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Date: 5/3/2018	Subcontract Release Number/Purchase Order: 53005-081		Transmittal Number: 53005-81-COM-0518-002		Project Num N/A	nber: Project/Contract Title Mobile Lab Data Ana		ntract Title: Data Analysis		
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Submittal Number Submittal Description		Specification Number	Specificatio Paragraph Number	Copies E / H	TOC Document Number	Rev	Supplier Document Number	Supplier Rev		
004-004 Task 3 Final Weekly Summary Repor 53005-81-RPT-004		t: SOW	3.0	E	N/A	0	53005-81- COM-0518-002	0		
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## WEEKLY REPORT FOR WEEK 4 (APRIL 1, 2018 – APRIL 7, 2018)

Report No. 53005-81-RPT-004 Revision 0

May 2018

**Prepared for:** 

Washington River Protection Solutions, LLC P.O. Box 850 Richland, WA 99352

Subcontract 53005, Release 81

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Date: 5/3/2018

## **Record of Revision**

Revision	Date	Pages/Sections Changed	Brief Description
0	05/2018	N/A	Initial release.

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## Acronyms

CAPA	Corrective and Preventative Action
COPC	Chemical of Potential Concern
FTP	File Transfer Protocol
NDMA	N-nitrosodimethylamine
NMEA	N-nitrosomethylethylamine
NMOR	N-nitrosomorpholine
OEL	Occupational Exposure Limit
PTR-MS	Proton Transfer Reaction – Mass Spectrometer
QA	Quality Assurance
QC	Quality Control
WRPS	Washington River Protection Solutions, LLC

#### 1.0 APRIL 7, 2018 – APRIL 8, 2018 – STUDY SITE #1

#### 1.1 Quality Assessment

Data from April 7, 2018, were transferred to TerraGraphics via the Washington River Protection Solutions, LLC (WRPS) File Transfer Protocol (FTP) site on April 12, 2018. Data were assessed using Procedure 17124-DOE-HS-102, "Mobile Laboratory Data Processing – Analysis." A completed Data Exchange Checklist was sent to WRPS on April 16, 2018. The data were accepted by TerraGraphics with the following comments. All startup, shutdown, and calibration procedures were adequately documented and all other checks passed the acceptance limits. No other exceptions besides those below were noted.

Extra data fields were stored with weather station data and Corrective and Preventative Action (CAPA) 1820 was issued on April 9, 2018. Upon reinstallation of the weather station, extra data fields were not turned off which caused several other data fields to be stored with weather station data. This may cause issue upon data interpretation depending on how sophisticated the algorithm is for pulling out pertinent weather station data sentences. If the weather station is reinstalled in the future, all other data fields will be turned off and saved to avoid convoluted weather data review.

During the end of the day validation checks for the Mobile Laboratory the TeamViewer<sup>®1</sup> software was not operating correctly and a verbal validation had to be performed. CAPA 1822 was issued on April 9, 2018. The license was expired for quality assurance (QA) personnel and would no longer enable them to connect to multiple instruments in the Mobile Laboratory for verification. Pictures of the instruments will supplement the use of TeamViewer for the end of the day validation checks until QA personnel can become added to the global TeamViewer license. The practice of taking pictures for verification was approved by the client on April 7, 2018.

#### 1.2 Summary

Joe Sears and Krystin Riha performed background sampling using the Mobile Laboratory from April 7, 2018, to April 8, 2018, at Study Site 1. Site 1 is located on the plateau northwest of the 200W Tank Farm operations. This is an upwind site from the central Hanford Plateau. The Mobile Laboratory arrived at Site 1 at 12:29 on April 7, 2018. The initial QA/quality control (QC) zero air/sensitivity checks were performed on the CO<sub>2</sub> monitor, NH<sub>3</sub> monitor, and the Proton Transfer Reaction – Mass Spectrometer (PTR-MS) beginning at 12:34. The data file names were confirmed and routine data collection resumed by 13:49. The Mobile Laboratory staff departed the monitoring site at 16:10.

The Mobile Laboratory staff had returned to Site 1 at 06:46 on April 8, 2018, and began confirmatory sample collection by 06:55. Closeout zero air/sensitivity checks were performed at 10:40. The Mobile Laboratory moved to Site 2 by 12:07.

<sup>&</sup>lt;sup>1</sup> TeamViewer is a registered trademark of TeamViewer GmbH, Goeppingen, Germany.

Use of a new lower concentration Ammonia standard was implemented. It was prepared from the 100,000 ppbv NH<sub>3</sub> standard (CBAL-451-74B) to create a new 10,000 ppbv NH<sub>3</sub> standard (CBAL-451-85A). The new standard will be used until it fails the percent recovery criteria.



Figure 1-1. Mobile Lab Site #1 for the Duration of the Monitoring Period.

#### **1.3** Samples Collected

Continuous air monitoring was performed using the following instrumentation:

- PTR-MS,
- LI-COR<sup>®2</sup> CO<sub>2</sub> Monitor,
- Picarro Ammonia Monitor, and
- Weather Station.

<sup>&</sup>lt;sup>2</sup> LI-COR is a registered trademark of LI-COR, Inc., Lincoln, Nebraska.

Confirmatory air samples were collected as follows:

Site	Date	Sample Type	ID	Start	Stop	Sample Time (min)
1	7-Apr	Thermosorb <sup>®3</sup> /N	EL22184	12:46	15:46	180
1	7-Apr	CarboTrap <sup>®4</sup> -300	A046038	12:59	14:12	72
1	8-Apr	Thermosorb/N	EL22189	06:55	10:10	194
1	8-Apr	CarboTrap-300	A048159	07:05	08:16	70

#### Table 1-1. Alternative Media Samples Taken.

Table 1-2 displays the statistical information for the monitoring period of April 7, 2018, to April 8, 2018. By definition, the occupational exposure limit (OEL) is an 8-hour, time-weighted average that establishes a limit for personnel exposures to hazardous chemicals. It is the exposure level to which a person may be exposed for 8 hours/day, 40 hours/week for 40 years and have no expectation of adverse health effects. In this study, area vapor concentration measurements were made to better understand the hazardous vapor exposures that workers may receive. These measurements are only compared to OEL concentrations to give them context. It is neither accurate nor appropriate to interpret these short duration measurements (2 seconds) as worker exposure levels. Since the OEL is defined as a time-weighted average, it is more appropriate to compare them to daily average vapor concentrations. Short duration excursions above the OEL concentration are not significant.

<sup>&</sup>lt;sup>3</sup> Thermosorb is a registered trademark of Ellutia Limited Company, Cambridgeshire, United Kingdom.

<sup>&</sup>lt;sup>4</sup> CarboTrap is a registered trademark of Sigma-Aldrich Co., LLC, St. Louis, Missouri.

COPC #	COPC Name	Reporting Limit (ppb)	OEL (ppb)	Ave. (ppb)	St. Dev. (ppb)	Rel. St. Dev. (%)	Max (ppb)	Median (ppb)	Sec. over 50% OEL	Sec. over OEL
1	ammonia	1	25000	6.77	1.741	25.7%	12.60	6.35	0	0
2	furan	0.09	1	0.045	0.015	58.1%	0.124	0.024	0	0
	but-3-en-2-one + 2,3- dihydrofuran + 2,5-									
3	dihydrofuran	0.22	1	0.110	0.015	47.1%	N/A*	N/A*	N/A	N/A
4	NDMA**	0.06	0.3	0.033	0.023	122.3%	0.154	0.010	2	0
5	2-methylfuran	0.05	1	0.026	0.014	62.1%	0.108	0.020	0	0
6	NEMA	0.02	0.3	0.012	0.010	237.3%	0.099	0.000	0	0
7	2,5- dimethylfuran	0.05	1	0.025	0.010	70.9%	0.077	0.013	0	0
8	NDEA	0.01	0.1	0.006	0.006	263.5%	0.060	0.000	10	0
9	2-propylfuran + 2-ethyl-5- methylfuran	0.02	1	0.012	0.009	105.1%	0.065	0.006	0	0
10	NMOR	0.05	0.6	0.025	0.006	93.8%	0.048	0.006	0	0
	2-ethyl-2- hexenal + 4-(1- methylpropyl)- 2,3- dihydrofuran + 3-(1,1- dimethylethyl)- 2,3-	0.04		0.022	0.015	70.10/	0.112	0.015		0
11	dihydrofuran	0.04	l	0.023	0.015	78.1%	0.112	0.015	0	0
12	2-pentylfuran	0.04	1	0.022	0.011	51.2%	0.097	0.019	0	0
13	2-heptylfuran	0.02	1	0.011	0.006	62.5%	0.048	0.009	0	0
14	2-octylfuran	0.01	1	0.005	0.002	207.4%	0.025	0.000	0	0
15	6-(2-furanyl)-6- methyl-2- heptanone	0.01	1	0.005	0.003	143.1%	0.024	0.000	0	0
16	furfural acetophenone	0.07	1	0.035	0.006	61.7%	0.047	0.009	0	0

# Table 1-2. Statistical Information for the Monitoring Period of<br/>April 7, 2018 – April 8, 2018.

\* The maximum peak value for but-3-en-2-one + 2,3 dihydrofuran + 2,5 dihydrofuran was 0.113 ppb and the median value was 0.029 ppb. The PTR-MS results for but-3-en-2-one + 2,3 dihydrofuran + 2,5 dihydrofuran are not compared to OEL concentrations because: 1) the result is suspect due to a known biogenic interferant (methacrolein) that is expected to be in concentrations that occasionally exceed the dihydrofuran OEL, and 2) this combination of COPCs have OEL concentrations that differ by a factor of 200, which provide widely variant bases for these numbers.

\*\*Nitrosamine results are also suspect due to interferants identified during the background study.

The following figures display each chemical of potential concern (COPC) signal, overlaid with the same signal smoothed using a 1-minute moving average, and CO<sub>2</sub>, for the monitoring period April 7, 2018, to April 8, 2018.







Figure 1-3. but-3-en-2-one + 2,3-dihydrofuran + 2,5-dihydrofuran.



Figure 1-4. 2-methylfuran.



Figure 1-5. 2,5-dimethylfuran.







Figure 1-7. 4-(1-methylpropyl)-2,3-dihydrofuran + 3-(1-1-dimethylethyl)-2,3-dihydrofuran + 2-ethyl-2-hexenal.



Figure 1-8. 2-pentylfuran.



Figure 1-9. 2-heptylfuran.







Figure 1-11. 2-(3-oxo-3-phenylprop-1-enyl)furan.







Figure 1-13. N-nitrosodimethylamine (NDMA).







Figure 1-15. N-nitrosodiethylamine (NDEA).



Figure 1-16. N-nitrosomorpholine (NMOR).



Figure 1-17. Ammonia.







Figure 1-19. Gasoline Combustion Markers.



Figure 1-20. Plant and Human Markers.



Figure 1-21. Weather Data.

#### 2.0 **REFERENCES**

Procedure 17124-DOE-HS-102, 2018, "Mobile Laboratory Data Processing – Analysis," Revision 0, TerraGraphics Environmental Engineering, Inc., Pasco, Washington.