		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m³)	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 09/07/2016 00:36	/S/ Thomas J. Masoian 09/07/2016 08:01

### Laboratory Contact Information

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

Phone: (801) 266-7700  
Email: [alslt.lab@ALSGlobal.com](mailto:alslt.lab@ALSGlobal.com)  
Web: [www.alssl.com](http://www.alssl.com)



## ANALYTICAL REPORT

Workorder: **34-1624557**

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	ANAB (DoD ELAP)	ADE-1420	<a href="http://www.anab.org/accredited-organizations/">http://www.anab.org/accredited-organizations/</a>
	Utah (NELAC)	DATA 1	<a href="http://health.utah.gov/lab/labimp/">http://health.utah.gov/lab/labimp/</a>
	Nevada	UT00009	<a href="http://ndep.nv.gov/bsdwl/labservice.htm">http://ndep.nv.gov/bsdwl/labservice.htm</a>
	Oklahoma	UT00009	<a href="http://www.deq.state.ok.us/CSDnew/">http://www.deq.state.ok.us/CSDnew/</a>
	Iowa	IA# 376	<a href="http://www.iowadnr.gov/insideDNR/RegulatoryWater.aspx">http://www.iowadnr.gov/insideDNR/RegulatoryWater.aspx</a>
	Texas (TNI)	T 104704456-11-1	<a href="http://www.tceq.texas.gov/field/qalab_accred_certif.html">http://www.tceq.texas.gov/field/qalab_accred_certif.html</a>
	Washington	C596-16	<a href="http://www.ecy.wa.gov/programs/eap/labs/index.html">http://www.ecy.wa.gov/programs/eap/labs/index.html</a>
	Kansas	E-10416	<a href="http://www.kdheks.gov/lipo/index.html">http://www.kdheks.gov/lipo/index.html</a>
Industrial Hygiene	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
	Washington	C596-16	<a href="http://www.ecy.wa.gov/programs/eap/labs/index.html">http://www.ecy.wa.gov/programs/eap/labs/index.html</a>
Lead Testing:			
CPSC	ANAB (ISO 17025, CPSC)	ADE-1420	<a href="http://www.anab.org/accredited-organizations/">http://www.anab.org/accredited-organizations/</a>
Soil, Dust, Paint, Air	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
Dietary Supplements	ACLASS (ISO 17025)	ADE-1420	<a href="http://www.aiclasscorp.com">http://www.aiclasscorp.com</a>

### 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: 1624557

Limits: Historical/Performance

Basis: ALS Laboratory Group

Preparation: NA

Batch: NA

Prepared By: NA

Analysis: NIOSH 1024

Batch: IFID/7731 (HBN: 176024)

Analyzed By: Fred Rejali

### Blank

MB: 516537 Analyzed: 09/06/2016 00:00 Units: mg/sample			
Analyte	Result	MDL	RL
1,3-Butadiene	ND	NA	0.00100

MB: 516540 Analyzed: 09/06/2016 00:00 Units: mg/sample			
Analyte	Result	MDL	RL
1,3-Butadiene	ND	NA	0.00100

MB: 516748 Analyzed: 09/06/2016 00:00 Units: mg/sample			
Analyte	Result	MDL	RL
1,3-Butadiene	ND	NA	0.00100

MB: 516751 Analyzed: 09/06/2016 00:00 Units: mg/sample			
Analyte	Result	MDL	RL
1,3-Butadiene	ND	NA	0.00100

MB: 516754 Analyzed: 09/06/2016 00:00 Units: mg/sample			
Analyte	Result	MDL	RL
1,3-Butadiene	ND	NA	0.00100

### Laboratory Control Sample - Laboratory Control Sample Duplicate

LCS: 516538 Analyzed: 09/06/2016 00:00 Dilution: 1 Units: mg/sample					LCSD: 516539 Analyzed: 09/06/2016 00:00 Dilution: 1 Units: mg/sample				
Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
1,3-Butadiene	0.0266	0.0274	97.2	78.0 117.6	0.0281	103	5.48	0.0 20.0	

LCS: 516541 Analyzed: 09/06/2016 00:00 Dilution: 1 Units: mg/sample					LCSD: 516542 Analyzed: 09/06/2016 00:00 Dilution: 1 Units: mg/sample				
Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
1,3-Butadiene	0.0256	0.0239	107	78.0 117.6	0.0228	95.2	11.6	0.0 20.0	



## Quality Control Sample Batch Report

### Analysis Information

Workorder: 1624557

Limits: Historical/Performance  
Basis: ALS Laboratory Group

Preparation: NA  
Batch: NA  
Prepared By: NA

Analysis: NIOSH 1024  
Batch: IFID/7731 (HBN: 176024)  
Analyzed By: Fred Rejali

### Laboratory Control Sample - Laboratory Control Sample Duplicate

LCS: 516749 Analyzed: 09/06/2016 00:00 Dilution: 1 Units: mg/sample					LCSD: 516750 Analyzed: 09/06/2016 00:00 Dilution: 1 Units: mg/sample				
Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
1,3-Butadiene	0.0236	0.0239	98.6	78.0 117.6	0.0254	106	7.35	0.0 20.0	
LCS: 516752 Analyzed: 09/06/2016 00:00 Dilution: 1 Units: mg/sample					LCSD: 516753 Analyzed: 09/06/2016 00:00 Dilution: 1 Units: mg/sample				
Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
1,3-Butadiene	0.0216	0.0239	90.2	78.0 117.6	0.0224	93.6	3.64	0.0 20.0	
LCS: 516755 Analyzed: 09/06/2016 00:00 Dilution: 1 Units: mg/sample					LCSD: 516756 Analyzed: 09/06/2016 00:00 Dilution: 1 Units: mg/sample				
Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
1,3-Butadiene	0.0228	0.0239	95.2	78.0 117.6	0.0215	89.8	5.87	0.0 20.0	

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

Analyst	Peer Review
/S/ Fred Rejali 09/07/2016 00:36	/S/ Thomas J. Masoian 09/07/2016 08:01

### 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



1624557

1624557

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST									
Assembler N/A		C.O.C. No. 20162538 Page 1 of 4							
Collector JONES	Contact/Requestor CARL HOWARD IV	Telephone No. 373-6361		MSNH 16-05 FAX 372-1878					
SAF No. N/A	Sample Origin CARTRIDGE EVALUATION	Purchase Order/Charge Code 202109/0220							
Project Title CARTRIDGE EVALUATION	Logbook/Work Package No. N/A	Ice Chest No. N/A		Temp. N/A					
Shipped To (Lab) AUS	Method of Shipment	Bill of Lading/Air Bill No. 8599 0424 0140							
Protocol N/A	Data Turnaround 10 DAYS	Parts and Return No. 41238							
Sample No.	Lab ID	*	Date	Time	No./Type Container	Sample Analysis		Preservative	
	S167027163	VA	8/27/16		CHARCOAL TUBE	1,3-Butadiene 16-07654-9-A-A1		CHILL -4C	
	S167027164	VA	8/27/16		CHARCOAL TUBE	1,3-Butadiene 16-07654-9-A-A2		CHILL -4C	
	S167027165	VA	8/27/16		CHARCOAL TUBE	1,3-Butadiene 16-07654-9-A-B1		CHILL -4C	
	S167027166	VA	8/27/16		CHARCOAL TUBE	1,3-Butadiene 16-07654-9-A-B2		CHILL -4C	
	S167027167	VA	8/27/16		CHARCOAL TUBE	1,3-Butadiene 16-07654-9-A-BLANK		CHILL -4C	
	S167027168	VA	8/27/16		CHARCOAL TUBE	1,3-Butadiene 16-07654-9-A-BLANK2		CHILL -4C	
	S167027169	VA	8/27/16		CHARCOAL TUBE	1,3-Butadiene 16-07654-9-A-C1		CHILL -4C	
	S167027170	VA	8/27/16		CHARCOAL TUBE	1,3-Butadiene 16-07654-9-A-C2		CHILL -4C	
	S167027171	VA	8/27/16		CHARCOAL TUBE	1,3-Butadiene 16-07654-9-A-D1		CHILL -4C	
	S167027172	VA	8/27/16		CHARCOAL TUBE	1,3-Butadiene 16-07654-9-A-D2		CHILL -4C	
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 W. Howald IV, Carl W. Howald@ri.gov, and Greg Moore, Gregory S. Moore@ri.gov see SOM for email Reference Contract # 55502 REFUSE NIOGH 1024 CHILL BELOW -4 C									
Relinquished By Dianne Turner	Print Dianne Turner	Sign Dianne Turner	Date/Time 8/31/16 0900	Received By JA Grady	Print JA Grady	Sign JA Grady	Date/Time 8/31/16 0900	Matrix* DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation O = Oil A = Air X = Other DS = Drum Solids	
Relinquished By WRPS	Print WRPS	Sign WRPS	Date/Time 8/31/16 1400	Received By FEDEX	Print FEDEX	Sign FEDEX	Date/Time 8/31/16 1400		
Relinquished By WRPS	Print WRPS	Sign WRPS	Date/Time 8/31/16 1400	Received By WRPS	Print WRPS	Sign WRPS	Date/Time 8/31/16 1400		
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)							Date/Time 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 N/A		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				C.O.C. No. 20162538	
Collector JONES		Contact/Requestor CARL HOWARD IV		Telephone No. 373-6861		Page 2 of 4	
SAF No. N/A		Sample Origin CARTRIDGE EVALUATION		MSIN 16-05		Fax 372-1878	
Project Title CARTRIDGE EVALUATION		Logbook/Work Package No. N/A		Purchase Order/Charge Code 207708/CS20			
Shipped To (Lab) ALS		Method of Shipment		Ice Chest No. WYS-033		Temp. ON ICE	
Protocol N/A		Data Turnaround 16 CITS		Bill of Lading/Air Bill No. 8599 0424 0140			
				Parts and Return No. 41238			
Sample No.	Lab ID	* Date	Time	No./Type Container	Sample Analysis	Preservative	
	S16T027173	VA 8/27/16		CHARCOAL TUBE	1,3-Butadiene 16-07654-9-A-E1	CHILL -4C	
	S16T027174	VA 8/27/16		CHARCOAL TUBE	1,3-Butadiene 16-07654-9-A-E2	CHILL -4C	
	S16T027175	VA 8/27/16		CHARCOAL TUBE	1,3-Butadiene 16-07654-9-A-E1	CHILL -4C	
	S16T027176	VA 8/27/16		CHARCOAL TUBE	1,3-Butadiene 16-07654-9-A-E2	CHILL -4C	
	S16T027177	VA 8/27/16		CHARCOAL TUBE	1,3-Butadiene 16-07654-9-A-E1	CHILL -4C	
	S16T027178	VA 8/27/16		CHARCOAL TUBE	1,3-Butadiene 16-07654-9-A-E2	CHILL -4C	
	S16T027179	VA 8/27/16		CHARCOAL TUBE	1,3-Butadiene 16-07654-9-A-E1	CHILL -4C	
	S16T027180	VA 8/27/16		CHARCOAL TUBE	1,3-Butadiene 16-07654-9-A-E2	CHILL -4C	
	S16T027181	VA 8/27/16		CHARCOAL TUBE	1,3-Butadiene 16-07654-9-A-E1	CHILL -4C	
	S16T027182	VA 8/27/16		CHARCOAL TUBE	1,3-Butadiene 16-07654-9-A-E2	CHILL -4C	

POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes)		MSDS	Yes	No	Hold Time
SPECIAL INSTRUCTIONS Send Results to Carl W. Howard IV, Carl W. Howard@rl.gov, and Greg Moore, Gregory S. Moore@rl.gov see SOW for email Reference Contract # 55502 RELEASE 9 NIOSH 1024 CHILL BELOW -4 C					

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix*
Dianne Turner	8/31/16	8/31/16	8/31/16	WRPS	8/31/16	8/31/16	8/31/16	DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation VA = Vapor A = Air X = Other
Relinquished By	WRPS	8/31/16	8/31/16	Received By	FEDEX	8/31/16	8/31/16	
Relinquished By	WRPS	8/31/16	8/31/16	Received By	WRPS	8/31/16	8/31/16	
Relinquished By	WRPS	8/31/16	8/31/16	Received By	WRPS	8/31/16	8/31/16	

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)	Disposed By	Date/Time
		Fred Rejali	09/06/16 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)

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST									
Assembler N/A	C.O.C. No. 20162538				Page 3 of 4				
Collector JONES	Contact/Requestor CARL HOWARD IV	Telephone No. 373-6861		MSIN 16-05 FAX 372-1878					
SAF No. N/A	Sample Origin CARTRIDGE EVALUATION	Purchase Order/Charge Code 207197/624		Temp. <u>ON ICE</u>					
Project Title CARTRIDGE EVALUATION	Logbook/Work Package No. N/A	Ice Chest No. <u>WTS-033</u>		Bill of Lading/Air Bill No. <u>8599 0424 0140</u>					
Shipped To (Lab) AUS	Method of Shipment	Parts and Return No. <u>41238</u>		Preservative					
Protocol N/A	Data Turnaround 10 DAYS								
Sample No.	Lab ID	Date	Time	No/Type Container	Sample Analysis				Preservative
	S16T027183	VA	8/27/16	CHARCOAL TUBE	1,3-Butadiene 16-07654-9-B-B1				CHILL -4C
	S16T027184	VA	8/27/16	CHARCOAL TUBE	1,3-Butadiene 16-07654-9-B-B2				CHILL -4C
	S16T027185	VA	8/27/16	CHARCOAL TUBE	1,3-Butadiene 16-07654-9-B-BLANK				CHILL -4C
	S16T027186	VA	8/27/16	CHARCOAL TUBE	1,3-Butadiene 16-07654-9-B-BLANK2				CHILL -4C
	S16T027187	VA	8/27/16	CHARCOAL TUBE	1,3-Butadiene 16-07654-9-B-BLANK				CHILL -4C
	S16T027188	VA	8/27/16	CHARCOAL TUBE	1,3-Butadiene 16-07654-9-B-BLANK				CHILL -4C
	S16T027189	VA	8/27/16	CHARCOAL TUBE	1,3-Butadiene 16-07654-9-B-BLANK				CHILL -4C
	S16T027190	VA	8/27/16	CHARCOAL TUBE	1,3-Butadiene 16-07654-9-B-BLANK				CHILL -4C
	S16T027191	VA	8/27/16	CHARCOAL TUBE	1,3-Butadiene 16-07654-9-B-BLANK				CHILL -4C
	S16T027192	VA	8/27/16	CHARCOAL TUBE	1,3-Butadiene 16-07654-9-B-BLANK				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@rl.gov, and Greg Moore, Gregory.S.Moore@rl.gov see SCW for email Reference Contract # 55502 RELEASE 9 NIOGH 1024 CHILL BELOW -4 C</p>									
Relinquished By <u>DIANNE TURNER</u>	Print <u>WRPS</u>	Sign <u>Juli Gadsden</u>	Date/Time <u>8/31/16</u>	Received By <u>JA Gadsden</u>	Print <u>WRPS</u>	Sign <u>Juli Gadsden</u>	Date/Time <u>8/31/16</u>	Matrix* S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids	Date/Time <u>09/06/16</u>
Relinquished By <u>WRPS</u>	Print <u>WRPS</u>	Sign <u>Juli Gadsden</u>	Date/Time <u>8/31/16</u>	Received By <u>WRPS</u>	Print <u>WRPS</u>	Sign <u>Juli Gadsden</u>	Date/Time <u>8/31/16</u>	Matrix* DL = Drum Liquids T = Tissue WM = Wipe L = Liquid V = Vegetation VA = Vapor X = Other	Date/Time <u>09/06/16</u>
Relinquished By <u>WRPS</u>	Print <u>WRPS</u>	Sign <u>Juli Gadsden</u>	Date/Time <u>8/31/16</u>	Received By <u>WRPS</u>	Print <u>WRPS</u>	Sign <u>Juli Gadsden</u>	Date/Time <u>8/31/16</u>	Matrix* DL = Drum Liquids T = Tissue WM = Wipe L = Liquid V = Vegetation VA = Vapor X = Other	Date/Time <u>09/06/16</u>
Relinquished By <u>WRPS</u>	Print <u>WRPS</u>	Sign <u>Juli Gadsden</u>	Date/Time <u>8/31/16</u>	Received By <u>WRPS</u>	Print <u>WRPS</u>	Sign <u>Juli Gadsden</u>	Date/Time <u>8/31/16</u>	Matrix* DL = Drum Liquids T = Tissue WM = Wipe L = Liquid V = Vegetation VA = Vapor X = Other	Date/Time <u>09/06/16</u>
<p>Disposal Method (e.g., Return to customer, per lab procedure) used in process</p> <p>Disposited By <u>Fred Rejoli</u></p>									
FINAL SAMPLE DISPOSITION									Date/Time <u>2300</u>

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)

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST										C.O.C. No. 20162538	
										Page 4 of 4	
Assembler N/A		Contract/Requestor CARL HOWARD IV		Telephone No. 373-6861		MSIN 16-05		FAX 372-1978			
Collector JONES		Sample Origin CARTRIDGE EVALUATION		Purchase Order/Charge Code 202706/CH20							
SAF No. N/A		Logbook/ Work Package No. N/A		Ice Chest No. WTS-033		Temp. ON ICE					
Project Title CARTRIDGE EVALUATION		Method of Shipment N/A		Bill of Lading/Air Bill No. 8599 0424 0140							
Shipped To (Lab) ALS		Data Turnaround 10 DAYS		Parts and Return No. 41238							
Protocol N/A											
Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis	Preservative					
	S167027193	VA	8/27/16	CHARCOAL TUBE	1,3-Butadiene 16-07654-9-B-F1	CHILL -4C					
	S167027194	VA	8/27/16	CHARCOAL TUBE	1,3-Butadiene 16-07654-9-B-F2	CHILL -4C					
	S167027195	VA	8/27/16	CHARCOAL TUBE	1,3-Butadiene 16-07654-9-B-G1	CHILL -4C					
	S167027196	VA	8/27/16	CHARCOAL TUBE	1,3-Butadiene 16-07654-9-B-G2	CHILL -4C					
	S167027197	VA	8/27/16	CHARCOAL TUBE	1,3-Butadiene 16-07654-9-B-H1	CHILL -4C					
	S167027198	VA	8/27/16	CHARCOAL TUBE	1,3-Butadiene 16-07654-9-B-H2	CHILL -4C					
	S167027199	VA	8/27/16	CHARCOAL TUBE	1,3-Butadiene 16-07654-9-EFF-A-BASE	CHILL -4C					
	S167027200	VA	8/27/16	CHARCOAL TUBE	1,3-Butadiene 16-07654-9-EFF-B-BASE	CHILL -4C					
	S167027201	VA	8/27/16	CHARCOAL TUBE	1,3-Butadiene 16-07654-9-IN-A-BASE	CHILL -4C					
	S167027202	VA	8/27/16	CHARCOAL TUBE	1,3-Butadiene 16-07654-9-IN-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. Howald IV, Carl W. Howald@ri.gov, and Greg Moore, Gregory S. Moore@ri.gov see SCM for email Reference Contract # 55502 RELEASE 9 NIOSEH 1024 CHILL BELOW -4 C</p>											
Relinquished By DIANNE TURNER		Print 8/31/16		Sign Dianne Turner		Received By JA Gradisher		Print 8/31/16		Sign Julie Gradisher	
Relinquished By WRPS		Date/Time 8/31/16 0900		Date/Time 8/31/16 1400		Received By FEDEX		Date/Time 8/31/16 0900		Date/Time 8/31/16 1400	
Relinquished By Felix		Date/Time 8/31/16 1400		Date/Time 8/31/16 1400		Received By EDWARDS MUD SHED		Date/Time 9/16/16		Date/Time 9/16/16	
Relinquished By		Date/Time		Date/Time		Received By		Date/Time		Date/Time	
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure used in process)		Disposed By Fred Rejula		Date/Time 09/06/16		Date/Time 2300			

A-6003-962 (03/05)

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





## ANALYTICAL REPORT

Report Date: September 07, 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

20162533

Workorder: **34-1624559**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: <b>S16T027108</b>		Collected: 08/26/2016		
Lab ID: 1624559001		Received: 09/01/2016		
Method: <b>NIOSH 1024</b>		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: <b>Air Volume Not Provided</b>		
Analyzed: 09/06/2016				
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: <b>S16T027109</b>		Collected: 08/26/2016		
Lab ID: 1624559002		Received: 09/01/2016		
Method: <b>NIOSH 1024</b>		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: <b>Air Volume Not Provided</b>		
Analyzed: 09/06/2016				
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: <b>S16T027110</b>		Collected: 08/26/2016		
Lab ID: 1624559003		Received: 09/01/2016		
Method: <b>NIOSH 1024</b>		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: <b>Air Volume Not Provided</b>		
Analyzed: 09/06/2016				
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: <b>S16T027111</b>		Collected: 08/26/2016		
Lab ID: 1624559004		Received: 09/01/2016		
Method: <b>NIOSH 1024</b>		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: <b>Air Volume Not Provided</b>		
Analyzed: 09/06/2016				
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

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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## ANALYTICAL REPORT

Workorder: 34-1624559

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027112		Collected: 08/26/2016	
Lab ID: 1624559005		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm) RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA 0.0010

Sample ID: S16T027113		Collected: 08/26/2016	
Lab ID: 1624559006		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm) RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA 0.0010

Sample ID: S16T027114		Collected: 08/26/2016	
Lab ID: 1624559007		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm) RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA 0.0010

Sample ID: S16T027115		Collected: 08/26/2016	
Lab ID: 1624559008		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm) RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA 0.0010

Sample ID: S16T027116		Collected: 08/26/2016	
Lab ID: 1624559009		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm) RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA 0.0010



## ANALYTICAL REPORT

Workorder: 34-1624559

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027117		Collected: 08/26/2016	
Lab ID: 1624559010		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)
1,3-Butadiene	<0.0010	NA	NA

Sample ID: S16T027118		Collected: 08/26/2016	
Lab ID: 1624559011		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)
1,3-Butadiene	<0.0010	NA	NA

Sample ID: S16T027119		Collected: 08/26/2016	
Lab ID: 1624559012		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)
1,3-Butadiene	<0.0010	NA	NA

Sample ID: S16T027120		Collected: 08/26/2016	
Lab ID: 1624559013		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)
1,3-Butadiene	<0.0010	NA	NA

Sample ID: S16T027121		Collected: 08/26/2016	
Lab ID: 1624559014		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)
1,3-Butadiene	<0.0010	NA	NA



## ANALYTICAL REPORT

Workorder: 34-1624559

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027122		Collected: 08/26/2016		
Lab ID: 1624559015		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027123		Collected: 08/26/2016		
Lab ID: 1624559016		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027124		Collected: 08/26/2016		
Lab ID: 1624559017		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027125		Collected: 08/26/2016		
Lab ID: 1624559018		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027126		Collected: 08/26/2016		
Lab ID: 1624559019		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010



## ANALYTICAL REPORT

Workorder: 34-1624559

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027127		Collected: 08/26/2016		
Lab ID: 1624559020		Received: 09/01/2016		
Sampling Location: CARTRIDGE EVALUATION				
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027128		Collected: 08/26/2016		
Lab ID: 1624559021		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027129		Collected: 08/26/2016		
Lab ID: 1624559022		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027130		Collected: 08/26/2016		
Lab ID: 1624559023		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027131		Collected: 08/26/2016		
Lab ID: 1624559024		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010



## ANALYTICAL REPORT

Workorder: 34-1624559

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027132		Collected: 08/26/2016	
Lab ID: 1624559025		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)
1,3-Butadiene	<0.0010	NA	NA

Sample ID: S16T027133		Collected: 08/26/2016	
Lab ID: 1624559026		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)
1,3-Butadiene	<0.0010	NA	NA

Sample ID: S16T027134		Collected: 08/26/2016	
Lab ID: 1624559027		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)
1,3-Butadiene	<0.0010	NA	NA

Sample ID: S16T027135		Collected: 08/26/2016	
Lab ID: 1624559028		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)
1,3-Butadiene	<0.0010	NA	NA

Sample ID: S16T027136		Collected: 08/26/2016	
Lab ID: 1624559029		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)
1,3-Butadiene	<0.0010	NA	NA



## ANALYTICAL REPORT

Workorder: 34-1624559

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027137		Collected: 08/26/2016		
Lab ID: 1624559030		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027138		Collected: 08/26/2016		
Lab ID: 1624559031		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027139		Collected: 08/26/2016		
Lab ID: 1624559032		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027140		Collected: 08/26/2016		
Lab ID: 1624559033		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010

Sample ID: S16T027141		Collected: 08/26/2016		
Lab ID: 1624559034		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Sampling Parameter: Air Volume Not Provided		
		Analyzed: 09/06/2016		
Analyte	Result (mg/sample)	Result (mg/m³)	Result (ppm)	RL (mg/sample)
1,3-Butadiene	<0.0010	NA	NA	0.0010



## ANALYTICAL REPORT

Workorder: 34-1624559

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027142		Collected: 08/26/2016	
Lab ID: 1624559035		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)
1,3-Butadiene	<0.0010	NA	NA

Sample ID: S16T027143		Collected: 08/26/2016	
Lab ID: 1624559036		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)
1,3-Butadiene	<0.0010	NA	NA

Sample ID: S16T027144		Collected: 08/26/2016	
Lab ID: 1624559037		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)
1,3-Butadiene	<0.0010	NA	NA

Sample ID: S16T027145		Collected: 08/26/2016	
Lab ID: 1624559038		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)
1,3-Butadiene	<0.0010	NA	NA

Sample ID: S16T027146		Collected: 08/26/2016	
Lab ID: 1624559039		Received: 09/01/2016	
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube	
Sampling Parameter: Air Volume Not Provided		Analyzed: 09/06/2016	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)
1,3-Butadiene	<0.0010	NA	NA





## ANALYTICAL REPORT

Workorder: **34-1624559**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027147		Collected: 08/26/2016		
Lab ID: 1624559040		Received: 09/01/2016		
Method: NIOSH 1024		Media: SKC 226-37 Sorbent Tube		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (mg/sample)	Result (mg/m³)	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 09/07/2016 00:36	/S/ Thomas J. Masoian 09/07/2016 08:01

### Laboratory Contact Information

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

Phone: (801) 266-7700  
Email: [alslt.lab@ALSGlobal.com](mailto:alslt.lab@ALSGlobal.com)  
Web: [www.alssl.com](http://www.alssl.com)



## ANALYTICAL REPORT

Workorder: **34-1624559**

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	ANAB (DoD ELAP)	ADE-1420	<a href="http://www.anab.org/accredited-organizations/">http://www.anab.org/accredited-organizations/</a>
	Utah (NELAC)	DATA 1	<a href="http://health.utah.gov/lab/labimp/">http://health.utah.gov/lab/labimp/</a>
	Nevada	UT00009	<a href="http://ndep.nv.gov/bsdwl/labservice.htm">http://ndep.nv.gov/bsdwl/labservice.htm</a>
	Oklahoma	UT00009	<a href="http://www.deq.state.ok.us/CSDnew/">http://www.deq.state.ok.us/CSDnew/</a>
	Iowa	IA# 376	<a href="http://www.iowadnr.gov/insideDNR/RegulatoryWater.aspx">http://www.iowadnr.gov/insideDNR/RegulatoryWater.aspx</a>
	Texas (TNI)	T 104704456-11-1	<a href="http://www.tceq.texas.gov/field/qalab_accred_certif.html">http://www.tceq.texas.gov/field/qalab_accred_certif.html</a>
	Washington	C596-16	<a href="http://www.ecy.wa.gov/programs/eap/labs/index.html">http://www.ecy.wa.gov/programs/eap/labs/index.html</a>
	Kansas	E-10416	<a href="http://www.kdheks.gov/lipo/index.html">http://www.kdheks.gov/lipo/index.html</a>
Industrial Hygiene	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
	Washington	C596-16	<a href="http://www.ecy.wa.gov/programs/eap/labs/index.html">http://www.ecy.wa.gov/programs/eap/labs/index.html</a>
Lead Testing:			
CPSC	ANAB (ISO 17025, CPSC)	ADE-1420	<a href="http://www.anab.org/accredited-organizations/">http://www.anab.org/accredited-organizations/</a>
Soil, Dust, Paint, Air	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
Dietary Supplements	ACLASS (ISO 17025)	ADE-1420	<a href="http://www.aiclasscorp.com">http://www.aiclasscorp.com</a>

### 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: **1624559**

Limits: Historical/Performance

Basis: ALS Laboratory Group

Preparation: NA

Batch: NA

Prepared By: NA

Analysis: NIOSH 1024

Batch: IFID/7731 (HBN: 176024)

Analyzed By: Fred Rejali

### Blank

MB: 516537 Analyzed: 09/06/2016 00:00 Units: mg/sample			
Analyte	Result	MDL	RL
1,3-Butadiene	ND	NA	0.00100

MB: 516540 Analyzed: 09/06/2016 00:00 Units: mg/sample			
Analyte	Result	MDL	RL
1,3-Butadiene	ND	NA	0.00100

MB: 516748 Analyzed: 09/06/2016 00:00 Units: mg/sample			
Analyte	Result	MDL	RL
1,3-Butadiene	ND	NA	0.00100

MB: 516751 Analyzed: 09/06/2016 00:00 Units: mg/sample			
Analyte	Result	MDL	RL
1,3-Butadiene	ND	NA	0.00100

MB: 516754 Analyzed: 09/06/2016 00:00 Units: mg/sample			
Analyte	Result	MDL	RL
1,3-Butadiene	ND	NA	0.00100

### Laboratory Control Sample - Laboratory Control Sample Duplicate

LCS: 516538 Analyzed: 09/06/2016 00:00 Dilution: 1 Units: mg/sample					LCSD: 516539 Analyzed: 09/06/2016 00:00 Dilution: 1 Units: mg/sample				
Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
1,3-Butadiene	0.0266	0.0274	97.2	78.0 117.6	0.0281	103	5.48	0.0 20.0	

LCS: 516541 Analyzed: 09/06/2016 00:00 Dilution: 1 Units: mg/sample					LCSD: 516542 Analyzed: 09/06/2016 00:00 Dilution: 1 Units: mg/sample				
Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
1,3-Butadiene	0.0256	0.0239	107	78.0 117.6	0.0228	95.2	11.6	0.0 20.0	



## Quality Control Sample Batch Report

### Analysis Information

Workorder: 1624559

Limits: Historical/Performance

Basis: ALS Laboratory Group

Preparation: NA

Batch: NA

Prepared By: NA

Analysis: NIOSH 1024

Batch: IFID/7731 (HBN: 176024)

Analyzed By: Fred Rejali

### Laboratory Control Sample - Laboratory Control Sample Duplicate

LCS: 516749 Analyzed: 09/06/2016 00:00 Dilution: 1 Units: mg/sample					LCSD: 516750 Analyzed: 09/06/2016 00:00 Dilution: 1 Units: mg/sample				
Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
1,3-Butadiene	0.0236	0.0239	98.6	78.0 117.6	0.0254	106	7.35	0.0 20.0	
LCS: 516752 Analyzed: 09/06/2016 00:00 Dilution: 1 Units: mg/sample					LCSD: 516753 Analyzed: 09/06/2016 00:00 Dilution: 1 Units: mg/sample				
Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
1,3-Butadiene	0.0216	0.0239	90.2	78.0 117.6	0.0224	93.6	3.64	0.0 20.0	
LCS: 516755 Analyzed: 09/06/2016 00:00 Dilution: 1 Units: mg/sample					LCSD: 516756 Analyzed: 09/06/2016 00:00 Dilution: 1 Units: mg/sample				
Analyte	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
1,3-Butadiene	0.0228	0.0239	95.2	78.0 117.6	0.0215	89.8	5.87	0.0 20.0	

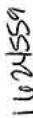
### QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Analyst	Peer Review
/S/ Fred Rejali 09/07/2016 00:36	/S/ Thomas J. Masoian 09/07/2016 08:01

### 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



1624559

A-6003-962 (03/05)

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. 20162533	
										Page 2 of 4	
Assembler N/A	Collector JONES	Contact/Requestor CARL HOWARD IV	Telephone No.	373-6861	MSIN	76-05	FAX	372-1878			
SAF No. N/A	Sample Origin CARTRIDGE EVALUATION	Sample Origin CARTRIDGE EVALUATION	Purchase Order/Charge Code	20308/CSD0							
Project Title CARTRIDGE EVALUATION	Logbook/Work Package No. N/A	Logbook/Work Package No. N/A	Ice Chest No.	WTS-033	Temp.	ON ICE					
Shipped To (Lab) ALS	Method of Shipment	Method of Shipment	Bill of Lading/Air Bill No.	8599 0424 0140							
Protocol N/A	Data Turnaround 10 DAYS	Data Turnaround 10 DAYS	Parts and Return No.	41238							
Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis				Preservative		
	S16T027118	VA	8/26/16	CHARCOAL TUBE	1, 3-Butadiene 16-07645-9-A-E1 *				CHILL -4C		
	S16T027119	VA	8/26/16	CHARCOAL TUBE	1, 3-Butadiene 16-07645-9-A-E2 *				CHILL -4C		
	S16T027120	VA	8/26/16	CHARCOAL TUBE	1, 3-Butadiene 16-07645-9-A-E1 *				CHILL -4C		
	S16T027121	VA	8/26/16	CHARCOAL TUBE	1, 3-Butadiene 16-07645-9-A-E2 *				CHILL -4C		
	S16T027122	VA	8/26/16	CHARCOAL TUBE	1, 3-Butadiene 16-07645-9-A-E1 *				CHILL -4C		
	S16T027123	VA	8/26/16	CHARCOAL TUBE	1, 3-Butadiene 16-07645-9-A-E2 *				CHILL -4C		
	S16T027124	VA	8/26/16	CHARCOAL TUBE	1, 3-Butadiene 16-07645-9-A-E1 *				CHILL -4C		
	S16T027125	VA	8/26/16	CHARCOAL TUBE	1, 3-Butadiene 16-07645-9-A-E2 *				CHILL -4C		
	S16T027126	VA	8/26/16	CHARCOAL TUBE	1, 3-Butadiene 16-07645-9-B-N1 *				CHILL -4C		
	S16T027127	VA	8/26/16	CHARCOAL TUBE	1, 3-Butadiene 16-07645-9-B-N2 *				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</p> <p>Send Results to Carl W. Howald IV, Carl W. Howald@rl.gov, and Greg Moore, Gregory S. Moore@rl.gov see SOW for email</p> <p>Reference Contract # 55502 REFPASS 9 NIOGH 1024 CHILL BELOW -4 C</p>											
Reinquished By Dianne Turner	Print Dianne Turner	Sign Dianne Turner	Date/Time 8/31/16 0900	Received By WRPS	Sign Julie Godwin	Date/Time 8/31/16 0900	Matrix* S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids	DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation VA = Vapor X = Other			
Reinquished By WRPS	Print Julie Godwin	Sign Julie Godwin	Date/Time 8/31/16 1400	Received By WRPS	Sign Julie Godwin	Date/Time 8/31/16 0900					
Reinquished By WRPS	Print WRPS	Sign WRPS	Date/Time 8/31/16 1400	Received By WRPS	Sign WRPS	Date/Time 8/31/16 0900					
Reinquished By WRPS	Print WRPS	Sign WRPS	Date/Time 8/31/16 1400	Received By WRPS	Sign WRPS	Date/Time 8/31/16 0900					
Disposal Method (e.g., Return to customer, per lab procedure, used in process)							Date/Time 09/06/16 2300				
Disposal Method (e.g., Return to customer, per lab procedure, used in process)							Date/Time 09/06/16 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)

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST										C.O.C. No. 20162533	
										Page 3 of 4	
Assembler N/A										MSIN T6-05	
Collector JONES	Contact/Requestor CARL HOWARD IV									Telephone No. 373-6861	
SAF No. N/A	Sample Origin CARTRIDGE EVALUATION									Purchase Order/Charge Code 202106/CE20	
Project Title CARTRIDGE EVALUATION	Logbook/Work Package No. N/A									Ice Chest No. <u>WTS-033</u>	
Shipped To (Lab) ALS	Method of Shipment									Bill of Lading/Air Bill No. <u>8599 0424 0140</u>	
Protocol N/A	Data Turnaround 10 DAYS									Parts and Return No. <u>41238</u>	
Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis					Preservative	
	S16T027128	VA	8/26/16	CHARCOAL TUBE	1,3-Butadiene 16-07645-9-B-B1					CHILL -4C	
	S16T027129	VA	8/26/16	CHARCOAL TUBE	1,3-Butadiene 16-07645-9-B-B2					CHILL -4C	
	S16T027130	VA	8/26/16	CHARCOAL TUBE	1,3-Butadiene 16-07645-9-B-BLANK					CHILL -4C	
	S16T027131	VA	8/26/16	CHARCOAL TUBE	1,3-Butadiene 16-07645-9-B-BLANK2					CHILL -4C	
	S16T027132	VA	8/26/16	CHARCOAL TUBE	1,3-Butadiene 16-07645-9-B-C1					CHILL -4C	
	S16T027133	VA	8/26/16	CHARCOAL TUBE	1,3-Butadiene 16-07645-9-B-C2					CHILL -4C	
	S16T027134	VA	8/26/16	CHARCOAL TUBE	1,3-Butadiene 16-07645-9-B-D1					CHILL -4C	
	S16T027135	VA	8/26/16	CHARCOAL TUBE	1,3-Butadiene 16-07645-9-B-D2					CHILL -4C	
	S16T027136	VA	8/26/16	CHARCOAL TUBE	1,3-Butadiene 16-07645-9-B-E1					CHILL -4C	
	S16T027137	VA	8/26/16	CHARCOAL TUBE	1,3-Butadiene 16-07645-9-B-E2					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 Howald IV, Carl W Howald@rl.gov, and Greg Moore, Gregory S Moore@rl.gov see SOW for email Reference Contract # 55502 RELEASE 9 NIOSH 1024 CHILL BELOW -4 C</p>											
Relinquished By Dianne Turner	Print Dianne Turner	Sign Dianne Turner	Date/Time 8/31/16 0900	Received By WRPS Julie Gadsom	Sign Julie Gadsom	Date/Time 8/31/16 0900	Matrix*				
Relinquished By WRPS	Print WRPS	Sign WRPS	Date/Time 8/31/16 1400	Received By FEDEX	Date/Time		DL = Drum Liquids SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids				
Relinquished By WRPS	Print WRPS	Sign WRPS	Date/Time 8/31/16 1400	Received By Munich Edwards	Sign Munich Edwards	Date/Time 9/1/16 1432	T = Tissue VM = Wipe L = Liquid V = Vegetation VA = Vapor X = Other				
Relinquished By	Print	Sign	Date/Time	Received By	Sign	Date/Time					
Disposal Method (e.g., Return to customer, per lab procedure, used in process)							Date/Time 09/06/16 2300				
Disposal Method (e.g., Return to customer, per lab procedure, used in process)							Date/Time 09/06/16 2300				
Disposal Method (e.g., Return to customer, per lab procedure, used in process)							Date/Time 09/06/16 2300				

A-6005-962 (03/05)

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





## C.3.10 Pyridines



### ANALYTICAL REPORT

Report Date: September 07, 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

20162539

Workorder: 34-1624556

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

#### Analytical Results

Sample ID: S16T027204		Collected: 08/26/2016		
Lab ID: 1624556001	Sampling Location: CARTRIDGE EVALUATION		Received: 09/01/2016	
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg	Analyzed: 09/06/2016	
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.50	NA	NA	0.50
2,4-Dimethylpyridine	<0.50	NA	NA	0.50

Sample ID: S16T027205		Collected: 08/26/2016		
Lab ID: 1624556002	Sampling Location: CARTRIDGE EVALUATION		Received: 09/01/2016	
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg	Analyzed: 09/06/2016	
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.50	NA	NA	0.50
2,4-Dimethylpyridine	<0.50	NA	NA	0.50

Sample ID: S16T027206		Collected: 08/26/2016		
Lab ID: 1624556003	Sampling Location: CARTRIDGE EVALUATION		Received: 09/01/2016	
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg	Analyzed: 09/06/2016	
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.50	NA	NA	0.50
2,4-Dimethylpyridine	<0.50	NA	NA	0.50

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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## ANALYTICAL REPORT

Workorder: 34-1624556

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027207		Collected: 08/26/2016	
Lab ID: 1624556004		Received: 09/01/2016	
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg	
		Analyzed: 09/06/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm) RL (ug/sample)
Pyridine	<0.50	NA	NA 0.50
2,4-Dimethylpyridine	<0.50	NA	NA 0.50

Sample ID: S16T027208		Collected: 08/26/2016	
Lab ID: 1624556005		Received: 09/01/2016	
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg	
		Analyzed: 09/06/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm) RL (ug/sample)
Pyridine	<0.50	NA	NA 0.50
2,4-Dimethylpyridine	<0.50	NA	NA 0.50

Sample ID: S16T027209		Collected: 08/26/2016		
Lab ID: 1624556006		Received: 09/01/2016		
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.50	NA	NA	0.50
2,4-Dimethylpyridine	<0.50	NA	NA	0.50

Sample ID: S16T027210		Collected: 08/26/2016		
Lab ID: 1624556007		Received: 09/01/2016		
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.50	NA	NA	0.50
2,4-Dimethylpyridine	<0.50	NA	NA	0.50



## ANALYTICAL REPORT

Workorder: 34-1624556

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027211		Collected: 08/26/2016	
Lab ID: 1624556008		Received: 09/01/2016	
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg	
		Analyzed: 09/06/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm) RL (ug/sample)
Pyridine	<0.50	NA	NA 0.50
2,4-Dimethylpyridine	<0.50	NA	NA 0.50

Sample ID: S16T027212		Collected: 08/26/2016	
Lab ID: 1624556009		Received: 09/01/2016	
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg	
		Analyzed: 09/06/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm) RL (ug/sample)
Pyridine	<0.50	NA	NA 0.50
2,4-Dimethylpyridine	<0.50	NA	NA 0.50

Sample ID: S16T027213		Collected: 08/26/2016		
Lab ID: 1624556010		Received: 09/01/2016		
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.50	NA	NA	0.50
2,4-Dimethylpyridine	<0.50	NA	NA	0.50

Sample ID: S16T027214		Collected: 08/26/2016		
Lab ID: 1624556011		Received: 09/01/2016		
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.50	NA	NA	0.50
2,4-Dimethylpyridine	<0.50	NA	NA	0.50



## ANALYTICAL REPORT

Workorder: 34-1624556

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027215		Collected: 08/26/2016	
Lab ID: 1624556012		Received: 09/01/2016	
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg	
		Analyzed: 09/06/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm) RL (ug/sample)
Pyridine	<0.50	NA	NA 0.50
2,4-Dimethylpyridine	<0.50	NA	NA 0.50

Sample ID: S16T027216		Collected: 08/26/2016		
Lab ID: 1624556013		Received: 09/01/2016		
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.50	NA	NA	0.50
2,4-Dimethylpyridine	<0.50	NA	NA	0.50

Sample ID: S16T027217		Collected: 08/26/2016		
Lab ID: 1624556014		Received: 09/01/2016		
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.50	NA	NA	0.50
2,4-Dimethylpyridine	<0.50	NA	NA	0.50

Sample ID: S16T027218		Collected: 08/26/2016		
Lab ID: 1624556015		Received: 09/01/2016		
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.50	NA	NA	0.50
2,4-Dimethylpyridine	<0.50	NA	NA	0.50



## ANALYTICAL REPORT

Workorder: 34-1624556

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027219		Collected: 08/26/2016	
Lab ID: 1624556016		Received: 09/01/2016	
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg	
		Analyzed: 09/06/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm) RL (ug/sample)
Pyridine	<0.50	NA	NA 0.50
2,4-Dimethylpyridine	<0.50	NA	NA 0.50

Sample ID: S16T027220		Collected: 08/26/2016	
Lab ID: 1624556017		Received: 09/01/2016	
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg	
		Analyzed: 09/06/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)      RL (ug/sample)
Pyridine	<0.50	NA	NA      0.50
2,4-Dimethylpyridine	<0.50	NA	NA      0.50

Sample ID: S16T027221		Collected: 08/26/2016		
Lab ID: 1624556018		Received: 09/01/2016		
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg		
		Analyzed: 09/06/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.50	NA	NA	0.50
2,4-Dimethylpyridine	<0.50	NA	NA	0.50

Sample ID: S16T027222		Collected: 08/26/2016		
Lab ID: 1624556019		Received: 09/01/2016		
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg		
		Analyzed: 09/07/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.50	NA	NA	0.50
2,4-Dimethylpyridine	<0.50	NA	NA	0.50



## ANALYTICAL REPORT

Workorder: **34-1624556**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027223		Collected: 08/26/2016		
Lab ID: 1624556020		Received: 09/01/2016		
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube		
		100/50mg		
		Analyzed: 09/07/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.50	NA	NA	0.50
2,4-Dimethylpyridine	<0.50	NA	NA	0.50

### Comments

Quality Control: NIOSH 1613 Mod. - (HBN: 176068)

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.

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

Method	Analyst	Peer Review
NIOSH 1613 Mod.	/S/ Steven Yourstone 09/07/2016 08:27	/S/ Thomas J. Masoian 09/07/2016 08:57

### Laboratory Contact Information

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

Phone: (801) 266-7700  
Email: [alslt.lab@ALSGlobal.com](mailto:alslt.lab@ALSGlobal.com)  
Web: [www.alssl.com](http://www.alssl.com)



## ANALYTICAL REPORT

Workorder: **34-1624556**

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	ANAB (DoD ELAP)	ADE-1420	<a href="http://www.anab.org/accredited-organizations/">http://www.anab.org/accredited-organizations/</a>
	Utah (NELAC)	DATA 1	<a href="http://health.utah.gov/lab/labimp/">http://health.utah.gov/lab/labimp/</a>
	Nevada	UT00009	<a href="http://ndep.nv.gov/bsdwl/labservice.htm">http://ndep.nv.gov/bsdwl/labservice.htm</a>
	Oklahoma	UT00009	<a href="http://www.deq.state.ok.us/CSDnew/">http://www.deq.state.ok.us/CSDnew/</a>
	Iowa	IA# 376	<a href="http://www.iowadnr.gov/insideDNR/RegulatoryWater.aspx">http://www.iowadnr.gov/insideDNR/RegulatoryWater.aspx</a>
	Texas (TNI)	T 104704456-11-1	<a href="http://www.tceq.texas.gov/field/qalab_accred_certif.html">http://www.tceq.texas.gov/field/qalab_accred_certif.html</a>
	Washington	C596-16	<a href="http://www.ecy.wa.gov/programs/eap/labs/index.html">http://www.ecy.wa.gov/programs/eap/labs/index.html</a>
	Kansas	E-10416	<a href="http://www.kdheks.gov/lipo/index.html">http://www.kdheks.gov/lipo/index.html</a>
Industrial Hygiene	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
	Washington	C596-16	<a href="http://www.ecy.wa.gov/programs/eap/labs/index.html">http://www.ecy.wa.gov/programs/eap/labs/index.html</a>
Lead Testing:			
CPSC	ANAB (ISO 17025, CPSC)	ADE-1420	<a href="http://www.anab.org/accredited-organizations/">http://www.anab.org/accredited-organizations/</a>
Soil, Dust, Paint, Air	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
Dietary Supplements	ACLASS (ISO 17025)	ADE-1420	<a href="http://www.aiclasscorp.com">http://www.aiclasscorp.com</a>

### 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: 1624556

Limits: Historical/Performance  
Basis: ALS Laboratory Group

Preparation: NA  
Batch: NA  
Prepared By: NA

Analysis: NIOSH 1613 Mod.  
Batch: ISVO/3126 (HBN: 176068)  
Analyzed By: Steven Yourstone

### Blank

LMB: 516642 Analyzed: 09/06/2016 12:13 Units: ug/sample			
Analyte	Result	MDL	RL
Pyridine	ND	NA	0.500
2,4-Dimethylpyridine	ND	NA	0.500

### Laboratory Control Sample - Laboratory Control Sample Duplicate

LCS: 516643 Analyzed: 09/06/2016 12:31 Dilution: 1 Units: ug/sample						LCSD: 516644 Analyzed: 09/06/2016 12:49 Dilution: 1 Units: ug/sample					
Analyte	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits		
Pyridine	1.18	1.00	118	61.8	141.1	1.24	124	5.56	0.0	22.1	
2,4-Dimethylpyridine	0.889	1.00	88.9	51.7	130.6	0.996	99.6	11.4	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.

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

Analyst	Peer Review
/S/ Steven Yourstone 09/07/2016 08:27	/S/ Thomas J. Masoian 09/07/2016 08:57

### 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





1624556

10/14/02

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST									
Assembler N/A		COC. No. 20162539		Page 1 of 2		Telephone No. 373-6861 MSN 25-05 FAX 372-1878			
Collector JONES	Contract/Requester Carl Rowland IV		Purchase Order/Change Code 202750/0424						
SAF No. N/A	Sample Origin CARTERVILLE, ILLINOIS		For Chest No. WTS-033		Emp. 000100				
Shipped To (Lab) AUS	Logbook/ Work Package No. N/A		Bill of Lading/Air Bill No. 8599 0424 0140						
Protocol N/A	Method of Shipment		Parts and Return No. 41238						
Data Turnaround 10 days									
Sample Analysis									
Sample No.	Lab ID	Date	Time	No./Type Container	Pyridines 16-07645-10-A1	Preservative			
	S167027204	VA	8/26/16	CHARCOAL TUBE	Pyridines 16-07645-10-A2	N/A			
	S167027205	VA	8/26/16	CHARCOAL TUBE	Pyridines 16-07645-10-B1	N/A			
	S167027206	VA	8/26/16	CHARCOAL TUBE	Pyridines 16-07645-10-B2	N/A			
	S167027207	VA	8/26/16	CHARCOAL TUBE	Pyridines 16-07645-10-BLANK 1	N/A			
	S167027208	VA	8/26/16	CHARCOAL TUBE	Pyridines 16-07645-10-BLANK 2	N/A			
	S167027209	VA	8/26/16	CHARCOAL TUBE	Pyridines 16-07645-10-C1	N/A			
	S167027210	VA	8/26/16	CHARCOAL TUBE	Pyridines 16-07645-10-C2	N/A			
	S167027211	VA	8/26/16	CHARCOAL TUBE	Pyridines 16-07645-10-D1	N/A			
	S167027212	VA	8/26/16	CHARCOAL TUBE	Pyridines 16-07645-10-D2	N/A			
	S167027213	VA	8/26/16	CHARCOAL TUBE	Pyridines 16-07645-10-D3	N/A			
SPECIAL INSTRUCTIONS									
Send Results to Carl Rowland IV and Greg Hogg, g.hogg@dril.gov and Gregory_S_Moore@dril.gov see SCW for email									
RELEASE 9 Reference Contract # 55502									
Hold Time									
POSSIBLE SAMPLE HAZARD/REMARKS (List all known wastes) MSDS <input checked="" type="radio"/> Yes <input type="radio"/> No									
Relinquished By Sharon Kholke	Print Signature	Sign Date/Time 8/31/16 0900	Received By WRPS	Print Signature	Sign Date/Time 8/31/16 0800	Material S = Soil DL = Drum Liquids SE = Sediment T = Tissue SO = Solid WM = Wipe SL = Sludge L = Liquid W = Water V = Vegetation O = Oil VA = Vapor A = Air X = Other DS = Drum Solids			
Relinquished By WRPS	Print Signature	Sign Date/Time 8/31/16 1400	Received By WRPS	Print Signature	Sign Date/Time 8/31/16 0800				
Relinquished By WRPS	Print Signature	Sign Date/Time 8/31/16 1400	Received By WRPS	Print Signature	Sign Date/Time 8/31/16 0800				
Relinquished By WRPS	Print Signature	Sign Date/Time 8/31/16 1400	Received By WRPS	Print Signature	Sign Date/Time 8/31/16 0800				
Disposal Method (e.g., Return to customer, per lab procedure, used in process)									
Per lab procedure									
Disposed By WRPS									
Date/Time 8/31/16 1435									

A-6003-962 (03/05)





## ANALYTICAL REPORT

Report Date: September 08, 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

20162540

Workorder: 34-1624561

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027224		Collected: 08/27/2016		
Lab ID: 1624561001		Received: 09/01/2016		
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube		
		100/50mg		
		Analyzed: 09/07/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.50	NA	NA	0.50
2,4-Dimethylpyridine	<0.50	NA	NA	0.50

Sample ID: S16T027225		Collected: 08/27/2016		
Lab ID: 1624561002		Received: 09/01/2016		
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg		
		Analyzed: 09/07/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.50	NA	NA	0.50
2,4-Dimethylpyridine	<0.50	NA	NA	0.50

Sample ID: S16T027226		Collected: 08/27/2016		
Lab ID: 1624561003		Received: 09/01/2016		
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg		
		Analyzed: 09/07/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.50	NA	NA	0.50
2,4-Dimethylpyridine	<0.50	NA	NA	0.50

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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## ANALYTICAL REPORT

Workorder: 34-1624561

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027227		Collected: 08/27/2016		
Lab ID: 1624561004		Received: 09/01/2016		
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg		
		Analyzed: 09/07/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.50	NA	NA	0.50
2,4-Dimethylpyridine	<0.50	NA	NA	0.50

Sample ID: S16T027228		Collected: 08/27/2016		
Lab ID: 1624561005		Received: 09/01/2016		
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg		
		Analyzed: 09/07/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.50	NA	NA	0.50
2,4-Dimethylpyridine	<0.50	NA	NA	0.50

Sample ID: S16T027229		Collected: 08/27/2016		
Lab ID: 1624561006		Received: 09/01/2016		
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg		
		Analyzed: 09/07/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.50	NA	NA	0.50
2,4-Dimethylpyridine	<0.50	NA	NA	0.50

Sample ID: S16T027230		Collected: 08/27/2016	
Lab ID: 1624561007		Received: 09/01/2016	
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg	
		Analyzed: 09/07/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm) RL (ug/sample)
Pyridine	<0.50	NA	NA 0.50
2,4-Dimethylpyridine	<0.50	NA	NA 0.50



## ANALYTICAL REPORT

Workorder: 34-1624561

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027231		Collected: 08/27/2016	
Lab ID: 1624561008		Received: 09/01/2016	
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg	
		Analyzed: 09/07/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm) RL (ug/sample)
Pyridine	<0.50	NA	NA 0.50
2,4-Dimethylpyridine	<0.50	NA	NA 0.50

Sample ID: S16T027232		Collected: 08/27/2016	
Lab ID: 1624561009		Received: 09/01/2016	
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg	
		Analyzed: 09/07/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm) RL (ug/sample)
Pyridine	<0.50	NA	NA 0.50
2,4-Dimethylpyridine	<0.50	NA	NA 0.50

Sample ID: S16T027233		Collected: 08/27/2016		
Lab ID: 1624561010		Received: 09/01/2016		
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg		
		Analyzed: 09/07/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.50	NA	NA	0.50
2,4-Dimethylpyridine	<0.50	NA	NA	0.50

Sample ID: S16T027234		Collected: 08/27/2016	
Lab ID: 1624561011		Received: 09/01/2016	
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg	
		Analyzed: 09/07/2016	
Sampling Parameter: Air Volume Not Provided			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm) RL (ug/sample)
Pyridine	<0.50	NA	NA 0.50
2,4-Dimethylpyridine	<0.50	NA	NA 0.50



## ANALYTICAL REPORT

Workorder: **34-1624561**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: <b>S16T027235</b>		Collected: 08/27/2016	
Lab ID: 1624561012		Received: 09/01/2016	
Method: <b>NIOSH 1613 Mod.</b>		Media: SKC 226-01, Charcoal Tube 100/50mg	
		Sampling Parameter: <b>Air Volume Not Provided</b>	
Analyzed: 09/07/2016			
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm) RL (ug/sample)
Pyridine	<0.50	NA	NA 0.50
2,4-Dimethylpyridine	<0.50	NA	NA 0.50

Sample ID: <b>S16T027236</b>		Collected: 08/27/2016	
Lab ID: 1624561013		Received: 09/01/2016	
Method: <b>NIOSH 1613 Mod.</b>		Media: SKC 226-01, Charcoal Tube 100/50mg	
		Sampling Parameter: <b>Air Volume Not Provided</b>	
Analyzed: 09/07/2016			
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm) RL (ug/sample)
Pyridine	<0.50	NA	NA 0.50
2,4-Dimethylpyridine	<0.50	NA	NA 0.50

Sample ID: <b>S16T027237</b>		Collected: 08/27/2016	
Lab ID: 1624561014		Received: 09/01/2016	
Method: <b>NIOSH 1613 Mod.</b>		Media: SKC 226-01, Charcoal Tube 100/50mg	
		Sampling Parameter: <b>Air Volume Not Provided</b>	
Analyzed: 09/07/2016			
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm) RL (ug/sample)
Pyridine	<0.50	NA	NA 0.50
2,4-Dimethylpyridine	<0.50	NA	NA 0.50

Sample ID: <b>S16T027238</b>		Collected: 08/27/2016	
Lab ID: 1624561015		Received: 09/01/2016	
Method: <b>NIOSH 1613 Mod.</b>		Media: SKC 226-01, Charcoal Tube 100/50mg	
		Sampling Parameter: <b>Air Volume Not Provided</b>	
Analyzed: 09/07/2016			
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm) RL (ug/sample)
Pyridine	<0.50	NA	NA 0.50
2,4-Dimethylpyridine	<0.50	NA	NA 0.50



## ANALYTICAL REPORT

Workorder: **34-1624561**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: <b>S16T027239</b>		Collected: 08/27/2016	
Lab ID: 1624561016		Received: 09/01/2016	
Method: <b>NIOSH 1613 Mod.</b>		Media: SKC 226-01, Charcoal Tube 100/50mg	
		Sampling Parameter: <b>Air Volume Not Provided</b>	
Analyzed: 09/07/2016			
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm) RL (ug/sample)
Pyridine	<0.50	NA	NA 0.50
2,4-Dimethylpyridine	<0.50	NA	NA 0.50

Sample ID: <b>S16T027240</b>		Collected: 08/27/2016	
Lab ID: 1624561017		Received: 09/01/2016	
Method: <b>NIOSH 1613 Mod.</b>		Media: SKC 226-01, Charcoal Tube 100/50mg	
		Sampling Parameter: <b>Air Volume Not Provided</b>	
Analyzed: 09/07/2016			
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm) RL (ug/sample)
Pyridine	<0.50	NA	NA 0.50
2,4-Dimethylpyridine	<0.50	NA	NA 0.50

Sample ID: <b>S16T027241</b>		Collected: 08/27/2016	
Lab ID: 1624561018		Received: 09/01/2016	
Method: <b>NIOSH 1613 Mod.</b>		Media: SKC 226-01, Charcoal Tube 100/50mg	
		Sampling Parameter: <b>Air Volume Not Provided</b>	
Analyzed: 09/07/2016			
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm) RL (ug/sample)
Pyridine	<0.50	NA	NA 0.50
2,4-Dimethylpyridine	<0.50	NA	NA 0.50

Sample ID: <b>S16T027242</b>		Collected: 08/27/2016	
Lab ID: 1624561019		Received: 09/01/2016	
Method: <b>NIOSH 1613 Mod.</b>		Media: SKC 226-01, Charcoal Tube 100/50mg	
		Sampling Parameter: <b>Air Volume Not Provided</b>	
Analyzed: 09/07/2016			
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm) RL (ug/sample)
Pyridine	<0.50	NA	NA 0.50
2,4-Dimethylpyridine	<0.50	NA	NA 0.50



## ANALYTICAL REPORT

Workorder: **34-1624561**

Client Project ID: CARTRIDGE EVALUATION

Purchase Order: 55502 Rel9

Project Manager: Rand Potter

### Analytical Results

Sample ID: S16T027243		Collected: 08/27/2016		
Lab ID: 1624561020		Received: 09/01/2016		
Method: NIOSH 1613 Mod.		Media: SKC 226-01, Charcoal Tube 100/50mg		
		Analyzed: 09/07/2016		
Sampling Parameter: Air Volume Not Provided				
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
Pyridine	<0.50	NA	NA	0.50
2,4-Dimethylpyridine	<0.50	NA	NA	0.50

### Comments

Quality Control: NIOSH 1613 Mod. - (HBN: 176097)

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.

LCS and LCSD both fail slightly low for 2,4-dimethylpyridine.

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

Method	Analyst	Peer Review
NIOSH 1613 Mod.	/S/ Steven Yourstone 09/08/2016 07:49	/S/ Thomas J. Masoian 09/08/2016 08:27

### Laboratory Contact Information

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

Phone: (801) 266-7700  
Email: [alst.lab@ALSGlobal.com](mailto:alst.lab@ALSGlobal.com)  
Web: [www.alssl.com](http://www.alssl.com)





## ANALYTICAL REPORT

Workorder: **34-1624561**

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	ANAB (DoD ELAP)	ADE-1420	<a href="http://www.anab.org/accredited-organizations/">http://www.anab.org/accredited-organizations/</a>
	Utah (NELAC)	DATA 1	<a href="http://health.utah.gov/lab/labimp/">http://health.utah.gov/lab/labimp/</a>
	Nevada	UT00009	<a href="http://ndep.nv.gov/bsdwl/labservice.htm">http://ndep.nv.gov/bsdwl/labservice.htm</a>
	Oklahoma	UT00009	<a href="http://www.deq.state.ok.us/CSDnew/">http://www.deq.state.ok.us/CSDnew/</a>
	Iowa	IA# 376	<a href="http://www.iowadnr.gov/insideDNR/RegulatoryWater.aspx">http://www.iowadnr.gov/insideDNR/RegulatoryWater.aspx</a>
	Texas (TNI)	T 104704456-11-1	<a href="http://www.tceq.texas.gov/field/qalab_accred_certif.html">http://www.tceq.texas.gov/field/qalab_accred_certif.html</a>
	Washington	C596-16	<a href="http://www.ecy.wa.gov/programs/eap/labs/index.html">http://www.ecy.wa.gov/programs/eap/labs/index.html</a>
	Kansas	E-10416	<a href="http://www.kdheks.gov/lipo/index.html">http://www.kdheks.gov/lipo/index.html</a>
Industrial Hygiene	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
	Washington	C596-16	<a href="http://www.ecy.wa.gov/programs/eap/labs/index.html">http://www.ecy.wa.gov/programs/eap/labs/index.html</a>
Lead Testing:			
CPSC	ANAB (ISO 17025, CPSC)	ADE-1420	<a href="http://www.anab.org/accredited-organizations/">http://www.anab.org/accredited-organizations/</a>
Soil, Dust, Paint, Air	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
Dietary Supplements	ACLASS (ISO 17025)	ADE-1420	<a href="http://www.aiclasscorp.com">http://www.aiclasscorp.com</a>

### 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: 1624561

Limits: Historical/Performance  
Basis: ALS Laboratory Group

Preparation: NA  
Batch: NA  
Prepared By: NA

Analysis: NIOSH 1613 Mod.  
Batch: ISVO/3128 (HBN: 176097)  
Analyzed By: Steven Yourstone

### Blank

LMB: 516720 Analyzed: 09/07/2016 01:54 Units: ug/sample			
Analyte	Result	MDL	RL
Pyridine	ND	NA	0.500
2,4-Dimethylpyridine	ND	NA	0.500

### Laboratory Control Sample - Laboratory Control Sample Duplicate

LCS: 516721 Analyzed: 09/07/2016 02:12 Dilution: 1 Units: ug/sample						LCSD: 516722 Analyzed: 09/07/2016 02:30 Dilution: 1 Units: ug/sample				
Analyte	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Pyridine	0.777	1.00	77.7	61.8	141.1	0.766	76.6	1.48	0.0	22.1
2,4-Dimethylpyridine	0.456	1.00	* 45.6	51.7	130.6	0.443	* 44.3	2.85	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.

LCS and LCSD both fail slightly low for 2,4-dimethylpyridine.

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

Analyst	Peer Review
/S/ Steven Yourstone 09/08/2016 07:49	/S/ Thomas J. Masoian 09/08/2016 08:27

### 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



4

1624561

1624561

Assembler		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		C.O.C. No. 20162540	
N/A				Page 1 of 2	
Collector	JONES	Contact/Requestor	CARL HOWARD IV	Telephone No.	373-6861
SAF No.	N/A	Sample Origin	CARTRIDGE EVALUATION	Purchase Order/Charge Code	MSIN 16-05 FAX 372-1878
Project Title	CARTRIDGE EVALUATION	Logbook/Work Package No.	N/A	Ice Chest No.	WTS-033 ON ICE
Shipped To (Lab)	ALS	Method of Shipment		Bill of Lading/Air Bill No.	8599 0724 0140
Protocol	N/A	Data Turnaround	10 days	Parts and Return No.	41238
Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis
	S16T027224	VA	8/27/16	CHARCOAL TUBE	Pyridines 16-07654-10-A1
	S16T027225	VA	8/27/16	CHARCOAL TUBE	Pyridines 16-07654-10-A2
	S16T027226	VA	8/27/16	CHARCOAL TUBE	Pyridines 16-07654-10-B1
	S16T027227	VA	8/27/16	CHARCOAL TUBE	Pyridines 16-07654-10-B2
	S16T027228	VA	8/27/16	CHARCOAL TUBE	Pyridines 16-07654-10-BLANK
	S16T027229	VA	8/27/16	CHARCOAL TUBE	Pyridines 16-07654-10-BLANK2
	S16T027230	VA	8/27/16	CHARCOAL TUBE	Pyridines 16-07654-10-C1
	S16T027231	VA	8/27/16	CHARCOAL TUBE	Pyridines 16-07654-10-C2
	S16T027232	VA	8/27/16	CHARCOAL TUBE	Pyridines 16-07654-10-D1
	S16T027233	VA	8/27/16	CHARCOAL TUBE	Pyridines 16-07654-10-D2
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 and Greg Moore Carl Howard IV: carl.howard@va.gov Gregory S. Moore: greg.s.moore@va.gov RELEASE 9 Reference Contract # 55502					
Relinquished By	Print	Sign	Date/Time	Received By	Date/Time
Dianne Turner	Dianne Turner	8/31/16	0900	WRPS Julie Gradisher	8/31/16 0920
Relinquished By	Print	Sign	Date/Time	Received By	Date/Time
WRPS Bradisher	WRPS Bradisher	8/31/16	0900	WRPS Julie Gradisher	8/31/16 0920
Relinquished By	Print	Sign	Date/Time	Received By	Date/Time
WRPS Julie Gradisher	WRPS Julie Gradisher	8/31/16	0900	WRPS Julie Gradisher	8/31/16 0920
Relinquished By	Print	Sign	Date/Time	Received By	Date/Time
WRPS Julie Gradisher	WRPS Julie Gradisher	8/31/16	0900	WRPS Julie Gradisher	8/31/16 0920
Disposal Method (e.g., Return to customer, per lab procedure, used in process)				Date/Time	
Per lab procedure				9/16/16 1530	
FINAL SAMPLE DISPOSITION					

A-6003-962 (03/05)

Assembler		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				C.O.C. No. 20162540	
N/A						Page 2 of 2	
Collector	JONES	Contact/Requestor	CARL HOWARD IV		Telephone No.	373-6861	FAX 372-1878
SAF No.	N/A	Sample Origin	CARTRIDGE EVALUATION		Purchase Order/Charge Code	202706/CE20	
Project Title	CARTRIDGE EVALUATION	Logbook/Work Package No.	N/A		Ice Chest No.	WHS-033	
Shipped To (Lab)	ALS	Method of Shipment			Bill of Lading/Air Bill No.	8599 0424 0140	
Protocol	N/A	Data Turnaround	10 days		Parts and Return No.	41238	
Sample No.	Lab ID	Date	No./Type Container	Sample Analysis	Preservative		
	S16T027234	VA 8/27/16	CHARCOAL TUBE	Pyridines 16-07654-10-E1 *	N/A		
	S16T027235	VA 8/27/16	CHARCOAL TUBE	Pyridines 16-07654-10-E2 *	N/A		
	S16T027236	VA 8/27/16	CHARCOAL TUBE	Pyridines 16-07654-10-EFF-BASE *	N/A		
	S16T027237	VA 8/27/16	CHARCOAL TUBE	Pyridines 16-07654-10-E1 *	N/A		
	S16T027238	VA 8/27/16	CHARCOAL TUBE	Pyridines 16-07654-10-E2 *	N/A		
	S16T027239	VA 8/27/16	CHARCOAL TUBE	Pyridines 16-07654-10-G1 *	N/A		
	S16T027240	VA 8/27/16	CHARCOAL TUBE	Pyridines 16-07654-10-G2 *	N/A		
	S16T027241	VA 8/27/16	CHARCOAL TUBE	Pyridines 16-07654-10-E1 *	N/A		
	S16T027242	VA 8/27/16	CHARCOAL TUBE	Pyridines 16-07654-10-E2 *	N/A		
	S16T027243	VA 8/27/16	CHARCOAL TUBE	Pyridines 16-07654-10-IN-BASE *	N/A		
<b>POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes)</b> MSDS <input type="radio"/> Yes <input checked="" type="radio"/> No <b>SPECIAL INSTRUCTIONS</b> Send Results to Carl Howard IV and Greg Moore Carl Howard IV: c.howard@hawaii.gov and Gregory S. Moore: g.s.moore@hawaii.gov see SOW for email RELEASE 9 Release Contract # 55502							
Relinquished By	Print	Sign	Received By	Sign	Date/Time	Date/Time	Matrix*
Dianne Turner	Turner	8/31/16	WRPS	Julie Gradstein	8/31/16	0900	S = Soil DL = Drum Liquids SE = Sediment T = Tissue SO = Solid VI = Vipe SL = Sludge L = Liquid W = Water VA = Vegetation O = Oil A = Air X = Other DS = Drum Solids
Relinquished By	Print	Sign	Received By	Sign	Date/Time	Date/Time	
WRPS	Julie Gradstein	8/31/16	FEDEX				
Relinquished By	Print	Sign	Received By	Sign	Date/Time	Date/Time	
<b>FINAL SAMPLE DISPOSITION</b> Disposal Method (e.g., Return to customer, per lab procedure, used in process) Per lab procedure				Date/Time 9/16/16 1530			

A-6003-962 (03/05)

## C.3.11 Nitrosamines

W608150 Rev. 1, Page 1 of 15



RJ LeeGroup, Inc. | Columbia Basin Analytical Laboratories  
2710 North 20th Avenue, Pasco WA 99301  
Tel: (509) 545-4989 | Fax: (509) 544-6010

Carl Howald IV

10/05/16

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 20162544, Revision 1.

Enclosed is the final report for group 20162544 number analyzed for Nitrosamines using NIOSH 2522-Modified. This group number 20162544 has been assigned a Columbia Basin Analytical Laboratories login order number of W608150. 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 20 samples on 08/31/16 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.

*This revision is being issued per client request for the presentation of summed totals for samples that required re-extraction due to unexpectedly high analyte concentrations. The original version of this report does not include a summed total for all extractions/re-extractions for each sample.*

*X- Analyte detected above MRL on initial analysis. Analyte not detected above MRL on conformational analysis. Analyte not confirmed.*

### Positive Results

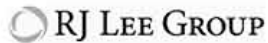
There were detectable nitrosamines concentrations above the reporting limit in the samples.

16-07654-11-A1	W608150-01	N-Nitrosodiethylamine	0.024	µg/tube	X
16-07654-11-A1	W608150-01	N-Nitrosodimethylamine	1.317	µg/tube	
16-07654-11-A1	W608150-01	N-Nitrosopiperidine	0.023	µg/tube	X
16-07654-11-B1	W608150-03	N-Nitrosodiethylamine	0.026	µg/tube	X
16-07654-11-B1	W608150-03	N-Nitrosodimethylamine	1.477	µg/tube	
16-07654-11-B1	W608150-03	N-Nitrosomethylethylamine	0.021	µg/tube	X
16-07654-11-C1	W608150-07	N-Nitrosodiethylamine	0.022	µg/tube	X
16-07654-11-C1	W608150-07	N-Nitrosodimethylamine	1.235	µg/tube	
16-07654-11-D1	W608150-09	N-Nitrosodimethylamine	1.125	µg/tube	
16-07654-11-E1	W608150-11	N-Nitrosodimethylamine	1.192	µg/tube	
16-07654-11-F1	W608150-14	N-Nitrosodimethylamine	1.32	µg/tube	
16-07654-11-G1	W608150-16	N-Nitrosodiethylamine	0.029	µg/tube	X
16-07654-11-G1	W608150-16	N-Nitrosodimethylamine	1.294	µg/tube	
16-07654-11-H1	W608150-18	N-Nitrosodimethylamine	1.405	µg/tube	

Columbia Basin Analytical Laboratories | 2710 North 20th Avenue, Pasco WA 99301 | 509.545.4989 | RJLeeGroup.com

Report Template: WRPS\_Nitrosamines\_v10 modified for Carl.rpt

Approved: 10/5/16 11:46  
Report Time Stamp: 10/06/16 16:20



#### Recovery Failures in the ICV, CCVs, LCS, RL and MRL

There were no recovery failures in the: ICV, CCV, LCS, LCSD, RL and MRL.

#### RSD Failures in the LCS and LCSDs

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.

10/05/16

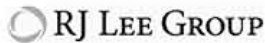
Scientist II DeNomy Dage

This report has been reviewed and approved by the following individual:

10/05/16

Scientist I Fernanda Pincheira

If you have any questions, please feel free to contact DeNomy Dage at [ddage@rjlg.com](mailto: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.: W608150  
Samples Received: 08/31/16  
Report Date: 10/05/16  
COC No.: 20162544  
Extraction Date: 9/8/2016

Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration pg/tube	RL	Qualifiers
Client Sample ID	RJLG ID						
16-07654-11-A1   S16T027288	W608150-01	08/27/16	09/24/16	N-Nitrosodimethylamine	1.24	0.207	D
		08/27/16	09/24/16	N-Nitrosodimethylamine	0.077	0.012	
		08/27/16	09/24/16	N-Nitrosomethylethylamine	<0.018	0.018	
		08/27/16	09/08/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/27/16	09/08/16	N-Nitrosodiethylamine	0.024	0.021	X
		08/27/16	09/24/16	N-Nitrosodiethylamine	<0.018	0.018	
		08/27/16	09/08/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/27/16	09/24/16	N-Nitrosodi-n-propylamine	<0.019	0.019	
		08/27/16	09/08/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/27/16	09/24/16	N-Nitrosodi-n-butylamine	<0.019	0.019	
		08/27/16	09/24/16	N-Nitrosopiperidine	<0.019	0.019	
		08/27/16	09/08/16	N-Nitrosopiperidine	0.023	0.021	X
		08/27/16	09/24/16	N-Nitrosopyrrolidine	<0.018	0.018	
		08/27/16	09/08/16	N-Nitrosopyrrolidine	<0.021	0.021	
08/27/16	09/08/16	N-Nitrosomorpholine	<0.021	0.021			
08/27/16	09/24/16	N-Nitrosomorpholine	<0.017	0.017			
16-07654-11-A2   S16T027289	W608150-02	08/27/16	09/08/16	N-Nitrosodimethylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/27/16	09/08/16	N-Nitrosodiethylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/27/16	09/08/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosopiperidine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosomorpholine	<0.021	0.021	

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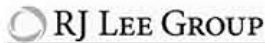
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ND = Not Detected

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Report Template: WRPS\_Nitrosamines\_v10 modified for Carl.rpt

Approved: 10/5/16 11:46  
Report Time Stamp: 10/06/16 16:20



Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration µg/tube	RL	Qualifiers
Client Sample ID	RJLG ID						
16-07654-11-B1   S16T027290	W608150-03	08/27/16	09/24/16	N-Nitrosodimethylamine	0.067	0.012	
		08/27/16	09/24/16	N-Nitrosodimethylamine	1.41	0.207	D
		08/27/16	09/24/16	N-Nitrosomethylethylamine	<0.018	0.018	
		08/27/16	09/08/16	N-Nitrosomethylethylamine	0.021	0.020	X
		08/27/16	09/24/16	N-Nitrosodiethylamine	<0.018	0.018	
		08/27/16	09/08/16	N-Nitrosodiethylamine	0.026	0.021	X
		08/27/16	09/08/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/27/16	09/24/16	N-Nitrosodi-n-propylamine	<0.019	0.019	
		08/27/16	09/24/16	N-Nitrosodi-n-butylamine	<0.019	0.019	
		08/27/16	09/08/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosopiperidine	0.021	0.021	X
		08/27/16	09/24/16	N-Nitrosopiperidine	<0.019	0.019	
		08/27/16	09/08/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/27/16	09/24/16	N-Nitrosopyrrolidine	<0.018	0.018	
		08/27/16	09/08/16	N-Nitrosomorpholine	<0.021	0.021	
		08/27/16	09/24/16	N-Nitrosomorpholine	<0.017	0.017	
16-07654-11-B2   S16T027291	W608150-04	08/27/16	09/08/16	N-Nitrosodimethylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/27/16	09/08/16	N-Nitrosodiethylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/27/16	09/08/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosopiperidine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosomorpholine	<0.021	0.021	
16-07654-11-BLANK   S16T027292	W608150-05	08/27/16	09/08/16	N-Nitrosodimethylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/27/16	09/08/16	N-Nitrosodiethylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/27/16	09/08/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosopiperidine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosomorpholine	<0.021	0.021	

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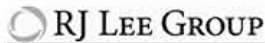
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Report Template: WRPS\_Nitrosamines\_v10 modified for Carl.rpt

Approved: 10/5/16 11:46  
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Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration µg/tube	RL	Qualifiers
Client Sample ID	RJLG ID						
16-07654-11-BLANK2   S16T027293	W608150-06	08/27/16	09/08/16	N-Nitrosodimethylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/27/16	09/08/16	N-Nitrosodiethylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/27/16	09/08/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosopiperidine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosomorpholine	<0.021	0.021	
16-07654-11-C1   S16T027294	W608150-07	08/27/16	09/25/16	N-Nitrosodimethylamine	1.15	0.207	D
		08/27/16	09/24/16	N-Nitrosodimethylamine	0.085	0.012	
		08/27/16	09/24/16	N-Nitrosomethylethylamine	<0.018	0.018	
		08/27/16	09/08/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/27/16	09/24/16	N-Nitrosodiethylamine	<0.018	0.018	
		08/27/16	09/08/16	N-Nitrosodiethylamine	0.022	0.021	X
		08/27/16	09/24/16	N-Nitrosodi-n-propylamine	<0.019	0.019	
		08/27/16	09/08/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/27/16	09/24/16	N-Nitrosodi-n-butylamine	<0.019	0.019	
		08/27/16	09/08/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosopiperidine	<0.021	0.021	
		08/27/16	09/24/16	N-Nitrosopiperidine	<0.019	0.019	
		08/27/16	09/08/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/27/16	09/24/16	N-Nitrosopyrrolidine	<0.018	0.018	
		08/27/16	09/24/16	N-Nitrosomorpholine	<0.017	0.017	
		08/27/16	09/08/16	N-Nitrosomorpholine	<0.021	0.021	
16-07654-11-C2   S16T027295	W608150-08	08/27/16	09/08/16	N-Nitrosodimethylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/27/16	09/08/16	N-Nitrosodiethylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/27/16	09/08/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosopiperidine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosomorpholine	<0.021	0.021	

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Report Template: WRPS\_Nitrosamines\_v10 modified for Carl.rpt

Approved: 10/5/16 11:46  
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Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration µg/tube	RL	Qualifiers
Client Sample ID	RJLG ID						
16-07654-11-D1   S16T027296	W608150-09	08/27/16	09/25/16	N-Nitrosodimethylamine	1.06	0.207	D
		08/27/16	09/25/16	N-Nitrosodimethylamine	0.065	0.012	
		08/27/16	09/25/16	N-Nitrosomethylethylamine	<0.018	0.018	
		08/27/16	09/08/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/27/16	09/08/16	N-Nitrosodiethylamine	<0.021	0.021	
		08/27/16	09/25/16	N-Nitrosodiethylamine	<0.018	0.018	
		08/27/16	09/25/16	N-Nitrosodi-n-propylamine	<0.019	0.019	
		08/27/16	09/08/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/27/16	09/25/16	N-Nitrosodi-n-butylamine	<0.019	0.019	
		08/27/16	09/08/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosopiperidine	<0.021	0.021	
		08/27/16	09/25/16	N-Nitrosopiperidine	<0.019	0.019	
		08/27/16	09/25/16	N-Nitrosopyrrolidine	<0.018	0.018	
		08/27/16	09/08/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosomorpholine	<0.021	0.021	
		08/27/16	09/25/16	N-Nitrosomorpholine	<0.017	0.017	
16-07654-11-D2   S16T027297	W608150-10	08/27/16	09/08/16	N-Nitrosodimethylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/27/16	09/08/16	N-Nitrosodiethylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/27/16	09/08/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosopiperidine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosomorpholine	<0.021	0.021	
16-07654-11-E1   S16T027298	W608150-11	08/27/16	09/25/16	N-Nitrosodimethylamine	1.14	0.207	D
		08/27/16	09/25/16	N-Nitrosodimethylamine	0.052	0.012	
		08/27/16	09/08/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/27/16	09/25/16	N-Nitrosomethylethylamine	<0.018	0.018	
		08/27/16	09/08/16	N-Nitrosodiethylamine	<0.021	0.021	
		08/27/16	09/25/16	N-Nitrosodiethylamine	<0.018	0.018	
		08/27/16	09/08/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/27/16	09/25/16	N-Nitrosodi-n-propylamine	<0.019	0.019	

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Report Template: WRPS\_Nitrosamines\_v10 modified for Carl.rpt

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Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration µg/tube	RL	Qualifiers
Client Sample ID	RJLG ID						
16-07654-11-E1   S16T027298	W608150-11	08/27/16	09/08/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/27/16	09/25/16	N-Nitrosodi-n-butylamine	<0.019	0.019	
		08/27/16	09/25/16	N-Nitrosopiperidine	<0.019	0.019	
		08/27/16	09/08/16	N-Nitrosopiperidine	<0.021	0.021	
		08/27/16	09/25/16	N-Nitrosopyrrolidine	<0.018	0.018	
		08/27/16	09/08/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosomorpholine	<0.021	0.021	
		08/27/16	09/25/16	N-Nitrosomorpholine	<0.017	0.017	
16-07654-11-E2   S16T027299	W608150-12	08/27/16	09/08/16	N-Nitrosodimethylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/27/16	09/08/16	N-Nitrosodiethylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/27/16	09/08/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosopiperidine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosomorpholine	<0.021	0.021	
16-07654-11-EFF-BASE   S16T027300	W608150-13	08/27/16	09/08/16	N-Nitrosodimethylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/27/16	09/08/16	N-Nitrosodiethylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/27/16	09/08/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosopiperidine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosomorpholine	<0.021	0.021	
16-07654-11-F1   S16T027301	W608150-14	08/27/16	09/25/16	N-Nitrosodimethylamine	1.26	0.207	D
		08/27/16	09/25/16	N-Nitrosodimethylamine	0.060	0.012	
		08/27/16	09/25/16	N-Nitrosomethylethylamine	<0.018	0.018	
		08/27/16	09/08/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/27/16	09/08/16	N-Nitrosodiethylamine	<0.021	0.021	
		08/27/16	09/25/16	N-Nitrosodiethylamine	<0.018	0.018	
		08/27/16	09/08/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/27/16	09/25/16	N-Nitrosodi-n-propylamine	<0.019	0.019	

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Report Template: WRPS\_Nitrosamines\_v10 modified for Carl.rpt

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Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration µg/tube	RL	Qualifiers
Client Sample ID	RJLG ID						
16-07654-11-F1   S16T027301	W608150-14	08/27/16	09/08/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/27/16	09/25/16	N-Nitrosodi-n-butylamine	<0.019	0.019	
		08/27/16	09/08/16	N-Nitrosopiperidine	<0.021	0.021	
		08/27/16	09/25/16	N-Nitrosopiperidine	<0.019	0.019	
		08/27/16	09/25/16	N-Nitrosopyrrolidine	<0.018	0.018	
		08/27/16	09/08/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosomorpholine	<0.021	0.021	
		08/27/16	09/25/16	N-Nitrosomorpholine	<0.017	0.017	
16-07654-11-F2   S16T027302	W608150-15	08/27/16	09/08/16	N-Nitrosodimethylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/27/16	09/08/16	N-Nitrosodiethylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/27/16	09/08/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosopiperidine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/27/16	09/08/16	N-Nitrosomorpholine	<0.021	0.021	
16-07654-11-G1   S16T027303	W608150-16	08/27/16	09/25/16	N-Nitrosodimethylamine	0.064	0.012	
		08/27/16	09/25/16	N-Nitrosodimethylamine	1.23	0.207	D
		08/27/16	09/25/16	N-Nitrosomethylethylamine	<0.018	0.018	
		08/27/16	09/08/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/27/16	09/25/16	N-Nitrosodiethylamine	<0.018	0.018	
		08/27/16	09/08/16	N-Nitrosodiethylamine	0.029	0.021	X
		08/27/16	09/08/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/27/16	09/25/16	N-Nitrosodi-n-propylamine	<0.019	0.019	
		08/27/16	09/08/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/27/16	09/25/16	N-Nitrosodi-n-butylamine	<0.019	0.019	
		08/27/16	09/08/16	N-Nitrosopiperidine	0.021	0.021	X
		08/27/16	09/25/16	N-Nitrosopiperidine	<0.019	0.019	
		08/27/16	09/25/16	N-Nitrosopyrrolidine	<0.018	0.018	
		08/27/16	09/08/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/27/16	09/25/16	N-Nitrosomorpholine	<0.017	0.017	
		08/27/16	09/08/16	N-Nitrosomorpholine	<0.021	0.021	

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Report Template: WRPS\_Nitrosamines\_v10 modified for Carl.rpt

Approved: 10/5/16 11:46  
Report Time Stamp: 10/06/16 16:20



Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration µg/tube	RL	Qualifiers
Client Sample ID	RJLG ID						
16-07654-11-G2   S16T027304	W608150-17	08/27/16	09/09/16	N-Nitrosodimethylamine	<0.021	0.021	
		08/27/16	09/09/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/27/16	09/09/16	N-Nitrosodiethylamine	<0.021	0.021	
		08/27/16	09/09/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/27/16	09/09/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/27/16	09/09/16	N-Nitrosopiperidine	<0.021	0.021	
		08/27/16	09/09/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/27/16	09/09/16	N-Nitrosomorpholine	<0.021	0.021	
16-07654-11-H1   S16T027305	W608150-18	08/27/16	09/25/16	N-Nitrosodimethylamine	1.34	0.207	D
		08/27/16	09/25/16	N-Nitrosodimethylamine	0.065	0.012	
		08/27/16	09/09/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/27/16	09/25/16	N-Nitrosomethylethylamine	<0.018	0.018	
		08/27/16	09/25/16	N-Nitrosodiethylamine	<0.018	0.018	
		08/27/16	09/09/16	N-Nitrosodiethylamine	<0.021	0.021	
		08/27/16	09/09/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/27/16	09/25/16	N-Nitrosodi-n-propylamine	<0.019	0.019	
		08/27/16	09/09/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/27/16	09/25/16	N-Nitrosodi-n-butylamine	<0.019	0.019	
		08/27/16	09/25/16	N-Nitrosopiperidine	<0.019	0.019	
		08/27/16	09/09/16	N-Nitrosopiperidine	<0.021	0.021	
		08/27/16	09/09/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/27/16	09/25/16	N-Nitrosopyrrolidine	<0.018	0.018	
		08/27/16	09/25/16	N-Nitrosomorpholine	<0.017	0.017	
		08/27/16	09/09/16	N-Nitrosomorpholine	<0.021	0.021	
16-07654-11-H2   S16T027306	W608150-19	08/27/16	09/09/16	N-Nitrosodimethylamine	<0.021	0.021	
		08/27/16	09/09/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/27/16	09/09/16	N-Nitrosodiethylamine	<0.021	0.021	
		08/27/16	09/09/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/27/16	09/09/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/27/16	09/09/16	N-Nitrosopiperidine	<0.021	0.021	
		08/27/16	09/09/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/27/16	09/09/16	N-Nitrosomorpholine	<0.021	0.021	

## Report Qualifiers:

A = Target Analyte media breakthrough suspect, see analytical report

D = Analyte analyzed in a dilution

E = Report concentration was above the instrument calibration range

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P = Library spectrum match, rsl &gt;80% w RT match

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Report Template: WRPS\_Nitrosamines\_v10 modified for Carl.rpt

Approved: 10/5/16 11:46  
Report Time Stamp: 10/06/16 16:20



Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration µg/tube	RL	Qualifiers
Client Sample ID	RJLG ID						
16-07654-11-IN-BASE   S16T027307	W608150-20	08/27/16	09/09/16	N-Nitrosodimethylamine	<0.021	0.021	
		08/27/16	09/09/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/27/16	09/09/16	N-Nitrosodiethylamine	<0.021	0.021	
		08/27/16	09/09/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/27/16	09/09/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/27/16	09/09/16	N-Nitrosopiperidine	<0.021	0.021	
		08/27/16	09/09/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/27/16	09/09/16	N-Nitrosomorpholine	<0.021	0.021	

## Report Qualifiers:

A = Target Analyte media breakthrough suspect, see analytical report

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 &gt;80% w RT match

R = RPD (relative percent difference) outside accepted recovery limits

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B = Analyte detected in the associated blank

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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

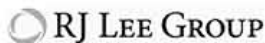
S = Spike Recovery outside accepted recovery limits

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Scientist II DeNomy Dage

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Carl Howald IV

Washington River Protection  
Solutions, LLC  
P.O. Box 850 MSIN H6-16  
Richland, WA 99352

**Quality Control**

NIOSH 2522

RJ Lee Group No.: W608150

Samples Received: 08/31/16

Report Date: 10/05/16

COC No.: 20162544

Extraction Date: 09/8/16

Client Project:

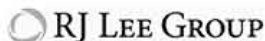
Cartridge Evaluation

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	09/08/16	0.200	0.195	0.96	0.203	101	1.61	
N-Nitrosodiethylamine	55-18-5	LCS-1	09/24/16	0.200	0.225	1.11	0.202	101	1.79	
N-Nitrosodimethylamine	62-75-9	LCS-1	09/08/16	0.200	0.195	0.97	0.201	101	3.87	
N-Nitrosodimethylamine	62-75-9	LCS-1	09/24/16	0.200	0.209	1.05	0.198	99.1	3.02	
N-Nitrosodi-n-butylamine	924-16-3	LCS-1	09/08/16	0.200	0.197	0.97	0.202	101	4.17	
N-Nitrosodi-n-butylamine	924-16-3	LCS-1	09/24/16	0.200	0.212	1.04	0.204	102	2.14	
N-Nitrosodi-n-propylamine	621-64-7	LCS-1	09/08/16	0.200	0.197	0.99	0.199	99.1	3.59	
N-Nitrosodi-n-propylamine	621-64-7	LCS-1	09/24/16	0.200	0.215	1.05	0.204	102	2.60	
N-Nitrosomethylethylamine	10595-95-6	LCS-1	09/08/16	0.200	0.196	0.98	0.200	100	1.73	
N-Nitrosomethylethylamine	10595-95-6	LCS-1	09/24/16	0.200	0.228	1.13	0.202	100	2.60	
N-Nitrosomorpholine	59-89-2	LCS-1	09/08/16	0.200	0.195	0.96	0.203	101	4.27	
N-Nitrosomorpholine	59-89-2	LCS-1	09/24/16	0.200	0.242	1.20	0.201	100	2.90	
N-Nitrosopiperidine	100-75-4	LCS-1	09/08/16	0.200	0.193	0.96	0.201	100	3.99	
N-Nitrosopiperidine	100-75-4	LCS-1	09/24/16	0.200	0.216	1.07	0.201	101	3.34	
N-Nitrosopyrrolidine	930-55-2	LCS-1	09/08/16	0.200	0.194	0.97	0.200	99.9	2.38	
N-Nitrosopyrrolidine	930-55-2	LCS-1	09/24/16	0.200	0.228	1.13	0.202	101	2.53	
N-Nitrosodiethylamine	55-18-5	LCS-2	09/08/16	0.200	0.193	0.96	0.201	100	1.61	
N-Nitrosodiethylamine	55-18-5	LCS-2	09/24/16	0.200	0.225	1.11	0.202	101	1.79	
N-Nitrosodimethylamine	62-75-9	LCS-2	09/08/16	0.200	0.201	0.97	0.208	104	3.87	
N-Nitrosodimethylamine	62-75-9	LCS-2	09/24/16	0.200	0.218	1.05	0.207	103	3.02	
N-Nitrosodi-n-butylamine	924-16-3	LCS-2	09/08/16	0.200	0.202	0.97	0.207	104	4.17	
N-Nitrosodi-n-butylamine	924-16-3	LCS-2	09/24/16	0.200	0.210	1.04	0.202	101	2.14	
N-Nitrosodi-n-propylamine	621-64-7	LCS-2	09/08/16	0.200	0.206	0.99	0.208	104	3.59	
N-Nitrosodi-n-propylamine	621-64-7	LCS-2	09/24/16	0.200	0.213	1.05	0.202	101	2.60	
N-Nitrosomethylethylamine	10595-95-6	LCS-2	09/08/16	0.200	0.200	0.98	0.204	102	1.73	
N-Nitrosomethylethylamine	10595-95-6	LCS-2	09/24/16	0.200	0.232	1.13	0.205	102	2.60	
N-Nitrosomorpholine	59-89-2	LCS-2	09/08/16	0.200	0.199	0.96	0.207	103	4.27	
N-Nitrosomorpholine	59-89-2	LCS-2	09/24/16	0.200	0.248	1.20	0.206	103	2.90	
N-Nitrosopiperidine	100-75-4	LCS-2	09/08/16	0.200	0.200	0.96	0.208	104	3.99	
N-Nitrosopiperidine	100-75-4	LCS-2	09/24/16	0.200	0.221	1.07	0.206	103	3.34	
N-Nitrosopyrrolidine	930-55-2	LCS-2	09/08/16	0.200	0.199	0.97	0.205	102	2.38	
N-Nitrosopyrrolidine	930-55-2	LCS-2	09/24/16	0.200	0.230	1.13	0.204	102	2.53	
N-Nitrosodiethylamine	55-18-5	LCS-3	09/08/16	0.200	0.189	0.96	0.197	98.3	1.61	
N-Nitrosodiethylamine	55-18-5	LCS-3	09/24/16	0.200	0.218	1.11	0.196	97.9	1.79	
N-Nitrosodimethylamine	62-75-9	LCS-3	09/08/16	0.200	0.186	0.97	0.192	95.9	3.87	

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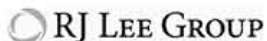
Analyte	CAS No.	Sample ID	Analyzed Date	Expected µg/tube	Result µg/tube	DE	DE Corrected	REC %	RSD %	Qualifier
N-Nitrosodimethylamine	62-75-9	LCS-3	09/24/16	0.200	0.206	1.05	0.196	97.5	3.02	
N-Nitrosodi-n-butylamine	924-16-3	LCS-3	09/08/16	0.200	0.186	0.97	0.191	95.5	4.17	
N-Nitrosodi-n-butylamine	924-16-3	LCS-3	09/24/16	0.200	0.203	1.04	0.195	97.6	2.14	
N-Nitrosodi-n-propylamine	621-64-7	LCS-3	09/08/16	0.200	0.192	0.99	0.194	96.9	3.59	
N-Nitrosodi-n-propylamine	621-64-7	LCS-3	09/24/16	0.200	0.205	1.05	0.194	97.0	2.60	
N-Nitrosomethylethylamine	10595-95-6	LCS-3	09/08/16	0.200	0.193	0.98	0.197	98.2	1.73	
N-Nitrosomethylethylamine	10595-95-6	LCS-3	09/24/16	0.200	0.220	1.13	0.194	97.2	2.60	
N-Nitrosomorpholine	59-89-2	LCS-3	09/08/16	0.200	0.183	0.96	0.190	95.2	4.27	
N-Nitrosomorpholine	59-89-2	LCS-3	09/24/16	0.200	0.234	1.20	0.194	96.9	2.90	
N-Nitrosopiperidine	100-75-4	LCS-3	09/08/16	0.200	0.185	0.96	0.192	95.9	3.99	
N-Nitrosopiperidine	100-75-4	LCS-3	09/24/16	0.200	0.207	1.07	0.193	96.3	3.34	
N-Nitrosopyrrolidine	930-55-2	LCS-3	09/08/16	0.200	0.190	0.97	0.196	97.7	2.38	
N-Nitrosopyrrolidine	930-55-2	LCS-3	09/24/16	0.200	0.219	1.13	0.194	97.1	2.53	
N-Nitrosodiethylamine	55-18-5	MB	09/08/16		0.00	0.96	0.00			
N-Nitrosodiethylamine	55-18-5	MB	09/24/16		0.00	1.11	0.00			
N-Nitrosodimethylamine	62-75-9	MB	09/08/16		0.00	0.97	0.00			
N-Nitrosodimethylamine	62-75-9	MB	09/24/16		0.00	1.05	0.00			
N-Nitrosodi-n-butylamine	924-16-3	MB	09/08/16		0.00	0.97	0.00			
N-Nitrosodi-n-butylamine	924-16-3	MB	09/24/16		0.00	1.04	0.00			
N-Nitrosodi-n-propylamine	621-64-7	MB	09/08/16		0.00	0.99	0.00			
N-Nitrosodi-n-propylamine	621-64-7	MB	09/24/16		0.00	1.05	0.00			
N-Nitrosomethylethylamine	10595-95-6	MB	09/08/16		0.00	0.98	0.00			
N-Nitrosomethylethylamine	10595-95-6	MB	09/24/16		0.00	1.13	0.00			
N-Nitrosomorpholine	59-89-2	MB	09/08/16		0.00	0.96	0.00			
N-Nitrosomorpholine	59-89-2	MB	09/24/16		0.00	1.20	0.00			
N-Nitrosopiperidine	100-75-4	MB	09/08/16		0.00	0.96	0.00			
N-Nitrosopiperidine	100-75-4	MB	09/24/16		0.00	1.07	0.00			
N-Nitrosopyrrolidine	930-55-2	MB	09/08/16		0.00	0.97	0.00			
N-Nitrosopyrrolidine	930-55-2	MB	09/24/16		0.00	1.13	0.00			
N-Nitrosodiethylamine	55-18-5	MRL	09/08/16	0.020	0.024	0.96	0.025	123		
N-Nitrosodiethylamine	55-18-5	MRL	09/24/16	0.020	0.023	1.11	0.021	107		
N-Nitrosodimethylamine	62-75-9	MRL	09/08/16	0.020	0.027	0.97	0.028	140		
N-Nitrosodimethylamine	62-75-9	MRL	09/24/16	0.020	0.024	1.05	0.023	113		
N-Nitrosodi-n-butylamine	924-16-3	MRL	09/08/16	0.020	0.026	0.97	0.027	137		
N-Nitrosodi-n-butylamine	924-16-3	MRL	09/24/16	0.020	0.020	1.04	0.019	96.5		
N-Nitrosodi-n-propylamine	621-64-7	MRL	09/08/16	0.020	0.024	0.99	0.024	121		
N-Nitrosodi-n-propylamine	621-64-7	MRL	09/24/16	0.020	0.024	1.05	0.023	117		
N-Nitrosomethylethylamine	10595-95-6	MRL	09/08/16	0.020	0.025	0.98	0.026	130		
N-Nitrosomethylethylamine	10595-95-6	MRL	09/24/16	0.020	0.027	1.13	0.024	118		
N-Nitrosomorpholine	59-89-2	MRL	09/08/16	0.020	0.024	0.96	0.025	126		
N-Nitrosomorpholine	59-89-2	MRL	09/24/16	0.020	0.028	1.20	0.023	114		
N-Nitrosopiperidine	100-75-4	MRL	09/08/16	0.020	0.022	0.96	0.023	114		

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Report Template: WRPS\_Nitrosamines\_v10 modified for Carl.rpt

Approved: 10/5/16 11:46 Report  
Time Stamp: 10/06/16 16:20





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	09/24/16	0.020	0.021	1.07	0.020	101		
N-Nitrosopyrrolidine	930-55-2	MRL	09/08/16	0.020	0.024	0.97	0.025	123		
N-Nitrosopyrrolidine	930-55-2	MRL	09/24/16	0.020	0.025	1.13	0.022	112		

## Report Qualifiers:

A = Target Analyte media breakthrough suspect, see analytical report

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 &gt;90% w RT match

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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

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Scientist II DeNomy Dage

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W608150

Assembler				CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				C.O.C. No. 20162544	
N/A								Page 1 of 2	
Collector	Contact/Requestor CARL HOWARD IV			Telephone No.	373-6861			MSIN	16-05
SAF No.	Sample Origin CARTRIDGE EVALUATION			Purchase Order/Charge Code	202706/C820			FAX	372-1878
Project Title	Logbook/ Work Package No.			Ice Chest No.				Temp.	27.1 °C
Shipped To (Lab)	Method of Shipment			Bill of Lading/Air Bill No.					
CRAL	Data Turnaround 10 DAYS			Parts and Return No.					
Protocol	N/A								
Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis			Preservative	
	SI67027288	VA 8/27/16		Nitrosamines 16-07654-11-A1 *	✓			N/A	
	SI67027289	VA 8/27/16		Nitrosamines 16-07654-11-A2	✓			N/A	
	SI67027290	VA 8/27/16		Nitrosamines 16-07654-11-B1	✓			N/A	
	SI67027291	VA 8/27/16		Nitrosamines 16-07654-11-B2	✓			N/A	
	SI67027292	VA 8/27/16		Nitrosamines 16-07654-11-BLANK	✓			N/A	
	SI67027293	VA 8/27/16		Nitrosamines 16-07654-11-BLANK2	✓			N/A	
	SI67027294	VA 8/27/16		Nitrosamines 16-07654-11-C1	✓			N/A	
	SI67027295	VA 8/27/16		Nitrosamines 16-07654-11-C2	✓			N/A	
	SI67027296	VA 8/27/16		Nitrosamines 16-07654-11-D1	✓			N/A	
	SI67027297	VA 8/27/16		Nitrosamines 16-07654-11-D2	✓			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 N Howard@rl.gov and Greg_S_Moore@rl.gov see SCW for email.			
				CONTRACT 55503		RELEASE 5			
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix*	
Relinquished By	Sharon Walker	VA	8-31-16 0900	Received By	Carl Rogers	VA	8-31-16 0900	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	KE ROGERS	VA	8-31-16 1:05	Received By	Matthew Rice	VA	08/31/16 1:05		
Relinquished By				Received By					
Relinquished By				Received By					
FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)			Disposed By			Date/Time		
	CONSUMED			KE Walker			10/03/16 2:50 PM		

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)

60608150

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST										C.O.C. No. 20162544	
										Page 2 of 2	
Assembler N/A											
Collector JONES	Contact/Requestor CARL HOWARD IV		Telephone No. 373-6861		MSIN 16-05		FAX 372-1878				
SAF No. N/A	Sample Origin CARTRIDGE EVALUATION		Purchase Order/Charge Code 20276/CB20								
Project Title CARTRIDGE EVALUATION	Logbook Work Package No. N/A		Ice Chest No.				Temp. 27.1 °C				
Shipped To (Lab) CARL	Method of Shipment		Bill of Lading/Air Bill No.								
Protocol N/A	Data Turnaround 10 DAYS		Parts and Return No.								
Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis		Preservative				
	S16T027298	VA 8/27/16		Thermosorb-N	Nitrosamines 16-07654-11-E1 ✓		N/A				
	S16T027299	VA 8/27/16		Thermosorb-N	Nitrosamines 16-07654-11-E2 ✓		N/A				
	S16T027300	VA 8/27/16		Thermosorb-N	Nitrosamines 16-07654-11-EFF-BASE ✓		N/A				
	S16T027301	VA 8/27/16		Thermosorb-N	Nitrosamines 16-07654-11-F1 ✓		N/A				
	S16T027302	VA 8/27/16		Thermosorb-N	Nitrosamines 16-07654-11-F2 ✓		N/A				
	S16T027303	VA 8/27/16		Thermosorb-N	Nitrosamines 16-07654-11-G1 ✓		N/A				
	S16T027304	VA 8/27/16		Thermosorb-N	Nitrosamines 16-07654-11-G2 ✓		N/A				
	S16T027305	VA 8/27/16		Thermosorb-N	Nitrosamines 16-07654-11-H1 ✓		N/A				
	S16T027306	VA 8/27/16		Thermosorb-N	Nitrosamines 16-07654-11-H2 ✓		N/A				
	S16T027307	VA 8/27/16		Thermosorb-N	Nitrosamines 16-07654-11-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.M.Howard@fl.gov and Greg.S.Moore@fl.gov see SWM for email CONTRACT 55503 RELEASE 5											
Hold Time											
Relinquished By <u>Shawn L. McLeod</u> <u>8-31-16 09:00</u> Received By <u>Re Hoopes</u> <u>8-31-16 09:00</u> Relinquished By <u>Re Hoopes</u> <u>8-31-16 1:05</u> Received By <u>Matthew Rice</u> <u>08/31/16 1:05</u> Relinquished By _____ Date/Time _____ Received By _____ Date/Time _____ Relinquished By _____ Date/Time _____ Received By _____ Date/Time _____											
Disposed By <u>Leo Harkin</u> <u>10/03/16 2:10 PM</u> Disposal Method (e.g., Return to customer, per lab procedure, used in process) <b>CONSUMED</b>											
FINAL SAMPLE DISPOSITION _____ Date/Time _____											

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



RJ LeeGroup, Inc. | Columbia Basin Analytical Laboratories  
2710 North 20th Avenue, Pasco WA 99301  
Tel: (509) 545-4989 | Fax: (509) 544-6010

Carl Howald IV

10/11/16

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 20162543**

Enclosed is the final report for group 20162543 number analyzed for Nitrosamines using NIOSH 2522-Modified. This group number 20162543 has been assigned a Columbia Basin Analytical Laboratories login order number of W608151. 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 20 samples on 08/31/16 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.

*\* Analyte not detected at or above MRL on initial analysis. Analyte detected at or above MRL on confirmational analysis. Analyte not confirmed.*

*X- Analyte detected at or above MRL on initial analysis. Analyte not detected at or above MRL on conformational analysis. Analyte not confirmed.*

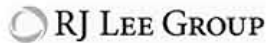
**Positive Results**

There were detectable nitrosamines concentrations at or above the reporting limit in the samples.

16-07645-11-A1	W608151-01	N-Nitrosodimethylamine	1.361	µg/tube	
16-07645-11-B1	W608151-03	N-Nitrosodimethylamine	1.366	µg/tube	
16-07645-11-B1	W608151-03	N-Nitrosomethylethylamine	0.021	µg/tube	X
16-07645-11-C1	W608151-07	N-Nitrosodimethylamine	1.308	µg/tube	
16-07645-11-D1	W608151-09	N-Nitrosodimethylamine	1.358	µg/tube	
16-07645-11-E1	W608151-11	N-Nitrosodimethylamine	1.416	µg/tube	
16-07645-11-F1	W608151-14	N-Nitrosodimethylamine	1.41	µg/tube	
16-07645-11-G1	W608151-16	N-Nitrosodimethylamine	1.527	µg/tube	
16-07645-11-H1	W608151-18	N-Nitrosodimethylamine	1.476	µg/tube	

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#### Recovery Failures in the ICV, CCVs, LCS, RL and MRL

There were no recovery failures in the: ICV, CCVs, LCSs, LCSD, RL and MRL.

#### RSD Failures in the LCSs

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.

10/10/16

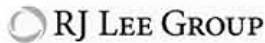
Scientist II DeNomy Dage

This report has been reviewed and approved by the following individual:

10/11/16

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.: W608151  
Samples Received: 08/31/16  
Report Date: 10/11/16  
COC No.: 20162543  
Extraction Date: 9/12/2016

Client Sample ID	Sample Identification RJLG ID	Sampling Date	Analysis Date	Analyte	Concentration µg/tube	RL	Qualifiers
16-07645-11-A1   S16T027267	W608151-01	08/26/16	10/03/16	N-Nitrosodimethylamine	1.26	0.216	D
		08/26/16	10/03/16	N-Nitrosodimethylamine	0.101	0.018	
		08/26/16	10/03/16	N-Nitrosomethylethylamine	<0.022	0.022	
		08/26/16	09/25/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/26/16	09/25/16	N-Nitrosodiethylamine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosodiethylamine	<0.022	0.022	
		08/26/16	09/25/16	N-Nitrosodi-n-propylamine	<0.021	0.021	
		08/26/16	10/03/16	N-Nitrosodi-n-propylamine	<0.023	0.023	
		08/26/16	09/25/16	N-Nitrosodi-n-butylamine	<0.021	0.021	*
		08/26/16	10/03/16	N-Nitrosodi-n-butylamine	<0.023	0.023	
		08/26/16	10/03/16	N-Nitrosopiperidine	<0.023	0.023	
		08/26/16	09/25/16	N-Nitrosopiperidine	<0.021	0.021	
		08/26/16	10/03/16	N-Nitrosopyrrolidine	<0.022	0.022	
		08/26/16	09/25/16	N-Nitrosopyrrolidine	<0.023	0.023	*
16-07645-11-A2   S16T027268	W608151-02	08/26/16	09/25/16	N-Nitrosomorpholine	<0.021	0.021	*
		08/26/16	10/03/16	N-Nitrosomorpholine	<0.022	0.022	
		08/26/16	09/25/16	N-Nitrosodimethylamine	<0.022	0.022	
		08/26/16	09/25/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/26/16	09/25/16	N-Nitrosodiethylamine	<0.020	0.020	
		08/26/16	09/25/16	N-Nitrosodi-n-propylamine	<0.021	0.021	
		08/26/16	09/25/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/26/16	09/25/16	N-Nitrosopiperidine	<0.021	0.021	
		08/26/16	09/25/16	N-Nitrosopyrrolidine	<0.023	0.023	
		08/26/16	09/25/16	N-Nitrosomorpholine	<0.021	0.021	

### Report Qualifiers:

A = Target Analyte media breakthrough suspect, see analytical report

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 >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

L = 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

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Report Template: WRPS\_Nitrosamines\_v10 modified for Carl with LT\_Eq

Approved: 10/10/16 15:06  
Report Time Stamp: 10/11/16 12:35



Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration µg/tube	RL	Qualifiers
Client Sample ID	RJLG ID						
16-07645-11-B1   S16T027269	W608151-03	08/26/16	10/03/16	N-Nitrosodimethylamine	0.056	0.018	
		08/26/16	10/03/16	N-Nitrosodimethylamine	1.31	0.216	D
		08/26/16	10/03/16	N-Nitrosomethylethylamine	<0.022	0.022	
		08/26/16	09/25/16	N-Nitrosomethylethylamine	0.021	0.020	X
		08/26/16	10/03/16	N-Nitrosodiethylamine	<0.022	0.022	
		08/26/16	09/25/16	N-Nitrosodiethylamine	<0.020	0.020	
		08/26/16	09/25/16	N-Nitrosodi-n-propylamine	<0.021	0.021	
		08/26/16	10/03/16	N-Nitrosodi-n-propylamine	<0.023	0.023	
		08/26/16	10/03/16	N-Nitrosodi-n-butylamine	<0.023	0.023	
		08/26/16	09/25/16	N-Nitrosodi-n-butylamine	<0.021	0.021	*
		08/26/16	09/25/16	N-Nitrosopiperidine	<0.021	0.021	
		08/26/16	10/03/16	N-Nitrosopiperidine	<0.023	0.023	
		08/26/16	09/25/16	N-Nitrosopyrrolidine	<0.023	0.023	
		08/26/16	10/03/16	N-Nitrosopyrrolidine	<0.022	0.022	
		08/26/16	09/25/16	N-Nitrosomorpholine	<0.021	0.021	
		08/26/16	10/03/16	N-Nitrosomorpholine	<0.022	0.022	
16-07645-11-B2   S16T027270	W608151-04	08/26/16	09/25/16	N-Nitrosodimethylamine	<0.022	0.022	
		08/26/16	09/25/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/26/16	09/25/16	N-Nitrosodiethylamine	<0.020	0.020	
		08/26/16	09/25/16	N-Nitrosodi-n-propylamine	<0.021	0.021	
		08/26/16	09/25/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/26/16	09/25/16	N-Nitrosopiperidine	<0.021	0.021	
		08/26/16	09/25/16	N-Nitrosopyrrolidine	<0.023	0.023	
		08/26/16	09/25/16	N-Nitrosomorpholine	<0.021	0.021	
16-07645-11-BLANK   S16T027271	W608151-05	08/26/16	09/25/16	N-Nitrosodimethylamine	<0.022	0.022	
		08/26/16	09/25/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/26/16	09/25/16	N-Nitrosodiethylamine	<0.020	0.020	
		08/26/16	09/25/16	N-Nitrosodi-n-propylamine	<0.021	0.021	
		08/26/16	09/25/16	N-Nitrosodi-n-butylamine	<0.021	0.021	
		08/26/16	09/25/16	N-Nitrosopiperidine	<0.021	0.021	
		08/26/16	09/25/16	N-Nitrosopyrrolidine	<0.023	0.023	
		08/26/16	09/25/16	N-Nitrosomorpholine	<0.021	0.021	

## Report Qualifiers:

A = Target Analyte media breakthrough suspect, see analytical report

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 &gt;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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Report Template: WRPS\_Nitrosamines\_v10 modified for Carl with LT\_Eq

Approved: 10/10/16 15:06  
 Report Time Stamp: 10/11/16 12:35



Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration µg/tube	RL	Qualifiers
Client Sample ID	RJLG ID						
16-07645-11-BLANK2   S16T027272	W608151-06	08/26/16	09/30/16	N-Nitrosodimethylamine	<0.021	0.021	
		08/26/16	09/30/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/26/16	09/30/16	N-Nitrosodiethylamine	<0.020	0.020	
		08/26/16	09/30/16	N-Nitrosodi-n-propylamine	<0.019	0.019	
		08/26/16	09/30/16	N-Nitrosodi-n-butylamine	<0.019	0.019	
		08/26/16	09/30/16	N-Nitrosopiperidine	<0.020	0.020	
		08/26/16	09/30/16	N-Nitrosopyrrolidine	<0.020	0.020	
		08/26/16	09/30/16	N-Nitrosomorpholine	<0.019	0.019	
16-07645-11-C1   S16T027273	W608151-07	08/26/16	10/03/16	N-Nitrosodimethylamine	1.27	0.210	D
		08/26/16	10/03/16	N-Nitrosodimethylamine	0.038	0.018	
		08/26/16	10/03/16	N-Nitrosomethylethylamine	<0.022	0.022	
		08/26/16	09/30/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosodiethylamine	<0.022	0.022	
		08/26/16	09/30/16	N-Nitrosodiethylamine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosodi-n-propylamine	<0.023	0.023	
		08/26/16	09/30/16	N-Nitrosodi-n-propylamine	<0.019	0.019	
		08/26/16	10/03/16	N-Nitrosodi-n-butylamine	<0.023	0.023	
		08/26/16	09/30/16	N-Nitrosodi-n-butylamine	<0.019	0.019	*
		08/26/16	09/30/16	N-Nitrosopiperidine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosopiperidine	<0.023	0.023	
		08/26/16	09/30/16	N-Nitrosopyrrolidine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosopyrrolidine	<0.022	0.022	
		08/26/16	10/03/16	N-Nitrosomorpholine	<0.022	0.022	
		08/26/16	09/30/16	N-Nitrosomorpholine	<0.019	0.019	
16-07645-11-C2   S16T027274	W608151-08	08/26/16	09/30/16	N-Nitrosodimethylamine	<0.021	0.021	
		08/26/16	09/30/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/26/16	09/30/16	N-Nitrosodiethylamine	<0.020	0.020	
		08/26/16	09/30/16	N-Nitrosodi-n-propylamine	<0.019	0.019	
		08/26/16	09/30/16	N-Nitrosodi-n-butylamine	<0.019	0.019	
		08/26/16	09/30/16	N-Nitrosopiperidine	<0.020	0.020	
		08/26/16	09/30/16	N-Nitrosopyrrolidine	<0.020	0.020	
		08/26/16	09/30/16	N-Nitrosomorpholine	<0.019	0.019	

## Report Qualifiers:

A = Target Analyte media breakthrough suspect, see analytical report

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Report Template: WRPS\_Nitrosamines\_v10 modified for Carl with LT\_Eq

 Approved: 10/10/16 15:06  
 Report Time Stamp: 10/11/16 12:35





Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration µg/tube	RL	Qualifiers
Client Sample ID	RJLG ID						
16-07645-11-D1   S16T027275	W608151-09	08/26/16	10/03/16	N-Nitrosodimethylamine	1.28	0.210	D
		08/26/16	10/03/16	N-Nitrosodimethylamine	0.078	0.018	
		08/26/16	10/03/16	N-Nitrosomethylethylamine	<0.022	0.022	
		08/26/16	09/30/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/26/16	09/30/16	N-Nitrosodiethylamine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosodiethylamine	<0.022	0.022	
		08/26/16	10/03/16	N-Nitrosodi-n-propylamine	<0.023	0.023	
		08/26/16	09/30/16	N-Nitrosodi-n-propylamine	<0.019	0.019	
		08/26/16	10/03/16	N-Nitrosodi-n-butylamine	<0.023	0.023	
		08/26/16	09/30/16	N-Nitrosodi-n-butylamine	<0.019	0.019	*
		08/26/16	09/30/16	N-Nitrosopiperidine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosopiperidine	<0.023	0.023	
		08/26/16	10/03/16	N-Nitrosopyrrolidine	<0.022	0.022	
		08/26/16	09/30/16	N-Nitrosopyrrolidine	<0.020	0.020	
16-07645-11-D2   S16T027276	W608151-10	08/26/16	10/01/16	N-Nitrosodimethylamine	<0.021	0.021	
		08/26/16	10/01/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosodiethylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosodi-n-propylamine	<0.019	0.019	
		08/26/16	10/01/16	N-Nitrosodi-n-butylamine	<0.019	0.019	
		08/26/16	10/01/16	N-Nitrosopiperidine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosopyrrolidine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosomorpholine	<0.019	0.019	
16-07645-11-E1   S16T027277	W608151-11	08/26/16	10/03/16	N-Nitrosodimethylamine	1.38	0.211	D
		08/26/16	10/03/16	N-Nitrosodimethylamine	0.036	0.018	
		08/26/16	10/01/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosomethylethylamine	<0.022	0.022	
		08/26/16	10/01/16	N-Nitrosodiethylamine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosodiethylamine	<0.022	0.022	
		08/26/16	10/01/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosodi-n-propylamine	<0.023	0.023	

## Report Qualifiers:

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Report Template: WRPS\_Nitrosamines\_v10 modified for Carl with LT\_Eq

 Approved: 10/10/16 15:06  
 Report Time Stamp: 10/11/16 12:35



Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration µg/tube	RL	Qualifiers
Client Sample ID	RJLG ID						
16-07645-11-E1   S16T027277	W608151-11	08/26/16	10/01/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosodi-n-butylamine	<0.023	0.023	
		08/26/16	10/03/16	N-Nitrosopiperidine	<0.023	0.023	
		08/26/16	10/01/16	N-Nitrosopiperidine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosopyrrolidine	<0.022	0.022	
		08/26/16	10/01/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/26/16	10/01/16	N-Nitrosomorpholine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosomorpholine	<0.022	0.022	
16-07645-11-E2   S16T027278	W608151-12	08/26/16	10/01/16	N-Nitrosodimethylamine	<0.021	0.021	
		08/26/16	10/01/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosodiethylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosopiperidine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/26/16	10/01/16	N-Nitrosomorpholine	<0.020	0.020	
16-07645-11-EFF-BASE   S16T027279	W608151-13	08/26/16	10/01/16	N-Nitrosodimethylamine	<0.021	0.021	
		08/26/16	10/01/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosodiethylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosopiperidine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/26/16	10/01/16	N-Nitrosomorpholine	<0.020	0.020	
16-07645-11-F1   S16T027280	W608151-14	08/26/16	10/03/16	N-Nitrosodimethylamine	1.33	0.211	D
		08/26/16	10/03/16	N-Nitrosodimethylamine	0.080	0.018	
		08/26/16	10/03/16	N-Nitrosomethylethylamine	<0.022	0.022	
		08/26/16	10/01/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosodiethylamine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosodiethylamine	<0.022	0.022	
		08/26/16	10/01/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosodi-n-propylamine	<0.023	0.023	

## Report Qualifiers:

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Report Template: WRPS\_Nitrosamines\_v10 modified for Carl with LT\_Eq

 Approved: 10/10/16 15:06  
 Report Time Stamp: 10/11/16 12:35



Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration µg/tube	RL	Qualifiers
Client Sample ID	RJLG ID						
16-07645-11-F1   S16T027280	W608151-14	08/26/16	10/01/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosodi-n-butylamine	<0.023	0.023	
		08/26/16	10/01/16	N-Nitrosopiperidine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosopiperidine	<0.023	0.023	
		08/26/16	10/03/16	N-Nitrosopyrrolidine	<0.022	0.022	
		08/26/16	10/01/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/26/16	10/01/16	N-Nitrosomorpholine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosomorpholine	<0.022	0.022	
16-07645-11-F2   S16T027281	W608151-15	08/26/16	10/01/16	N-Nitrosodimethylamine	<0.021	0.021	
		08/26/16	10/01/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosodiethylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosopiperidine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/26/16	10/01/16	N-Nitrosomorpholine	<0.020	0.020	
16-07645-11-G1   S16T027282	W608151-16	08/26/16	10/03/16	N-Nitrosodimethylamine	0.047	0.018	
		08/26/16	10/03/16	N-Nitrosodimethylamine	1.48	0.211	D
		08/26/16	10/03/16	N-Nitrosomethylethylamine	<0.022	0.022	
		08/26/16	10/01/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosodiethylamine	<0.022	0.022	
		08/26/16	10/01/16	N-Nitrosodiethylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosodi-n-propylamine	<0.023	0.023	
		08/26/16	10/01/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosodi-n-butylamine	<0.023	0.023	
		08/26/16	10/01/16	N-Nitrosopiperidine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosopiperidine	<0.023	0.023	
		08/26/16	10/03/16	N-Nitrosopyrrolidine	<0.022	0.022	
		08/26/16	10/01/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/26/16	10/03/16	N-Nitrosomorpholine	<0.022	0.022	
		08/26/16	10/01/16	N-Nitrosomorpholine	<0.020	0.020	

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Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration µg/tube	RL	Qualifiers
Client Sample ID	RJLG ID						
16-07645-11-G2   S16T027283	W608151-17	08/26/16	10/01/16	N-Nitrosodimethylamine	<0.021	0.021	
		08/26/16	10/01/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosodiethylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosopiperidine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/26/16	10/01/16	N-Nitrosomorpholine	<0.020	0.020	
16-07645-11-H1   S16T027284	W608151-18	08/26/16	10/03/16	N-Nitrosodimethylamine	1.42	0.211	D
		08/26/16	10/03/16	N-Nitrosodimethylamine	0.056	0.018	
		08/26/16	10/01/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosomethylethylamine	<0.022	0.022	
		08/26/16	10/03/16	N-Nitrosodiethylamine	<0.022	0.022	
		08/26/16	10/01/16	N-Nitrosodiethylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosodi-n-propylamine	<0.023	0.023	
		08/26/16	10/01/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		08/26/16	10/03/16	N-Nitrosodi-n-butylamine	<0.023	0.023	
		08/26/16	10/03/16	N-Nitrosopiperidine	<0.023	0.023	
		08/26/16	10/01/16	N-Nitrosopiperidine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/26/16	10/03/16	N-Nitrosopyrrolidine	<0.022	0.022	
		08/26/16	10/03/16	N-Nitrosomorpholine	<0.022	0.022	
		08/26/16	10/01/16	N-Nitrosomorpholine	<0.020	0.020	
16-07645-11-H2   S16T027285	W608151-19	08/26/16	10/01/16	N-Nitrosodimethylamine	<0.021	0.021	
		08/26/16	10/01/16	N-Nitrosomethylethylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosodiethylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosopiperidine	<0.020	0.020	
		08/26/16	10/01/16	N-Nitrosopyrrolidine	<0.021	0.021	
		08/26/16	10/01/16	N-Nitrosomorpholine	<0.020	0.020	

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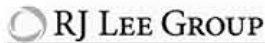
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Report Template: WRPS\_Nitrosamines\_v10 modified for Carl with LT\_Eq

 Approved: 10/10/16 15:06  
 Report Time Stamp: 10/11/16 12:35



Client Sample ID	Sample Identification		Sampling Date	Analysis Date	Analyte	Concentration µg/tube	RL	Qualifiers
	RJLG ID							
16-07645-11-IN-BASE   S16T027286	W608151-20		08/26/16	10/01/16	N-Nitrosodimethylamine	<0.021	0.021	
			08/26/16	10/01/16	N-Nitrosomethylethylamine	<0.020	0.020	
			08/26/16	10/01/16	N-Nitrosodiethylamine	<0.020	0.020	
			08/26/16	10/01/16	N-Nitrosodi-n-propylamine	<0.020	0.020	
			08/26/16	10/01/16	N-Nitrosodi-n-butylamine	<0.020	0.020	
			08/26/16	10/01/16	N-Nitrosopiperidine	<0.020	0.020	
			08/26/16	10/01/16	N-Nitrosopyrrolidine	<0.021	0.021	
			08/26/16	10/01/16	N-Nitrosomorpholine	<0.020	0.020	

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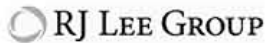
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These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, RJ Lee Group will store the samples for a period of ninety (90) days before discarding. A shipping and handling fee will be assessed for the return of any samples. Unless otherwise noted, samples were received in an acceptable condition. This laboratory operates in accordance with ISO 17025 guidelines, and holds limited scopes of accreditation under ORELAP Lab Code 4061 AIHA-LAP, LLC Lab ID 178656 EPA ID WA01195 and WA DOE Lab ID CES9. This report may not be used to claim product endorsement by any laboratory accrediting agency. The results contained in this report relate only to the items tested or to the sample(s) as received by the laboratory. Any reproduction of this document must be in full for the report to be valid. Quality control data is available upon request.



Carl Howald IV

Washington River Protection  
Solutions, LLC  
P.O. Box 850 MSIN H6-16  
Richland, WA 99352

## Quality Control

NIOSH 2522

RJ Lee Group No.: W608151  
Samples Received: 08/31/16  
Report Date: 10/11/16  
COC No.: 20162543  
Extraction Date: 09/12/16

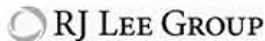
Client Project:  
Cartridge Evaluation

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	09/25/16	0.200	0.198	1.00	0.199	99.1	1.50	
N-Nitrosodiethylamine	55-18-5	LCS-1	09/30/16	0.200	0.202	1.00	0.202	101	2.66	
N-Nitrosodiethylamine	55-18-5	LCS-1	10/01/16	0.200	0.195	0.99	0.197	98.3	2.68	
N-Nitrosodiethylamine	55-18-5	LCS-1	10/03/16	0.200	0.184	0.90	0.204	102	1.70	
N-Nitrosodimethylamine	62-75-9	LCS-1	09/25/16	0.200	0.186	0.93	0.201	100	6.82	
N-Nitrosodimethylamine	62-75-9	LCS-1	09/30/16	0.200	0.192	0.95	0.202	101	5.66	
N-Nitrosodimethylamine	62-75-9	LCS-1	10/01/16	0.200	0.189	0.95	0.199	99.6	5.23	
N-Nitrosodimethylamine	62-75-9	LCS-1	10/03/16	0.200	0.181	0.91	0.199	99.2	2.64	
N-Nitrosodi-n-butylamine	924-16-3	LCS-1	09/25/16	0.200	0.190	0.95	0.201	100	0.302	
N-Nitrosodi-n-butylamine	924-16-3	LCS-1	09/30/16	0.200	0.215	1.07	0.201	100	0.765	
N-Nitrosodi-n-butylamine	924-16-3	LCS-1	10/01/16	0.200	0.192	1.00	0.193	96.1	3.36	
N-Nitrosodi-n-butylamine	924-16-3	LCS-1	10/03/16	0.200	0.178	0.86	0.206	103	2.92	
N-Nitrosodi-n-propylamine	621-64-7	LCS-1	09/25/16	0.200	0.191	0.95	0.201	100	0.437	
N-Nitrosodi-n-propylamine	621-64-7	LCS-1	09/30/16	0.200	0.206	1.03	0.199	99.7	1.86	
N-Nitrosodi-n-propylamine	621-64-7	LCS-1	10/01/16	0.200	0.195	0.99	0.196	98.0	2.19	
N-Nitrosodi-n-propylamine	621-64-7	LCS-1	10/03/16	0.200	0.183	0.88	0.207	104	4.06	
N-Nitrosomethylethylamine	10595-95-6	LCS-1	09/25/16	0.200	0.195	0.99	0.197	98.6	4.70	
N-Nitrosomethylethylamine	10595-95-6	LCS-1	09/30/16	0.200	0.203	1.01	0.200	100	3.09	
N-Nitrosomethylethylamine	10595-95-6	LCS-1	10/01/16	0.200	0.197	0.99	0.200	99.7	1.73	
N-Nitrosomethylethylamine	10595-95-6	LCS-1	10/03/16	0.200	0.188	0.92	0.205	102	2.53	
N-Nitrosomorpholine	59-89-2	LCS-1	09/25/16	0.200	0.184	0.93	0.197	98.6	2.49	
N-Nitrosomorpholine	59-89-2	LCS-1	09/30/16	0.200	0.207	1.04	0.199	99.4	2.67	
N-Nitrosomorpholine	59-89-2	LCS-1	10/01/16	0.200	0.197	0.98	0.200	99.9	1.42	
N-Nitrosomorpholine	59-89-2	LCS-1	10/03/16	0.200	0.185	0.90	0.206	103	2.54	
N-Nitrosopiperidine	100-75-4	LCS-1	09/25/16	0.200	0.189	0.93	0.203	101	3.51	
N-Nitrosopiperidine	100-75-4	LCS-1	09/30/16	0.200	0.203	1.02	0.198	98.9	3.28	
N-Nitrosopiperidine	100-75-4	LCS-1	10/01/16	0.200	0.192	0.98	0.196	98.1	2.60	
N-Nitrosopiperidine	100-75-4	LCS-1	10/03/16	0.200	0.179	0.88	0.204	102	1.90	
N-Nitrosopyrrolidine	930-55-2	LCS-1	09/25/16	0.200	0.179	0.86	0.208	104	6.58	
N-Nitrosopyrrolidine	930-55-2	LCS-1	09/30/16	0.200	0.202	1.00	0.203	101	4.48	
N-Nitrosopyrrolidine	930-55-2	LCS-1	10/01/16	0.200	0.192	0.96	0.199	99.3	6.12	
N-Nitrosopyrrolidine	930-55-2	LCS-1	10/03/16	0.200	0.180	0.89	0.201	101	2.62	
N-Nitrosodiethylamine	55-18-5	LCS-2	09/25/16	0.200	0.203	1.00	0.204	102	1.50	
N-Nitrosodiethylamine	55-18-5	LCS-2	09/30/16	0.200	0.205	1.00	0.205	102	2.66	
N-Nitrosodiethylamine	55-18-5	LCS-2	10/01/16	0.200	0.204	0.99	0.206	103	2.68	

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Report Template: WRPS\_Nitrosamines\_v10 modified for Carl with LT\_Eq

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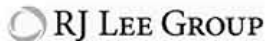


Analyte	CAS No.	Sample ID	Analyzed Date	Expected µg/tube	Result µg/tube	DE	DE Corrected	REC %	RSD %	Qualifier
N-Nitrosodiethylamine	55-18-5	LCS-2	10/03/16	0.200	0.178	0.90	0.197	98.5	1.70	
N-Nitrosodimethylamine	62-75-9	LCS-2	09/25/16	0.200	0.198	0.93	0.214	107	6.82	
N-Nitrosodimethylamine	62-75-9	LCS-2	09/30/16	0.200	0.201	0.95	0.211	105	5.66	
N-Nitrosodimethylamine	62-75-9	LCS-2	10/01/16	0.200	0.200	0.95	0.211	105	5.23	
N-Nitrosodimethylamine	62-75-9	LCS-2	10/03/16	0.200	0.178	0.91	0.195	97.8	2.64	
N-Nitrosodi-n-butylamine	924-16-3	LCS-2	09/25/16	0.200	0.190	0.95	0.201	99.9	0.302	
N-Nitrosodi-n-butylamine	924-16-3	LCS-2	09/30/16	0.200	0.216	1.07	0.202	101	0.765	
N-Nitrosodi-n-butylamine	924-16-3	LCS-2	10/01/16	0.200	0.204	1.00	0.205	102	3.36	
N-Nitrosodi-n-butylamine	924-16-3	LCS-2	10/03/16	0.200	0.170	0.86	0.197	98.7	2.92	
N-Nitrosodi-n-propylamine	621-64-7	LCS-2	09/25/16	0.200	0.191	0.95	0.201	100	0.437	
N-Nitrosodi-n-propylamine	621-64-7	LCS-2	09/30/16	0.200	0.211	1.03	0.204	102	1.86	
N-Nitrosodi-n-propylamine	621-64-7	LCS-2	10/01/16	0.200	0.204	0.99	0.205	102	2.19	
N-Nitrosodi-n-propylamine	621-64-7	LCS-2	10/03/16	0.200	0.169	0.88	0.191	95.6	4.06	
N-Nitrosomethylethylamine	10595-95-6	LCS-2	09/25/16	0.200	0.208	0.99	0.211	105	4.70	
N-Nitrosomethylethylamine	10595-95-6	LCS-2	09/30/16	0.200	0.209	1.01	0.206	103	3.09	
N-Nitrosomethylethylamine	10595-95-6	LCS-2	10/01/16	0.200	0.201	0.99	0.204	102	1.73	
N-Nitrosomethylethylamine	10595-95-6	LCS-2	10/03/16	0.200	0.179	0.92	0.195	97.3	2.53	
N-Nitrosomorpholine	59-89-2	LCS-2	09/25/16	0.200	0.192	0.93	0.206	103	2.49	
N-Nitrosomorpholine	59-89-2	LCS-2	09/30/16	0.200	0.214	1.04	0.206	103	2.67	
N-Nitrosomorpholine	59-89-2	LCS-2	10/01/16	0.200	0.200	0.98	0.203	101	1.42	
N-Nitrosomorpholine	59-89-2	LCS-2	10/03/16	0.200	0.176	0.90	0.196	97.7	2.54	
N-Nitrosopiperidine	100-75-4	LCS-2	09/25/16	0.200	0.192	0.93	0.206	103	3.51	
N-Nitrosopiperidine	100-75-4	LCS-2	09/30/16	0.200	0.213	1.02	0.208	104	3.28	
N-Nitrosopiperidine	100-75-4	LCS-2	10/01/16	0.200	0.202	0.98	0.206	103	2.60	
N-Nitrosopiperidine	100-75-4	LCS-2	10/03/16	0.200	0.172	0.88	0.196	98.0	1.90	
N-Nitrosopyrrolidine	930-55-2	LCS-2	09/25/16	0.200	0.178	0.86	0.207	104	6.58	
N-Nitrosopyrrolidine	930-55-2	LCS-2	09/30/16	0.200	0.207	1.00	0.208	104	4.48	
N-Nitrosopyrrolidine	930-55-2	LCS-2	10/01/16	0.200	0.205	0.96	0.213	106	6.12	
N-Nitrosopyrrolidine	930-55-2	LCS-2	10/03/16	0.200	0.174	0.89	0.195	97.1	2.62	
N-Nitrosodiethylamine	55-18-5	LCS-3	09/25/16	0.200	0.198	1.00	0.199	99.2	1.50	
N-Nitrosodiethylamine	55-18-5	LCS-3	09/30/16	0.200	0.195	1.00	0.195	97.0	2.66	
N-Nitrosodiethylamine	55-18-5	LCS-3	10/01/16	0.200	0.195	0.99	0.197	98.6	2.68	
N-Nitrosodiethylamine	55-18-5	LCS-3	10/03/16	0.200	0.180	0.90	0.200	99.7	1.70	
N-Nitrosodimethylamine	62-75-9	LCS-3	09/25/16	0.200	0.173	0.93	0.187	93.0	6.82	
N-Nitrosodimethylamine	62-75-9	LCS-3	09/30/16	0.200	0.179	0.95	0.188	94.1	5.66	
N-Nitrosodimethylamine	62-75-9	LCS-3	10/01/16	0.200	0.180	0.95	0.190	95.0	5.23	
N-Nitrosodimethylamine	62-75-9	LCS-3	10/03/16	0.200	0.188	0.91	0.206	103	2.64	
N-Nitrosodi-n-butylamine	924-16-3	LCS-3	09/25/16	0.200	0.189	0.95	0.199	99.8	0.302	
N-Nitrosodi-n-butylamine	924-16-3	LCS-3	09/30/16	0.200	0.213	1.07	0.199	99.2	0.765	
N-Nitrosodi-n-butylamine	924-16-3	LCS-3	10/01/16	0.200	0.203	1.00	0.204	102	3.36	
N-Nitrosodi-n-butylamine	924-16-3	LCS-3	10/03/16	0.200	0.169	0.86	0.196	97.9	2.92	
N-Nitrosodi-n-propylamine	621-64-7	LCS-3	09/25/16	0.200	0.189	0.95	0.199	99.5	0.437	

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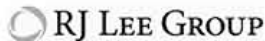
Analyte	CAS No.	Sample ID	Analyzed Date	Expected µg/tube	Result µg/tube	DE	DE Corrected	REC %	RSD %	Qualifier
N-Nitrosodi-n-propylamine	621-64-7	LCS-3	09/30/16	0.200	0.204	1.03	0.197	98.3	1.86	
N-Nitrosodi-n-propylamine	621-64-7	LCS-3	10/01/16	0.200	0.199	0.99	0.200	99.7	2.19	
N-Nitrosodi-n-propylamine	621-64-7	LCS-3	10/03/16	0.200	0.178	0.88	0.202	101	4.06	
N-Nitrosomethylethylamine	10595-95-6	LCS-3	09/25/16	0.200	0.190	0.99	0.192	96.2	4.70	
N-Nitrosomethylethylamine	10595-95-6	LCS-3	09/30/16	0.200	0.197	1.01	0.194	96.9	3.09	
N-Nitrosomethylethylamine	10595-95-6	LCS-3	10/01/16	0.200	0.195	0.99	0.198	98.5	1.73	
N-Nitrosomethylethylamine	10595-95-6	LCS-3	10/03/16	0.200	0.185	0.92	0.201	100	2.53	
N-Nitrosomorpholine	59-89-2	LCS-3	09/25/16	0.200	0.184	0.93	0.197	98.5	2.49	
N-Nitrosomorpholine	59-89-2	LCS-3	09/30/16	0.200	0.203	1.04	0.196	97.7	2.67	
N-Nitrosomorpholine	59-89-2	LCS-3	10/01/16	0.200	0.194	0.98	0.197	98.7	1.42	
N-Nitrosomorpholine	59-89-2	LCS-3	10/03/16	0.200	0.179	0.90	0.199	99.5	2.54	
N-Nitrosopiperidine	100-75-4	LCS-3	09/25/16	0.200	0.179	0.93	0.192	96.0	3.51	
N-Nitrosopiperidine	100-75-4	LCS-3	09/30/16	0.200	0.200	1.02	0.195	97.4	3.28	
N-Nitrosopiperidine	100-75-4	LCS-3	10/01/16	0.200	0.194	0.98	0.198	98.9	2.60	
N-Nitrosopiperidine	100-75-4	LCS-3	10/03/16	0.200	0.176	0.88	0.201	100	1.90	
N-Nitrosopyrrolidine	930-55-2	LCS-3	09/25/16	0.200	0.159	0.86	0.185	92.4	6.58	
N-Nitrosopyrrolidine	930-55-2	LCS-3	09/30/16	0.200	0.189	1.00	0.190	95.0	4.48	
N-Nitrosopyrrolidine	930-55-2	LCS-3	10/01/16	0.200	0.182	0.96	0.189	94.2	6.12	
N-Nitrosopyrrolidine	930-55-2	LCS-3	10/03/16	0.200	0.183	0.89	0.205	102	2.62	
N-Nitrosodiethylamine	55-18-5	MB	09/25/16		0.00	1.00	0.00			
N-Nitrosodiethylamine	55-18-5	MB	09/30/16		0.00	1.00	0.00			
N-Nitrosodiethylamine	55-18-5	MB	10/01/16		0.00	0.99	0.00			
N-Nitrosodiethylamine	55-18-5	MB	10/03/16		0.00	0.90	0.00			
N-Nitrosodimethylamine	62-75-9	MB	09/25/16		0.00	0.93	0.00			
N-Nitrosodimethylamine	62-75-9	MB	09/30/16		0.00	0.95	0.00			
N-Nitrosodimethylamine	62-75-9	MB	10/01/16		0.00	0.95	0.00			
N-Nitrosodimethylamine	62-75-9	MB	10/03/16		0.00	0.91	0.00			
N-Nitrosodi-n-butylamine	924-16-3	MB	09/25/16		0.00	0.95	0.00			
N-Nitrosodi-n-butylamine	924-16-3	MB	09/30/16		0.00	1.07	0.00			
N-Nitrosodi-n-butylamine	924-16-3	MB	10/01/16		0.00	1.00	0.00			
N-Nitrosodi-n-butylamine	924-16-3	MB	10/03/16		0.00	0.86	0.00			
N-Nitrosodi-n-propylamine	621-64-7	MB	09/25/16		0.00	0.95	0.00			
N-Nitrosodi-n-propylamine	621-64-7	MB	09/30/16		0.00	1.03	0.00			
N-Nitrosodi-n-propylamine	621-64-7	MB	10/01/16		0.00	0.99	0.00			
N-Nitrosodi-n-propylamine	621-64-7	MB	10/03/16		0.00	0.88	0.00			
N-Nitrosomethylethylamine	10595-95-6	MB	09/25/16		0.00	0.99	0.00			
N-Nitrosomethylethylamine	10595-95-6	MB	09/30/16		0.00	1.01	0.00			
N-Nitrosomethylethylamine	10595-95-6	MB	10/01/16		0.00	0.99	0.00			
N-Nitrosomethylethylamine	10595-95-6	MB	10/03/16		0.00	0.92	0.00			
N-Nitrosomorpholine	59-89-2	MB	09/25/16		0.00	0.93	0.00			
N-Nitrosomorpholine	59-89-2	MB	09/30/16		0.00	1.04	0.00			
N-Nitrosomorpholine	59-89-2	MB	10/01/16		0.00	0.98	0.00			

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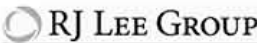


Analyte	CAS No.	Sample ID	Analyzed Date	Expected µg/tube	Result µg/tube	DE	DE Corrected	REC %	RSD %	Qualifier
N-Nitrosomorpholine	59-89-2	MB	10/03/16		0.00	0.90	0.00			
N-Nitrosopiperidine	100-75-4	MB	09/25/16		0.00	0.93	0.00			
N-Nitrosopiperidine	100-75-4	MB	09/30/16		0.00	1.02	0.00			
N-Nitrosopiperidine	100-75-4	MB	10/01/16		0.00	0.98	0.00			
N-Nitrosopiperidine	100-75-4	MB	10/03/16		0.00	0.88	0.00			
N-Nitrosopyrrolidine	930-55-2	MB	09/25/16		0.00	0.86	0.00			
N-Nitrosopyrrolidine	930-55-2	MB	09/30/16		0.00	1.00	0.00			
N-Nitrosopyrrolidine	930-55-2	MB	10/01/16		0.00	0.96	0.00			
N-Nitrosopyrrolidine	930-55-2	MB	10/03/16		0.00	0.89	0.00			
N-Nitrosodiethylamine	55-18-5	MRL	09/25/16	0.020	0.022	1.00	0.022	110		
N-Nitrosodiethylamine	55-18-5	MRL	09/30/16	0.020	0.020	1.00	0.020	102		
N-Nitrosodiethylamine	55-18-5	MRL	10/01/16	0.020	0.022	0.99	0.022	112		
N-Nitrosodiethylamine	55-18-5	MRL	10/03/16	0.020	0.018	0.90	0.020	102		
N-Nitrosodimethylamine	62-75-9	MRL	09/25/16	0.020	0.020	0.93	0.022	107		
N-Nitrosodimethylamine	62-75-9	MRL	09/30/16	0.020	0.023	0.95	0.024	119		
N-Nitrosodimethylamine	62-75-9	MRL	10/01/16	0.020	0.023	0.95	0.024	118		
N-Nitrosodimethylamine	62-75-9	MRL	10/03/16	0.020	0.021	0.91	0.023	116		
N-Nitrosodi-n-butylamine	924-16-3	MRL	09/25/16	0.020	0.021	0.95	0.022	111		
N-Nitrosodi-n-butylamine	924-16-3	MRL	09/30/16	0.020	0.021	1.07	0.020	98.1		
N-Nitrosodi-n-butylamine	924-16-3	MRL	10/01/16	0.020	0.019	1.00	0.019	93.2		
N-Nitrosodi-n-butylamine	924-16-3	MRL	10/03/16	0.020	0.018	0.86	0.021	106		
N-Nitrosodi-n-propylamine	621-64-7	MRL	09/25/16	0.020	0.019	0.95	0.020	102		
N-Nitrosodi-n-propylamine	621-64-7	MRL	09/30/16	0.020	0.019	1.03	0.018	91.7		
N-Nitrosodi-n-propylamine	621-64-7	MRL	10/01/16	0.020	0.021	0.99	0.021	105		
N-Nitrosodi-n-propylamine	621-64-7	MRL	10/03/16	0.020	0.015	0.88	0.017	86.1		
N-Nitrosomethylethylamine	10595-95-6	MRL	09/25/16	0.020	0.024	0.99	0.024	119		
N-Nitrosomethylethylamine	10595-95-6	MRL	09/30/16	0.020	0.021	1.01	0.021	103		
N-Nitrosomethylethylamine	10595-95-6	MRL	10/01/16	0.020	0.020	0.99	0.020	102		
N-Nitrosomethylethylamine	10595-95-6	MRL	10/03/16	0.020	0.020	0.92	0.022	110		
N-Nitrosomorpholine	59-89-2	MRL	09/25/16	0.020	0.023	0.93	0.025	126		
N-Nitrosomorpholine	59-89-2	MRL	09/30/16	0.020	0.023	1.04	0.022	108		
N-Nitrosomorpholine	59-89-2	MRL	10/01/16	0.020	0.021	0.98	0.021	106		
N-Nitrosomorpholine	59-89-2	MRL	10/03/16	0.020	0.018	0.90	0.020	102		
N-Nitrosopiperidine	100-75-4	MRL	09/25/16	0.020	0.021	0.93	0.022	112		
N-Nitrosopiperidine	100-75-4	MRL	09/30/16	0.020	0.022	1.02	0.021	106		
N-Nitrosopiperidine	100-75-4	MRL	10/01/16	0.020	0.021	0.98	0.021	107		
N-Nitrosopiperidine	100-75-4	MRL	10/03/16	0.020	0.017	0.88	0.019	95.1		
N-Nitrosopyrrolidine	930-55-2	MRL	09/25/16	0.020	0.022	0.86	0.026	129		
N-Nitrosopyrrolidine	930-55-2	MRL	09/30/16	0.020	0.019	1.00	0.019	95.9		
N-Nitrosopyrrolidine	930-55-2	MRL	10/01/16	0.020	0.020	0.96	0.021	106		
N-Nitrosopyrrolidine	930-55-2	MRL	10/03/16	0.020	0.019	0.89	0.021	106		

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Report Template: WRPS\_Nitrosamines\_v10 modified for Carl with LT\_Eq

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 Report Time Stamp: 10/11/16 12:35



Report Qualifiers:

A = Target Analyte media breakthrough suspect, see analytical report

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,  $\geq 90\%$  w RT match

R = RPD (relative percent difference) outside accepted recovery limits

U = Analyte analyzed for 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

L = 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

Scientist II DeNomy Dage

These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, RJ Lee Group will store the samples for a period of ninety (90) days before discarding. A shipping and handling fee will be assessed for the return of any samples. Unless otherwise noted, samples were received in an acceptable condition. This laboratory operates in accordance with ISO 17025 guidelines, and holds limited scopes of accreditation under ORELAP Lab Code 4061 AIHA-LAP, LLC Lab ID 178656 EPA ID WA01195 and WA DOE Lab ID C859. This report may not be used to claim product endorsement by any laboratory accrediting agency. The results contained in this report relate only to the items tested or to the sample(s) as received by the laboratory. Any reproduction of this document must be in full for the report to be

W608151

Assembler N/A		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST										C.O.C. No. 20162543	
Collector JONES		Contact/Requestor CARL HOWARD IV		Telephone No. 373-6861		MSIN 16-05		FAX 372-1878		Page 1 of 2			
SAF No. N/A		Sample Origin CARTRIDGE EVALUATION		Purchase Order/Charge Code 202700/0260									
Project Title CARTRIDGE EVALUATION		Logbook/ Work Package No. N/A		Ice Chest No.		Temp. 26.6°C							
Shipped To (Lab) CEAL		Method of Shipment		Bill of Lading/Air Bill No.									
Protocol N/A		Data Turnaround 10 DAYS		Parts and Return No.									

Sample No.	Lab ID	Date	Time	No./Type Container	Sample Analysis	Preservative
	S16T027267	VA	8/26/16	Thermosorb-N	Nitrosamines 16-07645-11-A1	N/A
	S16T027268	VA	8/26/16	Thermosorb-N	Nitrosamines 16-07645-11-A2	N/A
	S16T027269	VA	8/26/16	Thermosorb-N	Nitrosamines 16-07645-11-B1	N/A
	S16T027270	VA	8/26/16	Thermosorb-N	Nitrosamines 16-07645-11-B2	N/A
	S16T027271	VA	8/26/16	Thermosorb-N	Nitrosamines 16-07645-11-BLANK 1	N/A
	S16T027272	VA	8/26/16	Thermosorb-N	Nitrosamines 16-07645-11-BLANK 2	N/A
	S16T027273	VA	8/26/16	Thermosorb-N	Nitrosamines 16-07645-11-C1	N/A
	S16T027274	VA	8/26/16	Thermosorb-N	Nitrosamines 16-07645-11-C2	N/A
	S16T027275	VA	8/26/16	Thermosorb-N	Nitrosamines 16-07645-11-D1	N/A
	S16T027276	VA	8/26/16	Thermosorb-N	Nitrosamines 16-07645-11-D2	N/A

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

SPECIAL INSTRUCTIONS  
Send Results to Carl Howard IV & Greg Moore  
Carl N Howard@rl.gov and Greg\_S\_Moore@rl.gov  
see SCW for email

CONTRACT 55503  
RELEASE 5

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix*
Shawn L. Jones			8-31-16 0900	RE ROGERS			8-31-16 0900	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids
Relinquished By			8-31-16 1:05	Alex Zolner			8-31-16 1:05	DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation VA = Vapor X = Other
Relinquished By								

FINAL SAMPLE DISPOSITION	Consumed	Disposed By	10/07/16 11:30
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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)

A-6003-962 (03/05)

## **Appendix D**

### **Data Reduction Steps**



## Appendix D

### Data Reduction Steps

1. Only chemicals in the current Chemicals of Potential Concern (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 (ppm) using their molecular weights and corresponding flow rates after volume correction<sup>19</sup> as shown in the following equation:

$$C = 24.45 \frac{r}{M V}$$

where  $C$  is the concentration of COPC in ppmv;  $r$  is the analytical result with units of  $\mu\text{g}/\text{sample}$  (if the analytical result unit is expressed in  $\text{mg}/\text{sample}$ , the value of  $C$  needs to be multiplied by 1000; if the analytical result unit is in  $\text{ng}/\text{sample}$  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 expressed as  $\text{g}/\text{mol}$ . When the ratio between concentration and the corresponding Occupational Exposure Limit (OEL) is larger than 10%, the fraction is shown in red.

4. The reported volume measurements in Appendix C were made via DryCal devices placed downstream of each sample media tube. This allowed for precise volume measurements through each of the tubes. However, to perform the concentration conversion to ppm, the “actual” volumetric values required conversion to standard temperature and pressure conditions.

Ideal gas behavior was assumed for these volume corrections, and standard temperatures and pressures were assumed to be 298 K ( $T_{\text{standard}}$ ) and 760 Torr ( $P_{\text{standard}}$ ), respectively. For temperatures, the reported upstream temperatures for each time period were used ( $T_{\text{upstream}}$ , in Kelvin), and the temperature correction factor (i.e., the factor multiplied by each reported volume) was simply  $T_{\text{standard}}/T_{\text{upstream}}$ .

For the pressure corrections, additional pressure drop information was gathered so that the pressure at the point of the DryCal device could be calculated. Each time step had reported upstream pressures ( $P_{\text{upstream}}$ , or upstream of the respirator cartridges). Therefore, pressure drop measurements across the respirator cartridge and each sample media tube were performed offline to gather the additional information necessary for the correction.

The average reported pressure drop reading for the respirator cartridge ( $P_{\text{cartridge}}$ ) tested was 3.2 inches of water column (WC). The pressure drop measurements across the individual sample tubes are shown in the table below (all expressed as inches of WC).

The average pressure drops were then used in a pressure correction factor for the reported volumes. Note that all pressure values were first converted to units of Torr. For measurements made at the inlet of the respirator cartridge the pressure correction factor is  $(P_{\text{upstream}} - P_{\text{tube}}) \div P_{\text{standard}}$ .

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<sup>19</sup> Based on the Standard Temperature and Pressure condition of  $P=101325$  Pa,  $R=8.314$  J/(mol.K), and  $T = 298.15$  K.

For measurements made at the outlet of the respirator cartridge the pressure correction factor is  $(P_{\text{upstream}} - P_{\text{cartridge}} - P_{\text{tube}}) \div P_{\text{standard}}$ .

Tube Location	First Measure (inches of WC, tube on cartridge inlet side)	Second Measure (inches of WC, tube on cartridge outlet side)	Average of Both Measurements ( $P_{\text{tube}}$ , inches of WC)
A	5.0	12.4	8.7
B	6.9	7.2	7.1
C	2.3	2.5	2.4
D	0.8	0.8	0.8
E	1.9	2.1	2.0
F	3.8	6.8	5.3
G	1.6	1.7	1.7
H	7.7	6.5	7.1
I	5.2	4.0	4.6
J	15.9	16.3	16.1
K	10.1	9.7	9.9

An example calculation of the correction factors follows. For a given time period, assume that the reported upstream pressure ( $P_{\text{upstream}}$ ) was 734 Torr and the corresponding temperature ( $T_{\text{upstream}}$ ) was 85.9°F (or 302.9 K). Here, for tube location 'A' and upstream of the respirator cartridge, the corresponding temperature correction factor would be 0.984, and the pressure correction factor for the respirator cartridge outlet would be 0.944. When multiplied, these two factors equal 0.929, which would be the overall correction to the reported volume measurement.

5. 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 as the percentage of the OEL for each COPC. Because the flow rates vary, the calculated concentrations were different for each point, even though some of the results are less than the DL in the original reading. The last column in the tables below indicate if the original readings were less than the DL or not.
  - For ammonia and mercury, only the results obtained from using method of total vapor of ammonia and mercury were used.
  - For furan, results from the furan tube instead of Carbotrap 300 TDU were used. For acetonitrile, results from the Carbotrap 300 TDU tube were used. For butanal, the results from the Carbotrap 300 TDU tube instead of the aldehydes tube were used. For pyridine and 2,4-dimethylpyridine, the results from the Carbotrap 300 TDU tube were used.
  - For N-nitrosodimethylamine (NDMA) and other nitrosamines, data values above analytical DLs for the same time and position were added together because the original sample was diluted into three samples for measurements. This same rule applies to 1,3-butadiene. The results in the plots and tables reflect the sum of results.

The following tables show the calculated concentrations for each of the COPC measurements conducted in this study. Red highlighted values reflect measurements that were above 10% of the respective OEL values. COPCs with these highlights are plotted and shown in Section 5.0. Orange highlighted values reflect measurements in the 2 to 10% of the OEL range. COPCs with these highlights (only) are plotted and shown in Appendix E.

The position numbers that start with 7645 are for the SCOTT 7422-SD1 cartridge and the position numbers that start with 7654 are for the SCOTT 7422-SC1 cartridge.



COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL RL?	Approx. DL RL (%OEL)
1	Ammonia	2	7645-A1	17.2	25	68.8%		5.2%
1	Ammonia	4	7645-B1	18.6	25	74.2%		5.2%
1	Ammonia	6	7645-C1	18.2	25	72.9%		5.2%
1	Ammonia	8	7645-D1	19.0	25	76.0%		5.2%
1	Ammonia	10	7645-E1	18.7	25	74.7%		5.2%
1	Ammonia	12	7645-F1	18.5	25	74.2%		5.2%
1	Ammonia	14	7645-G1	18.4	25	73.7%		5.2%
1	Ammonia	16	7645-H1	18.0	25	71.8%		5.2%
1	Ammonia	2	7645-A2	0.67	25	2.69%	YES	5.2%
1	Ammonia	4	7645-B2	0.67	25	2.66%	YES	5.2%
1	Ammonia	6	7645-C2	0.66	25	2.65%	YES	5.2%
1	Ammonia	8	7645-D2	0.66	25	2.63%	YES	5.2%
1	Ammonia	10	7645-E2	0.88	25	3.51%		5.2%
1	Ammonia	12	7645-F2	1.6	25	6.50%		5.2%
1	Ammonia	14	7645-G2	2.8	25	11.4%		5.2%
1	Ammonia	16	7645-H2	3.5	25	13.9%		5.2%
1	Ammonia	2	7654-A1	17.5	25	70.0%		5.2%
1	Ammonia	4	7654-B1	18.7	25	74.8%		5.2%
1	Ammonia	6	7654-C1	18.1	25	72.4%		5.2%
1	Ammonia	8	7654-D1	18.1	25	72.2%		5.2%
1	Ammonia	10	7654-E1	17.7	25	70.7%		5.2%
1	Ammonia	12	7654-F1	18.5	25	73.8%		5.2%
1	Ammonia	14	7654-G1	18.0	25	71.8%		5.2%
1	Ammonia	16	7654-H1	18.4	25	73.7%		5.2%
1	Ammonia	2	7654-A2	0.69	25	2.76%	YES	5.2%
1	Ammonia	4	7654-B2	0.67	25	2.70%	YES	5.2%
1	Ammonia	6	7654-C2	0.67	25	2.68%	YES	5.2%
1	Ammonia	8	7654-D2	0.66	25	2.62%	YES	5.2%
1	Ammonia	10	7654-E2	1.3	25	5.19%	YES	5.2%
1	Ammonia	12	7654-F2	1.4	25	5.67%		5.2%
1	Ammonia	14	7654-G2	2.1	25	8.49%		5.2%
1	Ammonia	16	7654-H2	2.3	25	9.18%		5.2%
3	Mercury	2	7645-A1	0.0023	0.003	76.4%		7.6%
3	Mercury	4	7645-B1	0.0024	0.003	77.7%		7.6%
3	Mercury	6	7645-C1	0.0023	0.003	74.5%		7.6%
3	Mercury	8	7645-D1	0.0024	0.003	79.5%		7.6%
3	Mercury	10	7645-E1	0.0024	0.003	78.0%		7.6%
3	Mercury	12	7645-F1	0.0024	0.003	77.7%		7.6%
3	Mercury	14	7645-G1	0.0024	0.003	79.0%		7.6%
3	Mercury	16	7645-H1	0.0024	0.003	78.1%		7.6%
3	Mercury	2	7645-A2	0.0002	0.003	7.50%	YES	7.6%
3	Mercury	4	7645-B2	0.0002	0.003	7.27%	YES	7.6%
3	Mercury	6	7645-C2	0.0002	0.003	7.28%	YES	7.6%
3	Mercury	8	7645-D2	0.0002	0.003	7.38%	YES	7.6%
3	Mercury	10	7645-E2	0.0002	0.003	7.19%	YES	7.6%
3	Mercury	12	7645-F2	0.0002	0.003	7.21%	YES	7.6%
3	Mercury	14	7645-G2	0.0002	0.003	7.16%	YES	7.6%
3	Mercury	16	7645-H2	0.0002	0.003	7.05%	YES	7.6%
3	Mercury	2	7654-A1	0.0026	0.003	84.6%		7.6%
3	Mercury	4	7654-B1	0.0025	0.003	80.8%		7.6%
3	Mercury	6	7654-C1	0.0025	0.003	81.8%		7.6%
3	Mercury	8	7654-D1	0.0023	0.003	76.7%		7.6%
3	Mercury	10	7654-E1	0.0024	0.003	79.2%		7.6%
3	Mercury	12	7654-F1	0.0023	0.003	75.7%		7.6%
3	Mercury	14	7654-G1	0.0020	0.003	66.0%		7.6%
3	Mercury	16	7654-H1	0.0023	0.003	75.6%		7.6%
3	Mercury	2	7654-A2	0.0002	0.003	7.12%	YES	7.6%
3	Mercury	4	7654-B2	0.0002	0.003	7.56%	YES	7.6%
3	Mercury	6	7654-C2	0.0002	0.003	7.42%	YES	7.6%
3	Mercury	8	7654-D2	0.0002	0.003	7.61%	YES	7.6%
3	Mercury	10	7654-E2	0.0002	0.003	7.31%	YES	7.6%
3	Mercury	12	7654-F2	0.0002	0.003	7.14%	YES	7.6%
3	Mercury	14	7654-G2	0.0002	0.003	6.95%	YES	7.6%
3	Mercury	16	7654-H2	0.0002	0.003	6.98%	YES	7.6%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL RL?	Approx. DL RL (%OEL)
4	1,3-Butadiene	2	7645-A1	0.0210	1	2.10%	YES	3.6%
4	1,3-Butadiene	4	7645-B1	0.0209	1	2.09%	YES	3.6%
4	1,3-Butadiene	6	7645-C1	0.0210	1	2.10%	YES	3.6%
4	1,3-Butadiene	8	7645-D1	0.0210	1	2.10%	YES	3.6%
4	1,3-Butadiene	10	7645-E1	0.0203	1	2.03%	YES	3.6%
4	1,3-Butadiene	12	7645-F1	0.0204	1	2.04%	YES	3.6%
4	1,3-Butadiene	14	7645-G1	0.0201	1	2.01%	YES	3.6%
4	1,3-Butadiene	16	7645-H1	0.0201	1	2.01%	YES	3.6%
4	1,3-Butadiene	2	7645-A2	0.0204	1	2.04%	YES	3.6%
4	1,3-Butadiene	4	7645-B2	0.0200	1	2.00%	YES	3.6%
4	1,3-Butadiene	6	7645-C2	0.0198	1	1.98%	YES	3.6%
4	1,3-Butadiene	8	7645-D2	0.0207	1	2.07%	YES	3.6%
4	1,3-Butadiene	10	7645-E2	0.0206	1	2.06%	YES	3.6%
4	1,3-Butadiene	12	7645-F2	0.0204	1	2.04%	YES	3.6%
4	1,3-Butadiene	14	7645-G2	0.0203	1	2.03%	YES	3.6%
4	1,3-Butadiene	16	7645-H2	0.0203	1	2.03%	YES	3.6%
4	1,3-Butadiene	2	7654-A1	0.0192	1	1.92%	YES	3.6%
4	1,3-Butadiene	4	7654-B1	0.0208	1	2.08%	YES	3.6%
4	1,3-Butadiene	6	7654-C1	0.0208	1	2.08%	YES	3.6%
4	1,3-Butadiene	8	7654-D1	0.0209	1	2.09%	YES	3.6%
4	1,3-Butadiene	10	7654-E1	0.0201	1	2.01%	YES	3.6%
4	1,3-Butadiene	12	7654-F1	0.0202	1	2.02%	YES	3.6%
4	1,3-Butadiene	14	7654-G1	0.0200	1	2.00%	YES	3.6%
4	1,3-Butadiene	16	7654-H1	0.0357	1	3.57%	YES	3.6%
4	1,3-Butadiene	2	7654-A2	0.0189	1	1.89%	YES	3.6%
4	1,3-Butadiene	4	7654-B2	0.0212	1	2.12%	YES	3.6%
4	1,3-Butadiene	6	7654-C2	0.0213	1	2.13%	YES	3.6%
4	1,3-Butadiene	8	7654-D2	0.0213	1	2.13%	YES	3.6%
4	1,3-Butadiene	10	7654-E2	0.0081	1	0.81%	YES	3.6%
4	1,3-Butadiene	12	7654-F2	0.0201	1	2.01%	YES	3.6%
4	1,3-Butadiene	14	7654-G2	0.0197	1	1.97%	YES	3.6%
4	1,3-Butadiene	16	7654-H2	0.0197	1	1.97%	YES	3.6%
5	Benzene	2	7645-A1	0.0020	0.5	0.403%		0.03%
5	Benzene	4	7645-B1	0.0005	0.5	0.107%		0.03%
5	Benzene	6	7645-C1	0.0004	0.5	0.079%		0.03%
5	Benzene	8	7645-D1	0.0005	0.5	0.091%		0.03%
5	Benzene	10	7645-E1	0.0003	0.5	0.056%		0.03%
5	Benzene	12	7645-F1	0.0003	0.5	0.052%		0.03%
5	Benzene	14	7645-G1	0.0003	0.5	0.053%		0.03%
5	Benzene	16	7645-H1	0.0002	0.5	0.042%		0.03%
5	Benzene	2	7645-A2	0.0002	0.5	0.031%		0.03%
5	Benzene	4	7645-B2	0.0002	0.5	0.039%		0.03%
5	Benzene	6	7645-C2	0.0002	0.5	0.031%		0.03%
5	Benzene	8	7645-D2	0.0001	0.5	0.023%	YES	0.03%
5	Benzene	10	7645-E2	0.0001	0.5	0.022%	YES	0.03%
5	Benzene	12	7645-F2	0.0001	0.5	0.021%	YES	0.03%
5	Benzene	14	7645-G2	0.0001	0.5	0.021%	YES	0.03%
5	Benzene	16	7645-H2	0.0001	0.5	0.020%	YES	0.03%
5	Benzene	2	7654-A1	0.0003	0.5	0.055%		0.03%
5	Benzene	4	7654-B1	0.0003	0.5	0.052%		0.03%
5	Benzene	6	7654-C1	0.0003	0.5	0.052%		0.03%
5	Benzene	8	7654-D1	0.0002	0.5	0.045%		0.03%
5	Benzene	10	7654-E1	0.0002	0.5	0.040%		0.03%
5	Benzene	12	7654-F1	0.0002	0.5	0.042%		0.03%
5	Benzene	14	7654-G1	0.0002	0.5	0.040%		0.03%
5	Benzene	16	7654-H1	0.0002	0.5	0.044%		0.03%
5	Benzene	2	7654-A2	0.0001	0.5	0.025%	YES	0.03%
5	Benzene	4	7654-B2	0.0002	0.5	0.031%	YES	0.03%
5	Benzene	6	7654-C2	0.0001	0.5	0.029%	YES	0.03%
5	Benzene	8	7654-D2	0.0001	0.5	0.028%	YES	0.03%
5	Benzene	10	7654-E2	0.0001	0.5	0.027%	YES	0.03%
5	Benzene	12	7654-F2	0.0001	0.5	0.026%	YES	0.03%
5	Benzene	14	7654-G2	0.0001	0.5	0.026%	YES	0.03%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL RL?	Approx. DL RL (%OEL)
5	Benzene	16	7654-H2	0.0001	0.5	0.025%	YES	0.03%
6	Biphenyl	2	7645-A1	0.0002	0.2	0.096%	YES	23.8%
6	Biphenyl	4	7645-B1	0.0002	0.2	0.091%	YES	23.8%
6	Biphenyl	6	7645-C1	0.0002	0.2	0.092%	YES	23.8%
6	Biphenyl	8	7645-D1	0.0002	0.2	0.091%	YES	23.8%
6	Biphenyl	10	7645-E1	0.0002	0.2	0.090%	YES	23.8%
6	Biphenyl	12	7645-F1	0.0002	0.2	0.089%	YES	23.8%
6	Biphenyl	14	7645-G1	0.0002	0.2	0.087%	YES	23.8%
6	Biphenyl	16	7645-H1	0.0002	0.2	0.087%	YES	23.8%
6	Biphenyl	2	7645-A2	0.0002	0.2	0.091%	YES	23.8%
6	Biphenyl	4	7645-B2	0.0002	0.2	0.088%	YES	23.8%
6	Biphenyl	6	7645-C2	0.0002	0.2	0.087%	YES	23.8%
6	Biphenyl	8	7645-D2	0.0002	0.2	0.090%	YES	23.8%
6	Biphenyl	10	7645-E2	0.0002	0.2	0.088%	YES	23.8%
6	Biphenyl	12	7645-F2	0.0002	0.2	0.088%	YES	23.8%
6	Biphenyl	14	7645-G2	0.0002	0.2	0.086%	YES	23.8%
6	Biphenyl	16	7645-H2	0.0002	0.2	0.087%	YES	23.8%
6	Biphenyl	2	7654-A1	0.0002	0.2	0.080%	YES	23.8%
6	Biphenyl	4	7654-B1	0.0002	0.2	0.093%	YES	23.8%
6	Biphenyl	6	7654-C1	0.0002	0.2	0.091%	YES	23.8%
6	Biphenyl	8	7654-D1	0.0002	0.2	0.094%	YES	23.8%
6	Biphenyl	10	7654-E1	0.0002	0.2	0.087%	YES	23.8%
6	Biphenyl	12	7654-F1	0.0475	0.2	23.8%	YES	23.8%
6	Biphenyl	14	7654-G1	0.0002	0.2	0.085%	YES	23.8%
6	Biphenyl	16	7654-H1	0.0002	0.2	0.085%	YES	23.8%
6	Biphenyl	2	7654-A2	0.0002	0.2	0.082%	YES	23.8%
6	Biphenyl	4	7654-B2	0.0002	0.2	0.091%	YES	23.8%
6	Biphenyl	6	7654-C2	0.0002	0.2	0.091%	YES	23.8%
6	Biphenyl	8	7654-D2	0.0002	0.2	0.092%	YES	23.8%
6	Biphenyl	10	7654-E2	0.0002	0.2	0.085%	YES	23.8%
6	Biphenyl	12	7654-F2	0.0002	0.2	0.085%	YES	23.8%
6	Biphenyl	14	7654-G2	0.0002	0.2	0.084%	YES	23.8%
6	Biphenyl	16	7654-H2	0.0002	0.2	0.087%	YES	23.8%
7	1-Butanol	2	7645-A1	0.05312	20	0.266%		0.004%
7	1-Butanol	4	7645-B1	0.01012	20	0.051%		0.004%
7	1-Butanol	6	7645-C1	0.00650	20	0.032%		0.004%
7	1-Butanol	8	7645-D1	0.00849	20	0.042%		0.004%
7	1-Butanol	10	7645-E1	0.00765	20	0.038%		0.004%
7	1-Butanol	12	7645-F1	0.00461	20	0.023%		0.004%
7	1-Butanol	14	7645-G1	0.00529	20	0.026%		0.004%
7	1-Butanol	16	7645-H1	0.00760	20	0.038%		0.004%
7	1-Butanol	2	7645-A2	0.00090	20	0.004%	YES	0.004%
7	1-Butanol	4	7645-B2	0.00115	20	0.006%		0.004%
7	1-Butanol	6	7645-C2	0.00085	20	0.004%	YES	0.004%
7	1-Butanol	8	7645-D2	0.00089	20	0.004%	YES	0.004%
7	1-Butanol	10	7645-E2	0.00087	20	0.004%	YES	0.004%
7	1-Butanol	12	7645-F2	0.00082	20	0.004%	YES	0.004%
7	1-Butanol	14	7645-G2	0.00080	20	0.004%	YES	0.004%
7	1-Butanol	16	7645-H2	0.00076	20	0.004%	YES	0.004%
7	1-Butanol	2	7654-A1	0.00607	20	0.030%		0.004%
7	1-Butanol	4	7654-B1	0.01180	20	0.059%		0.004%
7	1-Butanol	6	7654-C1	0.00836	20	0.042%		0.004%
7	1-Butanol	8	7654-D1	0.00888	20	0.044%		0.004%
7	1-Butanol	10	7654-E1	0.00827	20	0.041%		0.004%
7	1-Butanol	12	7654-F1	0.00875	20	0.044%		0.004%
7	1-Butanol	14	7654-G1	0.00871	20	0.044%		0.004%
7	1-Butanol	16	7654-H1	0.00358	20	0.018%		0.004%
7	1-Butanol	2	7654-A2	0.00037	20	0.002%	YES	0.004%
7	1-Butanol	4	7654-B2	0.00046	20	0.002%	YES	0.004%
7	1-Butanol	6	7654-C2	0.00055	20	0.003%		0.004%
7	1-Butanol	8	7654-D2	0.00042	20	0.002%	YES	0.004%
7	1-Butanol	10	7654-E2	0.00041	20	0.002%	YES	0.004%
7	1-Butanol	12	7654-F2	0.00055	20	0.003%		0.004%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL RL?	Approx. DL RL (%OEL)
7	1-Butanol	14	7654-G2	0.00039	20	0.002%	YES	0.004%
7	1-Butanol	16	7654-H2	0.00038	20	0.002%	YES	0.004%
9	2-Hexanone	2	7645-A1	0.00089	5	0.018%		0.004%
9	2-Hexanone	4	7645-B1	0.00025	5	0.005%		0.004%
9	2-Hexanone	6	7645-C1	0.00018	5	0.004%		0.004%
9	2-Hexanone	8	7645-D1	0.00020	5	0.004%		0.004%
9	2-Hexanone	10	7645-E1	0.00017	5	0.003%	YES	0.004%
9	2-Hexanone	12	7645-F1	0.00016	5	0.003%	YES	0.004%
9	2-Hexanone	14	7645-G1	0.00017	5	0.003%	YES	0.004%
9	2-Hexanone	16	7645-H1	0.00013	5	0.003%		0.004%
9	2-Hexanone	2	7645-A2	0.00009	5	0.002%	YES	0.004%
9	2-Hexanone	4	7645-B2	0.00010	5	0.002%	YES	0.004%
9	2-Hexanone	6	7645-C2	0.00008	5	0.002%	YES	0.004%
9	2-Hexanone	8	7645-D2	0.00009	5	0.002%	YES	0.004%
9	2-Hexanone	10	7645-E2	0.00009	5	0.002%	YES	0.004%
9	2-Hexanone	12	7645-F2	0.00008	5	0.002%	YES	0.004%
9	2-Hexanone	14	7645-G2	0.00008	5	0.002%	YES	0.004%
9	2-Hexanone	16	7645-H2	0.00008	5	0.002%	YES	0.004%
9	2-Hexanone	2	7654-A1	0.00020	5	0.004%		0.004%
9	2-Hexanone	4	7654-B1	0.00019	5	0.004%		0.004%
9	2-Hexanone	6	7654-C1	0.00017	5	0.003%		0.004%
9	2-Hexanone	8	7654-D1	0.00016	5	0.003%		0.004%
9	2-Hexanone	10	7654-E1	0.00014	5	0.003%		0.004%
9	2-Hexanone	12	7654-F1	0.00014	5	0.003%		0.004%
9	2-Hexanone	14	7654-G1	0.00012	5	0.002%		0.004%
9	2-Hexanone	16	7654-H1	0.00017	5	0.003%	YES	0.004%
9	2-Hexanone	2	7654-A2	0.00016	5	0.003%	YES	0.004%
9	2-Hexanone	4	7654-B2	0.00020	5	0.004%	YES	0.004%
9	2-Hexanone	6	7654-C2	0.00019	5	0.004%	YES	0.004%
9	2-Hexanone	8	7654-D2	0.00018	5	0.004%	YES	0.004%
9	2-Hexanone	10	7654-E2	0.00018	5	0.004%	YES	0.004%
9	2-Hexanone	12	7654-F2	0.00017	5	0.003%	YES	0.004%
9	2-Hexanone	14	7654-G2	0.00017	5	0.003%	YES	0.004%
9	2-Hexanone	16	7654-H2	0.00016	5	0.003%	YES	0.004%
11	4-Methyl-2-hexanone	2	7645-A1	0.00030	0.5	0.060%	YES	0.06%
11	4-Methyl-2-hexanone	4	7645-B1	0.00016	0.5	0.031%	YES	0.06%
11	4-Methyl-2-hexanone	6	7645-C1	0.00015	0.5	0.030%	YES	0.06%
11	4-Methyl-2-hexanone	8	7645-D1	0.00016	0.5	0.031%	YES	0.06%
11	4-Methyl-2-hexanone	10	7645-E1	0.00016	0.5	0.031%	YES	0.06%
11	4-Methyl-2-hexanone	12	7645-F1	0.00014	0.5	0.029%	YES	0.06%
11	4-Methyl-2-hexanone	14	7645-G1	0.00015	0.5	0.030%	YES	0.06%
11	4-Methyl-2-hexanone	16	7645-H1	0.00007	0.5	0.014%	YES	0.06%
11	4-Methyl-2-hexanone	2	7645-A2	0.00009	0.5	0.017%	YES	0.06%
11	4-Methyl-2-hexanone	4	7645-B2	0.00010	0.5	0.019%	YES	0.06%
11	4-Methyl-2-hexanone	6	7645-C2	0.00008	0.5	0.016%	YES	0.06%
11	4-Methyl-2-hexanone	8	7645-D2	0.00008	0.5	0.017%	YES	0.06%
11	4-Methyl-2-hexanone	10	7645-E2	0.00008	0.5	0.016%	YES	0.06%
11	4-Methyl-2-hexanone	12	7645-F2	0.00008	0.5	0.016%	YES	0.06%
11	4-Methyl-2-hexanone	14	7645-G2	0.00008	0.5	0.015%	YES	0.06%
11	4-Methyl-2-hexanone	16	7645-H2	0.00007	0.5	0.014%	YES	0.06%
11	4-Methyl-2-hexanone	2	7654-A1	0.00015	0.5	0.031%	YES	0.06%
11	4-Methyl-2-hexanone	4	7654-B1	0.00008	0.5	0.017%	YES	0.06%
11	4-Methyl-2-hexanone	6	7654-C1	0.00008	0.5	0.016%	YES	0.06%
11	4-Methyl-2-hexanone	8	7654-D1	0.00008	0.5	0.017%	YES	0.06%
11	4-Methyl-2-hexanone	10	7654-E1	0.00008	0.5	0.016%	YES	0.06%
11	4-Methyl-2-hexanone	12	7654-F1	0.00008	0.5	0.015%	YES	0.06%
11	4-Methyl-2-hexanone	14	7654-G1	0.00007	0.5	0.015%	YES	0.06%
11	4-Methyl-2-hexanone	16	7654-H1	0.00016	0.5	0.031%	YES	0.06%
11	4-Methyl-2-hexanone	2	7654-A2	0.00015	0.5	0.029%	YES	0.06%
11	4-Methyl-2-hexanone	4	7654-B2	0.00018	0.5	0.036%	YES	0.06%
11	4-Methyl-2-hexanone	6	7654-C2	0.00017	0.5	0.034%	YES	0.06%
11	4-Methyl-2-hexanone	8	7654-D2	0.00017	0.5	0.033%	YES	0.06%
11	4-Methyl-2-hexanone	10	7654-E2	0.00016	0.5	0.033%	YES	0.06%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL RL?	Approx. DL RL (%OEL)
11	4-Methyl-2-hexanone	12	7654-F2	0.00016	0.5	0.031%	YES	0.06%
11	4-Methyl-2-hexanone	14	7654-G2	0.00015	0.5	0.030%	YES	0.06%
11	4-Methyl-2-hexanone	16	7654-H2	0.00015	0.5	0.030%	YES	0.06%
13	3-Buten-2-one	2	7645-A1	0.00228	0.2	1.14%		0.10%
13	3-Buten-2-one	4	7645-B1	0.00070	0.2	0.35%		0.10%
13	3-Buten-2-one	6	7645-C1	0.00056	0.2	0.28%		0.10%
13	3-Buten-2-one	8	7645-D1	0.00061	0.2	0.31%		0.10%
13	3-Buten-2-one	10	7645-E1	0.00040	0.2	0.20%		0.10%
13	3-Buten-2-one	12	7645-F1	0.00038	0.2	0.19%		0.10%
13	3-Buten-2-one	14	7645-G1	0.00037	0.2	0.18%		0.10%
13	3-Buten-2-one	16	7645-H1	0.00034	0.2	0.17%		0.10%
13	3-Buten-2-one	2	7645-A2	0.00018	0.2	0.09%	YES	0.10%
13	3-Buten-2-one	4	7645-B2	0.00035	0.2	0.18%		0.10%
13	3-Buten-2-one	6	7645-C2	0.00026	0.2	0.13%		0.10%
13	3-Buten-2-one	8	7645-D2	0.00020	0.2	0.10%		0.10%
13	3-Buten-2-one	10	7645-E2	0.00018	0.2	0.09%	YES	0.10%
13	3-Buten-2-one	12	7645-F2	0.00017	0.2	0.08%	YES	0.10%
13	3-Buten-2-one	14	7645-G2	0.00016	0.2	0.08%	YES	0.10%
13	3-Buten-2-one	16	7645-H2	0.00015	0.2	0.08%	YES	0.10%
13	3-Buten-2-one	2	7654-A1	0.00058	0.2	0.29%		0.10%
13	3-Buten-2-one	4	7654-B1	0.00063	0.2	0.32%		0.10%
13	3-Buten-2-one	6	7654-C1	0.00044	0.2	0.22%		0.10%
13	3-Buten-2-one	8	7654-D1	0.00050	0.2	0.25%		0.10%
13	3-Buten-2-one	10	7654-E1	0.00038	0.2	0.19%		0.10%
13	3-Buten-2-one	12	7654-F1	0.00040	0.2	0.20%		0.10%
13	3-Buten-2-one	14	7654-G1	0.00031	0.2	0.15%		0.10%
13	3-Buten-2-one	16	7654-H1	0.00034	0.2	0.17%		0.10%
13	3-Buten-2-one	2	7654-A2	0.00025	0.2	0.13%		0.10%
13	3-Buten-2-one	4	7654-B2	0.00023	0.2	0.11%		0.10%
13	3-Buten-2-one	6	7654-C2	0.00023	0.2	0.12%		0.10%
13	3-Buten-2-one	8	7654-D2	0.00020	0.2	0.10%	YES	0.10%
13	3-Buten-2-one	10	7654-E2	0.00019	0.2	0.10%	YES	0.10%
13	3-Buten-2-one	12	7654-F2	0.00019	0.2	0.09%	YES	0.10%
13	3-Buten-2-one	14	7654-G2	0.00018	0.2	0.09%	YES	0.10%
13	3-Buten-2-one	16	7654-H2	0.00018	0.2	0.09%	YES	0.10%
14	Formaldehyde	2	7645-A1	0.0047	0.3	1.56%		0.63%
14	Formaldehyde	4	7645-B1	0.0045	0.3	1.50%		0.63%
14	Formaldehyde	6	7645-C1	0.0052	0.3	1.75%		0.63%
14	Formaldehyde	8	7645-D1	0.0041	0.3	1.36%		0.63%
14	Formaldehyde	10	7645-E1	0.0033	0.3	1.11%		0.63%
14	Formaldehyde	12	7645-F1	0.0031	0.3	1.02%		0.63%
14	Formaldehyde	14	7645-G1	0.0024	0.3	0.80%		0.63%
14	Formaldehyde	16	7645-H1	0.0032	0.3	1.07%		0.63%
14	Formaldehyde	2	7645-A2	0.0029	0.3	0.96%		0.63%
14	Formaldehyde	4	7645-B2	0.0030	0.3	1.00%		0.63%
14	Formaldehyde	6	7645-C2	0.0033	0.3	1.11%		0.63%
14	Formaldehyde	8	7645-D2	0.0019	0.3	0.63%	YES	0.63%
14	Formaldehyde	10	7645-E2	0.0018	0.3	0.61%	YES	0.63%
14	Formaldehyde	12	7645-F2	0.0019	0.3	0.62%		0.63%
14	Formaldehyde	14	7645-G2	0.0018	0.3	0.60%	YES	0.63%
14	Formaldehyde	16	7645-H2	0.0018	0.3	0.60%	YES	0.63%
14	Formaldehyde	2	7654-A1	0.0077	0.3	2.57%		0.63%
14	Formaldehyde	4	7654-B1	0.0049	0.3	1.65%		0.63%
14	Formaldehyde	6	7654-C1	0.0090	0.3	3.01%		0.63%
14	Formaldehyde	8	7654-D1	0.0064	0.3	2.14%		0.63%
14	Formaldehyde	10	7654-E1	0.0029	0.3	0.96%		0.63%
14	Formaldehyde	12	7654-F1	0.0023	0.3	0.78%		0.63%
14	Formaldehyde	14	7654-G1	0.0018	0.3	0.59%	YES	0.63%
14	Formaldehyde	16	7654-H1	0.0018	0.3	0.59%	YES	0.63%
14	Formaldehyde	2	7654-A2	0.0033	0.3	1.09%		0.63%
14	Formaldehyde	4	7654-B2	0.0030	0.3	1.00%		0.63%
14	Formaldehyde	6	7654-C2	0.0025	0.3	0.84%		0.63%
14	Formaldehyde	8	7654-D2	0.0019	0.3	0.63%	YES	0.63%



COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL RL?	Approx. DL RL (%OEL)
14	Formaldehyde	10	7654-E2	0.0019	0.3	0.62%	YES	0.63%
14	Formaldehyde	12	7654-F2	0.0018	0.3	0.61%	YES	0.63%
14	Formaldehyde	14	7654-G2	0.0018	0.3	0.61%	YES	0.63%
14	Formaldehyde	16	7654-H2	0.0018	0.3	0.60%	YES	0.63%
15	Acetaldehyde	2	7645-A1	0.0142	25	0.057%		0.005%
15	Acetaldehyde	4	7645-B1	0.0135	25	0.054%		0.005%
15	Acetaldehyde	6	7645-C1	0.0138	25	0.055%		0.005%
15	Acetaldehyde	8	7645-D1	0.0127	25	0.051%		0.005%
15	Acetaldehyde	10	7645-E1	0.0121	25	0.048%		0.005%
15	Acetaldehyde	12	7645-F1	0.0123	25	0.049%		0.005%
15	Acetaldehyde	14	7645-G1	0.0114	25	0.046%		0.005%
15	Acetaldehyde	16	7645-H1	0.0115	25	0.046%		0.005%
15	Acetaldehyde	2	7645-A2	0.0047	25	0.019%		0.005%
15	Acetaldehyde	4	7645-B2	0.0094	25	0.037%		0.005%
15	Acetaldehyde	6	7645-C2	0.0091	25	0.036%		0.005%
15	Acetaldehyde	8	7645-D2	0.0052	25	0.021%		0.005%
15	Acetaldehyde	10	7645-E2	0.0085	25	0.034%		0.005%
15	Acetaldehyde	12	7645-F2	0.0075	25	0.030%		0.005%
15	Acetaldehyde	14	7645-G2	0.0074	25	0.029%		0.005%
15	Acetaldehyde	16	7645-H2	0.0076	25	0.030%		0.005%
15	Acetaldehyde	2	7654-A1	0.0143	25	0.057%		0.005%
15	Acetaldehyde	4	7654-B1	0.0132	25	0.053%		0.005%
15	Acetaldehyde	6	7654-C1	0.0146	25	0.059%		0.005%
15	Acetaldehyde	8	7654-D1	0.0123	25	0.049%		0.005%
15	Acetaldehyde	10	7654-E1	0.0115	25	0.046%		0.005%
15	Acetaldehyde	12	7654-F1	0.0114	25	0.046%		0.005%
15	Acetaldehyde	14	7654-G1	0.0107	25	0.043%		0.005%
15	Acetaldehyde	16	7654-H1	0.0098	25	0.039%		0.005%
15	Acetaldehyde	2	7654-A2	0.0059	25	0.024%		0.005%
15	Acetaldehyde	4	7654-B2	0.0108	25	0.043%		0.005%
15	Acetaldehyde	6	7654-C2	0.0119	25	0.048%		0.005%
15	Acetaldehyde	8	7654-D2	0.0100	25	0.040%		0.005%
15	Acetaldehyde	10	7654-E2	0.0089	25	0.036%		0.005%
15	Acetaldehyde	12	7654-F2	0.0092	25	0.037%		0.005%
15	Acetaldehyde	14	7654-G2	0.0087	25	0.035%		0.005%
15	Acetaldehyde	16	7654-H2	0.0078	25	0.031%		0.005%
16	Butanal	2	7645-A1	0.00364	25	0.015%		0.001%
16	Butanal	4	7645-B1	0.00142	25	0.006%		0.001%
16	Butanal	6	7645-C1	0.00080	25	0.003%		0.001%
16	Butanal	8	7645-D1	0.00071	25	0.003%		0.001%
16	Butanal	10	7645-E1	0.00061	25	0.002%		0.001%
16	Butanal	12	7645-F1	0.00047	25	0.002%		0.001%
16	Butanal	14	7645-G1	0.00037	25	0.001%		0.001%
16	Butanal	16	7645-H1	0.00049	25	0.002%		0.001%
16	Butanal	2	7645-A2	0.00031	25	0.001%		0.001%
16	Butanal	4	7645-B2	0.00031	25	0.001%		0.001%
16	Butanal	6	7645-C2	0.00022	25	0.001%		0.001%
16	Butanal	8	7645-D2	0.00025	25	0.001%		0.001%
16	Butanal	10	7645-E2	0.00021	25	0.001%	YES	0.001%
16	Butanal	12	7645-F2	0.00020	25	0.001%	YES	0.001%
16	Butanal	14	7645-G2	0.00019	25	0.001%	YES	0.001%
16	Butanal	16	7645-H2	0.00019	25	0.001%	YES	0.001%
16	Butanal	2	7654-A1	0.00074	25	0.003%		0.001%
16	Butanal	4	7654-B1	0.00096	25	0.004%		0.001%
16	Butanal	6	7654-C1	0.00058	25	0.002%		0.001%
16	Butanal	8	7654-D1	0.00072	25	0.003%		0.001%
16	Butanal	10	7654-E1	0.00047	25	0.002%		0.001%
16	Butanal	12	7654-F1	0.00055	25	0.002%		0.001%
16	Butanal	14	7654-G1	0.00053	25	0.002%		0.001%
16	Butanal	16	7654-H1	0.00073	25	0.003%		0.001%
16	Butanal	2	7654-A2	0.00027	25	0.001%	YES	0.001%
16	Butanal	4	7654-B2	0.00033	25	0.001%	YES	0.001%
16	Butanal	6	7654-C2	0.00031	25	0.001%	YES	0.001%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL RL?	Approx. DL RL (%OEL)
16	Butanal	8	7654-D2	0.00030	25	0.001%	YES	0.001%
16	Butanal	10	7654-E2	0.00030	25	0.001%	YES	0.001%
16	Butanal	12	7654-F2	0.00029	25	0.001%	YES	0.001%
16	Butanal	14	7654-G2	0.00028	25	0.001%	YES	0.001%
16	Butanal	16	7654-H2	0.00027	25	0.001%	YES	0.001%
19	Furan	2	7645-A1	0.000095	0.001	9.46%		0.55%
19	Furan	4	7645-B1	0.000015	0.001	1.52%		0.55%
19	Furan	6	7645-C1	0.000013	0.001	1.31%		0.55%
19	Furan	8	7645-D1	0.000011	0.001	1.10%		0.55%
19	Furan	10	7645-E1	0.000057	0.001	5.66%	YES	5.74%
19	Furan	12	7645-F1	0.000057	0.001	5.74%	YES	5.74%
19	Furan	14	7645-G1	0.000056	0.001	5.59%	YES	5.74%
19	Furan	16	7645-H1	0.000055	0.001	5.47%	YES	5.74%
19	Furan	2	7645-A2	0.000026	0.001	2.58%		5.74%
19	Furan	4	7645-B2	0.000006	0.001	0.61%		5.74%
19	Furan	6	7645-C2	0.000006	0.001	0.59%		5.74%
19	Furan	8	7645-D2	0.000006	0.001	0.59%	YES	5.74%
19	Furan	10	7645-E2	0.000038	0.001	3.81%	YES	5.74%
19	Furan	12	7645-F2	0.000037	0.001	3.74%	YES	5.74%
19	Furan	14	7645-G2	0.000038	0.001	3.76%	YES	5.74%
19	Furan	16	7645-H2	0.000038	0.001	3.77%	YES	5.74%
19	Furan	2	7654-A1	0.000012	0.001	1.17%		0.57%
19	Furan	4	7654-B1	0.000013	0.001	1.28%		0.57%
19	Furan	6	7654-C1	0.000010	0.001	1.04%		0.57%
19	Furan	8	7654-D1	0.000012	0.001	1.16%		0.57%
19	Furan	10	7654-E1	0.000037	0.001	3.71%	YES	3.71%
19	Furan	12	7654-F1	0.000036	0.001	3.60%	YES	3.71%
19	Furan	14	7654-G1	0.000035	0.001	3.54%	YES	3.71%
19	Furan	16	7654-H1	0.000035	0.001	3.50%	YES	3.71%
19	Furan	2	7654-A2	0.000006	0.001	0.57%		3.71%
19	Furan	4	7654-B2	0.000008	0.001	0.83%		3.71%
19	Furan	6	7654-C2	0.000009	0.001	0.89%		3.71%
19	Furan	8	7654-D2	0.000006	0.001	0.63%		3.71%
19	Furan	10	7654-E2	0.000024	0.001	2.43%	YES	3.71%
19	Furan	12	7654-F2	0.000024	0.001	2.37%	YES	3.71%
19	Furan	14	7654-G2	0.000024	0.001	2.36%	YES	3.71%
19	Furan	16	7654-H2	0.000024	0.001	2.37%	YES	3.71%
20	2,3-Dihydrofuran	2	7645-A1	0.000056	0.001	5.65%		1.1%
20	2,3-Dihydrofuran	4	7645-B1	0.000062	0.001	6.19%		1.1%
20	2,3-Dihydrofuran	6	7645-C1	0.000037	0.001	3.72%		1.1%
20	2,3-Dihydrofuran	8	7645-D1	0.000052	0.001	5.24%		1.1%
20	2,3-Dihydrofuran	10	7645-E1	0.000030	0.001	3.03%	YES	3.1%
20	2,3-Dihydrofuran	12	7645-F1	0.000031	0.001	3.08%	YES	3.1%
20	2,3-Dihydrofuran	14	7645-G1	0.000030	0.001	3.00%	YES	3.1%
20	2,3-Dihydrofuran	16	7645-H1	0.000029	0.001	2.93%	YES	3.1%
20	2,3-Dihydrofuran	2	7645-A2	0.000011	0.001	1.10%	YES	1.1%
20	2,3-Dihydrofuran	4	7645-B2	0.000011	0.001	1.07%	YES	1.1%
20	2,3-Dihydrofuran	6	7645-C2	0.000011	0.001	1.14%	YES	1.1%
20	2,3-Dihydrofuran	8	7645-D2	0.000012	0.001	1.15%	YES	1.1%
20	2,3-Dihydrofuran	10	7645-E2	0.000020	0.001	2.04%	YES	3.1%
20	2,3-Dihydrofuran	12	7645-F2	0.000020	0.001	2.01%	YES	3.1%
20	2,3-Dihydrofuran	14	7645-G2	0.000020	0.001	2.02%	YES	3.1%
20	2,3-Dihydrofuran	16	7645-H2	0.000020	0.001	2.02%	YES	3.1%
20	2,3-Dihydrofuran	2	7654-A1	0.000040	0.001	3.99%		1.1%
20	2,3-Dihydrofuran	4	7654-B1	0.000036	0.001	3.63%		1.1%
20	2,3-Dihydrofuran	6	7654-C1	0.000033	0.001	3.34%		1.1%
20	2,3-Dihydrofuran	8	7654-D1	0.000018	0.001	1.85%	YES	1.1%
20	2,3-Dihydrofuran	10	7654-E1	0.000022	0.001	2.24%	YES	2.2%
20	2,3-Dihydrofuran	12	7654-F1	0.000022	0.001	2.17%	YES	2.2%
20	2,3-Dihydrofuran	14	7654-G1	0.000021	0.001	2.14%	YES	2.2%
20	2,3-Dihydrofuran	16	7654-H1	0.000021	0.001	2.11%	YES	2.2%
20	2,3-Dihydrofuran	2	7654-A2	0.000011	0.001	1.10%	YES	1.1%
20	2,3-Dihydrofuran	4	7654-B2	0.000011	0.001	1.11%	YES	1.1%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL RL?	Approx. DL RL (%OEL)
20	2,3-Dihydrofuran	6	7654-C2	0.000011	0.001	1.11%	YES	1.1%
20	2,3-Dihydrofuran	8	7654-D2	0.000011	0.001	1.11%	YES	1.1%
20	2,3-Dihydrofuran	10	7654-E2	0.000015	0.001	1.47%	YES	2.2%
20	2,3-Dihydrofuran	12	7654-F2	0.000014	0.001	1.43%	YES	2.2%
20	2,3-Dihydrofuran	14	7654-G2	0.000014	0.001	1.42%	YES	2.2%
20	2,3-Dihydrofuran	16	7654-H2	0.000014	0.001	1.43%	YES	2.2%
21	2,5-Dihydrofuran	2	7645-A1	0.000220	0.001	22.0%		1.4%
21	2,5-Dihydrofuran	4	7645-B1	0.000035	0.001	3.54%		1.4%
21	2,5-Dihydrofuran	6	7645-C1	0.000028	0.001	2.84%		1.4%
21	2,5-Dihydrofuran	8	7645-D1	0.000023	0.001	2.33%		1.4%
21	2,5-Dihydrofuran	10	7645-E1	0.000043	0.001	4.27%	YES	4.3%
21	2,5-Dihydrofuran	12	7645-F1	0.000043	0.001	4.32%	YES	4.3%
21	2,5-Dihydrofuran	14	7645-G1	0.000042	0.001	4.21%	YES	4.3%
21	2,5-Dihydrofuran	16	7645-H1	0.000041	0.001	4.12%	YES	4.3%
21	2,5-Dihydrofuran	2	7645-A2	0.000046	0.001	4.58%		1.4%
21	2,5-Dihydrofuran	4	7645-B2	0.000014	0.001	1.37%	YES	1.4%
21	2,5-Dihydrofuran	6	7645-C2	0.000015	0.001	1.46%	YES	1.4%
21	2,5-Dihydrofuran	8	7645-D2	0.000015	0.001	1.47%	YES	1.4%
21	2,5-Dihydrofuran	10	7645-E2	0.000029	0.001	2.87%	YES	4.3%
21	2,5-Dihydrofuran	12	7645-F2	0.000028	0.001	2.82%	YES	4.3%
21	2,5-Dihydrofuran	14	7645-G2	0.000028	0.001	2.84%	YES	4.3%
21	2,5-Dihydrofuran	16	7645-H2	0.000028	0.001	2.84%	YES	4.3%
21	2,5-Dihydrofuran	2	7654-A1	0.000022	0.001	2.18%	YES	2.2%
21	2,5-Dihydrofuran	4	7654-B1	0.000031	0.001	3.11%		2.2%
21	2,5-Dihydrofuran	6	7654-C1	0.000023	0.001	2.32%	YES	2.2%
21	2,5-Dihydrofuran	8	7654-D1	0.000024	0.001	2.36%	YES	2.2%
21	2,5-Dihydrofuran	10	7654-E1	0.000032	0.001	3.21%	YES	3.2%
21	2,5-Dihydrofuran	12	7654-F1	0.000031	0.001	3.11%	YES	3.2%
21	2,5-Dihydrofuran	14	7654-G1	0.000031	0.001	3.07%	YES	3.2%
21	2,5-Dihydrofuran	16	7654-H1	0.000030	0.001	3.03%	YES	3.2%
21	2,5-Dihydrofuran	2	7654-A2	0.000014	0.001	1.41%	YES	2.2%
21	2,5-Dihydrofuran	4	7654-B2	0.000014	0.001	1.42%	YES	2.2%
21	2,5-Dihydrofuran	6	7654-C2	0.000014	0.001	1.42%	YES	2.2%
21	2,5-Dihydrofuran	8	7654-D2	0.000014	0.001	1.42%	YES	2.2%
21	2,5-Dihydrofuran	10	7654-E2	0.000021	0.001	2.11%	YES	3.2%
21	2,5-Dihydrofuran	12	7654-F2	0.000021	0.001	2.05%	YES	3.2%
21	2,5-Dihydrofuran	14	7654-G2	0.000020	0.001	2.04%	YES	3.2%
21	2,5-Dihydrofuran	16	7654-H2	0.000020	0.001	2.05%	YES	3.2%
22	2-Methylfuran	2	7645-A1	0.000253	0.001	25.3%		1.2%
22	2-Methylfuran	4	7645-B1	0.000051	0.001	5.12%		1.2%
22	2-Methylfuran	6	7645-C1	0.000036	0.001	3.59%		1.2%
22	2-Methylfuran	8	7645-D1	0.000023	0.001	2.32%		1.2%
22	2-Methylfuran	10	7645-E1	0.000012	0.001	1.21%		1.2%
22	2-Methylfuran	12	7645-F1	0.000012	0.001	1.23%	YES	1.2%
22	2-Methylfuran	14	7645-G1	0.000012	0.001	1.20%	YES	1.2%
22	2-Methylfuran	16	7645-H1	0.000012	0.001	1.17%	YES	1.2%
22	2-Methylfuran	2	7645-A2	0.000051	0.001	5.11%		1.2%
22	2-Methylfuran	4	7645-B2	0.000012	0.001	1.17%	YES	1.2%
22	2-Methylfuran	6	7645-C2	0.000012	0.001	1.24%	YES	1.2%
22	2-Methylfuran	8	7645-D2	0.000013	0.001	1.26%	YES	1.2%
22	2-Methylfuran	10	7645-E2	0.000008	0.001	0.82%	YES	1.2%
22	2-Methylfuran	12	7645-F2	0.000008	0.001	0.80%	YES	1.2%
22	2-Methylfuran	14	7645-G2	0.000008	0.001	0.81%	YES	1.2%
22	2-Methylfuran	16	7645-H2	0.000008	0.001	0.81%	YES	1.2%
22	2-Methylfuran	2	7654-A1	0.000023	0.001	2.27%		2.0%
22	2-Methylfuran	4	7654-B1	0.000026	0.001	2.57%		2.0%
22	2-Methylfuran	6	7654-C1	0.000020	0.001	1.98%	YES	2.0%
22	2-Methylfuran	8	7654-D1	0.000021	0.001	2.10%		2.0%
22	2-Methylfuran	10	7654-E1	0.000038	0.001	3.82%	YES	3.8%
22	2-Methylfuran	12	7654-F1	0.000037	0.001	3.71%	YES	3.8%
22	2-Methylfuran	14	7654-G1	0.000037	0.001	3.65%	YES	3.8%
22	2-Methylfuran	16	7654-H1	0.000036	0.001	3.61%	YES	3.8%
22	2-Methylfuran	2	7654-A2	0.000012	0.001	1.20%	YES	2.0%



COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL RL?	Approx. DL RL (%OEL)
22	2-Methylfuran	4	7654-B2	0.000012	0.001	1.21%	YES	2.0%
22	2-Methylfuran	6	7654-C2	0.000012	0.001	1.22%	YES	2.0%
22	2-Methylfuran	8	7654-D2	0.000012	0.001	1.21%	YES	2.0%
22	2-Methylfuran	10	7654-E2	0.000025	0.001	2.51%	YES	3.8%
22	2-Methylfuran	12	7654-F2	0.000024	0.001	2.44%	YES	3.8%
22	2-Methylfuran	14	7654-G2	0.000024	0.001	2.43%	YES	3.8%
22	2-Methylfuran	16	7654-H2	0.000024	0.001	2.44%	YES	3.8%
23	2,5-Dimethylfuran	2	7645-A1	0.000030	0.001	3.00%	YES	3.1%
23	2,5-Dimethylfuran	4	7645-B1	0.000031	0.001	3.08%	YES	3.1%
23	2,5-Dimethylfuran	6	7645-C1	0.000031	0.001	3.07%	YES	3.1%
23	2,5-Dimethylfuran	8	7645-D1	0.000030	0.001	3.04%	YES	3.1%
23	2,5-Dimethylfuran	10	7645-E1	0.000018	0.001	1.80%	YES	1.8%
23	2,5-Dimethylfuran	12	7645-F1	0.000018	0.001	1.82%	YES	1.8%
23	2,5-Dimethylfuran	14	7645-G1	0.000018	0.001	1.77%	YES	1.8%
23	2,5-Dimethylfuran	16	7645-H1	0.000017	0.001	1.74%	YES	1.8%
23	2,5-Dimethylfuran	2	7645-A2	0.000019	0.001	1.91%	YES	3.1%
23	2,5-Dimethylfuran	4	7645-B2	0.000019	0.001	1.87%	YES	3.1%
23	2,5-Dimethylfuran	6	7645-C2	0.000020	0.001	1.98%	YES	3.1%
23	2,5-Dimethylfuran	8	7645-D2	0.000020	0.001	2.01%	YES	3.1%
23	2,5-Dimethylfuran	10	7645-E2	0.000012	0.001	1.21%	YES	1.8%
23	2,5-Dimethylfuran	12	7645-F2	0.000012	0.001	1.19%	YES	1.8%
23	2,5-Dimethylfuran	14	7645-G2	0.000012	0.001	1.19%	YES	1.8%
23	2,5-Dimethylfuran	16	7645-H2	0.000012	0.001	1.20%	YES	1.8%
23	2,5-Dimethylfuran	2	7654-A1	0.000030	0.001	2.98%	YES	3.2%
23	2,5-Dimethylfuran	4	7654-B1	0.000033	0.001	3.25%	YES	3.2%
23	2,5-Dimethylfuran	6	7654-C1	0.000032	0.001	3.17%	YES	3.2%
23	2,5-Dimethylfuran	8	7654-D1	0.000032	0.001	3.22%	YES	3.2%
23	2,5-Dimethylfuran	10	7654-E1	0.000053	0.001	5.32%	YES	5.3%
23	2,5-Dimethylfuran	12	7654-F1	0.000052	0.001	5.16%	YES	5.3%
23	2,5-Dimethylfuran	14	7654-G1	0.000051	0.001	5.08%	YES	5.3%
23	2,5-Dimethylfuran	16	7654-H1	0.000050	0.001	5.03%	YES	5.3%
23	2,5-Dimethylfuran	2	7654-A2	0.000019	0.001	1.92%	YES	3.2%
23	2,5-Dimethylfuran	4	7654-B2	0.000019	0.001	1.93%	YES	3.2%
23	2,5-Dimethylfuran	6	7654-C2	0.000019	0.001	1.94%	YES	3.2%
23	2,5-Dimethylfuran	8	7654-D2	0.000019	0.001	1.93%	YES	3.2%
23	2,5-Dimethylfuran	10	7654-E2	0.000035	0.001	3.49%	YES	5.3%
23	2,5-Dimethylfuran	12	7654-F2	0.000034	0.001	3.40%	YES	5.3%
23	2,5-Dimethylfuran	14	7654-G2	0.000034	0.001	3.39%	YES	5.3%
23	2,5-Dimethylfuran	16	7654-H2	0.000034	0.001	3.40%	YES	5.3%
27	2-Pentylfuran	2	7645-A1	0.000044	0.001	4.37%		1.1%
27	2-Pentylfuran	4	7645-B1	0.000055	0.001	5.48%		1.1%
27	2-Pentylfuran	6	7645-C1	0.000048	0.001	4.77%		1.1%
27	2-Pentylfuran	8	7645-D1	0.000033	0.001	3.35%		1.1%
27	2-Pentylfuran	10	7645-E1	0.000036	0.001	3.60%		1.3%
27	2-Pentylfuran	12	7645-F1	0.000027	0.001	2.73%		1.3%
27	2-Pentylfuran	14	7645-G1	0.000024	0.001	2.37%		1.3%
27	2-Pentylfuran	16	7645-H1	0.000013	0.001	1.35%	YES	1.3%
27	2-Pentylfuran	2	7645-A2	0.000011	0.001	1.08%		1.1%
27	2-Pentylfuran	4	7645-B2	0.000010	0.001	1.03%	YES	1.1%
27	2-Pentylfuran	6	7645-C2	0.000011	0.001	1.09%	YES	1.1%
27	2-Pentylfuran	8	7645-D2	0.000011	0.001	1.10%	YES	1.1%
27	2-Pentylfuran	10	7645-E2	0.000017	0.001	1.68%		1.3%
27	2-Pentylfuran	12	7645-F2	0.000009	0.001	0.92%	YES	1.3%
27	2-Pentylfuran	14	7645-G2	0.000009	0.001	0.93%	YES	1.3%
27	2-Pentylfuran	16	7645-H2	0.000009	0.001	0.93%	YES	1.3%
27	2-Pentylfuran	2	7654-A1	0.000027	0.001	2.74%		1.1%
27	2-Pentylfuran	4	7654-B1	0.000037	0.001	3.68%		1.1%
27	2-Pentylfuran	6	7654-C1	0.000032	0.001	3.23%		1.1%
27	2-Pentylfuran	8	7654-D1	0.000021	0.001	2.08%		1.1%
27	2-Pentylfuran	10	7654-E1	0.000049	0.001	4.93%		4.3%
27	2-Pentylfuran	12	7654-F1	0.000043	0.001	4.31%	YES	4.3%
27	2-Pentylfuran	14	7654-G1	0.000042	0.001	4.24%	YES	4.3%
27	2-Pentylfuran	16	7654-H1	0.000042	0.001	4.20%	YES	4.3%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL RL?	Approx. DL RL (%OEL)
27	2-Pentylfuran	2	7654-A2	0.000011	0.001	1.06%	YES	1.1%
27	2-Pentylfuran	4	7654-B2	0.000011	0.001	1.06%	YES	1.1%
27	2-Pentylfuran	6	7654-C2	0.000013	0.001	1.26%		1.1%
27	2-Pentylfuran	8	7654-D2	0.000011	0.001	1.06%	YES	1.1%
27	2-Pentylfuran	10	7654-E2	0.000029	0.001	2.92%	YES	4.3%
27	2-Pentylfuran	12	7654-F2	0.000028	0.001	2.84%	YES	4.3%
27	2-Pentylfuran	14	7654-G2	0.000028	0.001	2.83%	YES	4.3%
27	2-Pentylfuran	16	7654-H2	0.000028	0.001	2.83%	YES	4.3%
28	2-Heptylfuran	2	7645-A1	0.000011	0.001	1.09%	YES	1.1%
28	2-Heptylfuran	4	7645-B1	0.000011	0.001	1.12%	YES	1.1%
28	2-Heptylfuran	6	7645-C1	0.000011	0.001	1.11%	YES	1.1%
28	2-Heptylfuran	8	7645-D1	0.000011	0.001	1.11%	YES	1.1%
28	2-Heptylfuran	10	7645-E1	0.000026	0.001	2.64%		1.5%
28	2-Heptylfuran	12	7645-F1	0.000015	0.001	1.54%	YES	1.5%
28	2-Heptylfuran	14	7645-G1	0.000015	0.001	1.50%	YES	1.5%
28	2-Heptylfuran	16	7645-H1	0.000015	0.001	1.47%	YES	1.5%
28	2-Heptylfuran	2	7645-A2	0.000007	0.001	0.69%	YES	1.1%
28	2-Heptylfuran	4	7645-B2	0.000007	0.001	0.68%	YES	1.1%
28	2-Heptylfuran	6	7645-C2	0.000007	0.001	0.72%	YES	1.1%
28	2-Heptylfuran	8	7645-D2	0.000007	0.001	0.73%	YES	1.1%
28	2-Heptylfuran	10	7645-E2	0.000010	0.001	1.02%	YES	1.5%
28	2-Heptylfuran	12	7645-F2	0.000010	0.001	1.00%	YES	1.5%
28	2-Heptylfuran	14	7645-G2	0.000010	0.001	1.01%	YES	1.5%
28	2-Heptylfuran	16	7645-H2	0.000010	0.001	1.01%	YES	1.5%
28	2-Heptylfuran	2	7654-A1	0.000011	0.001	1.08%	YES	1.2%
28	2-Heptylfuran	4	7654-B1	0.000012	0.001	1.18%	YES	1.2%
28	2-Heptylfuran	6	7654-C1	0.000012	0.001	1.15%	YES	1.2%
28	2-Heptylfuran	8	7654-D1	0.000012	0.001	1.17%	YES	1.2%
28	2-Heptylfuran	10	7654-E1	0.000035	0.001	3.53%	YES	3.4%
28	2-Heptylfuran	12	7654-F1	0.000034	0.001	3.42%	YES	3.4%
28	2-Heptylfuran	14	7654-G1	0.000034	0.001	3.37%	YES	3.4%
28	2-Heptylfuran	16	7654-H1	0.000033	0.001	3.33%	YES	3.4%
28	2-Heptylfuran	2	7654-A2	0.000007	0.001	0.70%	YES	1.2%
28	2-Heptylfuran	4	7654-B2	0.000007	0.001	0.70%	YES	1.2%
28	2-Heptylfuran	6	7654-C2	0.000007	0.001	0.70%	YES	1.2%
28	2-Heptylfuran	8	7654-D2	0.000007	0.001	0.70%	YES	1.2%
28	2-Heptylfuran	10	7654-E2	0.000023	0.001	2.32%	YES	3.4%
28	2-Heptylfuran	12	7654-F2	0.000023	0.001	2.26%	YES	3.4%
28	2-Heptylfuran	14	7654-G2	0.000022	0.001	2.24%	YES	3.4%
28	2-Heptylfuran	16	7654-H2	0.000023	0.001	2.25%	YES	3.4%
29	2-Propylfuran	2	7645-A1	0.000027	0.001	2.68%	YES	2.7%
29	2-Propylfuran	4	7645-B1	0.000028	0.001	2.75%	YES	2.7%
29	2-Propylfuran	6	7645-C1	0.000027	0.001	2.74%	YES	2.7%
29	2-Propylfuran	8	7645-D1	0.000027	0.001	2.72%	YES	2.7%
29	2-Propylfuran	10	7645-E1	0.000013	0.001	1.27%	YES	1.3%
29	2-Propylfuran	12	7645-F1	0.000013	0.001	1.28%	YES	1.3%
29	2-Propylfuran	14	7645-G1	0.000013	0.001	1.25%	YES	1.3%
29	2-Propylfuran	16	7645-H1	0.000012	0.001	1.22%	YES	1.3%
29	2-Propylfuran	2	7645-A2	0.000017	0.001	1.71%	YES	2.7%
29	2-Propylfuran	4	7645-B2	0.000017	0.001	1.67%	YES	2.7%
29	2-Propylfuran	6	7645-C2	0.000018	0.001	1.77%	YES	2.7%
29	2-Propylfuran	8	7645-D2	0.000018	0.001	1.79%	YES	2.7%
29	2-Propylfuran	10	7645-E2	0.000009	0.001	0.85%	YES	1.3%
29	2-Propylfuran	12	7645-F2	0.000008	0.001	0.84%	YES	1.3%
29	2-Propylfuran	14	7645-G2	0.000008	0.001	0.84%	YES	1.3%
29	2-Propylfuran	16	7645-H2	0.000008	0.001	0.84%	YES	1.3%
29	2-Propylfuran	2	7654-A1	0.000027	0.001	2.66%	YES	2.9%
29	2-Propylfuran	4	7654-B1	0.000029	0.001	2.90%	YES	2.9%
29	2-Propylfuran	6	7654-C1	0.000028	0.001	2.83%	YES	2.9%
29	2-Propylfuran	8	7654-D1	0.000029	0.001	2.87%	YES	2.9%
29	2-Propylfuran	10	7654-E1	0.000038	0.001	3.84%	YES	3.8%
29	2-Propylfuran	12	7654-F1	0.000037	0.001	3.72%	YES	3.8%
29	2-Propylfuran	14	7654-G1	0.000037	0.001	3.67%	YES	3.8%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL RL?	Approx. DL RL (%OEL)
29	2-Propylfuran	16	7654-H1	0.000036	0.001	3.63%	YES	3.8%
29	2-Propylfuran	2	7654-A2	0.000017	0.001	1.71%	YES	2.9%
29	2-Propylfuran	4	7654-B2	0.000017	0.001	1.73%	YES	2.9%
29	2-Propylfuran	6	7654-C2	0.000017	0.001	1.73%	YES	2.9%
29	2-Propylfuran	8	7654-D2	0.000017	0.001	1.72%	YES	2.9%
29	2-Propylfuran	10	7654-E2	0.000025	0.001	2.52%	YES	3.8%
29	2-Propylfuran	12	7654-F2	0.000025	0.001	2.45%	YES	3.8%
29	2-Propylfuran	14	7654-G2	0.000024	0.001	2.44%	YES	3.8%
29	2-Propylfuran	16	7654-H2	0.000024	0.001	2.45%	YES	3.8%
33	Diethylphthalate	2	7645-A1	0.00023	0.550148173	0.043%	YES	10.5%
33	Diethylphthalate	4	7645-B1	0.00022	0.550148173	0.040%	YES	10.5%
33	Diethylphthalate	6	7645-C1	0.00022	0.550148173	0.041%	YES	10.5%
33	Diethylphthalate	8	7645-D1	0.00022	0.550148173	0.040%	YES	10.5%
33	Diethylphthalate	10	7645-E1	0.00022	0.550148173	0.040%	YES	10.5%
33	Diethylphthalate	12	7645-F1	0.00022	0.550148173	0.039%	YES	10.5%
33	Diethylphthalate	14	7645-G1	0.00021	0.550148173	0.038%	YES	10.5%
33	Diethylphthalate	16	7645-H1	0.00021	0.550148173	0.038%	YES	10.5%
33	Diethylphthalate	2	7645-A2	0.00022	0.550148173	0.040%	YES	10.5%
33	Diethylphthalate	4	7645-B2	0.00021	0.550148173	0.039%	YES	10.5%
33	Diethylphthalate	6	7645-C2	0.00021	0.550148173	0.039%	YES	10.5%
33	Diethylphthalate	8	7645-D2	0.00022	0.550148173	0.040%	YES	10.5%
33	Diethylphthalate	10	7645-E2	0.00021	0.550148173	0.039%	YES	10.5%
33	Diethylphthalate	12	7645-F2	0.00021	0.550148173	0.039%	YES	10.5%
33	Diethylphthalate	14	7645-G2	0.00021	0.550148173	0.038%	YES	10.5%
33	Diethylphthalate	16	7645-H2	0.00021	0.550148173	0.038%	YES	10.5%
33	Diethylphthalate	2	7654-A1	0.00019	0.550148173	0.035%	YES	10.5%
33	Diethylphthalate	4	7654-B1	0.00022	0.550148173	0.041%	YES	10.5%
33	Diethylphthalate	6	7654-C1	0.00022	0.550148173	0.040%	YES	10.5%
33	Diethylphthalate	8	7654-D1	0.00023	0.550148173	0.041%	YES	10.5%
33	Diethylphthalate	10	7654-E1	0.00021	0.550148173	0.038%	YES	10.5%
33	Diethylphthalate	12	7654-F1	0.05774	0.550148173	10.5%	YES	10.5%
33	Diethylphthalate	14	7654-G1	0.00021	0.550148173	0.037%	YES	10.5%
33	Diethylphthalate	16	7654-H1	0.00021	0.550148173	0.037%	YES	10.5%
33	Diethylphthalate	2	7654-A2	0.00020	0.550148173	0.036%	YES	10.5%
33	Diethylphthalate	4	7654-B2	0.00022	0.550148173	0.040%	YES	10.5%
33	Diethylphthalate	6	7654-C2	0.00022	0.550148173	0.040%	YES	10.5%
33	Diethylphthalate	8	7654-D2	0.00022	0.550148173	0.040%	YES	10.5%
33	Diethylphthalate	10	7654-E2	0.00021	0.550148173	0.038%	YES	10.5%
33	Diethylphthalate	12	7654-F2	0.00021	0.550148173	0.037%	YES	10.5%
33	Diethylphthalate	14	7654-G2	0.00020	0.550148173	0.037%	YES	10.5%
33	Diethylphthalate	16	7654-H2	0.00021	0.550148173	0.038%	YES	10.5%
34	Acetonitrile	2	7645-A1	0.0217	20	0.109%		0.002%
34	Acetonitrile	4	7645-B1	0.0052	20	0.026%		0.002%
34	Acetonitrile	6	7645-C1	0.0052	20	0.026%		0.002%
34	Acetonitrile	8	7645-D1	0.0053	20	0.027%		0.002%
34	Acetonitrile	10	7645-E1	0.0433	20	0.216%		0.002%
34	Acetonitrile	12	7645-F1	0.0063	20	0.032%		0.002%
34	Acetonitrile	14	7645-G1	0.0047	20	0.023%		0.002%
34	Acetonitrile	16	7645-H1	0.0046	20	0.023%		0.002%
34	Acetonitrile	2	7645-A2	0.0017	20	0.009%		0.002%
34	Acetonitrile	4	7645-B2	0.0038	20	0.019%		0.002%
34	Acetonitrile	6	7645-C2	0.0041	20	0.021%		0.002%
34	Acetonitrile	8	7645-D2	0.0045	20	0.023%		0.002%
34	Acetonitrile	10	7645-E2	0.0042	20	0.021%		0.002%
34	Acetonitrile	12	7645-F2	0.0076	20	0.038%		0.002%
34	Acetonitrile	14	7645-G2	0.0049	20	0.024%		0.002%
34	Acetonitrile	16	7645-H2	0.0039	20	0.019%		0.002%
34	Acetonitrile	2	7654-A1	0.0278	20	0.139%		0.002%
34	Acetonitrile	4	7654-B1	0.0149	20	0.075%		0.002%
34	Acetonitrile	6	7654-C1	0.0240	20	0.120%		0.002%
34	Acetonitrile	8	7654-D1	0.0069	20	0.035%		0.002%
34	Acetonitrile	10	7654-E1	0.0056	20	0.028%		0.002%
34	Acetonitrile	12	7654-F1	0.0123	20	0.061%		0.002%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL RL?	Approx. DL RL (%OEL)
34	Acetonitrile	14	7654-G1	0.0059	20	0.029%		0.002%
34	Acetonitrile	16	7654-H1	0.0398	20	0.199%		0.002%
34	Acetonitrile	2	7654-A2	0.0128	20	0.064%		0.002%
34	Acetonitrile	4	7654-B2	0.0115	20	0.057%		0.002%
34	Acetonitrile	6	7654-C2	0.1302	20	0.651%		0.002%
34	Acetonitrile	8	7654-D2	0.0069	20	0.035%		0.002%
34	Acetonitrile	10	7654-E2	0.0061	20	0.030%		0.002%
34	Acetonitrile	12	7654-F2	0.0284	20	0.142%		0.002%
34	Acetonitrile	14	7654-G2	0.0243	20	0.121%		0.002%
34	Acetonitrile	16	7654-H2	0.0206	20	0.103%		0.002%
35	Propanenitrile	2	7645-A1	0.00262	6	0.044%		0.004%
35	Propanenitrile	4	7645-B1	0.00022	6	0.004%	YES	0.004%
35	Propanenitrile	6	7645-C1	0.00064	6	0.011%		0.004%
35	Propanenitrile	8	7645-D1	0.00084	6	0.014%		0.004%
35	Propanenitrile	10	7645-E1	0.00067	6	0.011%		0.004%
35	Propanenitrile	12	7645-F1	0.00066	6	0.011%		0.004%
35	Propanenitrile	14	7645-G1	0.00069	6	0.011%		0.004%
35	Propanenitrile	16	7645-H1	0.00066	6	0.011%		0.004%
35	Propanenitrile	2	7645-A2	0.00019	6	0.003%	YES	0.004%
35	Propanenitrile	4	7645-B2	0.00022	6	0.004%	YES	0.004%
35	Propanenitrile	6	7645-C2	0.00018	6	0.003%	YES	0.004%
35	Propanenitrile	8	7645-D2	0.00019	6	0.003%	YES	0.004%
35	Propanenitrile	10	7645-E2	0.00018	6	0.003%	YES	0.004%
35	Propanenitrile	12	7645-F2	0.00017	6	0.003%	YES	0.004%
35	Propanenitrile	14	7645-G2	0.00017	6	0.003%	YES	0.004%
35	Propanenitrile	16	7645-H2	0.00016	6	0.003%	YES	0.004%
35	Propanenitrile	2	7654-A1	0.00065	6	0.011%		0.004%
35	Propanenitrile	4	7654-B1	0.00070	6	0.012%		0.004%
35	Propanenitrile	6	7654-C1	0.00072	6	0.012%		0.004%
35	Propanenitrile	8	7654-D1	0.00064	6	0.011%		0.004%
35	Propanenitrile	10	7654-E1	0.00067	6	0.011%		0.004%
35	Propanenitrile	12	7654-F1	0.00070	6	0.012%		0.004%
35	Propanenitrile	14	7654-G1	0.00070	6	0.012%		0.004%
35	Propanenitrile	16	7654-H1	0.00061	6	0.010%		0.004%
35	Propanenitrile	2	7654-A2	0.00021	6	0.003%	YES	0.004%
35	Propanenitrile	4	7654-B2	0.00026	6	0.004%	YES	0.004%
35	Propanenitrile	6	7654-C2	0.00024	6	0.004%	YES	0.004%
35	Propanenitrile	8	7654-D2	0.00024	6	0.004%	YES	0.004%
35	Propanenitrile	10	7654-E2	0.00023	6	0.004%	YES	0.004%
35	Propanenitrile	12	7654-F2	0.00022	6	0.004%	YES	0.004%
35	Propanenitrile	14	7654-G2	0.00022	6	0.004%	YES	0.004%
35	Propanenitrile	16	7654-H2	0.00021	6	0.004%	YES	0.004%
36	Butanenitrile	2	7645-A1	0.00228	8	0.028%		0.003%
36	Butanenitrile	4	7645-B1	0.00076	8	0.010%		0.003%
36	Butanenitrile	6	7645-C1	0.00061	8	0.008%		0.003%
36	Butanenitrile	8	7645-D1	0.00073	8	0.009%		0.003%
36	Butanenitrile	10	7645-E1	0.00055	8	0.007%		0.003%
36	Butanenitrile	12	7645-F1	0.00058	8	0.007%		0.003%
36	Butanenitrile	14	7645-G1	0.00062	8	0.008%		0.003%
36	Butanenitrile	16	7645-H1	0.00053	8	0.007%		0.003%
36	Butanenitrile	2	7645-A2	0.00013	8	0.002%	YES	0.003%
36	Butanenitrile	4	7645-B2	0.00015	8	0.002%	YES	0.003%
36	Butanenitrile	6	7645-C2	0.00012	8	0.002%	YES	0.003%
36	Butanenitrile	8	7645-D2	0.00013	8	0.002%	YES	0.003%
36	Butanenitrile	10	7645-E2	0.00013	8	0.002%	YES	0.003%
36	Butanenitrile	12	7645-F2	0.00012	8	0.001%	YES	0.003%
36	Butanenitrile	14	7645-G2	0.00012	8	0.001%	YES	0.003%
36	Butanenitrile	16	7645-H2	0.00011	8	0.001%	YES	0.003%
36	Butanenitrile	2	7654-A1	0.00058	8	0.007%		0.003%
36	Butanenitrile	4	7654-B1	0.00056	8	0.007%		0.003%
36	Butanenitrile	6	7654-C1	0.00056	8	0.007%		0.003%
36	Butanenitrile	8	7654-D1	0.00055	8	0.007%		0.003%
36	Butanenitrile	10	7654-E1	0.00054	8	0.007%		0.003%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL RL?	Approx. DL RL (%OEL)
36	Butanenitrile	12	7654-F1	0.00057	8	0.007%		0.003%
36	Butanenitrile	14	7654-G1	0.00057	8	0.007%		0.003%
36	Butanenitrile	16	7654-H1	0.00059	8	0.007%		0.003%
36	Butanenitrile	2	7654-A2	0.00019	8	0.002%	YES	0.003%
36	Butanenitrile	4	7654-B2	0.00024	8	0.003%	YES	0.003%
36	Butanenitrile	6	7654-C2	0.00023	8	0.003%	YES	0.003%
36	Butanenitrile	8	7654-D2	0.00022	8	0.003%	YES	0.003%
36	Butanenitrile	10	7654-E2	0.00022	8	0.003%	YES	0.003%
36	Butanenitrile	12	7654-F2	0.00021	8	0.003%	YES	0.003%
36	Butanenitrile	14	7654-G2	0.00020	8	0.003%	YES	0.003%
36	Butanenitrile	16	7654-H2	0.00020	8	0.002%	YES	0.003%
37	Pentanenitrile	2	7645-A1	0.00069	6	0.012%		0.004%
37	Pentanenitrile	4	7645-B1	0.00030	6	0.005%		0.004%
37	Pentanenitrile	6	7645-C1	0.00021	6	0.003%	YES	0.004%
37	Pentanenitrile	8	7645-D1	0.00025	6	0.004%		0.004%
37	Pentanenitrile	10	7645-E1	0.00021	6	0.004%	YES	0.004%
37	Pentanenitrile	12	7645-F1	0.00020	6	0.003%	YES	0.004%
37	Pentanenitrile	14	7645-G1	0.00021	6	0.003%	YES	0.004%
37	Pentanenitrile	16	7645-H1	0.00015	6	0.003%		0.004%
37	Pentanenitrile	2	7645-A2	0.00014	6	0.002%	YES	0.004%
37	Pentanenitrile	4	7645-B2	0.00016	6	0.003%	YES	0.004%
37	Pentanenitrile	6	7645-C2	0.00014	6	0.002%	YES	0.004%
37	Pentanenitrile	8	7645-D2	0.00014	6	0.002%	YES	0.004%
37	Pentanenitrile	10	7645-E2	0.00014	6	0.002%	YES	0.004%
37	Pentanenitrile	12	7645-F2	0.00013	6	0.002%	YES	0.004%
37	Pentanenitrile	14	7645-G2	0.00013	6	0.002%	YES	0.004%
37	Pentanenitrile	16	7645-H2	0.00012	6	0.002%	YES	0.004%
37	Pentanenitrile	2	7654-A1	0.00021	6	0.004%	YES	0.004%
37	Pentanenitrile	4	7654-B1	0.00021	6	0.004%		0.004%
37	Pentanenitrile	6	7654-C1	0.00019	6	0.003%		0.004%
37	Pentanenitrile	8	7654-D1	0.00017	6	0.003%		0.004%
37	Pentanenitrile	10	7654-E1	0.00016	6	0.003%		0.004%
37	Pentanenitrile	12	7654-F1	0.00018	6	0.003%		0.004%
37	Pentanenitrile	14	7654-G1	0.00018	6	0.003%		0.004%
37	Pentanenitrile	16	7654-H1	0.00021	6	0.004%	YES	0.004%
37	Pentanenitrile	2	7654-A2	0.00020	6	0.003%	YES	0.004%
37	Pentanenitrile	4	7654-B2	0.00025	6	0.004%	YES	0.004%
37	Pentanenitrile	6	7654-C2	0.00023	6	0.004%	YES	0.004%
37	Pentanenitrile	8	7654-D2	0.00023	6	0.004%	YES	0.004%
37	Pentanenitrile	10	7654-E2	0.00022	6	0.004%	YES	0.004%
37	Pentanenitrile	12	7654-F2	0.00021	6	0.004%	YES	0.004%
37	Pentanenitrile	14	7654-G2	0.00021	6	0.003%	YES	0.004%
37	Pentanenitrile	16	7654-H2	0.00020	6	0.003%	YES	0.004%
38	Hexanenitrile	2	7645-A1	0.00124	6	0.021%		0.004%
38	Hexanenitrile	4	7645-B1	0.00026	6	0.004%		0.004%
38	Hexanenitrile	6	7645-C1	0.00021	6	0.003%		0.004%
38	Hexanenitrile	8	7645-D1	0.00023	6	0.004%		0.004%
38	Hexanenitrile	10	7645-E1	0.00018	6	0.003%	YES	0.004%
38	Hexanenitrile	12	7645-F1	0.00017	6	0.003%	YES	0.004%
38	Hexanenitrile	14	7645-G1	0.00018	6	0.003%	YES	0.004%
38	Hexanenitrile	16	7645-H1	0.00010	6	0.002%	YES	0.004%
38	Hexanenitrile	2	7645-A2	0.00012	6	0.002%	YES	0.004%
38	Hexanenitrile	4	7645-B2	0.00013	6	0.002%	YES	0.004%
38	Hexanenitrile	6	7645-C2	0.00011	6	0.002%	YES	0.004%
38	Hexanenitrile	8	7645-D2	0.00011	6	0.002%	YES	0.004%
38	Hexanenitrile	10	7645-E2	0.00011	6	0.002%	YES	0.004%
38	Hexanenitrile	12	7645-F2	0.00011	6	0.002%	YES	0.004%
38	Hexanenitrile	14	7645-G2	0.00010	6	0.002%	YES	0.004%
38	Hexanenitrile	16	7645-H2	0.00010	6	0.002%	YES	0.004%
38	Hexanenitrile	2	7654-A1	0.00018	6	0.003%	YES	0.004%
38	Hexanenitrile	4	7654-B1	0.00011	6	0.002%	YES	0.004%
38	Hexanenitrile	6	7654-C1	0.00015	6	0.003%		0.004%
38	Hexanenitrile	8	7654-D1	0.00011	6	0.002%	YES	0.004%



COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL RL?	Approx. DL RL (%OEL)
38	Hexanenitrile	10	7654-E1	0.00011	6	0.002%	YES	0.004%
38	Hexanenitrile	12	7654-F1	0.00010	6	0.002%	YES	0.004%
38	Hexanenitrile	14	7654-G1	0.00010	6	0.002%	YES	0.004%
38	Hexanenitrile	16	7654-H1	0.00018	6	0.003%	YES	0.004%
38	Hexanenitrile	2	7654-A2	0.00017	6	0.003%	YES	0.004%
38	Hexanenitrile	4	7654-B2	0.00021	6	0.004%	YES	0.004%
38	Hexanenitrile	6	7654-C2	0.00020	6	0.003%	YES	0.004%
38	Hexanenitrile	8	7654-D2	0.00020	6	0.003%	YES	0.004%
38	Hexanenitrile	10	7654-E2	0.00019	6	0.003%	YES	0.004%
38	Hexanenitrile	12	7654-F2	0.00018	6	0.003%	YES	0.004%
38	Hexanenitrile	14	7654-G2	0.00018	6	0.003%	YES	0.004%
38	Hexanenitrile	16	7654-H2	0.00017	6	0.003%	YES	0.004%
42	Ethylamine	2	7645-A1	0.0049	5	0.10%	YES	0.10%
42	Ethylamine	4	7645-B1	0.0047	5	0.09%	YES	0.10%
42	Ethylamine	6	7645-C1	0.0047	5	0.09%	YES	0.10%
42	Ethylamine	8	7645-D1	0.0049	5	0.10%	YES	0.10%
42	Ethylamine	10	7645-E1	0.0048	5	0.10%	YES	0.10%
42	Ethylamine	12	7645-F1	0.0049	5	0.10%	YES	0.10%
42	Ethylamine	14	7645-G1	0.0046	5	0.09%	YES	0.10%
42	Ethylamine	16	7645-H1	0.0047	5	0.09%	YES	0.10%
42	Ethylamine	2	7645-A2	0.0048	5	0.10%	YES	0.10%
42	Ethylamine	4	7645-B2	0.0049	5	0.10%	YES	0.10%
42	Ethylamine	6	7645-C2	0.0047	5	0.09%	YES	0.10%
42	Ethylamine	8	7645-D2	0.0048	5	0.10%	YES	0.10%
42	Ethylamine	10	7645-E2	0.0048	5	0.10%	YES	0.10%
42	Ethylamine	12	7645-F2	0.0048	5	0.10%	YES	0.10%
42	Ethylamine	14	7645-G2	0.0048	5	0.10%	YES	0.10%
42	Ethylamine	16	7645-H2	0.0048	5	0.10%	YES	0.10%
42	Ethylamine	2	7654-A1	0.0047	5	0.09%	YES	0.10%
42	Ethylamine	4	7654-B1	0.0048	5	0.10%	YES	0.10%
42	Ethylamine	6	7654-C1	0.0048	5	0.10%	YES	0.10%
42	Ethylamine	8	7654-D1	0.0049	5	0.10%	YES	0.10%
42	Ethylamine	10	7654-E1	0.0049	5	0.10%	YES	0.10%
42	Ethylamine	12	7654-F1	0.0048	5	0.10%	YES	0.10%
42	Ethylamine	14	7654-G1	0.0047	5	0.09%	YES	0.10%
42	Ethylamine	16	7654-H1	0.0047	5	0.09%	YES	0.10%
42	Ethylamine	2	7654-A2	0.0050	5	0.10%	YES	0.10%
42	Ethylamine	4	7654-B2	0.0049	5	0.10%	YES	0.10%
42	Ethylamine	6	7654-C2	0.0049	5	0.10%	YES	0.10%
42	Ethylamine	8	7654-D2	0.0049	5	0.10%	YES	0.10%
42	Ethylamine	10	7654-E2	0.0050	5	0.10%	YES	0.10%
42	Ethylamine	12	7654-F2	0.0049	5	0.10%	YES	0.10%
42	Ethylamine	14	7654-G2	0.0047	5	0.09%	YES	0.10%
42	Ethylamine	16	7654-H2	0.0046	5	0.09%	YES	0.10%
43	N-Nitrosodimethylamine	2	7645-A1	0.00213	0.0003	708%		11.4%
43	N-Nitrosodimethylamine	4	7645-B1	0.00214	0.0003	714%		11.4%
43	N-Nitrosodimethylamine	6	7645-C1	0.00202	0.0003	673%		11.4%
43	N-Nitrosodimethylamine	8	7645-D1	0.00206	0.0003	687%		11.4%
43	N-Nitrosodimethylamine	10	7645-E1	0.00219	0.0003	730%		11.4%
43	N-Nitrosodimethylamine	12	7645-F1	0.00212	0.0003	705%		11.4%
43	N-Nitrosodimethylamine	14	7645-G1	0.00228	0.0003	760%		11.4%
43	N-Nitrosodimethylamine	16	7645-H1	0.00220	0.0003	733%		11.4%
43	N-Nitrosodimethylamine	2	7645-A2	0.00003	0.0003	11.4%	YES	11.4%
43	N-Nitrosodimethylamine	4	7645-B2	0.00003	0.0003	11.4%	YES	11.4%
43	N-Nitrosodimethylamine	6	7645-C2	0.00003	0.0003	10.6%	YES	11.4%
43	N-Nitrosodimethylamine	8	7645-D2	0.00003	0.0003	10.6%	YES	11.4%
43	N-Nitrosodimethylamine	10	7645-E2	0.00003	0.0003	10.6%	YES	11.4%
43	N-Nitrosodimethylamine	12	7645-F2	0.00003	0.0003	10.5%	YES	11.4%
43	N-Nitrosodimethylamine	14	7645-G2	0.00003	0.0003	10.4%	YES	11.4%
43	N-Nitrosodimethylamine	16	7645-H2	0.00003	0.0003	10.4%	YES	11.4%
43	N-Nitrosodimethylamine	2	7654-A1	0.00191	0.0003	636%		11.4%
43	N-Nitrosodimethylamine	4	7654-B1	0.00227	0.0003	757%		11.4%
43	N-Nitrosodimethylamine	6	7654-C1	0.00186	0.0003	619%		11.4%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL <sup>1</sup>	Measurement < DL RL?	Approx. DL RL (%OEL)
43	N-Nitrosodimethylamine	8	7654-D1	0.00170	0.0003	566%		11.4%
43	N-Nitrosodimethylamine	10	7654-E1	0.00177	0.0003	590%		11.4%
43	N-Nitrosodimethylamine	12	7654-F1	0.00193	0.0003	645%		11.4%
43	N-Nitrosodimethylamine	14	7654-G1	0.00190	0.0003	634%		11.4%
43	N-Nitrosodimethylamine	16	7654-H1	0.00205	0.0003	683%		11.4%
43	N-Nitrosodimethylamine	2	7654-A2	0.00003	0.0003	10.9%	YES	11.4%
43	N-Nitrosodimethylamine	4	7654-B2	0.00003	0.0003	10.9%	YES	11.4%
43	N-Nitrosodimethylamine	6	7654-C2	0.00003	0.0003	10.8%	YES	11.4%
43	N-Nitrosodimethylamine	8	7654-D2	0.00003	0.0003	10.7%	YES	11.4%
43	N-Nitrosodimethylamine	10	7654-E2	0.00003	0.0003	10.5%	YES	11.4%
43	N-Nitrosodimethylamine	12	7654-F2	0.00003	0.0003	10.5%	YES	11.4%
43	N-Nitrosodimethylamine	14	7654-G2	0.00003	0.0003	10.4%	YES	11.4%
43	N-Nitrosodimethylamine	16	7654-H2	0.00003	0.0003	10.2%	YES	11.4%
44	N-Nitrosodiethylamine	2	7645-A1	0.00002	0.0001	24.9%	YES	30.9%
44	N-Nitrosodiethylamine	4	7645-B1	0.00003	0.0001	25.0%	YES	30.9%
44	N-Nitrosodiethylamine	6	7645-C1	0.00002	0.0001	24.6%	YES	30.9%
44	N-Nitrosodiethylamine	8	7645-D1	0.00002	0.0001	24.2%	YES	30.9%
44	N-Nitrosodiethylamine	10	7645-E1	0.00002	0.0001	24.7%	YES	30.9%
44	N-Nitrosodiethylamine	12	7645-F1	0.00002	0.0001	23.9%	YES	30.9%
44	N-Nitrosodiethylamine	14	7645-G1	0.00002	0.0001	23.8%	YES	30.9%
44	N-Nitrosodiethylamine	16	7645-H1	0.00002	0.0001	23.8%	YES	30.9%
44	N-Nitrosodiethylamine	2	7645-A2	0.00002	0.0001	22.6%	YES	30.9%
44	N-Nitrosodiethylamine	4	7645-B2	0.00002	0.0001	22.5%	YES	30.9%
44	N-Nitrosodiethylamine	6	7645-C2	0.00002	0.0001	22.1%	YES	30.9%
44	N-Nitrosodiethylamine	8	7645-D2	0.00002	0.0001	22.0%	YES	30.9%
44	N-Nitrosodiethylamine	10	7645-E2	0.00002	0.0001	22.0%	YES	30.9%
44	N-Nitrosodiethylamine	12	7645-F2	0.00002	0.0001	21.8%	YES	30.9%
44	N-Nitrosodiethylamine	14	7645-G2	0.00002	0.0001	21.6%	YES	30.9%
44	N-Nitrosodiethylamine	16	7645-H2	0.00002	0.0001	21.6%	YES	30.9%
44	N-Nitrosodiethylamine	2	7654-A1	0.00003	0.0001	25.2%		30.9%
44	N-Nitrosodiethylamine	4	7654-B1	0.00003	0.0001	29.0%		30.9%
44	N-Nitrosodiethylamine	6	7654-C1	0.00002	0.0001	24.0%		30.9%
44	N-Nitrosodiethylamine	8	7654-D1	0.00002	0.0001	23.0%	YES	30.9%
44	N-Nitrosodiethylamine	10	7654-E1	0.00002	0.0001	22.6%	YES	30.9%
44	N-Nitrosodiethylamine	12	7654-F1	0.00002	0.0001	22.3%	YES	30.9%
44	N-Nitrosodiethylamine	14	7654-G1	0.00003	0.0001	30.9%		30.9%
44	N-Nitrosodiethylamine	16	7654-H1	0.00002	0.0001	22.2%	YES	30.9%
44	N-Nitrosodiethylamine	2	7654-A2	0.00002	0.0001	23.8%	YES	30.9%
44	N-Nitrosodiethylamine	4	7654-B2	0.00002	0.0001	23.7%	YES	30.9%
44	N-Nitrosodiethylamine	6	7654-C2	0.00002	0.0001	23.5%	YES	30.9%
44	N-Nitrosodiethylamine	8	7654-D2	0.00002	0.0001	23.4%	YES	30.9%
44	N-Nitrosodiethylamine	10	7654-E2	0.00002	0.0001	22.9%	YES	30.9%
44	N-Nitrosodiethylamine	12	7654-F2	0.00002	0.0001	22.8%	YES	30.9%
44	N-Nitrosodiethylamine	14	7654-G2	0.00002	0.0001	22.7%	YES	30.9%
44	N-Nitrosodiethylamine	16	7654-H2	0.00002	0.0001	22.2%	YES	30.9%
45	N-Nitrosomethylethylamine	2	7645-A1	0.00003	0.0003	9.63%	YES	9.6%
45	N-Nitrosomethylethylamine	4	7645-B1	0.00003	0.0003	9.22%		9.6%
45	N-Nitrosomethylethylamine	6	7645-C1	0.00003	0.0003	9.51%	YES	9.6%
45	N-Nitrosomethylethylamine	8	7645-D1	0.00003	0.0003	9.36%	YES	9.6%
45	N-Nitrosomethylethylamine	10	7645-E1	0.00003	0.0003	9.53%	YES	9.6%
45	N-Nitrosomethylethylamine	12	7645-F1	0.00003	0.0003	9.25%	YES	9.6%
45	N-Nitrosomethylethylamine	14	7645-G1	0.00003	0.0003	9.20%	YES	9.6%
45	N-Nitrosomethylethylamine	16	7645-H1	0.00003	0.0003	9.19%	YES	9.6%
45	N-Nitrosomethylethylamine	2	7645-A2	0.00003	0.0003	8.71%	YES	9.6%
45	N-Nitrosomethylethylamine	4	7645-B2	0.00003	0.0003	8.68%	YES	9.6%
45	N-Nitrosomethylethylamine	6	7645-C2	0.00003	0.0003	8.52%	YES	9.6%
45	N-Nitrosomethylethylamine	8	7645-D2	0.00003	0.0003	8.52%	YES	9.6%
45	N-Nitrosomethylethylamine	10	7645-E2	0.00003	0.0003	8.50%	YES	9.6%
45	N-Nitrosomethylethylamine	12	7645-F2	0.00003	0.0003	8.42%	YES	9.6%
45	N-Nitrosomethylethylamine	14	7645-G2	0.00003	0.0003	8.33%	YES	9.6%
45	N-Nitrosomethylethylamine	16	7645-H2	0.00003	0.0003	8.34%	YES	9.6%
45	N-Nitrosomethylethylamine	2	7654-A1	0.00002	0.0003	8.12%	YES	9.6%
45	N-Nitrosomethylethylamine	4	7654-B1	0.00003	0.0003	9.04%		9.6%
45	N-Nitrosomethylethylamine	6	7654-C1	0.00003	0.0003	8.43%	YES	9.6%
45	N-Nitrosomethylethylamine	8	7654-D1	0.00003	0.0003	8.46%	YES	9.6%
45	N-Nitrosomethylethylamine	10	7654-E1	0.00002	0.0003	8.31%	YES	9.6%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL <sup>1</sup>	Measurement < DL RL?	Approx. DL RL (%OEL)
45	N-Nitrosomethylethylamine	12	7654-F1	0.00002	0.0003	8.21%	YES	9.6%
45	N-Nitrosomethylethylamine	14	7654-G1	0.00002	0.0003	8.24%	YES	9.6%
45	N-Nitrosomethylethylamine	16	7654-H1	0.00002	0.0003	8.17%	YES	9.6%
45	N-Nitrosomethylethylamine	2	7654-A2	0.00003	0.0003	8.74%	YES	9.6%
45	N-Nitrosomethylethylamine	4	7654-B2	0.00003	0.0003	8.71%	YES	9.6%
45	N-Nitrosomethylethylamine	6	7654-C2	0.00003	0.0003	8.65%	YES	9.6%
45	N-Nitrosomethylethylamine	8	7654-D2	0.00003	0.0003	8.60%	YES	9.6%
45	N-Nitrosomethylethylamine	10	7654-E2	0.00003	0.0003	8.43%	YES	9.6%
45	N-Nitrosomethylethylamine	12	7654-F2	0.00003	0.0003	8.38%	YES	9.6%
45	N-Nitrosomethylethylamine	14	7654-G2	0.00003	0.0003	8.35%	YES	9.6%
45	N-Nitrosomethylethylamine	16	7654-H2	0.00002	0.0003	8.15%	YES	9.6%
46	N-Nitrosomorpholine	2	7645-A1	0.00002	0.0006	3.65%	YES	3.7%
46	N-Nitrosomorpholine	4	7645-B1	0.00002	0.0006	3.67%	YES	3.7%
46	N-Nitrosomorpholine	6	7645-C1	0.00002	0.0006	3.61%	YES	3.7%
46	N-Nitrosomorpholine	8	7645-D1	0.00002	0.0006	3.55%	YES	3.7%
46	N-Nitrosomorpholine	10	7645-E1	0.00002	0.0006	3.62%	YES	3.7%
46	N-Nitrosomorpholine	12	7645-F1	0.00002	0.0006	3.51%	YES	3.7%
46	N-Nitrosomorpholine	14	7645-G1	0.00002	0.0006	3.49%	YES	3.7%
46	N-Nitrosomorpholine	16	7645-H1	0.00002	0.0006	3.49%	YES	3.7%
46	N-Nitrosomorpholine	2	7645-A2	0.00002	0.0006	3.47%	YES	3.7%
46	N-Nitrosomorpholine	4	7645-B2	0.00002	0.0006	3.46%	YES	3.7%
46	N-Nitrosomorpholine	6	7645-C2	0.00002	0.0006	3.07%	YES	3.7%
46	N-Nitrosomorpholine	8	7645-D2	0.00002	0.0006	3.07%	YES	3.7%
46	N-Nitrosomorpholine	10	7645-E2	0.00002	0.0006	3.23%	YES	3.7%
46	N-Nitrosomorpholine	12	7645-F2	0.00002	0.0006	3.19%	YES	3.7%
46	N-Nitrosomorpholine	14	7645-G2	0.00002	0.0006	3.16%	YES	3.7%
46	N-Nitrosomorpholine	16	7645-H2	0.00002	0.0006	3.16%	YES	3.7%
46	N-Nitrosomorpholine	2	7654-A1	0.00002	0.0006	3.23%	YES	3.7%
46	N-Nitrosomorpholine	4	7654-B1	0.00002	0.0006	3.43%	YES	3.7%
46	N-Nitrosomorpholine	6	7654-C1	0.00002	0.0006	3.36%	YES	3.7%
46	N-Nitrosomorpholine	8	7654-D1	0.00002	0.0006	3.37%	YES	3.7%
46	N-Nitrosomorpholine	10	7654-E1	0.00002	0.0006	3.31%	YES	3.7%
46	N-Nitrosomorpholine	12	7654-F1	0.00002	0.0006	3.27%	YES	3.7%
46	N-Nitrosomorpholine	14	7654-G1	0.00002	0.0006	3.28%	YES	3.7%
46	N-Nitrosomorpholine	16	7654-H1	0.00002	0.0006	3.25%	YES	3.7%
46	N-Nitrosomorpholine	2	7654-A2	0.00002	0.0006	3.48%	YES	3.7%
46	N-Nitrosomorpholine	4	7654-B2	0.00002	0.0006	3.47%	YES	3.7%
46	N-Nitrosomorpholine	6	7654-C2	0.00002	0.0006	3.45%	YES	3.7%
46	N-Nitrosomorpholine	8	7654-D2	0.00002	0.0006	3.43%	YES	3.7%
46	N-Nitrosomorpholine	10	7654-E2	0.00002	0.0006	3.36%	YES	3.7%
46	N-Nitrosomorpholine	12	7654-F2	0.00002	0.0006	3.34%	YES	3.7%
46	N-Nitrosomorpholine	14	7654-G2	0.00002	0.0006	3.33%	YES	3.7%
46	N-Nitrosomorpholine	16	7654-H2	0.00002	0.0006	3.25%	YES	3.7%
47	Tributyl phosphate	2	7645-A1	0.00016	0.2	0.08%	YES	19.3%
47	Tributyl phosphate	4	7645-B1	0.00015	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	6	7645-C1	0.00015	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	8	7645-D1	0.00015	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	10	7645-E1	0.00015	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	12	7645-F1	0.00014	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	14	7645-G1	0.00014	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	16	7645-H1	0.00014	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	2	7645-A2	0.00015	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	4	7645-B2	0.00014	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	6	7645-C2	0.00014	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	8	7645-D2	0.00015	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	10	7645-E2	0.00014	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	12	7645-F2	0.00014	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	14	7645-G2	0.00014	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	16	7645-H2	0.00014	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	2	7654-A1	0.00013	0.2	0.06%	YES	19.3%



COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL RL?	Approx. DL RL (%OEL)
47	Tributyl phosphate	4	7654-B1	0.00015	0.2	0.08%	YES	19.3%
47	Tributyl phosphate	6	7654-C1	0.00015	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	8	7654-D1	0.00015	0.2	0.08%	YES	19.3%
47	Tributyl phosphate	10	7654-E1	0.00014	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	12	7654-F1	0.03855	0.2	19.3%	YES	19.3%
47	Tributyl phosphate	14	7654-G1	0.00014	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	16	7654-H1	0.00014	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	2	7654-A2	0.00013	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	4	7654-B2	0.00015	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	6	7654-C2	0.00015	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	8	7654-D2	0.00015	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	10	7654-E2	0.00014	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	12	7654-F2	0.00014	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	14	7654-G2	0.00014	0.2	0.07%	YES	19.3%
47	Tributyl phosphate	16	7654-H2	0.00014	0.2	0.07%	YES	19.3%
48	Dibutyl butylphosphonate	2	7645-A1	0.00011	0.007	1.53%	YES	377%
48	Dibutyl butylphosphonate	4	7645-B1	0.00010	0.007	1.44%	YES	377%
48	Dibutyl butylphosphonate	6	7645-C1	0.00010	0.007	1.47%	YES	377%
48	Dibutyl butylphosphonate	8	7645-D1	0.00010	0.007	1.44%	YES	377%
48	Dibutyl butylphosphonate	10	7645-E1	0.00010	0.007	1.42%	YES	377%
48	Dibutyl butylphosphonate	12	7645-F1	0.00010	0.007	1.41%	YES	377%
48	Dibutyl butylphosphonate	14	7645-G1	0.00010	0.007	1.37%	YES	377%
48	Dibutyl butylphosphonate	16	7645-H1	0.00010	0.007	1.38%	YES	377%
48	Dibutyl butylphosphonate	2	7645-A2	0.00010	0.007	1.44%	YES	377%
48	Dibutyl butylphosphonate	4	7645-B2	0.00010	0.007	1.40%	YES	377%
48	Dibutyl butylphosphonate	6	7645-C2	0.00010	0.007	1.39%	YES	377%
48	Dibutyl butylphosphonate	8	7645-D2	0.00010	0.007	1.43%	YES	377%
48	Dibutyl butylphosphonate	10	7645-E2	0.00010	0.007	1.39%	YES	377%
48	Dibutyl butylphosphonate	12	7645-F2	0.00010	0.007	1.39%	YES	377%
48	Dibutyl butylphosphonate	14	7645-G2	0.00010	0.007	1.36%	YES	377%
48	Dibutyl butylphosphonate	16	7645-H2	0.00010	0.007	1.38%	YES	377%
48	Dibutyl butylphosphonate	2	7654-A1	0.00009	0.007	1.26%	YES	377%
48	Dibutyl butylphosphonate	4	7654-B1	0.00010	0.007	1.47%	YES	377%
48	Dibutyl butylphosphonate	6	7654-C1	0.00010	0.007	1.45%	YES	377%
48	Dibutyl butylphosphonate	8	7654-D1	0.00010	0.007	1.48%	YES	377%
48	Dibutyl butylphosphonate	10	7654-E1	0.00010	0.007	1.38%	YES	377%
48	Dibutyl butylphosphonate	12	7654-F1	0.02636	0.007	377%	YES	377%
48	Dibutyl butylphosphonate	14	7654-G1	0.00009	0.007	1.34%	YES	377%
48	Dibutyl butylphosphonate	16	7654-H1	0.00009	0.007	1.34%	YES	377%
48	Dibutyl butylphosphonate	2	7654-A2	0.00009	0.007	1.31%	YES	377%
48	Dibutyl butylphosphonate	4	7654-B2	0.00010	0.007	1.44%	YES	377%
48	Dibutyl butylphosphonate	6	7654-C2	0.00010	0.007	1.44%	YES	377%
48	Dibutyl butylphosphonate	8	7654-D2	0.00010	0.007	1.45%	YES	377%
48	Dibutyl butylphosphonate	10	7654-E2	0.00009	0.007	1.35%	YES	377%
48	Dibutyl butylphosphonate	12	7654-F2	0.00009	0.007	1.35%	YES	377%
48	Dibutyl butylphosphonate	14	7654-G2	0.00009	0.007	1.33%	YES	377%
48	Dibutyl butylphosphonate	16	7654-H2	0.00010	0.007	1.38%	YES	377%
51	Pyridine	2	7645-A1	0.0015	1	0.15%	YES	0.15%
51	Pyridine	4	7645-B1	0.0015	1	0.15%	YES	0.15%
51	Pyridine	6	7645-C1	0.0015	1	0.15%	YES	0.15%
51	Pyridine	8	7645-D1	0.0014	1	0.14%	YES	0.15%
51	Pyridine	10	7645-E1	0.0014	1	0.14%	YES	0.15%
51	Pyridine	12	7645-F1	0.0014	1	0.14%	YES	0.15%
51	Pyridine	14	7645-G1	0.0014	1	0.14%	YES	0.15%
51	Pyridine	16	7645-H1	0.0014	1	0.14%	YES	0.15%
51	Pyridine	2	7645-A2	0.0015	1	0.15%	YES	0.15%
51	Pyridine	4	7645-B2	0.0014	1	0.14%	YES	0.15%
51	Pyridine	6	7645-C2	0.0014	1	0.14%	YES	0.15%
51	Pyridine	8	7645-D2	0.0014	1	0.14%	YES	0.15%
51	Pyridine	10	7645-E2	0.0014	1	0.14%	YES	0.15%
51	Pyridine	12	7645-F2	0.0014	1	0.14%	YES	0.15%
51	Pyridine	14	7645-G2	0.0014	1	0.14%	YES	0.15%
51	Pyridine	16	7645-H2	0.0014	1	0.14%	YES	0.15%

COPC #	Analyte	End Time (h)	Position	Conc. (ppm)	OEL (ppm)	Fraction of OEL	Measurement < DL RL?	Approx. DL RL (%OEL)
51	Pyridine	2	7654-A1	0.0012	1	0.12%	YES	0.15%
51	Pyridine	4	7654-B1	0.0014	1	0.14%	YES	0.15%
51	Pyridine	6	7654-C1	0.0014	1	0.14%	YES	0.15%
51	Pyridine	8	7654-D1	0.0014	1	0.14%	YES	0.15%
51	Pyridine	10	7654-E1	0.0014	1	0.14%	YES	0.15%
51	Pyridine	12	7654-F1	0.0014	1	0.14%	YES	0.15%
51	Pyridine	14	7654-G1	0.0014	1	0.14%	YES	0.15%
51	Pyridine	16	7654-H1	0.0013	1	0.13%	YES	0.15%
51	Pyridine	2	7654-A2	0.0013	1	0.13%	YES	0.15%
51	Pyridine	4	7654-B2	0.0015	1	0.15%	YES	0.15%
51	Pyridine	6	7654-C2	0.0014	1	0.14%	YES	0.15%
51	Pyridine	8	7654-D2	0.0014	1	0.14%	YES	0.15%
51	Pyridine	10	7654-E2	0.0014	1	0.14%	YES	0.15%
51	Pyridine	12	7654-F2	0.0014	1	0.14%	YES	0.15%
51	Pyridine	14	7654-G2	0.0014	1	0.14%	YES	0.15%
51	Pyridine	16	7654-H2	0.0014	1	0.14%	YES	0.15%
52	2,4-Dimethylpyridine	2	7645-A1	0.0011	0.5	0.22%	YES	0.22%
52	2,4-Dimethylpyridine	4	7645-B1	0.0011	0.5	0.22%	YES	0.22%
52	2,4-Dimethylpyridine	6	7645-C1	0.0011	0.5	0.22%	YES	0.22%
52	2,4-Dimethylpyridine	8	7645-D1	0.0011	0.5	0.21%	YES	0.22%
52	2,4-Dimethylpyridine	10	7645-E1	0.0011	0.5	0.21%	YES	0.22%
52	2,4-Dimethylpyridine	12	7645-F1	0.0010	0.5	0.21%	YES	0.22%
52	2,4-Dimethylpyridine	14	7645-G1	0.0010	0.5	0.20%	YES	0.22%
52	2,4-Dimethylpyridine	16	7645-H1	0.0010	0.5	0.20%	YES	0.22%
52	2,4-Dimethylpyridine	2	7645-A2	0.0011	0.5	0.21%	YES	0.22%
52	2,4-Dimethylpyridine	4	7645-B2	0.0011	0.5	0.21%	YES	0.22%
52	2,4-Dimethylpyridine	6	7645-C2	0.0011	0.5	0.21%	YES	0.22%
52	2,4-Dimethylpyridine	8	7645-D2	0.0011	0.5	0.21%	YES	0.22%
52	2,4-Dimethylpyridine	10	7645-E2	0.0011	0.5	0.21%	YES	0.22%
52	2,4-Dimethylpyridine	12	7645-F2	0.0010	0.5	0.21%	YES	0.22%
52	2,4-Dimethylpyridine	14	7645-G2	0.0010	0.5	0.20%	YES	0.22%
52	2,4-Dimethylpyridine	16	7645-H2	0.0010	0.5	0.21%	YES	0.22%
52	2,4-Dimethylpyridine	2	7654-A1	0.0009	0.5	0.18%	YES	0.22%
52	2,4-Dimethylpyridine	4	7654-B1	0.0011	0.5	0.21%	YES	0.22%
52	2,4-Dimethylpyridine	6	7654-C1	0.0011	0.5	0.21%	YES	0.22%
52	2,4-Dimethylpyridine	8	7654-D1	0.0011	0.5	0.21%	YES	0.22%
52	2,4-Dimethylpyridine	10	7654-E1	0.0010	0.5	0.20%	YES	0.22%
52	2,4-Dimethylpyridine	12	7654-F1	0.0010	0.5	0.20%	YES	0.22%
52	2,4-Dimethylpyridine	14	7654-G1	0.0010	0.5	0.20%	YES	0.22%
52	2,4-Dimethylpyridine	16	7654-H1	0.0010	0.5	0.20%	YES	0.22%
52	2,4-Dimethylpyridine	2	7654-A2	0.0009	0.5	0.19%	YES	0.22%
52	2,4-Dimethylpyridine	4	7654-B2	0.0011	0.5	0.22%	YES	0.22%
52	2,4-Dimethylpyridine	6	7654-C2	0.0011	0.5	0.21%	YES	0.22%
52	2,4-Dimethylpyridine	8	7654-D2	0.0011	0.5	0.21%	YES	0.22%
52	2,4-Dimethylpyridine	10	7654-E2	0.0010	0.5	0.20%	YES	0.22%
52	2,4-Dimethylpyridine	12	7654-F2	0.0010	0.5	0.21%	YES	0.22%
52	2,4-Dimethylpyridine	14	7654-G2	0.0010	0.5	0.20%	YES	0.22%
52	2,4-Dimethylpyridine	16	7654-H2	0.0010	0.5	0.20%	YES	0.22%

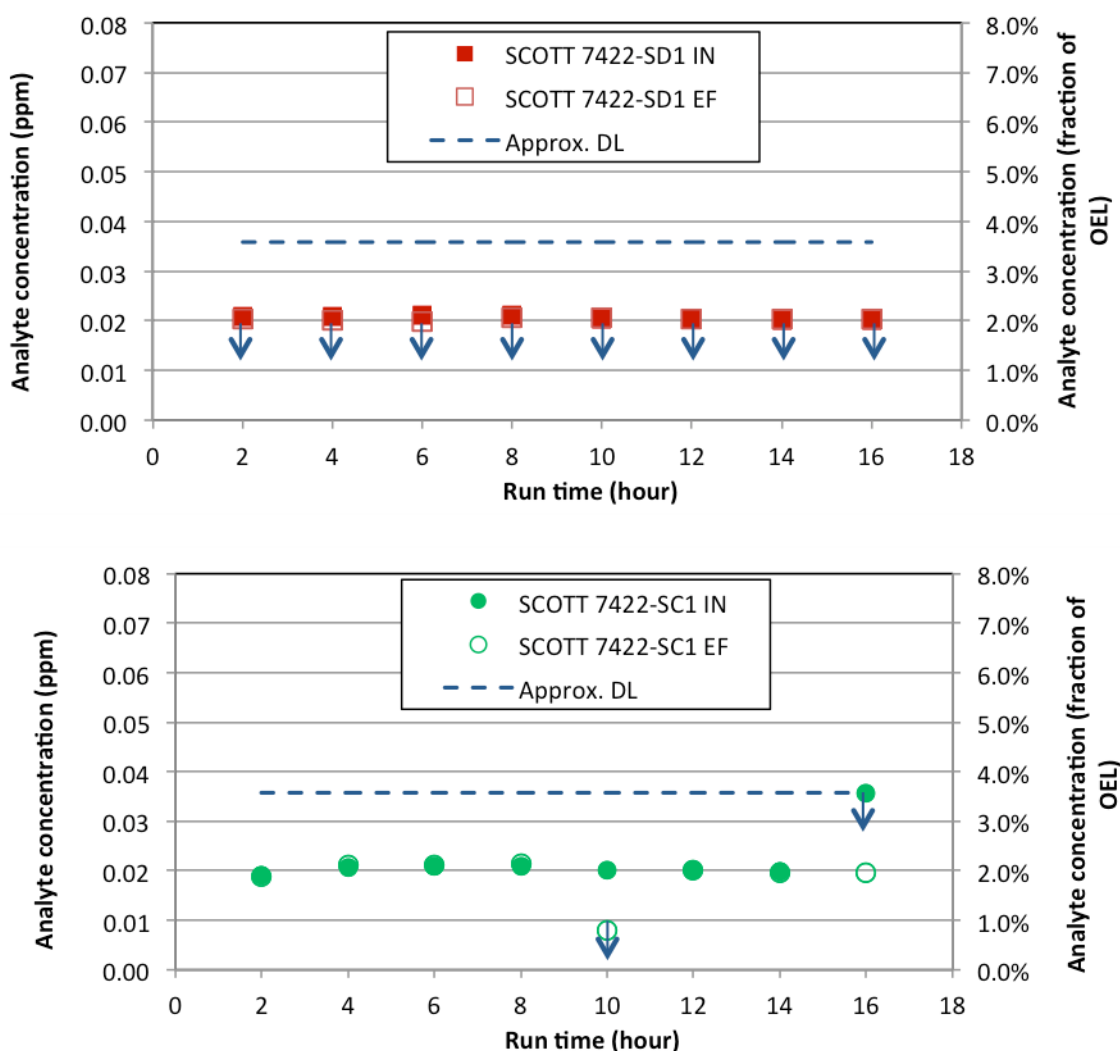
## **Appendix E**

### **Plots of Other COPCs with Significant (2–10% of the OEL) Detected Values**

## Appendix E

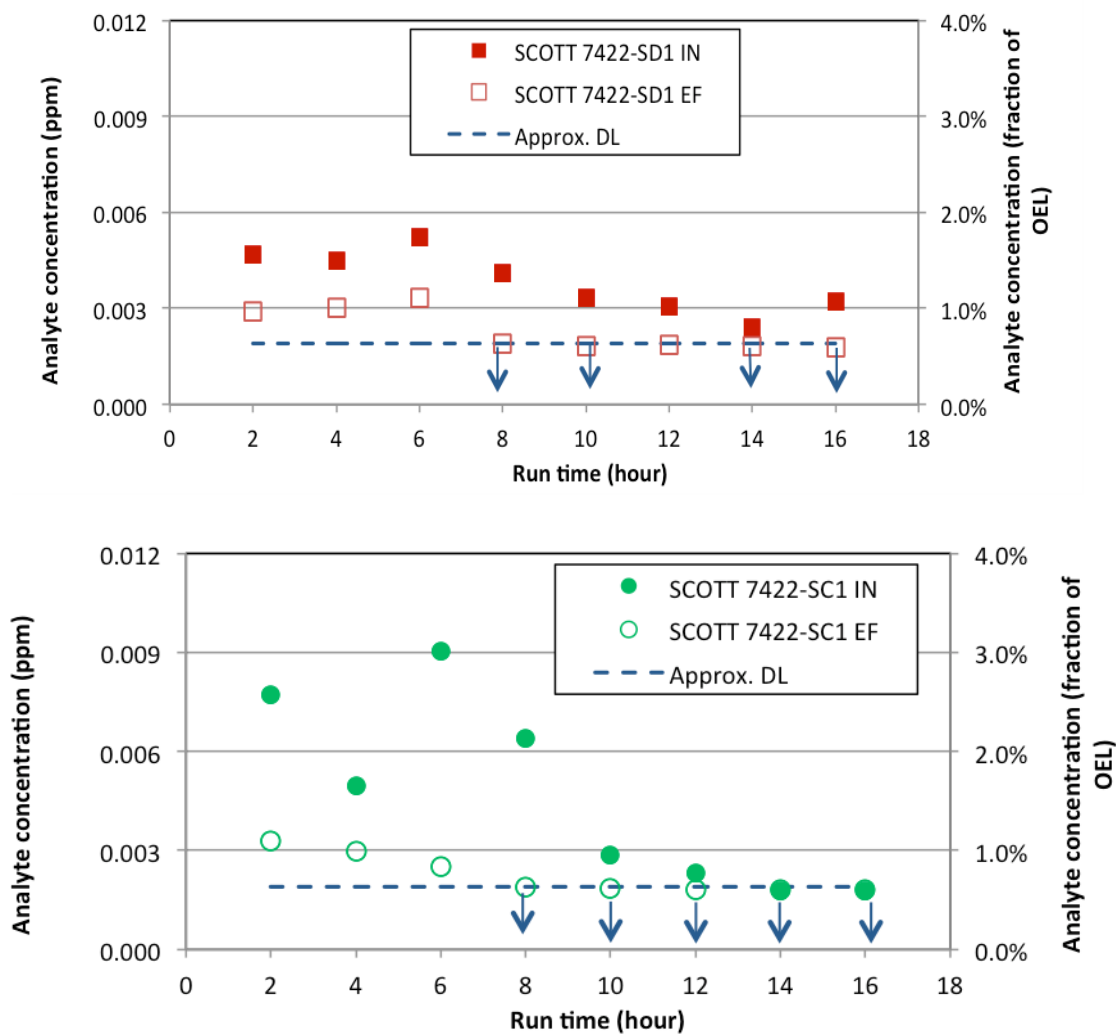
### Plots of Other Chemicals of Potential Concern with Significant (2–10% of the OEL) Detected Values

**1,3-Butadiene** (see Figure E.1) – The detection limit (DL) for 1,3-butadiene corresponds to ~3.6% of the Occupational Exposure Limit (OEL). All inlet and outlet concentration measurements were below the DL. The last inlet concentration for SCOTT 7422-SC1 was higher than the other values, but still at the DL. Based on the data, there is no evidence of breakthrough over the measured time period for either cartridge tested.



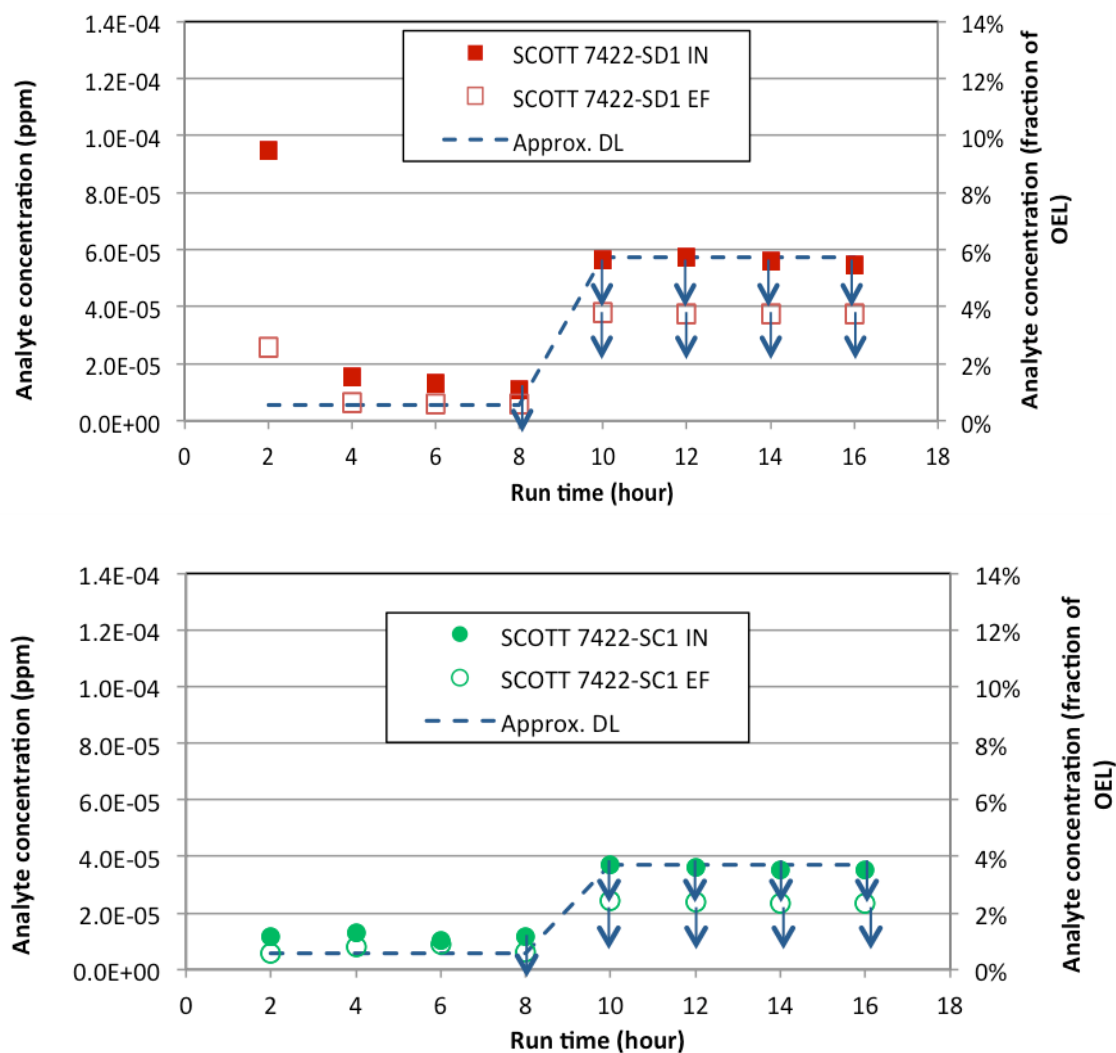
**Figure E.1.** Plot of Measured 1,3-Butadiene Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (SCOTT 7422-SD1 and SCOTT 7422-SC1). Data points noted with ↓ indicates measurements less than the DL or reporting limit (RL). Outlet data points not visible are obscured by the inlet data points.

**Formaldehyde** (see Figure E.2) – The DL for formaldehyde corresponds to ~0.6% of its OEL. All inlet and outlet values measured for both respirator cartridges were less than 10% of the OEL; specifically less than 3.0% of the OEL. The inlet concentrations measured throughout the testing period for both cartridges were higher than the DL earlier in the testing for both cartridges but decreased to the DL by the end. The latter outlet measurements for both cartridges were all less than the DL. This same trend was observed in prior tank analyses, suggesting possible environmental background interference, but this root cause still needs to be confirmed. Nevertheless, all outlet concentrations were less than 1.5% of the OEL which is significantly lower than 10%.



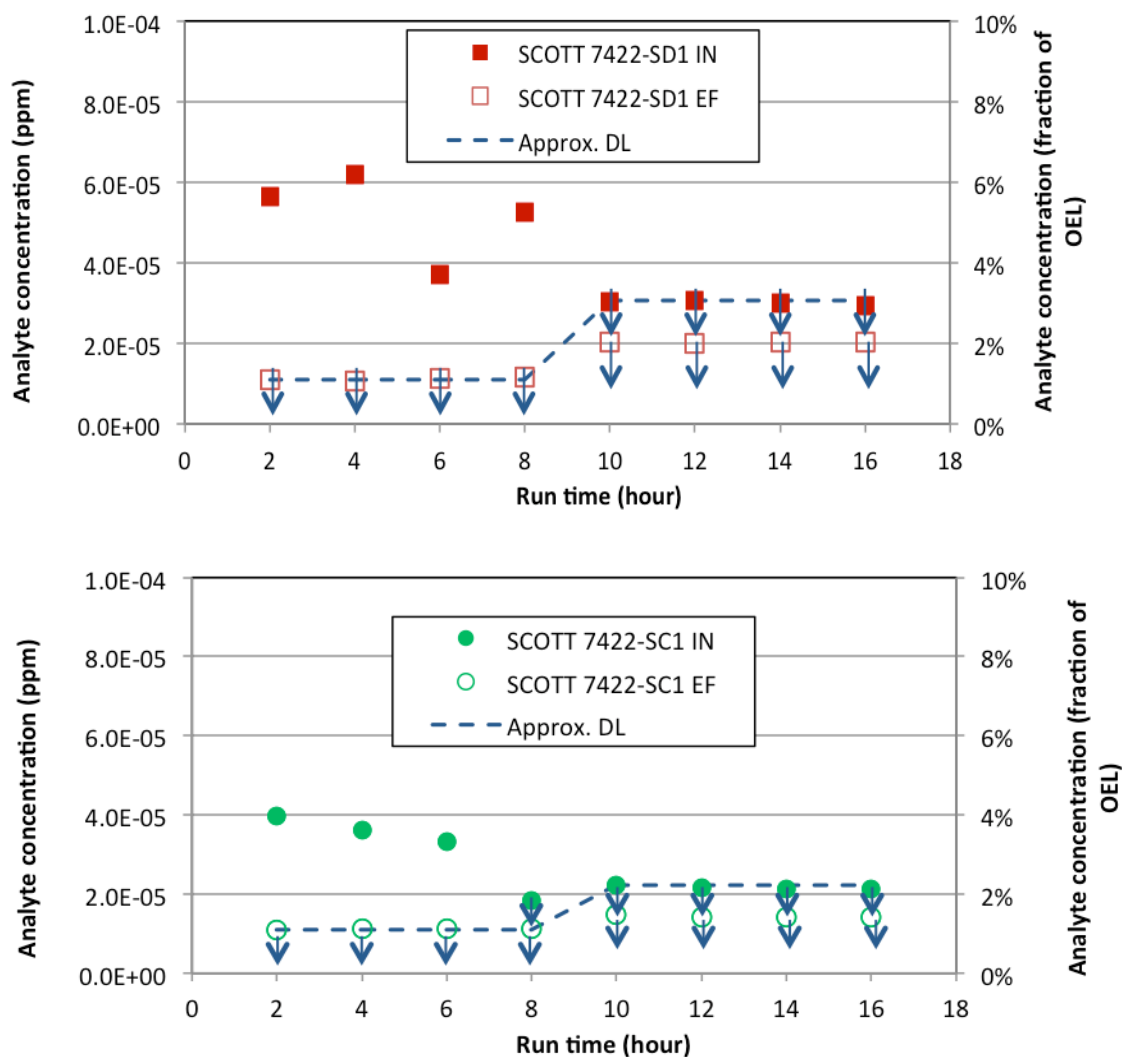
**Figure E.2.** Plot of Measured Formaldehyde Concentrations before the Inlets and after the Outlets of the two Respirator Cartridges Tested (SCOTT 7422-SD1 and SCOTT 7422-SC1). Data points noted with ↓ indicates measurements less than the DL or RL.

**Furan** (see Figure E.3) – The DL for furan for respirator cartridge SCOTT 7422-SD1 ranged from ~0.6 to 5.7% of the OEL and 0.6 to 3.7% of the OEL for respirator cartridge SCOTT 7422-SC1 due to analytical laboratory and instrument differences between tests and samples. All inlet and outlet values measured for the two respirator cartridges were less than 10% of the OEL. The first inlet value for SCOTT 7422-SD1 cartridge represented the highest concentration measurement at 9.5% of the OEL. All of the measured outlet concentrations were <3% of the OEL, and except for the first few measurements for each cartridge, were less than the DL. Because the higher outlet concentrations corresponded to the higher inlet concentrations, data error is not suspected. Initial contamination in the system could explain the higher initial readings for SCOTT 7422-SD1, but is not confirmed. Nevertheless, all measured outlet concentrations were <4% of the OEL, which is significantly lower than 10%.



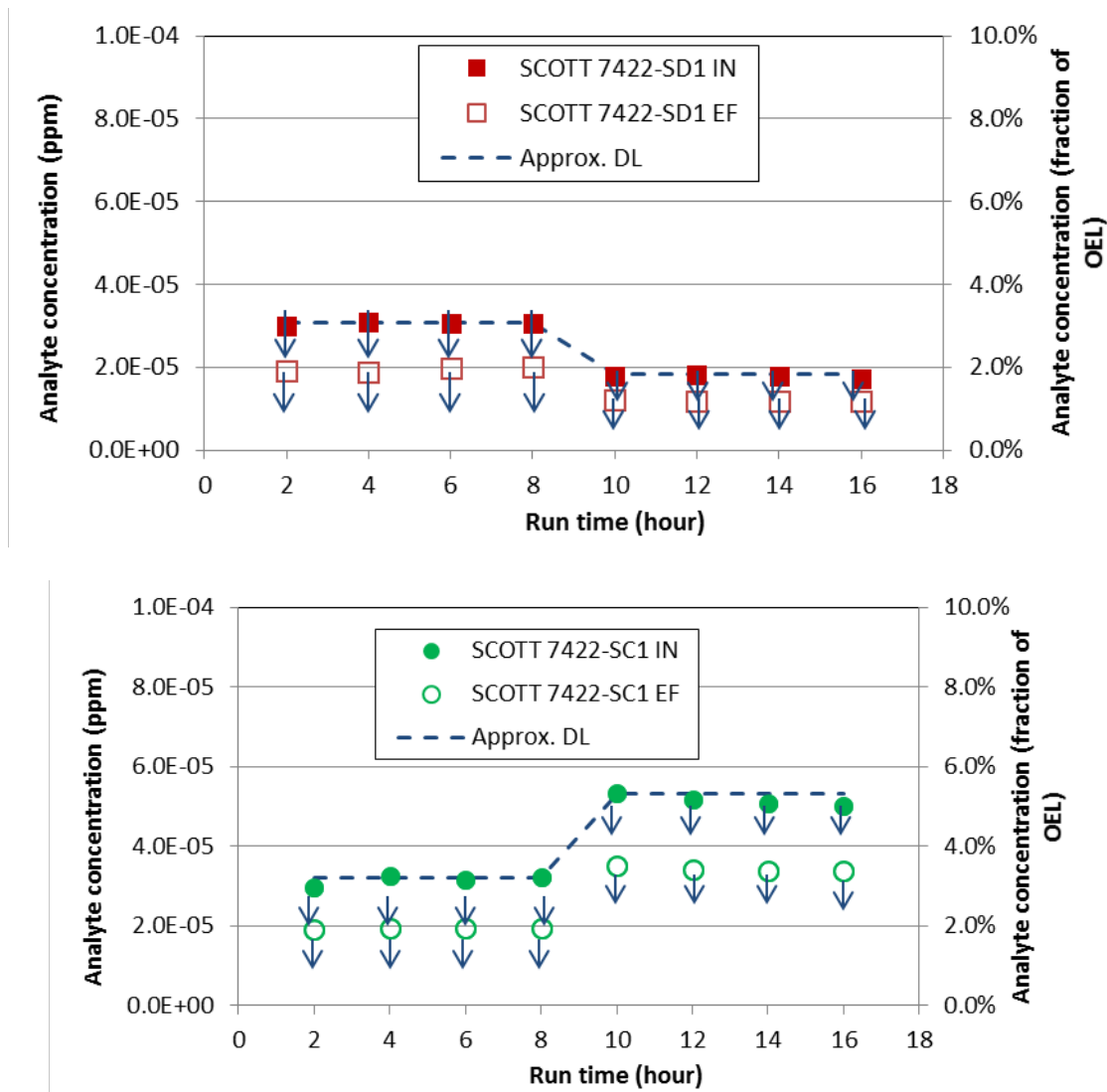
**Figure E.3.** Plot of Measured Furan Concentrations before the Inlets and after the Outlets of the two Respirator Cartridges Tested (SCOTT 7422-SD1 and SCOTT 7422-SC1). Data points noted with ↓ indicates measurements less than the DL or RL.

**2,3-Dihydrofuran** (see Figure E.4) – The DL for 2,3-dihydrofuran for respirator cartridge SCOTT 7422-SD1 ranged from ~1.1 to 3.1% of the OEL and 1.1 to 2.2% of the OEL for SCOTT 7422-SC1 due to analytical laboratory and instrument differences between tests and samples. For SCOTT 7422-SD1, the initial inlet concentration measurements were above the DL but somewhat scattered. For SCOTT 7422-SC1 the initial inlet concentration measurements were also above the DL. Because all outlet concentration were less than the DL, there is no evidence of breakthrough over the measured time period for either cartridge tested.



**Figure E.4.** Plot of Measured 2,3-Dihydrofuran Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (SCOTT 7422-SD1 and SCOTT 7422-SC1). Data points noted with ↓ indicates measurements less than the DL or RL.

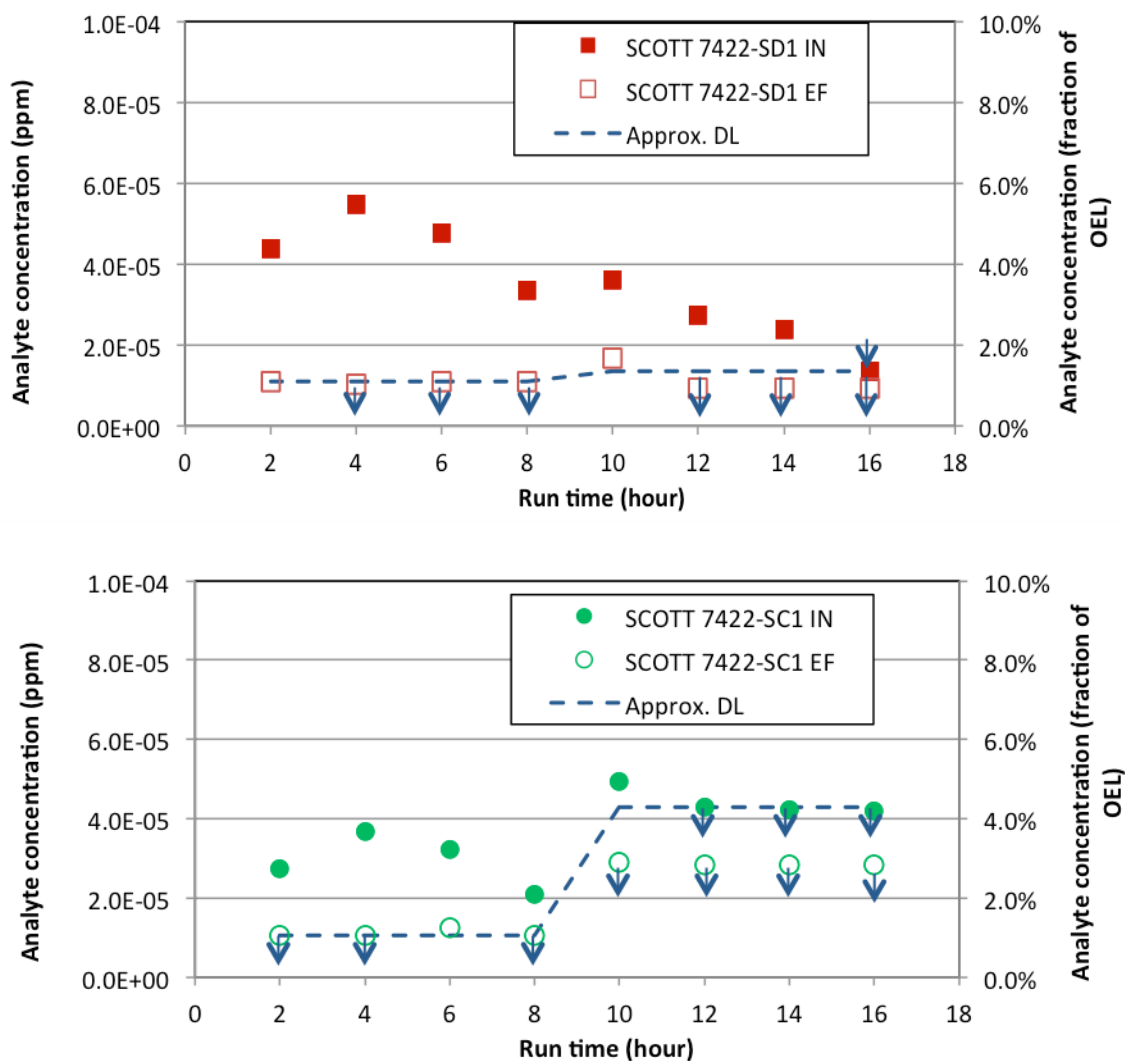
**2,5-Dimethylfuran** (see Figure E.5) – The DL for 2,5-dimethylfuran for respirator cartridge SCOTT 7422-SD1 ranged from ~1.8 to 3.1% of the OEL and 3.2 to 5.3% of the OEL for SCOTT 7422-SC1 due to analytical laboratory and instrument differences between tests and samples. All of the measured inlet and outlet concentrations were less than 6% of the OEL and below the DL. There is no evidence of breakthrough over the measured time period for either cartridge tested.



**Figure E.5.** Plot of Measured 2,5-Dimethylfuran Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (SCOTT 7422-SD1 and SCOTT 7422-SC1). Data points noted with ↓ indicates measurements less than the DL or RL.

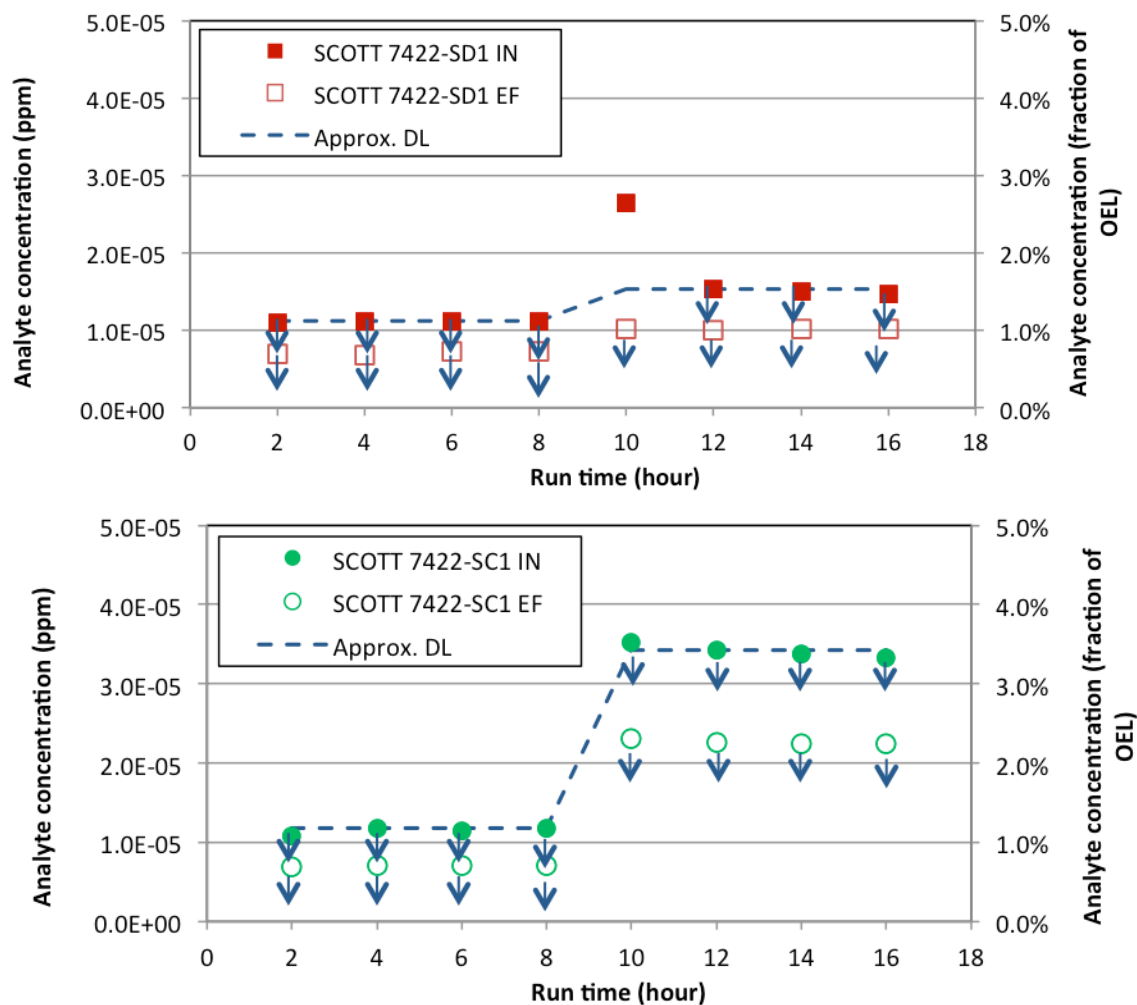


**2-Pentylfuran** (see Figure E.6) – The DL for 2-pentylfuran for respirator cartridge SCOTT 7422-SD1 ranged from ~1.1 to 1.3% of the OEL and 1.1 to 4.3% of the OEL for respirator cartridge SCOTT 7422-SC1. All inlet and outlet measurements were less than 5.5% of the OEL. The first inlet values at the beginning of each campaign were greater than the DL for SCOTT-7422-SD1, but reduced to the DL by the end of the test period. Because all of the outlet measurements were at or near the DL there is no evidence of cartridge breakthrough for 2-pentylfuran.



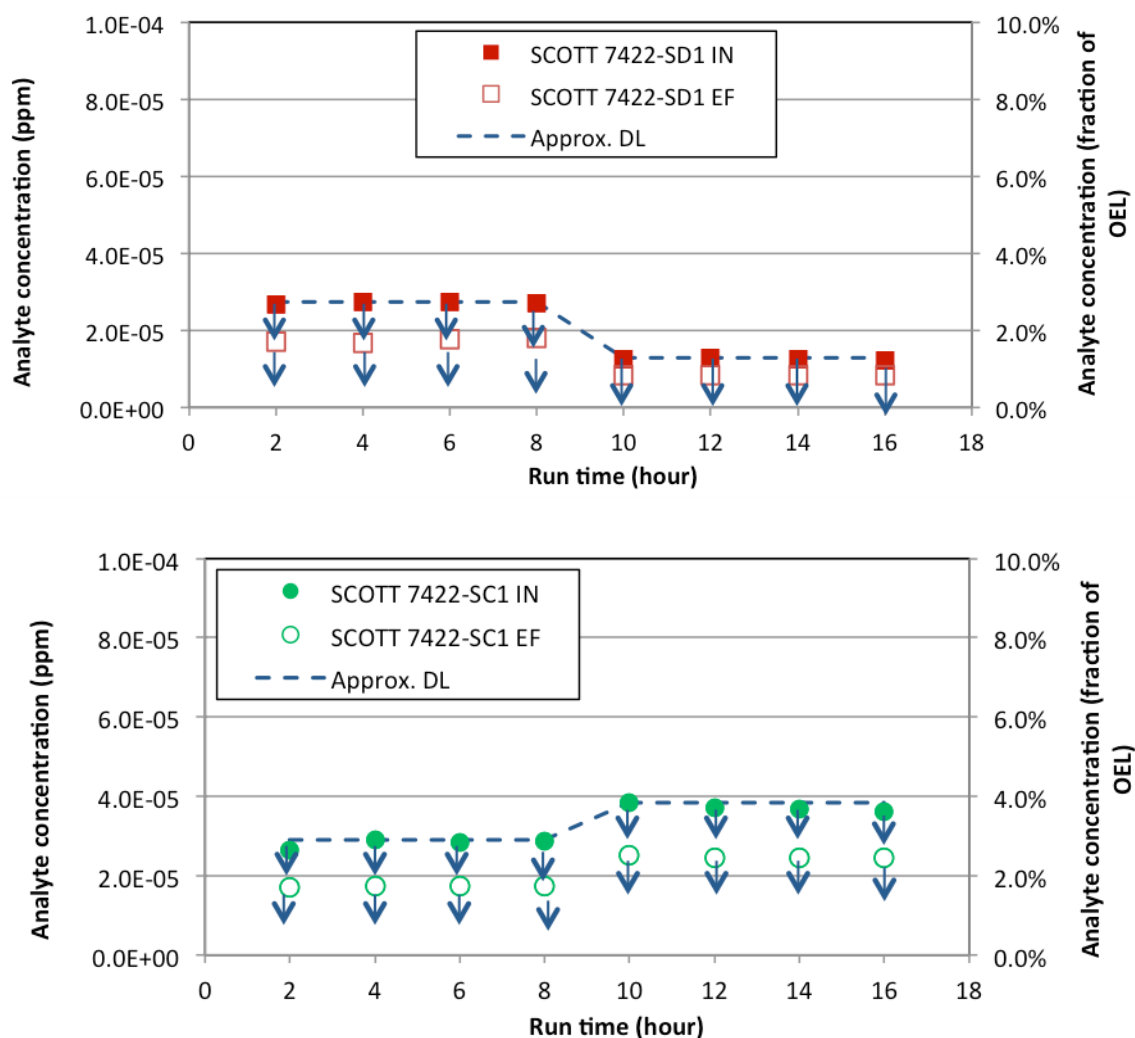
**Figure E.6.** Plot of Measured 2-Pentylfuran Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (SCOTT 7422-SD1 and SCOTT 7422-SC1). Data points noted with ↓ indicates measurements less than the DL or RL.

**2-Heptylfuran** (see Figure E.7) – The DL for 2-heptylfuran for respirator cartridge SCOTT 7422-SD1 ranged from ~1.1 to 1.5% of the OEL and 1.2 to 3.4% of the OEL for SCOTT 7422-SC1. All inlet concentrations measured for both respirator cartridges had measurements less than the DL, except one measurement at 10 hours for the SCOTT 7422-SD1 cartridge (2.6% of the OEL). All outlet values measured for the two respirator cartridges were less than the DL, thus, there is no evidence of breakthrough over the measured time period for either cartridge tested.



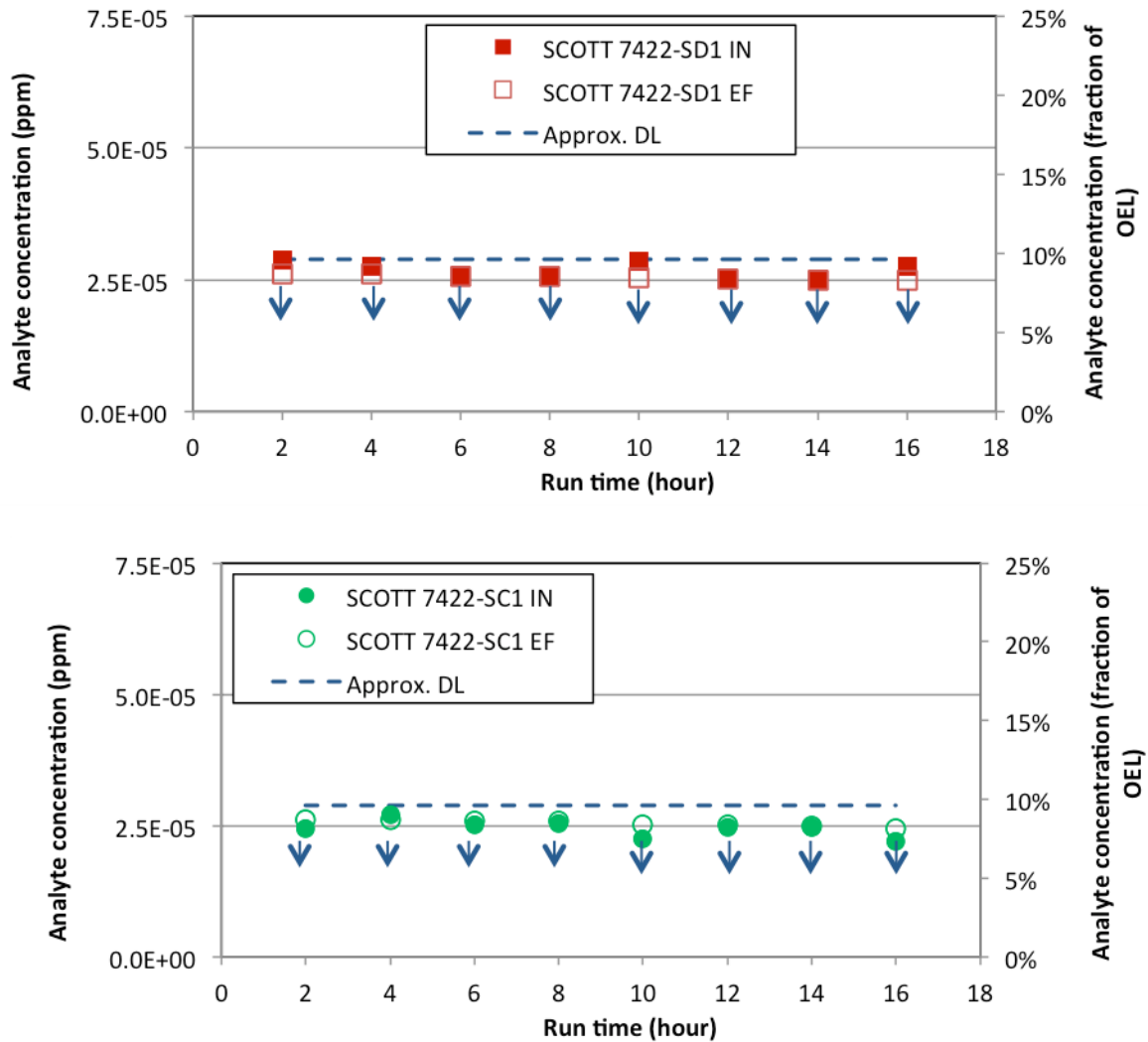
**Figure E.7.** Plot of Measured 2-Heptylfuran Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (SCOTT 7422-SD1 and SCOTT 7422-SC1). Data points noted with ↓ indicates measurements less than the DL or RL.

**2-Propylfuran** (see Figure E.8) – The DL for 2-propylfuran for respirator cartridge SCOTT 7422-SD1 ranged from ~1.3 to 2.7% of the OEL and 2.9 to 3.8% of the OEL for SCOTT 7422-SC1. All inlet and outlet concentration measurements for both respirator cartridges were less than 4% of the OEL and less than the DL. Based on the outlet measurements, there is no evidence of breakthrough over the measured time period for either cartridge tested.



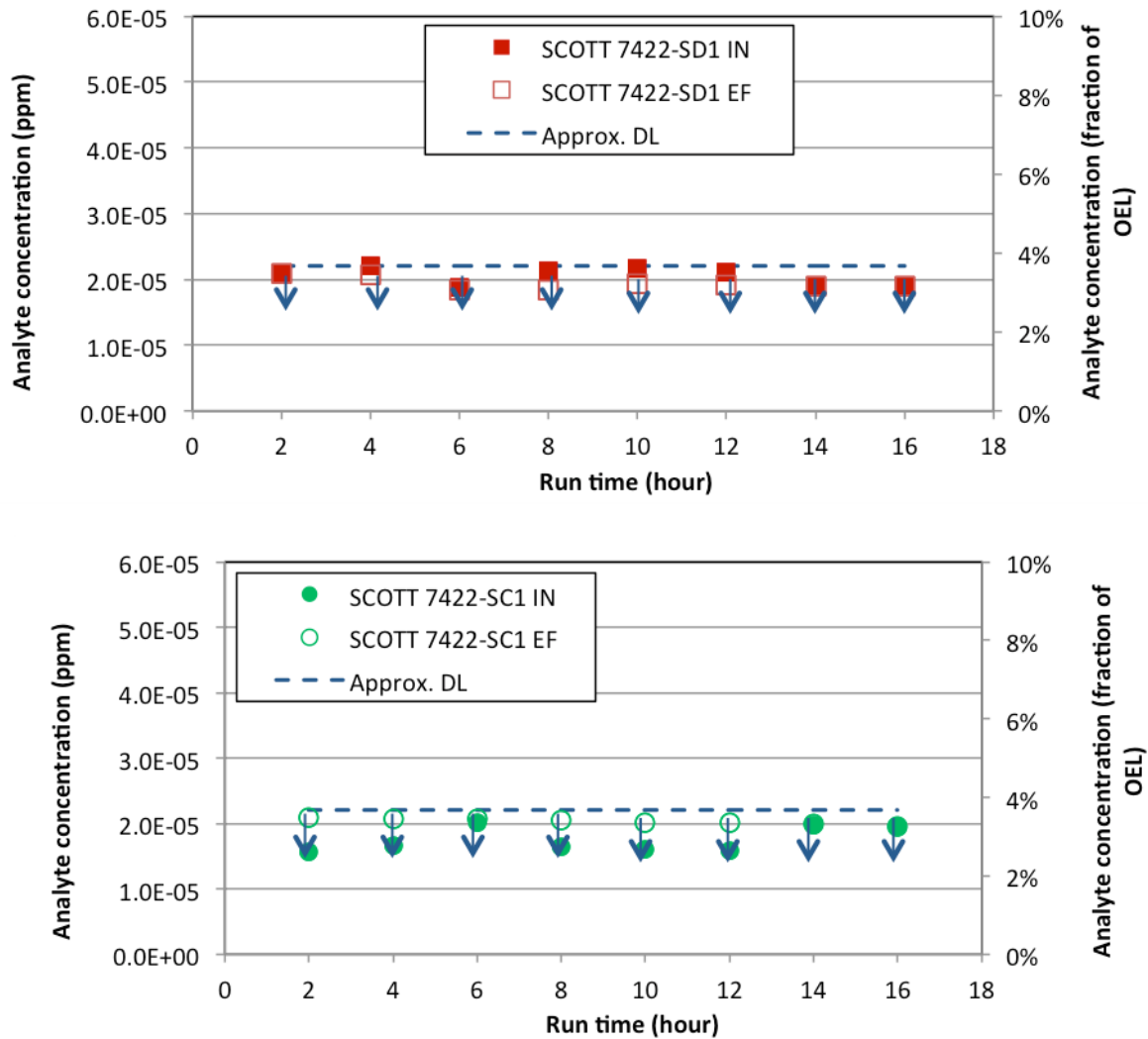
**Figure E.8.** Plot of Measured 2-Propylfuran Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (SCOTT 7422-SD1 and SCOTT 7422-SC1). Data points noted with ↓ indicates measurements less than the DL or RL.

*N*-nitrosomethylethylamine (see Figure E.9) – The DL for N-nitrosomethylethylamine corresponds to ~9.6% of the OEL. All inlet and outlet concentrations measured for both respirator cartridges were less than the DL. Based on the outlet measurements, there is no evidence of breakthrough over the measured time period for either cartridge tested.



**Figure E.9.** Plot of Measured N-nitrosomethylethylamine Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (SCOTT 7422-SD1 and SCOTT 7422-SC1). Data points noted with ↓ indicates measurements less than the DL or RL. Outlet data points not visible are obscured by the inlet data points.

***N-nitrosomorpholine*** (see Figure E.10) – The DL for N-nitrosomorpholine corresponds to ~3.7% of the OEL. All inlet and outlet concentrations measured for both respirator cartridges were less than the DL. Based on the outlet measurements, there is no evidence of breakthrough over the measured time period for either cartridge tested.



**Figure E.10.** Plot of Measured N-nitrosomorpholine Concentrations before the Inlets and after the Outlets of the Two Respirator Cartridges Tested (SCOTT 7422-SD1 and SCOTT 7422-SC1). Data points noted with ↓ indicates measurements less than the DL or RL. Outlet data points not visible are obscured by the inlet data points.



## **Appendix F**

### **Historical Data Comparison**





## Appendix F

### Historical Data Comparison

#### F.1 Data Sources

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-AY/AZ (AY/AZ) and its exhaust system (702-AZ) were obtained via a TWINS query on June 20, 2016, for TWINS HS,<sup>20</sup> 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).

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<sup>20</sup> No data have been added to TWINS HS since April 2005, so the June 2016 download does not require updating.

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 (CAS) number followed by M, the molecular weight of the identified chemical was added to the data record, the CAS number was used for 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/m<sup>3</sup> 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,<sup>21</sup> 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 702-AZ, only exhaust measurements were appropriate. The TWINS HS database contained data identified as having the location “AY/AZ Vent Sys,” which were included as part of this analysis. The SWIHD HS database contained no data for the 702-AZ exhaust. The TWINS IH database required sorting, as described below, so that only exhaust data were used.

The 702-AZ Farm data in the TWINS IH database gave 702-AZ as the farm and listed several different locations: “Stack”, “Primary Stack”, “Ventilation System”, and “Building.” Of these, data from the first three locations were used in analysis but the data with a “Building” location were not used. The unused data were from survey 13-01781, which was titled “AY Recirc Stack Baseline”.

Maximum and average<sup>(22)</sup> exhauster concentrations were found for each analyte for the combined TWINS IH and TWINS HS databases.<sup>(23)</sup> These maxima and averages are given in Table F.1,<sup>(24)</sup> together with Occupational Exposure Limits (OEL) 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. That is, Table F.1 contains two rows for the chemical instead of one, with the upper row (the default two-database combination) in normal font and the lower row (the two-database combination) in italics. 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.

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<sup>21</sup> Hoppe, EW, LA Mahoney, J Cole, and KS Rohlfing. 2016. *Hanford Tank Vapors COPCs Update*. PNNL-25880, Pacific Northwest National Laboratory, Richland, Washington.

<sup>22</sup> Arithmetic average.

<sup>23</sup> Because the SWIHD HS database contained no 702-AZ exhauster data, the TWINS IH data were the only concentrations present in the two-database combination.

<sup>24</sup> All %OEL values were calculated from concentration data that had been rounded to a minimum of three significant figures.

Because the RLs on concentrations in the historical database were generally higher than the RLs or detection limits in the cartridge tests, it was necessary to analyze data in a way that would let the effect of <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. 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 2 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.** Chemical of Poential Concern (COPC) Comparison to Historical 702-AZ Exhauster (AY/AZ Tank Farms) Measurements

COPC Number and Name		CAS Number	Boiling Point (°F)	Boiling Point Source	Occupational Exposure Limit (OEL)	Historical Measurements <sup>1</sup>				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 <sup>13</sup> (%OEL)
Inorganic														
1	Ammonia	7664-41-7	-28	Poling et al., 2007 <sup>2</sup>	25 ppm	25	169	22.5	676%	90%	76.0%	66.2%	9.20%	5.19% (RL)
2	Nitrous Oxide	10024-97-2	-127	Poling et al., 2007	50 ppm	1 3	<RL <RL	<RL <RL	<RL <RL	<RL <RL	Not Measured			
3	Mercury	7439-97-6	674	Poling et al., 2007	0.025 mg/m <sup>3</sup>	24	0.117	0.0201	468%	80%	84.0%	77.6%	7.60%	7.61% (RL)
Hydrocarbons														
4	1,3-Butadiene	106-99-0	24	Poling et al., 2007	1 ppm	34	0.109	0.0374*	11%	3.7%*	<RL	<RL	<RL	3.57% (RL)
5	Benzene	71-43-2	176	Poling et al., 2007	0.5 ppm	25	<RL	0.00418	<RL	0.84%	0.40%	0.078%	0.039%	0.031%
6	Biphenyl	92-52-4	491	Poling et al., 2007	0.2 ppm	17	<RL	<RL	<RL	<RL	<DL	<DL	<DL	23.8%
Alcohols														
7	1-Butanol	71-36-3	243	NIOSH	20 ppm	22	0.107	0.0268	0.54%	0.13%	0.27%	0.052%	0.006%	0.004%
8	Methanol	67-56-1	148	Poling et al., 2007	200 ppm	17	<RL	1.06*	<RL	0.53%*	Not Measured			
Ketones														
9	2-Hexanone	591-78-6	262	NIOSH	5 ppm	25	<RL	0.00316*	<RL	0.06%*	0.018%	0.004%	<DL	0.004%
10	3-Methyl-3-butene-2-one	814-78-8	208	CRC Handbook 1989 <sup>4</sup>	0.02 ppm	0	n/a	n/a	n/a	n/a	Not Detected - TIC <sup>12</sup>			
11	4-Methyl-2-hexanone	105-42-0	282	Predicted ACD/Labs <sup>5</sup>	0.5 ppm	9	<RL	<RL	<RL	<RL	<DL	<DL	<DL	0.060%
12	6-Methyl-2-heptanone	928-68-7	333	Predicted ACD/Labs	8 ppm	0	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	20	<RL	0.00246	<RL	1.2%	1.14%	0.29%	0.18%	0.099%
Aldehydes														
14	Formaldehyde	50-00-0	-6	NIOSH	0.3 ppm	27	<RL	0.0177*	<RL	5.9%*	3.01%	1.40%	1.10%	0.63% (RL)
15	Acetaldehyde	75-07-0	69	NIOSH	25 ppm	19	<RL	0.078*	<RL	0.31%*	0.057%	0.050%	0.048%	0.005% (RL)
16	Butanal	123-72-8	167	Oxford safety data <sup>6</sup>	25 ppm	37	<RL	0.0228*	<RL	0.09%*	0.015%	0.003%	0.001%	0.001%
17	2-Methyl-2-butenal	1115-11-3	244	United Nations <sup>7</sup>	0.03 ppm	0	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	0	n/a	n/a	n/a	n/a	Not Detected - TIC			

Table F.1. (continued)

COPC Number and Name	CAS Number	Boiling Point (°F)	Boiling Point Source	Occupational Exposure Limit (OEL)	Number of Values	Historical Measurements <sup>1</sup>				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 <sup>1,5</sup> (%OEL)
Furans													
19 Furan	110-00-9	88	Poling et al., 2007	1 ppb	27	<RL	6.31*	<RL	631%*	9.46%	3.43%	3.81%	0.55-5.74%
20 2,3-Dihydrofuran	1191-99-7	130	Alfa Aesar <sup>a</sup>	1 ppb	17	<RL	0.14	<RL	14%	6.19%	3.39%	<DL	1.10-3.08%
21 2,5-Dihydrofuran	1708-29-8	152	Aldrich <sup>a</sup>	1 ppb	26	<RL	<RL	<RL	<RL	22.0%	4.39%	4.58%	1.37-4.32%
22 2-Methylfuran	534-22-5	147	Oxford safety data	1 ppb	26	<RL	<RL	<RL	<RL	25.3%	4.06%	5.11%	1.17-3.82%
23 2,5-Dimethylfuran	625-86-5	199	Alfa Aesar	1 ppb	16	<RL	<RL	<RL	<RL	<DL	<DL	<DL	1.82-5.32%
24 2-Ethyl-5-methylfuran	1703-52-2	246	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	328	Predicted ACD/Labs	1 ppb	0	n/a	n/a	n/a	n/a	Not Detected - TIC			
26 3-(1,1-Dimethylethyl)-2,3-dihydrofuran	34314-82-4	306	Predicted ACD/Labs	1 ppb	0	n/a	n/a	n/a	n/a	Not Detected - TIC			
27 2-Pentylfuran	3777-69-3	333	Alfa Aesar	1 ppb	16	<RL	<RL	<RL	<RL	5.48%	3.74%	2.92%	1.06-4.31%
28 2-Heptylfuran	3777-71-7	410	Alfa Aesar	1 ppb	16	<RL	<RL	<RL	<RL	3.53%	1.86%	<DL	1.12-3.42%
29 2-Propylfuran	4229-91-8	231	Alfa Aesar	1 ppb	16	<RL	<RL	<RL	<RL	<DL	<DL	<DL	1.28-3.84%
30 2-Octylfuran	4179-38-8	452	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	605	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	Not available	1 ppb	0	n/a	n/a	n/a	n/a	Not Detected - TIC			
Phthalates													
33 Diethylphthalate	84-66-2	563	NIOSH	5 mg/m <sup>3</sup>	16	<RL	0.0049	<RL	0.10%	<DL	<DL	<DL	10.5%

**Table F.1. (continued)**

COPC Number and Name		CAS Number	Boiling Point (°F)	Boiling Point Source	Occupational Exposure Limit (OEL)	Historical Measurements <sup>1</sup>					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 <sup>13</sup> (%OEL)	
Nitriles															
34	Acetonitrile	75-05-8	179	NIOSH	20 ppm	23	0.551	0.11	2.8%	0.55%	0.20%	0.073%	0.65%		0.002%
35	Propanenitrile	107-12-0	207	NIOSH	6 ppm	21	<RL	0.00433*	<RL	0.07%*	0.044%	0.013%	<DL		0.004%
36	Butanenitrile	109-74-0	244	NIOSH	8 ppm	20	<RL	0.00486*	<RL	0.06%*	0.028%	0.009%	<DL		0.003%
37	Pentanenitrile	110-59-8	284	Alfa Aesar	6 ppm	20	<RL	<RL	<RL	<RL	0.012%	0.004%	<DL		0.004%
38	Hexanenitrile	628-73-9	328	Predicted ACD/Labs	6 ppm	20	<RL	<RL	<RL	<RL	0.021%	0.004%	<DL		0.004%
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	20	<RL	<RL	<RL	<RL	<RL	<RL	<RL		0.099% (RL)
Nitrosamines															
43	N-Nitrosodimethylamine	62-75-9	306	NIOSH	0.3 ppb	28	2.46	0.961	820%	320%	760%	677%	<RL		11.4% (RL)
44	N-Nitrosodiethylamine	55-18-5	351	Oxford safety data	0.1 ppb	27	<RL	0.0858	<RL	86%	30.9%	22.9%	<RL		30.9% (RL)
45	N-Nitrosomethylethylamine	10595-95-6	310	Predicted ACD/Labs	0.3 ppb	28	<RL	0.0978*	<RL	33%*	<RL	<RL	<RL		9.63% (RL)
46	N-Nitrosomorpholine	59-89-2	435	Oxford safety data	0.6 ppb	27	<RL	0.0749*	<RL	12%*	<RL	<RL	<RL		3.67% (RL)
Organophosphates															
47	Tributyl phosphate	126-73-8	552	NIOSH	0.2 ppm	17	<RL	<RL	<RL	<RL	<DL	<DL	<DL		19.3%
48	Dibutyl butylphosphonate	78-46-6	602	Predicted ACD/Labs	0.007 ppm	17	<RL	<RL	<RL	<RL	<DL	<DL	<DL		377%
Halogenated															
49	Chlorinated Biphenyls	Varies	Varies	Varies	1 mg/m <sup>3</sup>	0	n/a	n/a	n/a	n/a	Not Detected - TIC				
50	2-Fluoropropene	1184-60-7	-11	SynQuest <sup>11</sup>	0.1 ppm	0	n/a	n/a	n/a	n/a	Not Detected - TIC				

Table F.1. (continued)

COPC Number and Name		CAS Number	Boiling Point (°F)	Boiling Point Source	Occupational Exposure Limit (OEL)	Historical Measurements <sup>1</sup>					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 <sup>12</sup> (%OEL)
Pyridines														
51	Pyridine	110-86-1	240	NIOSH	1 ppm	26	<RL	0.0104*	<RL	1.0%*	<RL	<RL	<RL	0.15% (RL)
52	2,4-Dimethylpyridine	108-47-4	318	Alfa Aesar	0.5 ppm	26	<RL	<RL	<RL	<RL	<RL	<RL	<RL	0.22% (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			
Organonitrates														
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			
Isocyanates														
59	Methyl Isocyanate	624-83-9	103	NIOSH	0.02 ppm	1	<RL	<RL	<RL	<RL	Not Detected - TIC			

<sup>1</sup> 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 earlier than May 2005.

\* Indicates that the value of the average would differ by a factor of 2 or more (in either direction) if non-reports were excluded.

"< 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 mean that the pre-2006 TWINS headspace data were also included.

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

<sup>2</sup> Poling, B. E.; Prausnitz, J. M.; O'Connell, J. P. The Properties of Gases and Liquids. McGraw Hill, 2007.

<sup>3</sup> NIOSH: National Institute of Occupational Safety and Health

<sup>4</sup> CRC Handbook of Chemistry and Physics, CRC Press, 1989.

<sup>5</sup> ACD/Labs software <http://www.acdlabs.com/products/percepto/predictors.php>

<sup>6</sup> Oxford safety data from The Physical and Theoretical Chemistry Laboratory at Oxford University

<sup>7</sup> Food and Agriculture Organization of the United Nations

<sup>8</sup> Alfa Aesar: <https://www.alfa.com/>

<sup>9</sup> Aldrich: <https://www.sigmaaldrich.com/>

<sup>10</sup> OSHA: Occupational Safety and Health Administration

<sup>11</sup> SynQuest: <http://synquestlabs.com/product/fd/8330.html>

<sup>12</sup> TIC: Tentatively Identified Compounds that were not observed in this study using the specified analytical methods.

<sup>13</sup> Approximate Detection Limit (DL) 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.

## F.2 702-AZ (2016 Tests): Comparison with Historical Data

The maximum and average COPC concentrations measured during cartridge testing were compared to the maximum and average historical concentrations, and where differences were found, the historical data were examined for explanations in the type or circumstances of sampling. Two sets of cartridge tests were carried out. In 2016 tests were performed during a period when the waste was not being disturbed and had not been disturbed recently.

Generally speaking, the AY and AZ Farm tanks with headspaces upstream of the 702-AZ stack have been active over the whole period of record. A number of waste transfers or exchanges have occurred between 2000, when TWINS HS data were taken, and August 26, 2016, when the 2016 cartridge testing began. These changes in waste contents have included receipts from SY-101, C-106, AN-106, and numerous interchanges within the A complex. The waste-disturbing activities that most closely preceded 2016 cartridge testing were in April and June 2016.

The larger discrepancies, or apparent discrepancies, between cartridge inlet and historical concentrations are discussed in the following sections. When possible, the 2016 cartridge-inlet maxima are compared only to historical maxima taken when there was no disturbance.

### F.2.1 Ammonia

The maximum cartridge inlet concentration of 76% of the OEL in 2016 is low compared to the historical maximum concentration of 169 ppm (676% of the OEL), although the average concentrations are similar for historical data and 2016 cartridge data. The overall maximum in historical data was measured on January 6, 2011, during a disturbance (an exhaustor restart).

The highest historical concentration measured during non-disturbance conditions was 69 ppm (275% of the OEL). This was a transfer baseline sample taken on March 3, 2011; the Best Basis Inventory (BBI)<sup>25</sup> tank activity database confirms that this was an actual baseline (i.e., no waste transfer occurred in the AY/AZ farms at that time) and that there had been no waste transfers for months before. The 2016 cartridge maximum is low by comparison, but is >20%<sup>26</sup> of this non-disturbance historical maximum and, therefore, is not considered significantly different<sup>27</sup>.

### F.2.2 Nitrous Oxide

Nitrous oxide was not measured in cartridge testing. There were two measurements in historical data on August 14, 2000, both below-reports with an RL of 50 ppm (<100% of the OEL), found in the TWINS HS database. One more below-report concentration TWINS IH was measured on June 16, 2005. This

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<sup>25</sup> The BBI establishes the inventory of the underground waste storage tanks at Hanford by using sample data, process knowledge, surveillance data, and waste stream composition information from the Hanford Defined Waste (HDW) computer model (Agnew SF, J. Boyer, RA Corbin, TB Duran, JR FitzPatrick, KA Jurgensen, TP Ortiz, and BL Young. 1997. *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4*. LA-UR-96-3860, Los Alamos National Laboratory, Los Alamos, New Mexico).

<sup>26</sup> In Freeman et.al. [19] a 20% threshold was established for the comparison of historic to current concentrations to be considered as significant.

<sup>27</sup> This section uses the thresholds from Appendix C in Freeman et.al. [19]. Discrepancies are discussed if the maximum historical concentration of a compound was >10% of the OEL and the maximum cartridge inlet concentration was <50% of the historical value. However, discrepancies are considered significant only if the maximum historical concentration was >10% of the OEL and the maximum cartridge inlet concentration is <20% of the historical value.



measurement had an RL of 1 ppm (2% of the OEL). The last preceding waste transfer had been on May 22, 2005, so the sample is considered to have been taken during non-disturbance conditions.

### **F.2.3 Mercury**

The maximum cartridge inlet concentration of 84% of the OEL is low compared to the historical maximum concentration of 0.117 mg/m<sup>3</sup> (468% of the OEL), although the average concentrations are similar for historical data and 2016 cartridge data.

This maximum in historical data, 468% of the OEL, was measured on August 14, 2013, during a waste-disturbing AY-101 recirculation activity. The BBI database shows no tank-to-tank transfer at or near this date.

Other high concentrations, excluding those from surveys identified in their titles as being carried out for exhaustor restarts, were:

- 0.0359 mg/m<sup>3</sup>, March 15, 2016, survey title includes “AP-103 to AY-101 Transfer” – The BBI database indicates raw water was added to AY-102 during March 7–27, 2016, which includes the survey date.
- 0.0354 mg/m<sup>3</sup>, March 17, 2011, survey title includes “AN101 to AY101 Transfer” – The BBI database indicates raw water was added to AY-101 during March 11–17, 2011, which includes the survey date, and a waste transfer from AN-101 to AY-101 during March 16–17, 2011, which includes the survey date.
- 0.0254 mg/m<sup>3</sup>, March 16, 2011, survey title includes “AN101 to AY101 Transfer” – The BBI database indicates raw water was added to AY-101 during March 11–17, 2011, which includes the survey date, and a waste transfer from AN-101 to AY-101 occurred during March 16–17, 2011, which includes the survey date. If this survey was carried out before the transfer started on the same day, it is a baseline measurement.

The highest concentration measured during non-disturbance conditions was either 0.0359 mg/m<sup>3</sup> (144% of the OEL), if raw water additions are not considered waste-disturbing, or 0.0254 mg/m<sup>3</sup> (102% of the OEL), if the survey is assumed to have been carried out before transfer started. The 2016 cartridge maximum is >50% of these non-disturbance historical maxima and, therefore, is not considered one of the larger discrepancies, nor is it significant.

### **F.2.4 1,3-Butadiene**

The maximum 2016 cartridge inlet concentration was below the sample RLs. The 2016 cartridge maximum was <3.6% of the OEL. This is low compared to the historical maximum concentration of 0.109 ppm (11% of the OEL), although the average concentrations are similar for historical data and 2016 cartridge data. The maximum in historical data was measured on September 8, 2015. The survey title did not indicate a disturbance; however, the BBI activity database shows the survey was made during a waste transfer from AZ-102 to AW-102 during September 4–9, 2015. The only other two above-report measurements were taken during an exhaustor restart (as shown by the survey title).

Because none of the above-report historical data were from undisturbed conditions, it is unclear whether the 2016 cartridge maximum was less than 20% of an undisturbed historical maximum.

### **F.2.5 Formaldehyde**

The maximum cartridge inlet concentration of 3.0% of the OEL, for 2016, is low compared to the historical maximum concentration, a below-report datum that had an RL of 0.069 ppm (<23% of the OEL). The maximum above-report concentration in historical data was 0.015 ppm (4.9% of the OEL). It was measured on December 17, 2006, with no disturbance indicated in the survey title. However, the BBI activity database shows the survey was made during a waste transfer from AY-102 to AN-106 on December 16–19, 2006.

The 2016 cartridge maximum is lower than the maximum above-report historical concentration. However, because it is >20% of a maximum that occurred during waste disturbance, which would be expected to cause an increased concentration, it is considered not to be significantly discrepant for conditions.

### **F.2.6 Furan**

The maximum cartridge inlet concentration measured by the Carbotrap 300 TDU method was 58.0% of the OEL in 2016 (undisturbed conditions). This was low or very low compared to the historical maximum concentration, a below-report datum that had an RL of 145 ppb (<14,500% of the OEL). This historical measurement came from a December 17, 2006, Carbotrap 300 TDU sample in TWINS IH that had a volume of 0.35 L, which is a small volume compared to other 702-AZ samples in which furan was measured; this explains the high RL. The second highest RL was 10 ppb (<1000% of the OEL), and all other RLs were 4.3 ppb (<430% of the OEL), with many being less than 1 ppb (<100% of the OEL).

There was only one above-report furan concentration in the historical data, 0.79 ppb (79% of the OEL). It was measured on June 18, 2015, with a survey title that did not indicate disturbance. The BBI tank activity database shows no waste transfer or other waste disturbance in the AY/AZ farms for months before the sample was taken. The 2016 cartridge inlet maximum inlet concentration is not significantly less than the single historical undisturbed above-report concentration.

### **F.2.7 2,3-Dihydrofuran**

The maximum cartridge inlet concentration was 6.2% of the OEL (a below-report for which the RL was 25% of the OEL). The historical maximum concentration was a below-report datum that had an RL of 0.356 ppb (<36% of the OEL). There was a single maximum above-report concentration of 0.228 ppb (23% of the OEL), which was measured on June 19, 2014, during an exhauster restart.

Because there are no above-report historical data except one measurement taken during ventilation disturbance (as stated in the survey title), no firm conclusion can be drawn about where the 2016 cartridge inlet concentration lies with respect to non-disturbance historical data. However, cartridge inlet data taken during non-disturbed conditions would be expected to be lower than those taken during a disturbance, so the 2016 cartridge inlet concentrations were probably consistent with historical data.

### **F.2.8 2,5-Dihydrofuran, 2-Methylfuran**

The maximum historical concentration comes from a below-report measurement made from the same 0.35 L Carbotrap 300 TDU sample (taken on December 17, 2006) that dominated the historical furan concentration. There are no above-report historical data for these chemicals, so no conclusion can be drawn about where their cartridge inlet concentrations lie with respect to historical data.

### **F.2.9 2,5-Dimethylfuran, 2-Pentylfuran, 2-Heptylfuran, 2-Propylfuran**

The maximum and average cartridge inlet concentrations appear to be low compared to the historical maximum concentrations, which in all cases are below-report data. There are no above-report historical data for these chemicals, so no conclusion can be drawn about where their cartridge inlet concentrations lie with respect to historical data.

### **F.2.10 N-nitrosodiethylamine**

The maximum cartridge inlet concentration was 31% of the OEL in 2016 with no disturbance. The historical maximum concentration was a below-report datum that had an RL of 0.209 ppb (<209% of the OEL). This value came from the TWINS IH database, in which it is not unusually high although many other historical below-reports in TWINS IH had RLs of 0.1 ppb (<100% of the OEL) or less. There was a single above-report concentration in historical data, 0.066 ppm (66% of the OEL), which was measured on June 19, 2014, during an exhauster restart.

Because there are no above-report historical data except one measurement taken during a ventilation disturbance (as stated in the survey title), no firm conclusion can be drawn about where this chemical's 2016 cartridge inlet concentration lies with respect to non-disturbance historical data. However, cartridge inlet data taken during non-disturbed conditions would be expected to be lower than those taken during a disturbance, so the 2016 cartridge inlet concentrations were probably consistent with historical data.

### **F.2.11 N-nitrosomethylethylamine**

The maximum cartridge inlet concentration was <9.6% of the OEL, which was the RL, in 2016. The historical maximum concentration was a below-report datum that had an RL of 0.242 ppb (<81% of the OEL). This historical RL was not unusually high in the TWINS IH database. There were six above-report concentrations in historical data, ranging from 0.020 to 0.031 ppb (7–10% of the OEL). Of these, the three highest were measured on June 19, 2014, (two measurements) and January 6, 2011, during exhauster restarts. The three lower values were all about 0.02 ppb (7% of the OEL); at least one of these was both labeled baseline in the survey title and was free of waste disturbance in the BBI tank activity database.

The 2016 cartridge inlet measurements are reasonably comparable to the non-disturbed historical data.

### **F.2.12 N-nitrosomorpholine**

The maximum cartridge inlet concentration was <3.7% of the OEL, which was the RL, in 2016. The cartridge maximum is low compared to the historical maximum concentration, a below-report datum that had an RL of 0.167 ppb (<28% of the OEL). This historical RL was not unusually high in TWINS IH. There was a single above-report concentration in historical data, 0.025 ppm (4% of the OEL), which was measured on June 19, 2014, during an exhauster restart.

Because there are no above-report historical data except one measurement taken during a ventilation disturbance, no firm conclusion can be drawn about where the 2016 cartridge inlet maximum for this chemical lies with respect to non-disturbed historical data. However, cartridge inlet data taken during non-disturbed conditions would be expected to be lower than those taken during a disturbance, so the 2016 cartridge inlet concentrations were probably consistent with historical data.

### **F.2.13 Dibutyl butylphosphonate (DBBP)**

The maximum historical concentration comes from a below-report measurement made on the same 0.35 L Carbotrap 300 TDU sample (taken on December 17, 2006) that dominated the furan concentration. There are no above-report historical data for this chemical, so no conclusion can be drawn about where its cartridge inlet concentrations lie with respect to historical data.

### **F.2.14 Pyridine**

The maximum cartridge inlet concentration was <0.15% of the OEL. The concentration is low compared to the historical maximum concentration, a below-report datum that had an RL of 0.238 ppm (<24% of the OEL). The historical measurement came from a December 17, 2006, Carbotrap 300 TDU sample with a volume of 0.35 L, which is a small volume compared to other 702-AZ samples in which pyridine was measured; this explains the high RL. The second-highest RL was 0.00625 ppm (<0.6% of the OEL). The unusually high <RL maximum accounts for the high average pyridine concentration as well. There were two above-report concentrations in historical data, 0.00050 ppm and 0.00088 ppm (0.05% and 0.09% of the OEL, respectively). Both were measured during exhaustor restarts that occurred on June 19, 2014.

Given that cartridge inlet data taken during non-disturbed conditions would be expected to be lower than those taken during a disturbance, the 2016 cartridge inlet concentrations were probably consistent with historical data.

### **F.2.15 2,4-Dimethylpyridine**

As pyridine, the maximum and average historical concentrations are controlled by the RL from the 0.35 L Carbotrap 300 TDU sample. Because this substituted pyridine has no above-report historical data, no conclusion can be drawn about where its cartridge inlet concentration lies with respect to historical data.

### **F.2.16 Methyl isocyanate**

This chemical was a tentatively identified compound at the inlet in both series of cartridge testing. There is only one historical concentration, a below-report datum that had an RL of 0.00714 ppm (<36% of the OEL). Given the scarcity of data, no conclusion can be drawn about where this chemical's cartridge inlet concentration lies with respect to historical data.

### **F.2.17 Summary of Historical Data for 702-AZ (2016 Tests Without Disturbance)**

In summary, cartridge inlet maxima for the 2016 702-AZ tests that were substantially lower than historical data can be described as follows:

- Differences arose from using historical data taken during ventilation or waste disturbance for the historical maximum and were resolved by using non-disturbance historical data: ammonia, mercury, 2,3-dihydrofuran, N-nitrosodiethylamine, N-nitrosomethylethylamine, N-nitrosomorpholine, pyridine.
- Differences arose from using the RLs of below-report data for the historical maximum: formaldehyde.
- Differences arose from using data for vapor produced by a no-longer-existing inventory for the historical maximum: none.

- Differences could not be resolved because of the scarcity of non-disturbance above-report data: 1,3-butadiene, 2,5-dihydrofuran, 2-methylfuran, 2,5-dimethylfuran, 2-pentylfuran, 2-heptylfuran, 2-propylfuran, dibutyl butylphosphonate, 2,4-dimethylpyridine, methyl isocyanate.
- Cartridge inlet concentrations were determined to be significantly lower than above-report historical concentrations: none.







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**[www.pnnl.gov](http://www.pnnl.gov)**

902 Battelle Boulevard  
P.O. Box 999  
Richland, WA 99352  
1-888-375-PNNL (7665)

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