LABORATORY DATA AND DATA PACKAGE REVIEW FORM

(Technical and Administrative Review)

Project number: RP1616	Analyst: [redacted] B. [redacted]	Reviewer: [redacted]
Project name: Freedom Industries Etowah River Terminal		
Technique: GC/MS	PAC: [redacted]	Date submitted for review: 12/18/14

Administrative and Technical Review

Data package includes:		Verification:	
✓	Objective of work	✓	Proofread for content
✓	List of samples analyzed	✓	Check spelling and punctuation in text
✓	Method reference(s)	✓	Check for data transcription errors
✓	Description of sample prep/subsampling	✓	Check spelling of compounds/analytes
✓	Instrument identification	✓	Project number, analyst's initials and date on each NEIC generated record
✓	Software (include version number)	✓	Instrument Logbook entry by analyst
✓	QC requirements/data quality summary	✓	Reference to and description of tables
✓	Date of analysis		
✓	Summary of results		

Administrative and technical findings summary and actions requested, if any. Minor corrections, for example things noted by sticky note, need not be listed:*

-Comment on Surrogate % when certain spiking was used
-Minor fixes

Reviewer's signature: [redacted] **Date:** 12/3/14

Response to Action(s) Requested*

Made corrections as discussed

Analyst's signature: [redacted] **Date:** 1/7/15

Final Statement of Reviewer

I have reviewed this data package and it meets the documentation requirements of the NEIC Quality System. The data support the results being reported.

Reviewer's signature: [redacted] **Date:** 1/8/15

I have presented a summary of QC data from these analyses to a Branch QA representative.
Data were provided by: email _____ hardcopy _____ LIMS ✓

Analyst's signature: [redacted] **Date:** 2/27/15

*Attach additional sheets as necessary.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement and Compliance Assurance
Office of Criminal Enforcement, Forensics, and Training

Laboratory Activities Report

Project Number: NEIC RP1616

Project Name : Freedom Industries Etowah River Terminal

Prepared For :

NEIC
PO Box 25227 Denver Federal Center
Denver COLORADO, 80225

Project Manager : [redacted]

Laboratory Project Leader : [redacted] *Chemist_PM*

	10/10/14	10/28/14
Work Order ID		
N410005	10	5

[redacted] 2-27-15

NATIONAL ENFORCEMENT INVESTIGATIONS CENTER
PO Box 25227
Building 25, Denver Federal Center
Denver, Colorado 80225

Printed: Feb 27 2015 09:33AM by [redacted]

NEIC Laboratory Report

ANALYTICAL REPORT FOR SAMPLES

Station ID	Sample Comments	Tag ID	Matrix	Date Sampled	Laboratory ID
Date Received 10/10/14 13:10					
1A	Water Sample from Concrete Tower	NE36686	Liquid	10/08/14 10:55	N410005-01
1B	Water Sample from Concrete Tower	NE36687	Liquid	10/08/14 10:55	N410005-02
2A	Soil Sample from Concrete Structure on River Bank	NE36688	Solid	10/08/14 11:51	N410005-03
2B	Soil Sample from Concrete Structure on River Bank	NE36689	Solid	10/08/14 11:51	N410005-04
2C	Soil Sample from Concrete Structure on River Bank	NE36690	Solid	10/08/14 11:55	N410005-05
3	Upper Level Brick Firehouse	NE36691	Solid	10/08/14 13:20	N410005-06
4	Upper Level Concrete Tower	NE36692	Solid	10/08/14 13:43	N410005-07
5	Mid Level Brick Firehouse	NE36693	Solid	10/08/14 14:20	N410005-08
6	Lower Level Brick Firehouse	NE36694	Solid	10/08/14 14:35	N410005-09
7	Background Soil Sample	NE36695	Solid	10/08/14 16:17	N410005-10
Date Received 10/28/14 10:28					
RB01		#3-3035247	Solid	10/24/14 11:20	N410005-11
RB02		#3-3035244	Solid	10/24/14 11:30	N410005-12
RB03		#3-3035237	Solid	10/24/14 11:45	N410005-13
RB04		#3-3054998	Solid	10/24/14 11:53	N410005-14
Pipe	Rough Dimensions: Length-26.5 inches, Inner Diameter- roughly 3 inches	#3-3035851	Solid	10/24/14 11:53	N410005-15

NEIC Laboratory Report

Analyte	Result	Units	ReportLimit	Batch	Analyzed	Method	Notes
Sample Name: 1A						Sample Date:10/8/2014 10:55:00AM	
Tag ID: NE36686 Lab ID: N410005-01 (Liquid)							
1,4-cyclohexanedimethanol (1,4-CHDM)	< 0.056	mg/L	0.056	5020401	02/04/15		
4-methyl-cyclohexanecarboxylic acid (MCHC)	**NON DET**	mg/L		5020401	02/04/15		
4-methylcyclohexanemethanol (MCHM)	< 0.056	mg/L	0.056	5020401	02/04/15		
Dimethyl 1,4-cyclohexanedicarboxylate (DM-1,4,-DC)	< 0.056	mg/L	0.056	5020401	02/04/15		
Dipropylene glycol phenyl ether (diPPh)	< 0.055	mg/L	0.055	5020401	02/04/15		
Propylene glycol phenyl ether (PPh)	< 0.055	mg/L	0.055	5020401	02/04/15		
Sample Name: 1B						Sample Date:10/8/2014 10:55:00AM	
Tag ID: NE36687 Lab ID: N410005-02 (Liquid)							
1,4-cyclohexanedimethanol (1,4-CHDM)	< 0.056	mg/L	0.056	5020401	02/04/15		
4-methyl-cyclohexanecarboxylic acid (MCHC)	**NON DET**	mg/L		5020401	02/04/15		
4-methylcyclohexanemethanol (MCHM)	< 0.056	mg/L	0.056	5020401	02/04/15		
Dimethyl 1,4-cyclohexanedicarboxylate (DM-1,4,-DC)	< 0.056	mg/L	0.056	5020401	02/04/15		
Dipropylene glycol phenyl ether (diPPh)	< 0.055	mg/L	0.055	5020401	02/04/15		
Propylene glycol phenyl ether (PPh)	< 0.055	mg/L	0.055	5020401	02/04/15		
Sample Name: 2A						Sample Date:10/8/2014 11:51:00AM	
Tag ID: NE36688 Lab ID: N410005-03 (Solid)							
1,4-cyclohexanedimethanol (1,4-CHDM)	< 0.200	mg/kg	0.200	5020402	02/04/15		
4-methyl-cyclohexanecarboxylic acid (MCHC)	**DET**	mg/kg		5020402	02/04/15		
4-methylcyclohexanemethanol (MCHM)	**0.618**	mg/kg	0.200	5020402	02/04/15		
Dimethyl 1,4-cyclohexanedicarboxylate (DM-1,4,-DC)	< 0.200	mg/kg	0.200	5020402	02/04/15		
Dipropylene glycol phenyl ether (diPPh)	**0.774**	mg/kg	0.200	5020402	02/04/15		
Propylene glycol phenyl ether (PPh)	**0.266**	mg/kg	0.190	5020402	02/04/15		
Sample Name: 2B						Sample Date:10/8/2014 11:51:00AM	
Tag ID: NE36689 Lab ID: N410005-04 (Solid)							
1,4-cyclohexanedimethanol (1,4-CHDM)	< 0.180	mg/kg	0.180	5020402	02/04/15		
4-methyl-cyclohexanecarboxylic acid (MCHC)	**DET**	mg/kg		5020402	02/04/15		
4-methylcyclohexanemethanol (MCHM)	**0.826**	mg/kg	0.180	5020402	02/04/15		

NEIC Laboratory Report

Analyte	Result	Units	ReportLimit	Batch	Analyzed	Method	Notes
Sample Name: 2B						Sample Date:10/8/2014 11:51:00AM	
Tag ID: NE36689 Lab ID: N410005-04 (Solid)							
Dimethyl 1,4-cyclohexanedicarboxylate (DM-1,4,-DC)	< 0.180	mg/kg	0.180	5020402	02/04/15		
Dipropylene glycol phenyl ether (diPPh)	**1.53**	mg/kg	0.180	5020402	02/04/15		
Propylene glycol phenyl ether (PPh)	**0.554**	mg/kg	0.180	5020402	02/04/15		
Sample Name: 2C						Sample Date:10/8/2014 11:55:00AM	
Tag ID: NE36690 Lab ID: N410005-05 (Solid)							
1,4-cyclohexanedimethanol (1,4-CHDM)	< 0.190	mg/kg	0.190	5020402	02/04/15		
4-methyl-cyclohexanecarboxylic acid (MCHC)	**DET**	mg/kg		5020402	02/04/15		
4-methylcyclohexanemethanol (MCHM)	**0.584**	mg/kg	0.190	5020402	02/04/15		
Dimethyl 1,4-cyclohexanedicarboxylate (DM-1,4,-DC)	< 0.190	mg/kg	0.190	5020402	02/04/15		
Dipropylene glycol phenyl ether (diPPh)	**1.01**	mg/kg	0.190	5020402	02/04/15		
Propylene glycol phenyl ether (PPh)	**0.365**	mg/kg	0.180	5020402	02/04/15		
Sample Name: 3						Sample Date:10/8/2014 1:20:00PM	
Tag ID: NE36691 Lab ID: N410005-06 (Solid)							
1,4-cyclohexanedimethanol (1,4-CHDM)	< 19.0	mg/kg	19.0	5020402	02/04/15		
4-methyl-cyclohexanecarboxylic acid (MCHC)	**DET**	mg/kg		5020402	02/04/15		
4-methylcyclohexanemethanol (MCHM)	**286**	mg/kg	19.0	5020402	02/04/15		
Dimethyl 1,4-cyclohexanedicarboxylate (DM-1,4,-DC)	< 19.0	mg/kg	19.0	5020402	02/04/15		
Dipropylene glycol phenyl ether (diPPh)	**698**	mg/kg	18.0	5020402	02/04/15		
Propylene glycol phenyl ether (PPh)	**37.9**	mg/kg	18.0	5020402	02/04/15		
Sample Name: 4						Sample Date:10/8/2014 1:43:00PM	
Tag ID: NE36692 Lab ID: N410005-07 (Solid)							
1,4-cyclohexanedimethanol (1,4-CHDM)	< 0.190	mg/kg	0.190	5020402	02/04/15		A-01
4-methyl-cyclohexanecarboxylic acid (MCHC)	**DET**	mg/kg		5020402	02/04/15		A-01
4-methylcyclohexanemethanol (MCHM)	**0.685**	mg/kg	0.190	5020402	02/04/15		A-01
Dimethyl 1,4-cyclohexanedicarboxylate (DM-1,4,-DC)	< 0.190	mg/kg	0.190	5020402	02/04/15		A-01
Dipropylene glycol phenyl ether (diPPh)	**0.760**	mg/kg	0.190	5020402	02/04/15		A-01

NEIC Laboratory Report

Analyte	Result	Units	ReportLimit	Batch	Analyzed	Method	Notes
Sample Name: 4						Sample Date:10/8/2014 1:43:00PM	
Tag ID: NE36692 Lab ID: N410005-07 (Solid)							
Propylene glycol phenyl ether (PPh)	**0.240**	mg/kg	0.190	5020402	02/04/15		A-01
Sample Name: 5						Sample Date:10/8/2014 2:20:00PM	
Tag ID: NE36693 Lab ID: N410005-08 (Solid)							
1,4-cyclohexanedimethanol (1,4-CHDM)	< 0.230	mg/kg	0.230	5020402	02/04/15		
4-methyl-cyclohexanecarboxylic acid (MCHC)	**DET**	mg/kg		5020402	02/04/15		
4-methylcyclohexanemethanol (MCHM)	**0.895**	mg/kg	0.230	5020402	02/04/15		
Dimethyl 1,4-cyclohexanedicarboxylate (DM-1,4,-DC)	< 0.230	mg/kg	0.230	5020402	02/04/15		
Dipropylene glycol phenyl ether (diPPh)	**91.4**	mg/kg	2.30	5020402	02/04/15		
Propylene glycol phenyl ether (PPh)	**6.03**	mg/kg	2.30	5020402	02/04/15		
Sample Name: 6						Sample Date:10/8/2014 2:35:00PM	
Tag ID: NE36694 Lab ID: N410005-09 (Solid)							
1,4-cyclohexanedimethanol (1,4-CHDM)	< 0.190	mg/kg	0.190	5020402	02/04/15		
4-methyl-cyclohexanecarboxylic acid (MCHC)	**DET**	mg/kg		5020402	02/04/15		
4-methylcyclohexanemethanol (MCHM)	**4.20**	mg/kg	0.190	5020402	02/04/15		
Dimethyl 1,4-cyclohexanedicarboxylate (DM-1,4,-DC)	< 0.190	mg/kg	0.190	5020402	02/04/15		
Dipropylene glycol phenyl ether (diPPh)	**2.86**	mg/kg	0.190	5020402	02/04/15		
Propylene glycol phenyl ether (PPh)	**1.34**	mg/kg	0.190	5020402	02/04/15		
Sample Name: 7						Sample Date:10/8/2014 4:17:00PM	
Tag ID: NE36695 Lab ID: N410005-10 (Solid)							
1,4-cyclohexanedimethanol (1,4-CHDM)	< 0.230	mg/kg	0.230	5020402	02/04/15		
4-methyl-cyclohexanecarboxylic acid (MCHC)	**NON DET**	mg/kg		5020402	02/04/15		
4-methylcyclohexanemethanol (MCHM)	< 0.230	mg/kg	0.230	5020402	02/04/15		
Dimethyl 1,4-cyclohexanedicarboxylate (DM-1,4,-DC)	< 0.230	mg/kg	0.230	5020402	02/04/15		
Dipropylene glycol phenyl ether (diPPh)	< 0.220	mg/kg	0.220	5020402	02/04/15		
Propylene glycol phenyl ether (PPh)	< 0.220	mg/kg	0.220	5020402	02/04/15		
Sample Name: RB01						Sample Date:10/24/2014 11:20:00AM	
Tag ID: #3-3035247 Lab ID: N410005-11 (Solid)							

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Analyte	Result	Units	ReportLimit	Batch	Analyzed	Method	Notes
Sample Name: RB01						Sample Date:10/24/2014 11:20:00AM	
Tag ID: #3-3035247 Lab ID: N410005-11 (Solid)							
1,4-cyclohexanedimethanol (1,4-CHDM)	< 0.320	mg/kg	0.320	5020402	02/04/15		
4-methyl-cyclohexanecarboxylic acid (MCHC)	**NON DET**	mg/kg		5020402	02/04/15		
4-methylcyclohexanemethanol (MCHM)	< 0.320	mg/kg	0.320	5020402	02/04/15		
Dimethyl 1,4-cyclohexanedicarboxylate (DM-1,4,-DC)	< 0.320	mg/kg	0.320	5020402	02/04/15		
Dipropylene glycol phenyl ether (diPPh)	< 0.320	mg/kg	0.320	5020402	02/04/15		
Propylene glycol phenyl ether (PPh)	< 0.320	mg/kg	0.320	5020402	02/04/15		
Sample Name: RB02						Sample Date:10/24/2014 11:30:00AM	
Tag ID: #3-3035244 Lab ID: N410005-12 (Solid)							
1,4-cyclohexanedimethanol (1,4-CHDM)	< 0.300	mg/kg	0.300	5020402	02/04/15		
4-methyl-cyclohexanecarboxylic acid (MCHC)	**NON DET**	mg/kg		5020402	02/04/15		
4-methylcyclohexanemethanol (MCHM)	< 0.300	mg/kg	0.300	5020402	02/04/15		
Dimethyl 1,4-cyclohexanedicarboxylate (DM-1,4,-DC)	< 0.300	mg/kg	0.300	5020402	02/04/15		
Dipropylene glycol phenyl ether (diPPh)	< 0.290	mg/kg	0.290	5020402	02/04/15		
Propylene glycol phenyl ether (PPh)	< 0.290	mg/kg	0.290	5020402	02/04/15		
Sample Name: RB03						Sample Date:10/24/2014 11:45:00AM	
Tag ID: #3-3035237 Lab ID: N410005-13 (Solid)							
1,4-cyclohexanedimethanol (1,4-CHDM)	< 0.300	mg/kg	0.300	5020402	02/04/15		
4-methyl-cyclohexanecarboxylic acid (MCHC)	**NON DET**	mg/kg		5020402	02/04/15		
4-methylcyclohexanemethanol (MCHM)	< 0.300	mg/kg	0.300	5020402	02/04/15		
Dimethyl 1,4-cyclohexanedicarboxylate (DM-1,4,-DC)	< 0.300	mg/kg	0.300	5020402	02/04/15		
Dipropylene glycol phenyl ether (diPPh)	< 0.290	mg/kg	0.290	5020402	02/04/15		
Propylene glycol phenyl ether (PPh)	< 0.290	mg/kg	0.290	5020402	02/04/15		
Sample Name: RB04						Sample Date:10/24/2014 11:53:00AM	
Tag ID: #3-3054998 Lab ID: N410005-14 (Solid)							
1,4-cyclohexanedimethanol (1,4-CHDM)	< 0.270	mg/kg	0.270	5020402	02/04/15		
4-methyl-cyclohexanecarboxylic acid (MCHC)	**NON DET**	mg/kg		5020402	02/04/15		
4-methylcyclohexanemethanol (MCHM)	< 0.270	mg/kg	0.270	5020402	02/04/15		

NEIC Laboratory Report

Analyte	Result	Units	ReportLimit	Batch	Analyzed	Method	Notes
Sample Name: RB04						Sample Date:10/24/2014 11:53:00AM	
Tag ID: #3-3054998 Lab ID: N410005-14 (Solid)							
Dimethyl 1,4-cyclohexanedicarboxylate (DM-1,4,-DC)	< 0.270	mg/kg	0.270	5020402	02/04/15		
Dipropylene glycol phenyl ether (diPPh)	< 0.270	mg/kg	0.270	5020402	02/04/15		
Propylene glycol phenyl ether (PPh)	< 0.260	mg/kg	0.260	5020402	02/04/15		
Sample Name: Pipe						Sample Date:10/24/2014 11:53:00AM	
Tag ID: #3-3035851 Lab ID: N410005-15 (Solid)							
1,4-cyclohexanedimethanol (1,4-CHDM)	< 0.310	mg/kg	0.310	5020402	02/04/15		
1,4-cyclohexanedimethanol (1,4-CHDM)	< 1.10	mg/kg	1.10	5020402	02/04/15		RE1
1,4-cyclohexanedimethanol (1,4-CHDM)	< 0.500	mg/kg	0.500	5020402	02/04/15		RE2
1,4-cyclohexanedimethanol (1,4-CHDM)	< 0.500	mg/kg	0.500	5020402	02/04/15		RE3
1,4-cyclohexanedimethanol (1,4-CHDM)	< 0.500	mg/kg	0.500	5020402	02/04/15		RE4
4-methyl-cyclohexanecarboxylic acid (MCHC)	**NON DET**	mg/kg		5020402	02/04/15		
4-methyl-cyclohexanecarboxylic acid (MCHC)	**NON DET**	mg/kg		5020402	02/04/15		RE1
4-methyl-cyclohexanecarboxylic acid (MCHC)	**NON DET**	mg/kg		5020402	02/04/15		RE2
4-methyl-cyclohexanecarboxylic acid (MCHC)	**NON DET**	mg/kg		5020402	02/04/15		RE3
4-methyl-cyclohexanecarboxylic acid (MCHC)	**NON DET**	mg/kg		5020402	02/04/15		RE4
4-methylcyclohexanemethanol (MCHM)	< 0.320	mg/kg	0.320	5020402	02/04/15		
4-methylcyclohexanemethanol (MCHM)	< 1.10	mg/kg	1.10	5020402	02/04/15		RE1
4-methylcyclohexanemethanol (MCHM)	< 0.510	mg/kg	0.510	5020402	02/04/15		RE2
4-methylcyclohexanemethanol (MCHM)	< 0.510	mg/kg	0.510	5020402	02/04/15		RE3
4-methylcyclohexanemethanol (MCHM)	< 0.510	mg/kg	0.510	5020402	02/04/15		RE4
Dimethyl 1,4-cyclohexanedicarboxylate (DM-1,4,-DC)	< 0.310	mg/kg	0.310	5020402	02/04/15		
Dimethyl 1,4-cyclohexanedicarboxylate (DM-1,4,-DC)	< 1.10	mg/kg	1.10	5020402	02/04/15		RE1
Dimethyl 1,4-cyclohexanedicarboxylate (DM-1,4,-DC)	< 0.500	mg/kg	0.500	5020402	02/04/15		RE2
Dimethyl 1,4-cyclohexanedicarboxylate (DM-1,4,-DC)	< 0.500	mg/kg	0.500	5020402	02/04/15		RE3
Dimethyl 1,4-cyclohexanedicarboxylate (DM-1,4,-DC)	< 0.500	mg/kg	0.500	5020402	02/04/15		RE4

NEIC Laboratory Report

Analyte	Result	Units	ReportLimit	Batch	Analyzed	Method	Notes
Sample Name: Pipe							Sample Date:10/24/2014 11:53:00AM
Tag ID: #3-3035851 Lab ID: N410005-15 (Solid)							
Dipropylene glycol phenyl ether (diPPh)	**0.915**	mg/kg	0.310	5020402	02/04/15		
Dipropylene glycol phenyl ether (diPPh)	< 1.10	mg/kg	1.10	5020402	02/04/15		RE1
Dipropylene glycol phenyl ether (diPPh)	< 0.500	mg/kg	0.500	5020402	02/04/15		RE2
Dipropylene glycol phenyl ether (diPPh)	< 0.500	mg/kg	0.500	5020402	02/04/15		RE3
Dipropylene glycol phenyl ether (diPPh)	< 0.500	mg/kg	0.500	5020402	02/04/15		RE4
Propylene glycol phenyl ether (PPh)	< 0.310	mg/kg	0.310	5020402	02/04/15		
Propylene glycol phenyl ether (PPh)	< 1.10	mg/kg	1.10	5020402	02/04/15		RE1
Propylene glycol phenyl ether (PPh)	< 0.500	mg/kg	0.500	5020402	02/04/15		RE2
Propylene glycol phenyl ether (PPh)	< 0.500	mg/kg	0.500	5020402	02/04/15		RE3
Propylene glycol phenyl ether (PPh)	< 0.500	mg/kg	0.500	5020402	02/04/15		RE4

NOTE:
If * appears on the far right hand side of the results, the value reported is an average of replicate analyses.
The replicate results are reported in the QC section.

NOTE:
When "RE" appears on the far right hand side of the results, it designates the results are from a repeat analysis or a re-extraction.

NEIC Laboratory Report

Analyte	Result	Report Limit	Units	Spike Level	Source Result	%REC	% Rec Limits	RPD	RPD Limit	Notes

Qualifier	Definitions
A-01	*Averaged results from triplicate prep*

Analyst Narrative

Samples were submitted to the NEIC Laboratory for analysis in support of the Freedom Industries Etowah River Terminal project. Table 1 contains a summary of the analysis information for this work.

Table 1: Analysis Summary

1	**Project Code**	RP1616
2	**Project Name**	Freedom Industries Etowah River Terminal
3	**Project Location**	Charleston, West Virginia
4	**Analyst**	[redacted]
5	**Date of Summary**	December 16, 2014
6	**Time Frame of Analysis**	October-November, 2014
7	**Objective of Analysis**	Identify and quantify the submitted samples for the following analytes: • 4-Methylcyclohexanemethanol (*MCHM*)* • Propylene glycol phenyl ether (*PPH*) • 1,4-cyclohexanedimethanol (*1,4-CHDM*)* • Dimethylcyclohexane-1,4-dicarboxylate (*DMCH-1,4-DC*) • Dipropylene glycol phenyl ether (*di-PPH*)* **- Analyte response was the sum of its isomer responses.*
8	**Number of Samples/Aliquots for analysis**	Two water samples, twelve soil samples (including one background sample) and a section of 3" piping were analyze for the target analytes above.
9	**Physical Phase(s) [how many of each phase]**	Each water sample was comprised of a single liquid phase that was clear, transparent and non-viscous. Each soil sample contained organic matter along with granular and clay material. The pipe section was approximately 26" in length. Material present on the outside of the pipe, as well as in the interior were collected and analyzed. Three interior surface areas of the pipe were sampled using gauge pads (2" x 1") wetted with isopropyl alcohol.
10	**Analysis Method /Procedure**	The current versions of these methodologies were used during these analyses: • *Organic Compound Analysis*, NEICPROC/00-049 • *EPA Method 8270 (used as guidance)*
11	**Sample Preparation Method/Procedure**	See "Sample Extraction" section of this report
12	**Analysis Matrix/Solvent**	Methylene chloride (CH_2Cl_2) was used to extract the water, soil and gauge pads. Standard solutions were also prepared in CH_2Cl_2 for these analyses.
13	**Instrument Identification**	Agilent 7890A Gas Chromatograph – NEIC #5325 Agilent 5975C Mass Selective Detector- NEIC #5326 Column: HP-5MS UI, 20 m x 0.18 mm, 0.18 u (SN: USB540913H)
14	**Software Identification**	Chemstation F.01.01.2317, Excel 2007
15	**Instrument Method**	RP1616_[redacted]M
16	**Additional Analysis Information**	Notebook pages: *Standard Preps*: 61493, 64405-64406, 64433-64438 *Qualitative Screening:* 64426-64432 *Sample Analysis*: 64439-64443
17	**Data Processing Method**	Excel spreadsheets, results entered into LIMS

18	**Under Scope of Accreditation (yes/No)?**	Yes
19	**Blank(s) evaluation (Yes/No)?**	*Yes-* No responses from solvent, extraction and swab blank injections were observed at the retention times of the target, surrogate or internal standard analytes.
	Quality Control Acceptance Criteria:	
20	**Initial Tune**	Prior to calibration, the mass detector was auto-tuned in order to meet the recommended DFTPP fragmentation criteria listed in the current version of EPA method 8270. A 50 ppm DFTPP solution in CH_2Cl_2 was analyzed and the fragmentation results satisfied the 8270 criteria. DFTPP solutions were analyzed prior to each analysis set and these fragmentation results also satisfied 8270 fragmentation criteria.
21	**Internal Standard Responses**	For all solutions in which the internal standards were added, the rsd values for the three standards used with the target/surrogate analytes were less than 9.5% indicating that the GC/MS system was working properly.
22	**Surrogate Recovery** **(*Surrogate: 2-Fluorobiphenyl*)**	Because of the varying surrogate amounts in the injection solutions, a seven point calibration curve was generated with concentration values ranging from 0.0991 to 24.8 ug/mL. Individual surrogate recovery calculations are contained in the "Standards", "Soil Sample Analysis", "Matrix Spike", Water and Pipe Analysis", and "CCV Results" spreadsheets. Sample/Solution — Surrogate Recovery Second Weighing — $mean_{(n=3)}$= **99.4%**, rsd= **0.51%** CCV Std Solution — $mean_{(n=6)}$= **105%**, rsd= **2.9%** Water and Pipe Samples — $mean_{(n=7)}$= **88.2%**, rsd= **20%** Soil Samples — $mean_{(n=16)}$= **73.6%**, rsd= **19%**
23	**Initial Calibration Verification (ICV)**	Triplicate analysis of a second weighing standard solution produced acceptable analyte concentration values that validated the calibration curves used to quantify the target analytes. The mean % target values from the second weighing verification results ranged from 88.3% to 99.4%.
24	**Continuing Calibration Verification (CCV)**	CCV standard solutions were prepared for each analysis set and were analyzed prior to, along with and after the sample extracts. Each CCV solution was dispensed into multiple vials, thus eliminating solution concentration effects due to evaporation from multiple injections from one vial. The overall % recovery values for the six target and surrogate analytes ranged from 98.2% to 108% for the two run sets, indicating that the GC/MS system was working as expected. The highest rsd value from the six CCV injections was 22% for the di-PPH analyte.
25	**Replicate % Relative Standard Deviation**	•*NE36692 (Lab Triplicate):* MCHM: 9.0%, PPH: 3.7%, di-PPH: 3.9% •*NE36688, NE36689, NE36690 (Field Triplicate):* MCHM: 19%, PPH: 37%, di-PPH: 35%

26	**Spike % Recovery**	NE36692 (Soil): MCHM-36.4%, PPH-95.9%, di-PPH-91.7%
27	**Control Samples % Recovery (or Deviation)**	n/a
28	**QC results outside of acceptance Criteria:**	None
29	**Approach for estimated Measurement Uncertainty**	Results from the CCV, ICV, surrogate, and replicate analyses were used in estimating uncertainty for the reported results.
30	**Estimate of Measurement Uncertainty**	Looking at the relative standard deviation (rsd) from the CCV, ICV, surrogate and replicate analyses, the 37% value for the PPH results from the field triplicate analyses would be a conservative estimate of uncertainty for the analyte concentrations presented in Table 2.
31	**Comment(s)**	A qualitative screening of the samples was done during the last week of October, 2014. The goal was to determine if the target analytes were present in the samples. [redacted] eviewed these results and when completed, a results table was sent to Special Agent [redacted], see November 12, 2014 Memorandum. Quantitative results were reviewed by [redacted] nd upon completion, were sent to [redacted] see December 10, 2014 Memorandum. However, an incorrect result (N.D.) was reported for the di-PPH content for the pipe exterior content sample. This value was corrected an amended results table (see Table 2) was sent to [redacted] on 12/15/14. Two data analysis methods were used in conjunction with the instrument method to process the sample data: *RP1616_*[redacted]*b.M*, Target Analyte Quantitation *RP1616_*[redacted]*c.M*, Non-Target Analyte Identification

The analyte concentrations observed in the analyzed samples are shown in Table 2. The reporting limits were determined on the preparation used for each sample and the analyte concentration in the most dilute calibration standard solution. A 10X dilution of the NE36693 extract was analyzed in determining the PPH and di-PPH concentrations in this sample. This extract was analyzed a second time, without any dilution, in the determination of the MCHM, 1,4-CHDM and DM-1,4-DC concentrations

Table 2: Analytical Results from Water, Soil and Pipe Samples

Matrix	Station	Tag #	Observed Analyte Concentration (ppm)[1]					MCHC[3] Response
			MCHM	PPH	1,4-CHDM	DMCH-1,4-DC	di-PPH	
Water	1A	**NE36686**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	N.D.
	1B	**NE36687**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	N.D.
		Reporting Limit	*0.056*	*0.055*	*0.056*	*0.056*	*0.055*	
Soil	2A	**NE36688**	**0.618**	**0.266**	**N.D.**	**N.D.**	**0.774**	MGT
		Reporting Limit	*0.20*	*0.19*	*0.20*	*0.20*	*0.20*	
	2B	**NE36689**	**0.826**	**0.554**	**N.D.**	**N.D.**	**1.53**	MGT
		Reporting Limit	*0.18*	*0.18*	*0.18*	*0.18*	*0.18*	
	2C	**NE36690**	**0.584**	**0.365**	**N.D.**	**N.D.**	**1.01**	MGT
		Reporting Limit	*0.19*	*0.18*	*0.19*	*0.19*	*0.19*	
	3	**NE36691**	**286**	**37.9**	**N.D.**	**N.D.**	**698**	GT
		Reporting Limit	*19*	*18*	*19*	*19*	*18*	
	4	**NE36692[2]**	**0.685**	**0.240**	**N.D.**	**N.D.**	**0.760**	MGT
		Reporting Limit	*0.19*	*0.19*	*0.19*	*0.19*	*0.19*	
	5	**NE36693**	**0.895**	**6.03**	**N.D.**	**N.D.**	**91.4**	MGT
		Reporting Limit	*0.23*	*2.3*	*0.23*	*0.23*	*2.3*	
	6	**NE36694**	**4.20**	**1.34**	**N.D.**	**N.D.**	**2.86**	LT
		Reporting Limit	*0.19*	*0.19*	*0.19*	*0.19*	*0.19*	
	7	**NE36695**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	N.D.
		Reporting Limit	*0.23*	*0.22*	*0.23*	*0.23*	*0.22*	
	RB01	**3-3035247**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	N.D.
		Reporting Limit	*0.32*	*0.32*	*0.32*	*0.32*	*0.32*	
	RB02	**3-3035244**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	N.D.
		Reporting Limit	*0.30*	*0.29*	*0.30*	*0.30*	*0.29*	
	RB03	**3-3035237**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	N.D.
		Reporting Limit	*0.30*	*0.29*	*0.30*	*0.30*	*0.29*	
	RB04	**3-3054998**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	N.D.
		Reporting Limit	*0.27*	*0.26*	*0.27*	*0.27*	*0.27*	
Pipe	Swab #1	**3-3035851**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	N.D.
	Swab #2	**3-3035851**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	N.D.
	Swab #3	**3-3035851**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	N.D.
		Reporting Limit	*0.51*	*0.50*	*0.50*	*0.50*	*0.50*	
	Interior Contents	**3-3035851**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	N.D.
		Reporting Limit	*1.1*	*1.1*	*1.1*	*1.1*	*1.1*	
	Exterior Contents	**3-3035851**	**N.D.**	**N.D.**	**N.D.**	**N.D.**	**0.915**	N.D.
		Reporting Limit	*0.32*	*0.31*	*0.31*	*0.31*	*0.31*	

[1] - ppm = **mg/L** for water and swab matrices, **mg/kg** for soil and pipe material matrices
[2] - Result was averaged from triplicate sample preparations
[3] - "MGT"- Much greater than: The MCHC response > 2X the total response from the target analytes
"Greater" => MCHC response was larger than the total response from target analytes, but less that 2 times the total target analyte response.

Identification of Non-Target Analytes

While processing the data files for the target analytes, other significant, chromatographic responses due to non-target compounds were observed. One such response was 4-methylcyclohexanecarboxylic acid (MCHC), as indicated by a mass spectral comparison of this response to the NIST 2011 database. Neat material of this analyte was obtained and a 9.0 ug/mL solution was prepared and analyzed. During the preparation of this standard, the neat material had a

black licorice odor, similar to the odor associated with MCHM. The observed retention time of this analyte was 6.45 min, which was also the retention time observed for the naphthalene-d_8 internal standard compound. However, the two analyte responses were separated by their precursor m/z values, 142 and 136 for MCHC and naphthalene-d_8, respectively. The mass spectra from this solution matched the mass spectra observed in the samples shown in Table 2, despite the fact that the MCHC responses observed in the samples were significantly greater than the standard solution response, which resulted in retention time differences. To illustrate the significance of the MCHC response, its area response was compared to the total area response observed from the target analytes. For NE36694, the MCHC area was less than the total area observed for the target analytes. For the other samples where MCHC was observed, its area response was greater than (GT) or much great than (MGT) the total area response observed for the target analytes. These MCHC response comparisons are also included in Table 2.

Because of this observation, a second data analysis method (RP1616_[redacted]c) was developed that not only contained MCHC, but 57 other compounds including C10, C12, C14, C16, C18, C20, C22, C24, C26 and C28 straight chain hydrocarbon compounds, and 47 base/neutral (B/N) compounds listed on the Supelco Certificate of Analysis, Lot #LB77103. The identification of these compounds was based on evaluating retention times and mass spectra observed from the analysis of standard solutions containing these analytes. Other non-target analytes were also identified in the samples using the Library Search Compound Report (LSC) function in the Chemstation Data Editor application based on mass spectral comparisons to the NIST 2011 Mass Spectra data base. ***The presence of these potential compounds, however, was not verified by the analysis of a standard solution.***

Looking at the "Qual_Soil" worksheet, mono, bi-cyclic and polycyclic aromatic hydrocarbons (PAHs) were identified in RB01 (#3-3035247), RB02 (#3-3035244), RB03 (#3-3035237), RB04 (#3-3054998) and NE36695, and some straight chained hydrocarbon compounds were identified in RB01, RB02, RB03 and RB04. The library search results suggested the presence of other PAHs in RB01, RB02, RB03, RB04 and n-hexadecanoic acid in RB02 and RB04, *but these compounds were not confirmed with the analysis of a standard solution.*

In addition to MCHC, samples NE36688, NE36689, NE36690 and NE36694 contained a number of straight chained hydrocarbons and some PAHs, similar to samples RB01, RB02, RB03 and RB04. The triplicate analysis of NE36692 also contained MCHC, but a lesser number of straight chained and cyclic aromatic hydrocarbon compounds compared to NE36694. Sample NE33693 contained five straight chained hydrocarbon compounds along with the MCHC, and sample NE33691 contained three straight chained hydrocarbons in addition to the MCHC. The library search results suggested the presence of other PAHs and substituted benzene compounds in samples NE36688, NE36689, NE36690 and NE36694, and n-hexadecanoic acid in sample NE36693, *but these compounds were not confirmed with the analysis of a standard solution.*
Looking at the "Qual_Water&Pipe" worksheet, samples NE36686 and NE36687did not contain any straight chained hydrocarbon or polycyclic aromatic hydrocarbon compounds. For the pipe samples, straight chained and cylic aromatic hydrocarbon compounds, as well as phthalate analytes were confirmed in the interior and exterior content and swab samples.

The library search indicated the presence of n-hexadecanoic acid, and n-octadecanoic acid in the swab samples. The interior content samples may have contained n-hexadecanoic acid along with

other PAHs, and the exterior content sample appears to have contained some substituted hydrocarbon compounds, n-hexadecanoic acid, and n-octadecanoic acid and unsaturated octadecanoic acid, and octadecanoic methyl esters were observed in these samples, *but these compounds were not confirmed with the analysis of a standard solution.*

Qualitative Sample Screening

Qualitative screening analyses were performed on the soil and pipe samples to determine if the target analytes were present in these samples. Subsamples were extracted with CH_2Cl_2 (see "Sample Extractions- Qualitative Screening") and the resulting extracts were analyzed for the presence of the target analytes by comparing retention time and mass spectra of these responses to a standard solution containing these compounds analyzed under the same instrument conditions. A memo containing these qualitative screening results for the target analytes was sent to Special Agent [redacted] on November 12, 2014.

The mass spectra from other chromatographic responses that were comparable to or greater than the target analyte responses were compared to mass spectra from the NIST 2011 Mass Spectra library. Having a "Quality" value of 85 or greater, 4-methyl-cyclohexanecarboxylic acid (MCHC) was tentatively identified in samples NE36688, NE36689, NE36690, NE36691, NE36692, NE36693 and NE36694, and these results were also included in the memo sent to Agent [redacted] A group of chromatographic responses having elution times between 9.7 and 9.9 minutes was also observed in these samples, but the spectral comparisons with the NIST database (quality value < 85) did not yield any potential analytes.

Sample Extractions

Qualitative Screening

Each soil sample was placed in glass casserole dish having an aluminum foil/sorbent liner. The soil was spread out over the foil and aliquots were randomly removed with a metal spatula and placed in a 2 oz glass jar until about 20 g of material was collected. Any remaining sample material was returned to its original container. For the pipe, residual material present at each end was removed and placed in 2 oz glass jars. Each end was then wiped with a 2" x 4" gauze pad that was soaked in isopropanol and each swab was placed in a 2 oz glass jar. A blank IPA swab was also placed in a 2 oz glass jar.

A 20 mL of methylene chloride (CH_2Cl_2) was added to each jar containing an IPA swab, which were then sealed and then shaken by hand. To each soil subsample, 10 mL of CH_2Cl_2 was added to each jar, where were then sealed and shaken by hand. For NE36692, the shaking of the glass jar caused the sample material to clump up into a ball. All jars were then sonicated in a water bath for 30 minutes, and the extracts were removed and placed in a 12-mL glass vial containing $Na_2SO_{4(s)}$. After vortex mixing to remove residual water, the extracts were placed in 2-mL glass vials and injected into the GC/MS system. Another 10 mL of CH_2Cl_2 was added to each soil subsample, and the jars were hand shaken, sonicated for 30 minutes, allowed to sit overnight, and then sonicated for another 30 minutes the next morning. The extracts were remove and placed in a 12-ml glass vial and

processed like the first set of extracts. A third extraction of the subsample from NE36692 was done because the first two extractions had caused the sample to clump together into a ball. Thus, a metal spatula was used to break up this sample material, which was then extracted with 10 mL of CH_2Cl_2, like the first set of extracts.

Two sets of diluted extracts were analyzed and the set from 11/3/14 produced the best results in detecting the target analytes in these samples, (see worksheet **Screening #2**). From this data set, the sample extraction to be used for the quantitative analysis should include sonication, an overnight solvent soak, a second sonication the next morning, and **no shaking of the extraction jars,** thus avoiding the clumping up the sample material during this process.

Quantitative Analysis

Soil Samples:

A glass casserole dish was lined with aluminum foil. A sorbent pad was placed on top of the foil, followed by a second layer of aluminum foil that was placed on top of the pad. The sub-sampling of each soil was done by pouring the sample material into the casserole dished and spreading it over the top foil layer. Using a metal spatula, random subsamples were taken and placed into a pre-weighed 2 ounce jar until 20 grams or more of material was obtained. The remaining soil was transferred back to the original 16 ounce sample jar, and the top foil layer was removed and placed in a plastic bag for disposal. A clean foil layer was placed on top of the sorbent pad and the next soil sample was sub-sampled as described.

A 20 uL aliquot of a 7081 ug/mL surrogate stock solution was added to each subsample. The extraction jars ***were not*** shook after the surrogate additions, as the soil materials containing high clay content would clump up during the sample mixing.

Ten milliliters of CH_2Cl_2 was added to each extraction jar. This volume appeared to contact most of the soil subsamples, except for the "RB" samples. For these subsamples, an additional 5 mL of CH_2Cl_2 was added in order to increase the contact area of the solvent to the soil material. Each extraction jar was capped, placed in a water bath and sonicated for 30 minutes and allowed to sit overnight. After approximately 14 hours, the jars were placed in a water bath and sonicated for 30 minutes. Disposable glass pipette were used to transfer the resulting extracts from the extraction jars to 12-mL glass vials containing $Na_2SO_{4(g)}$. The vials were votex mixed for about 30 seconds to remove any residual water that was present in the extracts. A 0.500 mL volume of dried extract was transferred to a 2-mL sample vial and a 5 uL aliquot of a 2000 ug/mL internal standard solution was added and the resulting solution was analyzed for the target analytes using the GC/MS system described.

Water Samples:

A 10.0 mL sample aliquot was placed in a 20-mL clear glass vial along with 2.0 uL of the 7081 ug/mL surrogate stock solution. After mixing, 1.00 mL of CH_2Cl_2 was added to the vial that was then capped, vortex mixed for about 30 seconds, then placed in a centrifuge and spun at 1500 rpm for 5 minutes. Using a disposable glass pipet, the CH_2Cl_2 extract was

transferred to a 12-mL glass vial containing $Na_2SO_{4(s)}$ and the vial contents were vortex mixed. A 450 uL aliquot of the dried extract was combined with 50 uL of CH_2Cl_2 and 5 uL of the 2000 ug/mL internal standard solution. The resulting solution was analyzed on the GC/MS system described for the target analytes.

Pipe Sample:

Interior Contents: A large metal spatula was used to scrape the interior surface of the pipe and the resulting material was poured onto a large watch glass. This material was transferred to a pre-weighed 2 ounce glass jar and a 20 uL aliquot of a 7081 ug/mL surrogate stock solution was added.

Exterior Contents: A large metal spatula was used to remove material, mainly soil, from the exterior surface of pipe that was placed in a pre-weighed 2 ounce glass jar. A 20 uL aliquot of a 7081 ug/mL surrogate stock solution was added.

IPA Swabs: Three 2" x 1" swabs were prepared from a 4" x 4" gauze pad and were wetted with isopropyl alcohol (IPA). After removing a majority of the interior material, the IPA swabs were used to sample the inner surface of the pipe. One swab sample was taken at the middle of the pipe, and a swab sample was collected on each side of the pipe center as well. Each swab was placed in a 2 ounce glass jar and a 20 uL aliquot of a 7081 ug/mL surrogate stock solution was added.

These pipe samples were extracted with 10 mL of CH_2Cl_2, using the procedure discussed in the *Soil Sample* section. The dried extracts were analyzed for the target analytes using the GC/MS system described.

Analyte Concentrations and Surrogate Recoveries

Station	Sample	LIMS #	Observed [Analyte]$_{Sample}$ (mg/kg) MCHM	PPH	1,4-CHDM	DM-1,4-DC	di-PPH	Surrogate	Surrogate Recovery	
RB01	3-3035247, 1X	N410005-11	N.D.	N.D.	N.D.	N.D.	N.D.	6.06	101%	
		Reporting Limit	*0.32*	*0.32*	*0.32*	*0.32*	*0.32*			
RB02	3-3035244, 1X	N410005-12	N.D.	N.D.	N.D.	N.D.	N.D.	5.17	93.2%	
		Reporting Limit	*0.30*	*0.29*	*0.30*	*0.30*	*0.29*			
RB03	3-3035237, 1X	N410005-13	N.D.	N.D.	N.D.	N.D.	N.D.	5.15	92.8%	
		Reporting Limit	*0.30*	*0.29*	*0.30*	*0.30*	*0.29*			
RB04	3-3054998, 1X	N410005-14	N.D.	N.D.	N.D.	N.D.	N.D.	4.43	87.9%	
		Reporting Limit	*0.27*	*0.26*	*0.27*	*0.27*	*0.27*			
7	NE36695, 1X	N410005-10	N.D.	N.D.	N.D.	N.D.	N.D.	4.93	77.4%	
		Reporting Limit	*0.23*	*0.22*	*0.23*	*0.23*	*0.22*			
2A	NE36688, 1X	N410005-03	0.618	0.266	N.D.	N.D.	0.774	3.68	66.5%	
		Reporting Limit	*0.20*	*0.19*	*0.20*	*0.20*	*0.19*			
3	NE36691, 10X	N410005-06	289	23.8	N.D.	N.D.	617	5.42	103%	*
		Reporting Limit	*1.9*	*1.8*	*1.9*	*1.9*	*1.8*			
4	NE36692-A, 1X	N410005-07	0.755	0.230	N.D.	N.D.	0.793	3.08	57.5%	
		Reporting Limit	*0.19*	*0.19*	*0.19*	*0.19*	*0.19*			
5	**NE36693, 10X**	**N410005-08**	<R.L.	**6.03**	N.D.	N.D.	**91.4**	**4.07**	**62.8%**	**
		Reporting Limit	*2.3*	*2.3*	*2.3*	*2.3*	*2.3*			
6	**NE36694, 1X**	**N410005-09**	**4.20**	**1.34**	**N.D.**	**N.D.**	**2.86**	**3.38**	**62.6%**	
		Reporting Limit	*0.19*	*0.19*	*0.19*	*0.19*	*0.19*			
2B	NE36689, 1X	N410005-04	0.826	0.554	N.D.	N.D.	1.53	3.60	70.3%	
		Reporting Limit	*0.18*	*0.18*	*0.18*	*0.18*	*0.18*			
4	NE36692-B, 1X	DUP 1	0.655	0.248	N.D.	N.D.	0.736	3.90	64.3%	
		Reporting Limit	*0.22*	*0.21*	*0.22*	*0.22*	*0.21*			
2C	NE36690, 1X	N410005-05	0.584	0.365	N.D.	N.D.	1.01	3.61	68.5%	
		Reporting Limit	*0.19*	*0.18*	*0.19*	*0.19*	*0.19*			
4	NE36692-C, 1X	DUP 2	0.644	0.241	N.D.	N.D.	0.749	4.08	65.8%	
		Reporting Limit	*0.22*	*0.22*	*0.22*	*0.22*	*0.22*			
3	**NE36691, 100X**	**N410005-06**	**286**	**37.9**	**N.D.**	**N.D.**	**698**	**4.828**	**74.6%**	*
		Reporting Limit	*19*	*18*	*19*	*19*	*18*			
5	**NE36693, 1X**	**N410005-08**	**0.895**	5.19	**N.D.**	**N.D.**	73.66	**3.796**	**58.7%**	**
		Reporting Limit	*0.23*	*0.23*	*0.23*	*0.23*	*0.23*			

Surrogate Recoveries:

mean=	73.6%
s =	14%
rsd =	19%
n=	15

For the triplicate preparations of NE36692:

	[Analyte]$_{Sample}$ (mg/kg) MCHM	PPH	1,4-CHDM	DM-1,4-DC	di-PPH
mean$_{(n=3)}$=	0.685	0.240	N.D.	N.D.	0.760
s=	0.061	0.009	------	------	0.030
rsd=	9.0%	3.7%	------	------	3.9%
R.L. =	*0.19*	*0.19*	*0.19*	*0.19*	*0.19*

For the station reps NE36688, NE36689, NE36690:

	[Analyte]$_{Sample}$ (mg/kg) MCHM	PPH	1,4-CHDM	DM-1,4-DC	di-PPH
	0.676	0.395	N.D.	N.D.	1.11
s=	0.13	0.15	------	------	0.39
rsd=	19%	37%	------	------	35%
R.L. =	*0.18*	*0.18*	*0.18*	*0.18*	*0.18*

[4]- Observed [Analyte]$_{Sample}$ = Observed [Analyte]$_{inj\ sol'n}$ (ug/mL) x $\frac{\text{Injection Solution Volume (mL)}}{\text{Extract Aliquot (mL)}}$ x $\frac{CH_2Cl_2\text{ Volume (mL)}}{\text{Sample Amount}^1}$ x $\frac{1\text{ mg}}{1000\text{ ug}}$ x $\frac{1000\text{ g}}{1\text{ kg}}$

"< R.L." = Analyte was identified in sample but its concentration was less that the reporting limit (R.L.).
R.L. values were calculated using analyte concentrations in the lowest calibration standard and the sample processing procedure that diluted a 0.500 mL extract volume prior to analysis.

*- **For NE36691**: Since all of the observed analyte concentrations were with the calibration range for the 100X dilution, analyte concentrations from the 10X dilution were not reported.
- **For NE36693: The observed analyte concentrations from the 10X dilution were reported for PPH and Di-PPH. The observed analyte concentrations from the undiluted extract (1X) were reported for MCHM, 1,4-CHDM and DM-1,4-DC.

Soil Samples: Aliquot Preparations & Chromatographic Results

[Surrogate Sol'n] (ug/mL) in CH_2Cl_2 (see p. 64435): 7081

			Sample Prep & Extraction				*Injection Solution Prep*				*Chromatographic Results*					
											Observed [Analyte]$_{Inj\ Sol'n}$ (ug/mL)					
Station	Sample	LIMS #	Amount (g)	Surrogate Added (mL)	[Surrogate] (ug/g)	CH_2Cl_2 Volume (mL)	CH_2Cl_2 Extract[3] Aliquot (mL)	CH_2Cl_2 Added (mL)	Injection Sol'n Volume (mL)	IS Added (mL)	MCHM	PPH	1,4-CHDM	DM-1,4-DC	di-PPH	Surrogate
RB01	3-3035247, 1X	N410005-11	23.4942	0.020	6.028	15.00	0.500	0.000	0.500	0.005	N.D.	N.D.	N.D.	N.D.	N.D.	9.49
RB02	3-3035244, 1X	N410005-12	25.5337	0.020	5.546	15.00	0.500	0.000	0.500	0.005	N.D.	N.D.	N.D.	N.D.	N.D.	8.80
RB03	3-3035237, 1X	N410005-13	25.5045	0.020	5.553	15.00	0.500	0.000	0.500	0.005	N.D.	N.D.	N.D.	N.D.	N.D.	8.76
RB04	3-3054998, 1X	N410005-14	28.0977	0.020	5.040	15.00	0.500	0.500	0.500	0.005	N.D.	N.D.	N.D.	N.D.	N.D.	8.30
7	NE36695, 1X	N410005-10	22.2359	0.020	6.369	10.00	0.500	0.500	0.500	0.005	N.D.	N.D.	N.D.	N.D.	N.D.	10.96
2A	NE36688, 1X	N410005-03	25.5836	0.020	5.536	10.00	0.500	0.000	0.500	0.005	1.58	0.68	N.D.	N.D.	1.98	9.42
3	NE36691, 10X	N410005-06	26.9284	0.020	5.259	10.00	0.050	0.450	0.500	0.005	77.87	6.41	N.D.	N.D.	166.23	1.46
4	NE36692-A, 1X	N410005-07	26.4727	0.020	5.350	10.00	0.500	0.000	0.500	0.005	2.00	0.61	N.D.	N.D.	2.10	8.15
5	**NE36693, 10X**	**N410005-08**	**21.8897**	**0.020**	**6.470**	**10.00**	**0.050**	**0.450**	**0.500**	**0.005**	0.45	**1.32**	N.D.	N.D.	**20.00**	**0.89**
6	**NE36694, 1X**	**N410005-09**	**26.2578**	**0.020**	**5.393**	**10.00**	**0.500**	**0.000**	**0.500**	**0.005**	**11.04**	**3.53**	**N.D.**	**N.D.**	**7.52**	**8.87**
2B	NE36689, 1X	N410005-04	27.6175	0.020	5.128	10.00	0.500	0.000	0.500	0.005	2.28	1.53	N.D.	N.D.	4.23	9.95
4	NE36692-B, 1X	DUP 1	23.3610	0.020	6.062	10.00	0.500	0.000	0.500	0.005	1.53	0.58	N.D.	N.D.	1.72	9.11
2C	NE36690, 1X	N410005-05	26.8624	0.020	5.272	10.00	0.500	0.000	0.500	0.005	1.57	0.98	N.D.	N.D.	2.72	9.70
4	NE36692-C, 1X	DUP 2	22.8277	0.020	6.204	10.00	0.500	0.000	0.500	0.005	1.47	0.55	N.D.	N.D.	1.71	9.32
3	**NE36691, 100X**	**N410005-06**	**26.9284**	**0.020**	**5.259**	**10.00**	**0.005**	**0.495**	**0.500**	**0.005**	**7.71**	**1.02**	**N.D.**	**N.D.**	**18.8**	**0.13**
5	**NE36693, 1X**	**N410005-08**	**21.8897**	**0.020**	**6.470**	**10.00**	**0.500**	**0.000**	**0.500**	**0.005**	**1.96**	11.35	**N.D.**	**N.D.**	161.24	**8.31**
[Analyte] ug/mL in lowest cal. std.											*0.507*	*0.496*	*0.504*	*0.504*	*0.498*	*0.0991*

[3]- Extract was the resulting CH_2Cl_2 layer from the sample prep that was "dried" using $Na_2SO_{4(s)}$

N.D. = Analyte not detected

Analyte concentration was above the highest calibration standard (25 ug/mL)

Matrix Spike Sample

MS Spike Sol'ns in CH_2Cl_2 (see p.64435):

Analyte	$[\ ]_{stk\ sol'n}$ (ug/mL)	Aliquot Added (mL)	$[\ ]_{Target}$ (ug/mL) in 10 mL of CH_2Cl_2
MCHM	6762	0.005	3.381
PPH	6836	0.002	1.367
di-PPH	8300	0.004	3.320
Surrogate	7081	0.020	14.162

Matrix Spike (MS) Sample Preparation and Chromatographic Result:

			Sample Prep & Extraction				Injection Solution Prep			
Station	Sample	LIMS #	Amount (g)	Surrogate Added (mL)	$[Surrogate]_{Target}$ (ug/g)	CH_2Cl_2 Added (mL)	CH_2Cl_2 Extract * Aliquot (mL)	CH_2Cl_2 Added (mL)	Final Injection Solution (mL)	IS Added (mL)
4	NE36692-MS	N410005-07	22.4653	0.0200	6.30	10.00	0.500	0.000	0.500	0.005

* Extract was the resulting CH_2Cl_2 layer from the sample prep that was "dried" using $Na_2SO_{4(s)}$

Analyte Concentrations (ug/g):

		Observed $[Analyte]_{MS\ Sample}$ (ug/g)					$[Analyte]_{Sample}$ (ug/g)			
Station	Sample	MCHM	PPH	1,4-CHDM	DM-1,4-DC	di-PPH	MCHM	PPH	1,4-CHDM	DM-1,4-DC
4	NE36692-MS	1.23	0.823	N.D.	N.D.	2.11	0.685	0.240	N.D.	N.D.

$$\text{Observed } [Analyte]_{Spike\ Sample}\ (ug/mL) = \text{Observed } [Analyte]_{inj\ sol'n}\ (ug/mL) \times \frac{\text{Injection Solution Volume (mL)}}{\text{Extract Aliquot (mL)}} \times \frac{CH_2Cl_2\ \text{Volume (mL)}}{\text{Sample Volume (mL)}}$$

% Recovery:

Analytes:

		% Recovery				
Station	Sample	MCHM	PPH	1,4-CHDM	DM-1,4-DC	di-PPH
4	NE36692-MS	36.4%	95.9%	N.D.	N.D.	91.7%

$$\%\ \text{Recovery} = \frac{\{\text{Observed } [Analyte]_{Spike\ Sample} - \text{Observed } [Analyte]_{Sample}\}}{\text{Calculated } [Analyte]_{Spike\ Addition}} \times 100\%$$

Surrogate:

Station	Sample	$[Surrogate]_{Observed}$ (ug/g)
4	NE36692-MS	3.841

$$\%\ \text{Target} = \frac{[Surrogate]_{observed}\ (ug/g)}{[Surrogate]_{Target}\ (ug/g)} \times 100\%$$

Water & Pipe Samples: Aliquot Preparations & Chromatographic Results

[Surrogate Sol'n] (ug/mL) in CH_2Cl_2 (see p. 64435): 7081

			Sample Prep & Extraction				*Injection Solution Prep*				*Chromatographic Results*					
											Observed $[Analyte]_{Inj\ Sol'n}$ (ug/mL)					
Station	Sample	LIMS #	Amount (mL *or* g)[1]	Surrogate Added (mL)	[Surrogate] (ug/mL)	CH_2Cl_2 Volume (mL)	CH_2Cl_2 Extract[2] Aliquot (mL)	CH_2Cl_2 Added (mL)	Injection Sol'n Volume (mL)	IS Added (mL)	MCHM	PPH	1,4-CHDM	DM-1,4-DC	di-PPH	Surrogate
1A	NE36686	N410005-01	10.00	0.002	1.416	1.00	0.450	0.050	0.500	0.005	N.D.	N.D.	N.D.	N.D.	N.D.	16.91
1B	NE36687	N410005-02	10.00	0.002	1.416	1.00	0.450	0.050	0.500	0.005	N.D.	N.D.	N.D.	N.D.	N.D.	14.42
Pipe	3-3035851, swab #1		10.00	0.020	14.16	10.00	0.500	0.000	0.500	0.005	N.D.	N.D.	N.D.	N.D.	N.D.	13.21
Pipe	3-3035851, swab #2		10.00	0.020	14.16	10.00	0.500	0.000	0.500	0.005	N.D.	N.D.	N.D.	N.D.	N.D.	11.58
Pipe	3-3035851, swab #3	N410005-15	10.00	0.020	14.16	10.00	0.500	0.000	0.500	0.005	N.D.	N.D.	N.D.	N.D.	N.D.	12.44
Pipe	3-3035851,Interior		4.7209	0.020	30.00	10.00	0.500	0.000	0.500	0.005	N.D.	N.D.	N.D.	N.D.	N.D.	14.57
Pipe	3-3035851,Exterior		16.0595	0.020	8.818	10.00	0.500	0.000	0.500	0.005	N.D.	N.D.	N.D.	N.D.	1.47	13.36
[Analyte] ug/mL in lowest cal. std.											*0.507*	*0.496*	*0.504*	*0.504*	*0.498*	*0.0991*

[1]- Amount is in *g* for the interior and exterior pipe material samples, and mL for all the remaining samples.

[2]- Extract was the resulting CH_2Cl_2 layer from the sample prep that was "dried" using $Na_2SO_{4(s)}$

N.D. = Analyte not detected

Analyte Concentrations and Surrogate Recoveries

			Observed $[Analyte]_{Sample}$ (ppm)[3]						Surrogate
Station	Sample	LIMS #	MCHM	PPH	1,4-CHDM	DM-1,4-DC	di-PPH	Surrogate	Recovery
1A	NE36686	N410005-01	N.D.	N.D.	N.D.	N.D.	N.D.	1.879	133%
		Reporting Limit (ug/mL)	*0.056*	*0.055*	*0.056*	*0.056*	*0.055*		
1B	NE36687	N410005-02	N.D.	N.D.	N.D.	N.D.	N.D.	1.602	113%
		Reporting Limit (ug/mL)	*0.056*	*0.055*	*0.056*	*0.056*	*0.055*		
Pipe	3-3035851, swab #1	N410005-15	N.D.	N.D.	N.D.	N.D.	N.D.	13.21	93.3%
		Reporting Limit (ug)	*0.51*	*0.50*	*0.50*	*0.50*	*0.50*		
Pipe	3-3035851, swab #2	N410005-15	N.D.	N.D.	N.D.	N.D.	N.D.	11.58	81.8%
		Reporting Limit (ug)	*0.51*	*0.50*	*0.50*	*0.50*	*0.50*		
Pipe	3-3035851, swab #3	N410005-15	N.D.	N.D.	N.D.	N.D.	N.D.	12.44	87.8%
		Reporting Limit (ug)	*0.51*	*0.50*	*0.50*	*0.50*	*0.50*		
Pipe	3-3035851,Interior	N410005-15	N.D.	N.D.	N.D.	N.D.	N.D.	30.86	103%
		Reporting Limit	*1.1*	*1.1*	*1.1*	*1.1*	*1.1*		
Pipe	3-3035851,Exterior	N410005-15	N.D.	N.D.	N.D.	N.D.	0.915	8.319	94.3%
		Reporting Limit	*0.32*	*0.31*	*0.31*	*0.31*	*0.31*		

Surrogate Recoveries:	
mean=	88.2%
s =	17%
rsd =	20%
n=	7

[3]- Observed $[Analyte]_{Sample}$ (mg/L)= Observed $[Analyte]_{Inj\ sol'n}$ (ug/mL) x $\frac{\text{Injection Solution Volume (mL)}}{\text{Extract Aliquot (mL)}}$ x $\frac{CH_2Cl_2\text{ Volume (mL)}}{\text{Sample Amount (mL)}}$ x $\frac{1\text{ mg}}{1000\text{ ug}}$ x $\frac{1000\text{ mL}}{1\text{ L}}$

(For samples NE36686, NE3387 and swabs)

[3]- Observed $[Analyte]_{Sample}$ (mg/kg)= Observed $[Analyte]_{Inj\ sol'n}$ (ug/mL) x $\frac{\text{Injection Solution Volume (mL)}}{\text{Extract Aliquot (mL)}}$ x $\frac{CH_2Cl_2\text{ Volume (mL)}}{\text{Sample Amount (g)}}$ x $\frac{1\text{ mg}}{1000\text{ ug}}$ x $\frac{1000\text{ g}}{1\text{ kg}}$

(For pipe interior and exterior samples)

Reporting Limit values were calculated using analyte concentrations in the lowest calibration standard along with the extraction and injection solution preparation process for each sample.
For the swab samples, the reporting limit was based on a 10.0 mL CH_2Cl_2 extract volume and the analyte concentration in the lowest calibration standard.

CCV Evaluation:

CCV Preparation: See Cal Std 4 preparation from 11/10/14

Analyte	$[Analyte]_{Target}$	Run Date: 11/14/14								Run Date: 11/18/14				$mean_{n=6}$	s	rsd
		$[Analyte]_{obs}$	% Target	$[Analyte]_{obs}$	% Target	$[Analyte]_{obs}$	% Target	$[Analyte]_{obs}$	% Target	$[Analyte]_{obs}$	% Target	$[Analyte]_{obs}$	% Target			
MCHM	2.03	1.94	95.6%	2.29	113%	2.24	110%	2.36	116%	1.66	81.8%	2.00	98.6%	103%	13%	13%
PPH	1.98	1.78	89.8%	2.28	115%	2.18	110%	2.36	119%	1.69	85.2%	1.89	95.3%	102%	14%	14%
1,4-CHDM	2.01	1.71	84.9%	2.24	111%	2.22	110%	2.36	117%	1.55	76.9%	1.79	88.9%	98.2%	17%	17%
DM-1,4-CHDC	2.02	2.08	103%	2.08	103%	2.06	102%	2.14	106%	1.92	95.2%	1.99	98.6%	101%	3.9%	3.8%
di-PPH	1.99	1.62	81.3%	2.44	122%	2.40	120%	2.76	139%	1.61	80.8%	2.04	102%	108%	24%	22%
2-Fluorobiphenol	1.98	2.09	105%	2.12	107%	2.11	106%	2.16	109%	1.99	100%	2.04	103%	105%	3.1%	2.9%

[Analyte] = ug/mL

[redacted] 12/4/14

RP1616: Freedom Industries Etowah River Terminal

Run Date	Analysis	File	Internal Standard Area Responses		
			1,4-dichlorobenzene-d_4	Naphthalene-d_8	Acenaphthene-d_{10}
11/10/2014	Calibration	11102014_00 5	345944	1509882	781891
		11102014_00 6	347711	1541710	834148
		11102014_00 7	351370	1577010	832339
		11102014_00 8	353930	1599870	847928
		11102014_00 9	362805	1595218	856846
		11102014_00 10	357035	1598839	852147
		11102014_00 11	360741	1612159	833662
		11102014_00 12	369513	1634162	879923
		11102014_00 20	354026	1563256	830363
		11102014_00 21	366163	1611216	850465
		11102014_00 22	363855	1600436	837489
		11102014_00 23	362171	1574128	832350
		11102014_00 24	369766	1632331	863213
		11102014_00 25	363344	1604746	853187
		11102014_00 26	363629	1631164	868682
		11102014_00 27	361091	1619958	872339
		11102014_00 28	366487	1586511	851718
	2nd Weighing	11102014_00 13	347394	1559129	823099
		11102014_00 14	362561	1610296	860073
		11102014_00 15	346969	1560607	826084
		11102014_00 16	353678	1575320	841082
		11102014_00 17	355461	1565010	826855
		11102014_00 18	377193	1664396	883349
11/14/2014	Soil Samples	11142014_00 4	527766	2330312	1236435
		11142014_00 6	358943	1604343	854042
		11142014_00 7	357179	1591632	856360
		11142014_00 8	364026	1596288	864034
		11142014_00 9	358218	1588410	868603
		11142014_00 10	357386	1638858	888506
		11142014_00 11	388233	1725713	943322
		11142014_00 12	386331	1737845	942610
		11142014_00 13	410604	1823837	989926
		11142014_00 14	397390	1791208	971032
		11142014_00 15	407398	1797432	1001353
		11142014_00 16	**424125**	**1875168**	**1057509**
		11142014_00 17	423228	1891299	1012711
		11142014_00 18	394127	1797876	974240
		11142014_00 19	417610	1850408	1034788
		11142014_00 20	**428392**	**1895701**	**1040457**
		11142014_00 21	**429441**	**1930251**	**1053917**
		11142014_00 22	409445	1789525	986394
		11142014_00 23	399956	1763247	994942
		11142014_00 24	423726	1863262	1034576
		11142014_00 25	427851	1861756	1022448
		11142014_00 26	432381	1886857	1058879
		11142014_00 27	457497	2030816	1099220
		11142014_00 28	391778	1756328	948259
	Water Samples	11142014_00 30	421240	1909298	1048213
		11142014_00 31	437063	1959311	1035065
		11142014_00 32	404778	1808248	998933
	Pipe Samples	11142014_00 33	386823	1744678	942891
		11142014_00 34	400945	1807053	987068
		11142014_00 35	411676	1863468	1018027
		11142014_00 36	419645	1890061	1023468
		11142014_00 37	419822	1901391	1019340
		11142014_00 38	408094	1791764	971522
		11142014_00 39	491411	2118427	1135739
		11142014_00 40	414532	1797093	998558

1,4-dichlorobenzene-d_4

mean	s	rsd	mean-2s	mean+2s
359254	8264	2.3%	342726	375782

Naphthalene-d8

mean	s	rsd	mean-2s	mean+2s
1592494	34486	2.2%	1523522	1661465

Acenaphthene-d10

mean	s	rsd	mean-2s	mean+2s
845184	22260	2.6%	800665	889703

Not Included

1,4-dichlorobenzene-d_4

mean	s	rsd	mean-2s	mean+2s
401968	28424	7.1%	345120	458816

Naphthalene-d8

mean	s	rsd	mean-2s	mean+2s
1786437	119544	6.7%	1547349	2025525

Acenaphthene-d10

mean	s	rsd	mean-2s	mean+2s
978179	72111	7.4%	833957	1122402

1,4-dichlorobenzene-d_4

mean	s	rsd	mean-2s	mean+2s
419639	27069	6.5%	365501	473777

Naphthalene-d8

mean	s	rsd	mean-2s	mean+2s
1871890	103704	5.5%	1664482	2079298

Acenaphthene-d10

mean	s	rsd	mean-2s	mean+2s
1016257	49563	4.9%	917131	1115382

RP1616: Freedom Industries Etowah River Terminal

Run Date	Analysis	File	Internal Standard Area Responses		
			1,4-dichlorobenzene-d_4	Naphthalene-d_8	Acenaphthene-d_{10}
11/18/2014	Sample Run #2	11182014_00 4	777676	3346996	1508100
		11182014_00 6	334469	1479500	815436
		11182014_00 7	336772	1503187	842914
		11182014_00 8	335687	1479402	820586
		11182014_00 9	**333214**	**1486775**	**866729**
		11182014_00 10	**363126**	**1606949**	**945819**
		11182014_00 11	376810	1708581	899070
		11182014_00 12	363137	1592419	878030
		11182014_00 13	374341	1670817	905490
		11182014_00 14	380989	1702568	942421
		11182014_00 15	385843	1719365	916412
		11182014_00 16	379355	1676002	902737
		mean=	383645	1704879	924292
		s=	32946	145210	85572
		rsd=	8.6%	8.5%	9.3%
		n=	68	68	68

Not included

1,4-dichlorobenzene-d 4

mean	s	rsd	mean-2s	mean+2s
360340	21189	5.9%	317963	402718

Naphthalene-d8

mean	s	rsd	mean-2s	mean+2s
1602324	99324	6.2%	1403676	1800972

Acenaphthene-d10

mean	s	rsd	mean-2s	mean+2s
885059	44785	5.1%	795488	974629

RP1616: Freedom Industries Etowah River Terminal

Analysis Result	Analyte	Standard Solution	RB01	RB02	RB03	RB04	NE36695,1X	NE36688, 1X	NE36691, 10X	NE36692-A, 1X	NE36693, 10X	NE36694, 1X	NE36689, 1X	NE36692-B, 1X	NE36690, 1X
			Soil Samples												
[Analyte]$_{obs}$ (ug/mL)	MCHM	5.728	N.D.	N.D.	N.D.	N.D.	N.D.	1.58	77.87[b]	2.00	0.45[b]	11.04	2.28	1.53	1.57
	PPH	6.875	N.D.	N.D.	N.D.	N.D.	N.D.	0.68	6.41	0.61	1.32	3.53	1.53	0.58	0.98
	1,4-CHDM	7.522	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	DM-1,4-CHDC	7.992	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	di-PPH	8.551	N.D.	N.D.	N.D.	N.D.	N.D.	1.98	166.23[b]	2.10	20.0	7.52	4.23	1.72	2.72
Observed Retenion Time (min)	n-C_{10}	**4.969**	4.975	4.975	4.975	4.975	------	4.975	------	------	------	4.975	4.975	------	4.975
	MCHC	**6.457**	------	------	------	------	------	6.551	7.163	6.616	6.810	6.440	6.610	6.610	6.587
	n-C_{12}	**6.528**	6.528	6.528	6.528	6.528	------	6.528	6.528	------	------	6.528	------	------	------
	Napthalene	**6.481**	6.475	6.475	6.475	6.475	------	6.475	------	------	------	6.475	6.475	------	6.475
	2-Methyl-Napthalene	**7.175**	7.175	7.175	7.175	7.175	------	7.175	7.281	7.175	7.175	7.175	7.175	7.175	7.175
	n-C_{14}	**7.698**	7.698	7.698	7.698	7.698	------	7.692	------	7.698	------	7.698	7.693	7.698	7.698
	Acenaphthylene	**8.051**	------	8.051	------	------	------	------	------	------	------	------	------	------	------
	Dibenzofuran	**8.398**	8.393	8.392	8.392	8.393	------	8.392	------	------	------	8.392	8.393	------	8.393
	n-C_{16}	**8.698**	8.698	8.698	8.698	8.698	------	8.698	8.710	8.698	------	8.698	8.698	8.698	8.698
	n-C_{18}	**9.645**	9.645	9.645	9.645	9.645	------	9.645	------	9.645	------	9.645	9.645	9.645	9.645
	Phenanthrene	**9.710**	9.698	9.698	9.698	9.698	9.698	9.698	------	9.698	------	9.698	9.698	9.698	9.698
	Anthracene	**9.757**	9.745	9.745	9.745	------	9.745	9.739	------	------	------	9.745	9.745	------	9.745
	n-C_{20}	**10.751**	10.757	10.751	10.751	10.751	------	10.751	------	10.751	------	10.751	10.751	10.745	10.751
	Fluoranthene	**11.321**	11.304	11.304	11.304	11.304	11.304	11.304	------	------	------	11.304	11.310	------	------
	Pyrene	**11.668**	11.651	11.645	11.651	11.645	11.651	11.651	------	------	------	11.651	11.651	------	11.657
	n-C_{22}	**12.033**	12.034	12.033	12.033	12.033	------	12.039	------	------	------	12.033	12.033	------	12.033
	n-C_{24}	**13.421**	13.416	13.416	13.416	13.422	------	13.416	------	------	------	13.416	13.416	------	------
	n-C_{26}	**14.821**	14.816	14.821	14.821	14.822	------	------	------	------	------	14.821	14.822	------	------
	n-C_{28}	**16.198**	------	16.192	16.186	16.186	------	------	------	------	------	16.192	------	------	------
	Benzo[a]anthracene	**13.927**	------	------	------	13.916	13.916	------	------	------	------	------	------	------	------
	Chrysene	**14.021**	13.992	13.998	13.992	13.992	13.998	13.992	------	------	13.957	13.992	------	------	------
	Benzo[b]fluoranthene	**16.092**	------	------	16.110	16.092	16.092	------	------	------	------	------	------	------	------
	Benzo[k]fluoranthene	**16.151**	------	------	------	------	16.116	------	------	------	------	------	------	------	------
	Benz[a]pyrene	**16.680**	------	------	16.668	16.663	16.674	------	------	------	------	------	------	------	------
Library Search Report (Ret Time/Qual Factor): The presence of the analytes listed were not confirmed by the injection of a standard solution unless other wise indicated.	Xylene	------	------	------	------	------	------	3.793/91	------	------	------	3.793/90	3.793/95	------	------
	Benzaldehyde	------	4.634/94	4.634/94	4.634/94	4.634/93	------	------	------	------	------	------	------	------	------
	Trimethyl Benzene	------	------	------	------	------	------	4.940/94	------	------	------	------	4.940/94	------	------
	MCHC[a]	------	------	------	------	------	------	------	7.163/95	6.616/91	6.810/94	------	6.610/93	------	------
	2-Methyl Napthalene[a]	------	7.175/97	7.175/97	7.175/96	7.175/96	------	7.175/95	------	------	------	7.175/96	7.175/97	------	7.175/97
	1-Methyl Napthalene	------	7.275/96	7.281/96	7.275/96	7.275/96	------	7.275/95	------	------	------	7.275/96	7.275/97	------	7.275/95
	Dimethyl Napthalene	------	7.798/97	7.798/96	7.798/97	------	------	------	------	------	------	------	------	------	------
	Dimethyl Napthalene	------	7.898/98	7.881/98	7.881/97	7.881/98	------	7.875/98	------	------	------	7.881/97	7.881/97	------	------
	Dimethyl Napthalene	------	7.987/97	7.987/97	7.987/98	7.987/96	------	------	------	------	------	------	------	------	------
	Trimethyl Napthalene	------	------	------	------	8.451/90	------	------	------	------	------	------	------	------	------
	Trimethyl Napthalene	------	8.534/93	8.534/91	8.534/96	8.528/96	------	------	------	------	------	------	------	------	------
	Trimethyl Napthalene	------	------	8.616/93	8.616/94	------	------	------	------	------	------	------	------	------	------
	n-C_{16}[a]	------	------	------	8.698/93	------	------	------	------	------	------	------	------	------	------
	Trimethyl Napthalene	------	8.740/96	8.739/96	8.739/97	8.740/94	------	------	------	------	------	8.739/94	------	------	------
	Methyl Dibenzofuran	------	------	8.898/90	8.898/90	------	------	------	------	------	------	------	------	------	------
	Tetramethyl C_{15}	------	------	9.192/90	------	9.192/91	------	------	------	------	------	------	------	------	------
	Tetramethyl Napthalene	------	9.440/94	9.439/91	9.439/94	9.440/91	------	------	------	------	------	------	------	------	------
	Methyl Anthracene	------	10.339/93	------	------	------	------	------	------	------	------	------	------	------	------
	Methyl Phenanthrene	------	------	------	10.451/96	------	------	------	------	------	------	------	------	------	------
	n-Hexadecanoic Acid	------	------	10.510/95	------	10.510/93	------	------	------	------	------	------	------	------	------
	n-C_{20}[a]	------	------	------	------	10.751/90	------	------	------	------	------	------	------	------	------
	S_8	------	11.198/94	------	11.198/94	11.198/94	------	------	------	------	------	------	------	------	------
	Fluoranthene[a]	------	------	11.304/93	------	------	11.304/98	------	------	------	------	------	------	------	------
	Pyrene[a]	------	------	11.645/93	------	11.645/90	11.651/94	------	------	------	------	------	------	------	------

[a]- Ret Time value matches ret time value observed in standard solution

[b]- Observed concentration is outside of calibration range

[redacted] 12/3/14

NE36692-C, 1X	NE36691, 100X	NE36693, 1X
1.47	7.71	1.96
0.55	1.02	11.35
N.D.	N.D.	N.D.
N.D.	N.D.	N.D.
1.71	18.80	161.24[b]
------	------	------
6.604	6.728	7.287
------	------	------
------	------	------
7.175	------	------
7.693	------	7.704
------	------	------
8.393	------	------
8.698	------	8.710
9.645	------	9.657
9.698	------	------
------	------	------
10.751	------	10.751
------	------	------
------	------	------
12.034	------	12.033
------	------	------
------	------	------
------	------	------
------	------	------
------	------	------
------	------	------
------	------	------
------	------	------
------	------	
------	------	------
------	------	------
6.604/94	6.728/94	7.287/95
------	------	------
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------	------	10.528/98
------	------	------
------	------	------
------	------	------
------	------	------

RP1616: Freedom Industries Etowah River Terminal

Analysis Result	Analyte	Standard Solution	Water Samples		Pipe Samples					
			NE36686, 1.1X	NE36687, 1.1X	Swab Blk	Swab #1	Swab #2	Swab #3	Interior	Exterior
$[Analyte]_{obs}$ (ug/mL)	MCHM	5.728	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	PPH	6.875	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,4-CHDM	7.522	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	DM-1,4-CHDC	7.992	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	di-PPH	8.551	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	1.47
Observed Retenion Time (min)	MCHC	**6.457**	------	------	------	------	------	------	------	------
	2-Methyl-Napthalene	**7.175**	------	------	------	------	------	------	7.175	7.175
	n-C_{14}	**7.698**	------	------	------	------	------	------	------	7.722
	Dimethyl Phthalate	**8.039**	------	------	------	------	------	------	8.028	8.034
	n-C_{16}	**8.698**	------	------	8.698	8.698	8.698	8.698	------	------
	N-Nitrosodiphenylamine	**8.880**	------	------	------	------	------	------	8.763	------
	n-C_{18}	**9.645**	------	------	9.645	------	9.645	9.645	------	9.763
	Phenanthrene	**9.710**	------	------	------	------	9.698	9.698	9.698	9.704
	Dibutyl Phthalate	**10.592**	------	------	------	10.581	10.587	10.586	10.592	10.593
	n-C_{20}	**10.751**	------	------	------	------	10.751	10.745	------	10.757
	Fluoranthene	**11.321**	------	------	------	------	11.310	11.310	11.310	11.322
	Pyrene	**11.668**	------	------	------	------	11.651	------	11.657	11.663
	n-C_{22}	**12.033**	------	------	------	------	12.034	12.033	------	------
	Benzyl Butyl Phthalate	**13.157**	------	------	------	------	------	------	------	13.151
	n-C_{24}	**13.421**	------	------	------	13.427	13.422	13.422	------	13.428
	n-C_{26}	**14.821**	------	------	------	14.827	14.827	14.821	------	14.833
	n-C_{28}	**16.198**	------	------	------	16.198	16.204	16.204	------	16.204
	Chrysene	**14.021**	------	------	------	------	------	------	14.004	14.004
	Bis(2-ethylhexyl) phthalate	**14.509**	------	------	14.492	------	14.498	14.498	14.504	14.510
	Benzo[g,h,i]perylene	**19.080**	------	------	------	------	19.086	------	19.086	19.074
Library Search Report (Ret Time/Qual Factor): The presence of the analytes listed were not confirmed by the injection of a standard solution unless other wise indicated.	Dimethyl Undecane	------	------	------	------	------	------	------	------	6.622/94
	Methyl Tridecane	------	------	------	------	------	------	------	------	6.987/91
	Heptylcyclohexane	------	------	------	------	------	------	------	------	7.416/90
	Dimethyl Tridecane	------	------	------	------	------	------	------	------	7.722/90
	2,2'-Difluorobiphenyl	------	7.492/96	7.493/94	------	------	------	------	------	------
	n-C_{16}[a]	------	------	------	------	------	------	------	------	8.704/95
	Benzophenone	------	------	------	8.922/97	8.922/97	8.922/97	8.922/97	------	------
	Trimethyl C_{15}	------	------	------	------	------	------	------	------	8.934/91
	2-Phenyl-1H-Indene	------	------	------	------	------	------	------	10.451/90	------
	n-Hexadecanoic Acid	------	------	------	------	10.528/99	10.551/99	10.545/99	10.534/97	10.610/99
	Dibutyl Phthalate[a]	------	------	------	------	------	------	------	10.592/97	------
	Dimethyl Phenanthrene	------	------	------	------	------	------	------	11.010/90	------
	Dimethyl Phenanthrene	------	------	------	------	------	------	------	11.128/96	------
	Pyrene[a]	------	------	------	------	------	------	11.651/94	------	------
	Octadecanoic acid methyl ester	------	------	------	------	------	------	------	------	11.416/99
	Unsaturated Octadecanoic Acid	------	------	------	------	------	------	------	------	11.740/99
	n-Octadecanoic Acid	------	------	------	------	11.781/90	11.804/99	11.798/99	------	11.863/99
	N-phenylnaphthalenamine	------	------	------	------	12.386/93	------	12.386/93	12.392/97	------
	n-C_{24}[a]	------	------	------	------	------	13.428/91	------	------	------
	Squalene	------	------	16.416/91	------	------	------	------	------	------
	Benzo[g,h,i]perylene[a]	------	------	------	------	------	------	------	19.092/92	------

[a]- Ret Time value matches ret time value observed in standard solution

[redacted] 12/3/14

MCHC Response Evaluation:

Station	Sample	LIMS #	*Target Analyte Area* MCHM	PPH	1,4-CHDM	DMCH-1,4-DC	Di-PPH	Total	*MCHC* Area	Area Ratio (MCHC/Total)	*MCHC Response*
RB01	3-3035247, 1X	N410005-11	N.D.	N.D.	N.D.	N.D.	N.D.	------	N.D.	------	------
RB02	3-3035244, 1X	N410005-12	N.D.	N.D.	N.D.	N.D.	N.D.	------	N.D.	------	------
RB03	3-3035237, 1X	N410005-13	N.D.	N.D.	N.D.	N.D.	N.D.	------	N.D.	------	------
RB04	3-3054998, 1X	N410005-14	N.D.	N.D.	N.D.	N.D.	N.D.	------	N.D.	------	------
7	NE36695, 1X	N410005-10	N.D.	N.D.	N.D.	N.D.	N.D.	------	N.D.	------	------
2A	**NE36688, 1X**	**N410005-03**	57617	16236	N.D.	N.D.	58389	**132242**	**436367**	**3.3**	*Much Greater Than*
3	**NE36691, 10X**	**N410005-06**	3392356	308766	N.D.	N.D.	7113490	**10814612**	**19229188**	**1.8**	*Greater Than*
4	**NE36692-A, 1X**	**N410005-07**	77124	13153	N.D.	N.D.	65456	**155733**	**895643**	**5.8**	*Much Greater Than*
5	**NE36693, 10X**	**N410005-08**	10956	50011	N.D.	N.D.	821911	**882878**	**3950343**	**4.5**	*Much Greater Than*
6	**NE36694, 1X**	**N410005-09**	479363	166790	N.D.	N.D.	298561	**944714**	**89531**	**0.1**	*Less Than*
2B	**NE36689, 1X**	**N410005-04**	87531	57204	N.D.	N.D.	147909	**292644**	**867870**	**3.0**	*Much Greater Than*
4	**NE36692-B, 1X**	**DUP 1**	54447	11055	N.D.	N.D.	47526	**113028**	**858712**	**7.6**	*Much Greater Than*
2C	**NE36690, 1X**	**N410005-05**	59459	32065	N.D.	N.D.	91655	**183179**	**690492**	**3.8**	*Much Greater Than*
4	**NE36692-C, 1X**	**DUP 2**	55953	10205	N.D.	N.D.	48495	**114653**	**838035**	**7.3**	*Much Greater Than*
3	**NE36691, 100X**	**N410005-06**	257627	26960	N.D.	N.D.	642438	**927025**	**1864197**	**2.0**	*Greater Than*
5	**NE36693, 1X**	**N410005-08**	65606	480624	N.D.	N.D.	6170645	**6716875**	**25111784**	**3.7**	*Much Greater Than*
1A	NE36686	N410005-01	N.D.	N.D.	N.D.	N.D.	N.D.	------	N.D.	------	------
1B	NE36687	N410005-02	N.D.	N.D.	N.D.	N.D.	N.D.	------	N.D.	------	------
Pipe	3-3035851, swab #1		N.D.	N.D.	N.D.	N.D.	N.D.	------	N.D.	------	------
Pipe	3-3035851, swab #2		N.D.	N.D.	N.D.	N.D.	N.D.	------	N.D.	------	------
Pipe	3-3035851, swab #3	N410005-15	N.D.	N.D.	N.D.	N.D.	N.D.	------	N.D.	------	------
Pipe	3-3035851,Interior		N.D.	N.D.	N.D.	N.D.	N.D.	------	N.D.	------	------
Pipe	3-3035851,Exterior		N.D.	N.D.	N.D.	N.D.	N.D.	------	N.D.	------	------

MCHC Response: *Much Greater Than :* **Area Ratio** > 2, [MCHC Area > 2X Total Target Analyte Area]
Greater Than = 1 < **Area ratio** ≤ 2, [Total Target Analyte Area < MCHC Area < 2XTarget Analyte Area]
Less Than - **Area Ratio** < 1, [MCHC Area < Total Target Analyte Area]

4-methylcyclohexanecarboxylic acid (MCHC) was observed in the samples chromatograms from stations 2,3,4,5 and 6. To qualitatively assess the MCHC response to the target analytes, an area ratio [MCHC Area/Total Target Analyte Area] was calculated, with the catagorical designations listed above. Except for NE36694, MCHC appeared to be a major response compared to the target analytes observed in the soil samples above.

US EPA, National Enforcement Investigations Center Laboratory

SAMPLE RECEIPT REPORT

Work Order : N410005

Client: NEIC
Project: Freedom Industries Etowah River Terminal

Project Manager: [redacted]
Project Number: RP1616

Report To:

NEIC
[redacted]
PO Box 25227 Denver Federal Center
Denver, COLORADO 80225
Phone: (732) 321-4384

Date Due:
07/05/17 00:00 (999 day Turn Around Time-TAT)

Received By: [redacted]
Logged In By:

Date Received: 10/10/14 13:10
Date Logged In: 10/24/14 14:52

Custody Seals : YES
Preservation Confirmed : NO
Containers Intact : YES
Received On Ice : NO
COC/Labels Agree : YES

Analysis	Assigned Analyst	Comments
N410005-01 1A [Liquid] Sampled 10/08/14 10:55-Eastern NEIC Tag: NE36686		
MCHM Products	[redacted]	Water Sample from Concrete Tower
N410005-02 1B [Liquid] Sampled 10/08/14 10:55-Eastern NEIC Tag: NE36687		
MCHM Products	[redacted]	Water Sample from Concrete Tower
N410005-03 2A [Solid] Sampled 10/08/14 11:51-Eastern NEIC Tag: NE36688		
MCHM Products	[redacted]	Soil Sample from Concrete Structure on River Bank
N410005-04 2B [Solid] Sampled 10/08/14 11:51-Eastern NEIC Tag: NE36689		
MCHM Products	[redacted]	Soil Sample from Concrete Structure on River Bank
N410005-05 2C [Solid] Sampled 10/08/14 11:55-Eastern NEIC Tag: NE36690		
MCHM Products	[redacted]	Soil Sample from Concrete Structure on River Bank
N410005-06 3 [Solid] Sampled 10/08/14 13:20-Eastern NEIC Tag: NE36691		
MCHM Products	[redacted]	Upper Level Brick Firehouse
N410005-07 4 [Solid] Sampled 10/08/14 13:43-Eastern NEIC Tag: NE36692		
MCHM Products	[redacted]	Upper Level Concrete Tower
N410005-08 5 [Solid] Sampled 10/08/14 14:20-Eastern NEIC Tag: NE36693		
MCHM Products	[redacted]	Mid Level Brick Firehouse
N410005-09 6 [Solid] Sampled 10/08/14 14:35-Eastern NEIC Tag: NE36694		
MCHM Products	[redacted]	Lower Level Brick Firehouse
N410005-10 7 [Solid] Sampled 10/08/14 16:17-Eastern NEIC Tag: NE36695		
MCHM Products	[redacted]	Background Soil Sample
N410005-11 RB01 [Solid] Sampled 10/24/14 11:20-Eastern NEIC Tag: #3-3035247		
MCHM Products	[redacted]	
N410005-12 RB02 [Solid] Sampled 10/24/14 11:30-Eastern NEIC Tag: #3-3035244		
MCHM Products	[redacted]	
N410005-13 RB03 [Solid] Sampled 10/24/14 11:45-Eastern NEIC Tag: #3-3035237		
MCHM Products	[redacted]	

Work Order : N410005

Analysis	Assigned Analyst	Comments
N410005-14 RB04 [Solid] Sampled 10/24/14 11:53-Eastern NEIC Tag: #3-3054998		
MCHM Products	[redacted]	
N410005-15 Pipe [Solid] Sampled 10/24/14 11:53-Eastern NEIC Tag: #3-3035851		
MCHM Products	[redacted]	Rough Dimensions: Length-26.5 inches, Inner Diameter- roughly 3 inches

Name	Project No.	Location	64433
[redacted]	RP1616		Date: 11/5/14

Standard Solutions

A set of MCHM Compound Stock Solns (see p. 64405) was used to prepare an intermediate soln, which was then used to prepare calibration standards

Analyte	$[\,]_{stk}$ ($\frac{\mu g}{mL}$)	Aliquot (µL)	$[\,]_{Inter\ soln}$ ($\frac{\mu g}{mL}$)
MCHM	9163	11.0	100.8
PPH	8168	12.0	98.02
1,4-CHDM	11600	8.5	98.60
DM-1,4-CHC	12740	8.0	101.9
di-PPH	10830	9.5	102.9
2-Fluorobiphenyl	7469	13.5	100.8
CH_2Cl_2		937.5	
	Total	1000	

CH_2Cl_2: EM Science, Lot # 39194

Using Hamilton syringes, aliquots of the Inter Soln were further diluted w/ CH_2Cl_2 to produce the following calibration solutions

Cal Std	Inter Soln Aliquot (µL)	CH_2Cl_2 (µL)
1	1.0	999
2	5.0	995
3	10.0	990
4	20.0	980
5	50.0	950
6	100	900
7	250	750

Soln preps not used [redacted] 12/17/14

To each soln, 10.0 µL of a 2000 $\frac{\mu g}{mL}$ in CH_2Cl_2 internal standard solution was added. $[IS]_{calibr} = 20.0\ \frac{\mu g}{mL}$ (IS soln: Supelco, Lot # LC08427V)

Each soln was injected twice into the GC/MS system in generating calibration curves. Each solution was split between two vials

DH, 11/5/14

Name	Project No.	Location	64434
[redacted]	RP1616		Date: 11/5/14

Standard Solns

To verify the validity of the resulting calibration curves, a second set of MCNM compounds was used to produce a second weighing soln. (see p. 61493 and 61495 for stock solns.)

Analyte	$[]_{stk}$ ($\frac{\mu g}{ml}$)	Aliquot (µl)	$[]_{Intersoln}$ ($\frac{\mu g}{ml}$)
MCNM	6631	15.0	99.47
PPM	8350	12.0	100.2
1,4-CADM	6930	14.5	100.5
DM-1,4-CHDC	9377	10.5	98.46
di-PPM	8600	11.5	98.90
2-Fluorobiphenyl	2441	41.0	100.0
CH_2Cl_2	—	895.5	—
	Total	1000	

Hamilton syringes were used. CH_2Cl_2: EM Science, Lot # 39194

A 200 µl aliquot of this intermediate soln was combined with 980 µl of CH_2Cl_2 and 10.0 µl of the 200 $\frac{\mu g}{ml}$ IS soln. This soln was injected three times.

- A CCV standard was prepared from the ~~intermediate~~ intermediate DH 11/5/14 soln used in prepared the calibration solution, in which a 20 µl aliquot was combined with 980 µl of CH_2Cl_2 and 10.0 µl of the 200 $\frac{\mu g}{ml}$ IS soln. This soln was injected three times

Soln prep not used DH 12/17/14

- A 50.0 $\frac{\mu g}{ml}$ ~~DFP~~ DFTPP DH 11/5/14 solution was also prepared by combining a 50.0 µl aliquot of a 1000 $\frac{\mu g}{ml}$ DFTPP soln (Supelco, Lot # LC07494) with 950 µl of CH_2Cl_2. This soln was injected before the standard solns.

Name	Project No.	Location	64435
[redacted]	RP1616		Date: 11/6/14

Standard Solns

Based on the SS results from 11/5/14, another set of MCHM compounds will be weighed out.

Balance: # 4338

✓ wt set: EPA-K-5
20 mg => 0.0200 g
2 g => 2.0000 g
20 g => 19.9997 g

Analyte amounts placed in tared amber vials:

Analyte	Manu.	Lot #	Purity	Amount (g)	[Analyte]$_{stk}$ (µg/ml)
MCHM	TCI	RCGNA-PT	98.0%	0.0414	6762
PPH	Aldrich	MKBK0424V	93%	0.0441	6836
1,4-CHDM	Aldrich	MKBP6651V	99%	0.0407	6715
DM-1,4-CHDC	Aldrich	MKBJ2148V	97%	0.0480	7760
di-PPH	Dow	200602920-14	100%	0.0498	8300
2-Fluorobiphenyl	Aldrich	MH02520TK	97%	0.0438	7081

Using a Type-A vol pipet, 6.00 ml of CH_2Cl_2 was added to each vial. (EM Science, Lot # 39194)

$$* - [\text{Analyte}]_{stk} = \frac{\text{Amount (g)}}{6.00\,\text{mL}} \times \text{Purity} \times \frac{1\times10^6\,\mu g}{g}$$

11/7/14

Results from the 11/6/14 run indicate that the PPH & 1,4-CHDM concentrations were less than 85% of their target ~~conc~~ value. 11/7/14. Two more stock solns will be prepared and analyzed using the cal curve. Also, a stock soln will be prepared from a PPH material from Dow and the resulting concentration will be evaluated using the cal curve.

Balance: # 4338

✓ wt set: EPA-K-5
20 mg => 0.0200 g
2 g => 2.0000 g
20 g => 19.9999 g

Name	Project No.	Location	64436
[redacted]	RP1616		Date: 11/7/14

Standard Soln

The following amount was placed in tared, amber glass vials:

Analyte	Manuf.	Lot #	Purity	Amount (g)	$[Analyte]_{std}$ ($\frac{\mu g}{mL}$)
1,4-CNBM	Aldrich	MKBP6651V	99%	0.0459	7574
PPH	Aldrich	MKBR0424V	≥93%	0.0442	6857
~~PPH~~	~~Dow~~	~~21Ø5Ø16IAA~~	~~99.8%~~	~~0.0418~~	~~6953~~

solution was not used for second weighing evaluation DH 12/17/14

Using a type-A glass pipet, added 6.00 mL of CH_2Cl_2 (EM Science, Lot # 37194) to each vial.

$$[Analyte]\frac{\mu g}{mL} = \frac{Amount\,(g) \times Purity}{6.00\,mL} \times \frac{1 \times 10^6\,\mu g}{g}$$

11/10/14

The results from the 11/7/14 run were still not satisfactory, therefore 4 new stock soln will be weighed out, and combined with the stock soln prepared on 11/6 and 11/7 a new set of calibration standards will be prepared, and a second weighing soln.

Balance: #4338

✓ wt set: EPA-K-5
20 mg: 0.0200 g
2 g: ~~2.0000 g~~ 2.0000 g DH 11/10/14
20 g: 19.9998 g

The following analyte amounts were placed in tared, amber glass vials:

Analyte	Manuf	Lot #	Purity	Amount (g)	$[Analyte]_{std}$ ($\frac{\mu g}{mL}$)
MCNM	TCI	RCGNA-PT	>98.0%	0.0450	7350
di-PPH	Dow	20060292O-14 ~~100-04~~	100	0.0467	7783
DM-1,4-CHDC	Aldrich	MKBJ2148V	97	0.0464	7501
2-Fluorobiphenyl	Aldrich	PM02520TK	97	0.0454	7340

Using a type-A glass pipet, added 6.00 mL of CH_2Cl_2 (EM Science, Lot # 37194) to each vial.

Name	Project No.	Location	64437
[redacted]	RP1616		Date: 11/10/04

Standard Solns

The stock soln's list on p. 64435 were used to prepare a 100 ppm intermediate soln along with calibration solutions.

- Intermediate Soln:

Analyte	$[\,]_{stk}$ ($\frac{\mu g}{mL}$)	Aliquot (µl)	$[\,]_{inter\ soln}$ ($\frac{\mu g}{mL}$) *
MCHM	6762	15.0	101.4
PPH	6836	14.5	99.12
1,4-CHDM	6715	15.0	100.7
DM-1,4-CHDC	7760	13.0	100.9
di-PPH	8300	12.0	99.60
2-Fluorobiphenyl	7081	14.0	99.13
CH_2Cl_2	–	916.5	—
	Total	1000.0	

- Calibration Standards

Std	Aliquots (µl) Inter soln	CH_2Cl_2
1	1.0	999
2	5.0	995
3	10.0	990
4	20.0	980
5	50.0	950
6	100	900
7	250	750

100 µl of a 2000 $\frac{\mu g}{mL}$ IS solution were added to each cal std.

- CCV Standard: same prep as Cal Std 4

CH_2Cl_2: EM Science, Lot # 39194

Hamilton syringes were used in preparing the above standard solutions.

*- $[\,]_{inter\ soln}\left(\frac{\mu g}{mL}\right) = \frac{[\,]_{stk}\left(\frac{\mu g}{mL}\right) \times \text{Aliquot}\ (\mu l)}{1000\ \mu l}$

Name	Project No.	Location	64438
[redacted]	RP1616		Date: 11/10/14

Standard Solns

- Second weighing: The following stock solns on p. 64436 were used in preparing a second weighing intermediate soln:

- Intermediate Soln:

Analyte	$[\ ]_{stk}$ ($\frac{\mu g}{mL}$)	Aliquot (µL)	$[\ ]_{Intr\ soln}$ ($\frac{\mu g}{mL}$) *
MCHM	7350	13.5	99.23
PPH (Aldrich)	6851	14.5	99.34
1,4-CHDM	7574	13.0	98.46
DM-1,4-CHDC	7501	13.5	101.3
di-PPH	7783	13.0	101.2
2-Fluorobiphenyl	7340	13.5	99.09
CH_2Cl_2	—	919	—
		Total 1000	

- SS Std: Combined 20.0 µL of the above intermediate soln with 950 µL of CH_2Cl_2 and 10.0 µL of a 2000 $\frac{\mu g}{mL}$ IS soln.

$$* - [\ ]_{Intr\ soln} = \frac{[\ ]_{stk}\left(\frac{\mu g}{mL}\right) \times \text{Aliquot}(\mu L)}{1000\ \mu L}$$

- Prepared an IS soln by combining 1000 µL of CH_2Cl_2 and 10.0 µL of the 2000 $\frac{\mu g}{mL}$ IS soln.

CH_2Cl_2: EM Science, Lot # 39194

Hamilton syringes were used in preparing these solns.

11/18/14

Balance: # 4338 ✓ wt set: EPA-K-5

trans-4-methyl-1-cyclohexane carboxylic acid (MCHC) 20 mg ⇒ 0.0200 g

Aldrich, Lot # 06705JEV, 98%

Amount in tared amber vial: 0.0234 g, dissolved in 5.0 mL CH_2Cl_2 (EMScience, # 39194)

$$[MCHC] = \frac{0.0234\,g \times 0.98}{5.00\,mL} \times \frac{1 \times 10^6\,\mu g}{g} = 4586\ \frac{\mu g}{mL}$$

Name	Project No.	Location	64405
[redacted]	RP1582		Date: 9/16/14

Calibration Standards

Balance: #4338

✓ wt SOP: EPA-K-1
20 mg => 0.0200 g
20 g => 20.000 g

The following analytes were placed into individual amber vials that were tared:

Analyte	Manufacturer ~~Manuf~~ ~~Dil. 9/16/14~~	Lot #	Purity	Amount (g)	① [Analyte] µg/mL
MCHM	TCI	RCGNA-PT	>98.0%	0.0561	9163
PPH	Aldrich	MKBK0424V	≥ 93%	0.0527	8168
di-PPH	Dow Chemical	2000022244	100% (assumed)	0.0650	10,830
DMCH-1,4-DC	Aldrich	MKBJ2148V	97%	0.0788	12,740
1,4-CHDM	Aldrich	MKBP6651V	99%	0.0715	② 11,600 ~~11,500~~
2-Fluorobiphenyl	Aldrich	02520TK	97%	0.0462	7469

6.000 mL of CH_2Cl_2 (EM Science, Lot # 39199) was added to each using a type-A volumetric pipet. Solution was vortex mixed and sonicated for about 10 min in a water bath.

① $[\text{Analyte}]\left(\frac{\mu g}{mL}\right) = \frac{\text{Amount (g)} \times (\text{Purity}/100\%)}{6.000\ mL\ CH_2Cl_2} \times \frac{1 \times 10^6\ \mu g}{g}$

② For 1,4-CHDM: 100 µL of acetone was added to dissolve material. Total Volume: 6,100 µL

DFTPP Soln

Using a 1000 $\frac{\mu g}{mL}$ DFTPP soln from Supelco (Lot # LC07499V) a 50.0 µL aliquot was combined with 950 µL of CH_2Cl_2

$$[\text{DFTPP}]\ \frac{\mu g}{mL} = \frac{50.0\ \mu L \times 1000\ \frac{\mu g}{mL}}{1000\ \mu L\ soln} = 50.0\ \frac{\mu g}{mL}$$

Internal Standards (IS) Solution

Obtained a semivolatile internal standard soln from Supelco (Lot # LC084427V). Analyte concentration are 2000 $\frac{\mu g}{mL}$ in CH_2Cl_2.

Name	Project No.	Location	64406
[redacted]	RP1582		Date: 9/16/14

Calibration Standards

- 100 ppm 2-fluorobiphenyl: 13.5 µl of the 7469 µg/ml 2-fluorobiphenyl soln was combined with 986.5 µl of CH_2Cl_2:

$$[2\text{-fluorobiphenyl}] = \frac{13.5\ \mu l \times 7469\ \frac{\mu g}{ml}}{1000\ \mu l\ soln} = 100.8\ \frac{\mu g}{ml}$$

- 500 ppm analyte soln: Aliquots from the analyte stock solutions were combined with 756.5 µl CH_2Cl_2.

Analyte	$[\ ]_{stk}$ (µg/ml)	Aliquot (µl)	① $[\ ]_{final}$ (µg/ml)
MCHM	9163	54.5	499.4
PPH	5168	61.0	498.2
di-PPH	10,830	46.0	498.2
DMCH-1,4-DC	12,740	39.0	496.9
1,4-CHDM	11,600	43.0	498.8
	(Total)	243.5	

$$① [\ ]_{final}\left(\frac{\mu g}{ml}\right) = \frac{[\ ]_{stk}\left(\frac{\mu g}{ml}\right) \times \text{Aliquot}\ (\mu l)}{1000\ \mu l\ \text{total volume}\ (756.5 + 243.5)}$$

All stock and mix solutions were placed in refrigerator.

9/17/14

- Blank + IS: 1000 µl of CH_2Cl_2 was combined with 10 µl of the IS soln

- Surro + IS: 125 µl of the 100 ppm 2-fluorobiphenyl soln was combined with 875 µl of CH_2Cl_2 and 10 µl of the IS soln

- Calibration standards: Aliquots from the 500 ppm analyte soln were combined with aliquots from the 100 ppm 2-fluorobiphenyl soln and CH_2Cl_2. Afterwards, 10 µl of the IS soln was added to each standard.

RP1616 [redacted] 12/15/16

Name	Project No.	Location	61493
[redacted]	RP1581		Date: 6/24/14

Sample Analysis

- 6.00 ml of a 30% THF in IPA was added to each MS vial and these samples were extracted using the process on p. 61489.

For each MS, 10.0 µl of the resulting extract was combined with 50.0 µl of the 1000 ppm FAME Mix (p. 61487) and 940 µl of CH_2Cl_2. The resulting solutions were injected into the GC/MS system.

A new CCV standard was prepared (see p. 61488) and analyzed.

6/25/14

Decided to prepare another set of MCHM stocks since the solns that were initially used for the second source evaluation were prepared in MeOH rather than CH_2Cl_2.

Balance # 4338

✓ wt set: EPA-K-1
100 mg => 0.1000 g
1 g => 1.0000 g
20 g => 20.0004 g

Into tared, 8-ml amber vials, the following neat materials were placed:

Analyte	Source	Lot #	Purity %	Amount (g)	[Analyte] µg/ml
MCHM	TCI	RCGNA-PT	98.0	0.0406	6631 ✓
PPH	Dow	2I#S0162A6	99.8	0.0502	8350 ✓
di-PPH	Dow	20060920-14	100	0.0516	8600 ✓
DMCH-1,4-DC	Aldrich	MKBJ2148V	97	0.0580	9377 ✓
1,4-CHDM	Aldrich	MKBP6651V	99	0.0420	6930 ✓
CH_2Cl_2	EM Scienc	39194	—	—	—

6.00 ml of CH_2Cl_2 was added to each vial using a type-A volumetric pipet.

[redacted]

RP1616, [redacted] 12/16/14

Name	Project No.	Location	64426
[redacted]	RP1616		Date: 10/27/14

Sample Analysis
- Screening

Balance: # 4338

V ctrset: EPA-K-5
20 mg : 0.0200 g
10 g : 10.0000 g
50 g : 49.9999 g

For the screening, aliquots of the soil sampler will be placed into empty 20 ml glass vials. DH 10/27/14.

Sample	wt of vial + cap (g)	wt of sample + vial + cap (g)	Sample wt. (g)
NE 36688	18.1904	34.8923	16.7019
NE 36689	18.3030	31.6234	13.3204
NE 36690	18.6011	36.0923	17.4912
NE 36691	18.2932	33.7989	15.5057
NE 36692	18.3652	33.2517	14.8865
NE 36693	18.5741	34.3638	15.7897
NE 36694	18.1781	34.4116	16.2335
NE 36695	18.4684	38.8351	20.3667

For each aliquot, the sample material was poured into a glass dish lined with absorbent liner w/ foil on top. Using a spatula, the soil was chopped up and aliquots were placed into the pre-weighed vial. The foil layer was removed after each sample. For each jar, the custody seal was broken and the black was removed.

Samples NE 36688, 89 + 90: Contained material as described
Sample NE 36691: Contained material as described and had a "black licorice" odor.
Sample NE 36692: contained material as described. the lentil was a thick paste that was difficult to break up into smaller sizes w/o clumping.
Sample NE 36693: contained material as described and had a slight odor of "black licorice"!

Name	Project No.	Location	64427
[redacted]	RP1616		Date: 10/27/14

Sample Analysis
- Screening:

NE 36694: Sample contained material as described. Consistency was a thick paste that easily clumped together making it difficult to break up into smaller pieces.

NE 36695: Sample contained material as described. Texture was a thick wet paste that was difficult to break up into smaller pieces w/o clumping.

10/28/14

Balance: # 4338

✓ wt set: EPA-K-5
20 mg => 0.0200 g
10 g => 10.0000 g
50 g => 49.9996 g

Aliquots from the samples received on 10/28/14 will be placed in empty vials

Sample	wt of vial+cap (g)	wt of sample, vial+cap (g)	wt of sample (g)
RB01 (5247)	18.0580	30.6864	12.6284 ✓
RB02 (5244)	18.4981	32.9347	14.4366 ✓
RB03 (5237)	18.0226	33.5941	DLH 10/28/14 ~~15.3681~~ 15.5715 ✓
RB04 (4998)	18.1445	33.2056	15.0611 ✓
BLK	18.0086	—	—

10/29/14

5 IPA swabs were prepared by soaking 2"x4" gauze pads in IPA (Fisher, Lot# 096908)

4 swabs will be used to sample ~~in~~ the interior surface of the pipe. DLH, 10/29/14

Removed pipe from plastic bag and was able to scrap out residue material from both ends. Swabs were also taken at each end.

Name	Project No.	Location	64431
[redacted]	RP1616		Date: 10/29/14

Sample Screening

- Balance: #4338

✓ wt scale EPA-K-5
20 mg => 0.0200g
10 g => 9.9999g
50 g => 49.9994g

Aliquots from the pipe residue materials were placed in 20 ml glass vials.

Sample	wt of vial + cap (g)	wt of sample, vial, cap (g)	Sample wt (g)
5851 (round)	18.1096	21.0690	2.9594
5851 (flat)	17.9775	24.1096	6.1321

Methylene chloride (EM Science, Lot# 39194) was added to each sample

Sample	CH_2Cl_2 added (ml)
5851 (round) swab	20.00
5851 (flat) swab	20.00
BLK swab	20.00
5247 (RB01)	10.00
5244 (RB02)	10.00
5237 (RB03)	10.00
4998 (RB04)	10.00
NE36695	10.00
BLK	10.00
5851 (round)	10.00
5851 (flat)	10.00
NE36688	10.00
NE36689	10.00
NE36690	10.00
NE36691	10.00
NE36692	10.00
NE36693	10.00
NE36694	10.00

DH, 10/29/14

~~Ex~~ Extraction:

#1: Added CH_2Cl_2 to sample, mixed vial contents then sonicated for 30 min. Removed extract.

#2 Added 2nd CH_2Cl_2 aliquot, mixed vial contents, sonicated for 30 min. Will ~~be~~ let CH_2Cl_2 soak overnight and then sonicate for another 30 min. DH 10/30/14

(excluding swab samples)

Name	Project No.	Location	64432
[redacted]	RP1616		Date: 10/30/14

Sample Analysis

Screening: Sonicated soaking samples for another 30 min then removed extracts.

Each extract from both extractions sets were placed in a 12-mL glass vial containing $Na_2SO_{4(s)}$ to remove any residual water that may be present. For the swab extracts, these were transferred to a 40-mL amber bottles.

For each extract, except for the two from NE36693, 100 µL of extraction liquid was combined with 900 µL of CH_2Cl_2 and the resulting soln was injected into the GC/MS system.

For NE36693, both extracts were very dark, ∴ an initial dilution of 100 µL of the extract was combined with 900 µL of CH_2Cl_2. A 10 µL aliquot from this solution was combined w/ 1000 µL of CH_2Cl_2 and these 1000x diluted sample extracts were injected into the GC/MS.

For NE36692, the sample clumped up after hand shaking the vial on the initial extraction. The resulting extracts were very clear. ∴ a spatula was used to break up the clumps and ~5 mL of CH_2Cl_2 was added and the sample was sonicated for ~30 min. The extract was a yellow color, so this extract will be analyzed as well.

- A 50 ppm analyte standard was prepared from a 500 ppm analyte soln, (see p. 64466)
- A 50 ppm DFTP soln was prepared from a 1000 ppm DFTP soln pre-made soln (see p. 64405).
- Both solns were injected with the extract solns.

Name	Project No.	Location	64439
[redacted]	RP1616		Date: 11/10/14

Sample Analysis

- 2 oz glass jars will be used in extracting the soil samples. Since the balance verification was already done, the following weights were observed for the extraction jars:

Sample	wt of jar + cap (g)	wt of sample + jar + cap (g) ①	Sample Amount (g)
Extraction Blk	90.9860	~~116.2464~~ 116.2464 DAT 11/13/14	—
RB01	91.2522	~~116.4720~~ 116.4720 DAT 11/13/14	23.4942
RB02	90.9383	116.~~5621~~ 5620 DAT 11/13/14	25.5337
RB03	91.0626	116.5671	25.5045
RB04	90.9744	119.0721	28.0977
NE 36695	91.4287	113.6646	22.2359
NE 36688	91.0653	116.6489	25.5836
NE 36689	91.2445	118.8620	27.6175
NE 36690	91.3313	118.1937	26.8624
NE 36691	91.4709	118.3993	26.9284
NE 36693	91.7744	113.6641	21.8897
NE 36694	91.8183	118.0761	26.2578
NE 36692-A	91.4999	117.9726	26.4727
NE 36692-B	91.0690	114.4300	23.3610
NE 36692-C	91.6891	114.5168	22.8277
NE 36692-MS	91.0672	113.5325	22.4653
100g ✓ wt	99.9985	99.9980	—

① - Balance: #4338

11/13/14
✓ wt set: EPA-1K-5
20mg ⇒ 0.0200g
2g ⇒ 2.0000g
20g ⇒ 19.9997

Aliquots of each soil sample was obtained using the process from the sample screening (see p. 64426), and the jars containing the aliquots were weighed as recorded above.

Name	Project No.	Location	64440
[redacted]	RP1616		Date: 11/13/14

Sample Analysis

As for the pipe, took two soil samples (1 interior, 1 exterior) and 3 IPA swabs in the interior and center of pipe. These were also placed in 2 oz glass jars. For the solid samples:

Sample	wt of jar + cap (g)	wt of sample + jar + cap (g)	Sample Amount (g)
Interior Material	91.6958	96.4167	4.7209
Exterior "	90.9847	107.0442	16.0595

The exterior material was mainly soil that was still present on the pipe surface.

- To the NE 36692-MS sample, the following std soil aliquots were added

Analyte	[ ] std µg/mL	Aliquot (ml)
MCHM	6762	5.0
PPM	6836	2.0
di-PPM	8300	4.0

- To all samples, except the extraction + swab blanks, 20.0 ml of the 7081 µg/mL surrogate std soil was added.

- To all samples, except for RB01, RB02, RB03 and RB04, add 10.0 ml of CH_2Cl_2 (EM Science, Lot # 39194) using a type A, glass pipet.

- To RB01, RB02, RB03 and RB04, 15.0 ml of CH_2Cl_2 was added. Initially 10.0 ml was added to each, but the sample seemed to soak up a majority of the solvent. The additional 5.0 ml aliquot seemed to saturate these samples w/ CH_2Cl_2.

Name	Project No.	Location	64441
[redacted]	RP1616		Date: 11/13/14

Sample Analysis

After the CH_2Cl_2 addition, each jar was turned on its side and carefully rotated ~~at~~ DH 11/13/14. The jars were then sonicated for 30 min in a water bath and then placed in a locked cart.

11/14/14

After about 14 hours of solvent soaking, the jars were turned on their sides and carefully rolled and then placed in a sonication bath for 30 min.

- Prepared a CCV standard soln by combining 20.0 µl of the 100 ppm intermediate soln (see p. 64437) with 950 µl of CH_2Cl_2 and 10.0 µl of the 2000 ppm IS solution (see p. 64433)

- Prepared an IS soln by combining 1000 µl of CH_2Cl_2 and 100 µl of the 2000 ppm IS soln.

  CH_2Cl_2: EM Science, Lot# 39194

- Removed each extract from its extraction jar and placed in a 12 mL glass vial containing Na_2SO_4 (s) to remove residual water

- For both water extracts, 450 µl of the extraction soln was combined with 50 µl of CH_2Cl_2 and 5 µl of the 2000 ppm IS soln. (see p. 64442 for the extraction of these samples).

- For NE36671 and NE36693, 50 µl of the extraction soln was combined with 450 µl of CH_2Cl_2 and 5 µl of the 2000 ppm IS soln. (10x dilution)

- For the remaining extracts, 500 µl of each was combined with 5 µl of the 2000 ppm IS soln.

- All extracts (diluted + undiluted) /IS soln were analyzed.

Name	Project No.	Location	64442
[redacted]	RP1616		Date: 11/13/14

Sample Analysis

- For the water samples (NE 36686 and NE 36687), a 10.0 ml aliquot of each solution was extracted with 1.00 ml of CH_2Cl_2. A 2.0 µl aliquot of the 70% µg/ml surrogate soln in CH_2Cl_2 was added to each 10 ml aliquot before extraction. The extracts were prepared for analysis as discussed on p. 64441.

11/18/14

Based on the results from the first sample run, extracts from NE 36691 and NE 36693 were prepared a second time:

- NE 36691: 5 µl of the extract was combined w/ 495 µl of CH_2Cl_2 and ~~10~~ 5 µl of the IS soln (2000 ppm). DH 11/18/14
- NE 36693: 500 µl of the extract was combined w/ 5 µl of the IS soln (2000 ppm).

In addition, the following solns were prepared and analyzed with these extracts

- CCV: Combined 20 µl of the 100 ppm intermediate soln (p. 64437) with 980 µl of CH_2Cl_2 and 10 µl of the IS soln (2000 ppm).
- IS: Combined 1000 µl of CH_2Cl_2 with 10 µl of the IS soln (2000 ppm).
- MCHC: Combined 2 µl of the MCHC std soln (p. 64438) with 1000 µl of CH_2Cl_2 and 10 µl of the IS soln (2000 ppm).
- DRO: A 5 ppm diesel range organics (DRO) solution was prepared by combining 50 µl of a 50 ppm DRO soln (see copy of p. 60167) with 450 µl of CH_2Cl_2 and 5 µl of the IS soln (2000 ppm).

Name	Project No.	Location	64443
[redacted]	RP1616		Date: 11/18/14

Sample Analysis

- B/N : A 10 ppm base/neutrals (B/N) soln was prepared by combining 10 µl of a 1000 ppm B/N soln (Supelco, Lot# LB77103) with 990 µl of CH_2Cl_2 and 10 µl of the IS soln (2000 ppm).

The three solns (MCHC, DRO and B/N) will be used to tentatively identify compounds, in addition to the target analytes, in the sample extracts.

One observation worth noting, during the preparation of the MCHC stock soln (p. 64438), I noticed a distinctive odor similar to black licorice.

END

[redacted]

12/4/14

Certificate of Analysis

Apr 10, 2014 (JST)

TOKYO CHEMICAL INDUSTRY CO.,LTD.
4-10-1 Nihonbashi-Honcho, Chuo-ku, Tokyo 103-0023 Japan

Chemical Name: 4-Methyl-1-cyclohexanemethanol (cis- and trans- mixture) (MCHM)		
Product Number: M1412 CAS: 34885-03-5	Lot: RCGNA	

Tests	Results	Specifications
Purity(GC)	99.8 %	min. 98.0 %(total of isomers)
Specific gravity (20/20)	0.9156	0.9150 to 0.9190
Refractive index n20/D	1.4623	1.4610 to 1.4640

TCI Lot numbers are 4-5 characters in length.
Characters listed after the first 4-5 characters are control numbers for internal purpose only.

Customer service:

TCI AMERICA
Tel: +1-800-423-8616 / +1-503-283-1681
Fax: +1-888-520-1075 / +1-503-283-1987
E-mail: Sales-US@TCIchemicals.com

[redacted] RP1616 12/16/2014

SIGMA-ALDRICH®

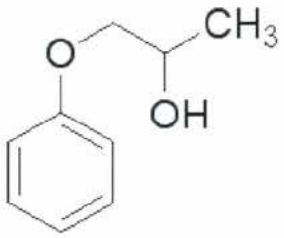
sigma-aldrich.com

3050 Spruce Street, Saint Louis, MO 63103, USA
Website: www.sigmaaldrich.com
Email USA: techserv@sial.com
Outside USA: eurtechserv@sial.com

Certificate of Analysis

Product Name:
1-Phenoxy-2-propanol - ≥93% (PPM)

Product Number:	**484423**
Lot Number:	**MKBK0424V**
Brand:	ALDRICH
CAS Number:	770-35-4
MDL Number:	MFCD00016861
Formula:	C9H12O2
Formula Weight:	152.19 g/mol
Quality Release Date:	09 FEB 2012



Test	Specification	Result
Appearance (Color)	Colorless	Colorless
Appearance (Form)	Liquid	Liquid
Infrared spectrum	Conforms to Structure	Conforms
Purity (GC)	≥ 93.0 %	99.8 %
Impurity	≤ 7 %	< 1 %
Dipropylene Glycol Phenyl Ether		
Impurity	≤ 0.1 %	< 0.1 %
Phenol		
Color Test	≤ 50 APHA	4 APHA
Water (by Karl Fischer)	≤ 0.35 %	0.01 %
Vendor Information	Confirmed	Conforms
Product of Dow Chemical		

[redacted]

Quality Control
Milwaukee, Wisconsin US

Sigma-Aldrich warrants, that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current Specification sheet may be available at Sigma-Aldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.

[redacted] RP1616 12/16/2014

Certificate 6329745 The Dow Chemical Company Page 1

Date: 10/15/2013 Certificate of Analysis

Cust P.O.: 48259 Dlvy Note: 72258667 10
Cust Ref: Order No.: 19026078

Material: DOWANOL* PPH GLYCOL ETHER
Cust Mtl:
Batch: 2I0501GIA0
Vehicle: (B)
Ship from: THE DOW CHEMICAL COMPANY DEER PARK TX UNITED STATES

This material meets the requirements of the specification.

Feature	Units	Results 2I0501GIA0	Limits Minimum	Maximum	Method
Assay	% wt	99.8	99.5	----	DOWM 100205
Phenol	ppm	0	----	200	DOWM 100205
Di-PPH as Dipropylene Glycol Phenyl Ether	% wt	0.00	----	0.10	DOWM 100205
Water	% wt	0.01	----	0.10	ASTM E203
Color Pt-Co	-	5	----	10	ASTM D5386
Appearance		Passes			DOWM 101967

Product conforms to the following typical properties: g:
Specific Gravity @ 20/20 degC 1.045-1.075 ASTM D4052

Quality Coordinator
Oxide Derivatives

For inquiries please contact Customer Service at 1-800-232-2436 (USA).

* Trademark of The Dow Chemical Company

THIS IS A TRUE COPY
OF THE ORIGINAL DATA
INITIAL/DATE: CAC 5-12-14

[redacted] RP1616 12/16/2014

SIGMA-ALDRICH®

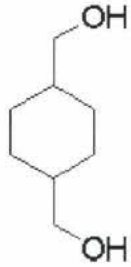
sigma-aldrich.com

3050 Spruce Street, Saint Louis, MO 63103, USA
Website: www.sigmaaldrich.com
Email USA: techserv@sial.com
Outside USA: eurtechserv@sial.com

Certificate of Analysis

Product Name:
1,4-Cyclohexanedimethanol - mixture of cis and trans, 99% (1,4-CHDM)

Product Number:	**125598**
Batch Number:	**MKBP6651V**
Brand:	ALDRICH
CAS Number:	105-08-8
MDL Number:	MFCD00001512
Formula:	C8H16O2
Formula Weight:	144.21 g/mol
Quality Release Date:	28 JUN 2013



Test	Specification	Result
Appearance (Color) White to Off-White Solid or Colorless to Pale Yellow Liquid	Conforms to Requirements	White
Appearance (Form) Solid or Liquid	Conforms to Requirements	Solid
Infrared spectrum	Conforms to Structure	Conforms
GC Purity (sum of isomers)	≥ 98.5 %A	99.3 %A

[redacted]

[redacted], Manager
Quality Control
Milwaukee, Wisconsin US

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[redacted] RP1616 12/16/2014

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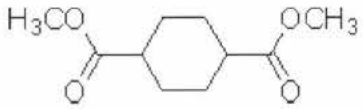
3050 Spruce Street, Saint Louis, MO 63103, USA
Website: www.sigmaaldrich.com
Email USA: techserv@sial.com
Outside USA: eurtechserv@sial.com

Certificate of Analysis

Product Name:
Dimethyl cyclohexane-1,4-dicarboxylate, mixture of cis and trans - 97% (DM-1,4-DC)

Product Number:	**206431**
Lot Number:	**MKBJ2148V**
Brand:	ALDRICH
CAS Number:	94-60-0
MDL Number:	MFCD00001460
Formula:	C10H16O4
Formula Weight:	200.23 g/mol
Quality Release Date:	16 NOV 2011



Test	Specification	Result
Appearance (Color)	Colorless	Colorless
Appearance (Form)	Liquid	Liquid
Infrared spectrum	Conforms to Structure	Conforms
GC Purity (sum of isomers)	≥ 96.5 %A	99.6 %A

[redacted]

[redacted], Manager
Quality Control
Milwaukee, Wisconsin US

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[redacted] RP1616 12/16/2014

RECORD OF CUSTODY

TEST MATERIAL NAME__Dipropylene Glycol Phenyl Ether (DiPPh)_____

LOT NUMBER: _____200602920-14_____

PHYSICAL STATE:____Liquid_____

STORAGE CONDITIONS: Ambient

AMOUNT SUBMITTED: 26.77g **(net)**

SENT BY: [redacted] DATE: 4-30-14

RECEIVED BY: [redacted] DATE: 5-1-14

PRINTED NAME: [redacted]

KEEP THE SIGNED ORGINAL FOR YOUR RECORDS AND RETURN A VERIFIED EXACT COPY TO:

[redacted]
Dow Chemical Company
1803 Building
Midland, MI 48674
Phone (989)638-7032 FAX (989)638-9305

Certificate of Analysis

SIGMA-ALDRICH

Product Name	2-Fluorobiphenyl, 96%
Product Number	102741
Product Brand	ALDRICH
CAS Number	321-60-8
Molecular Formula	$C_6H_5C_6H_4F$
Molecular Weight	172.20

TEST	SPECIFICATION	LOT 02520TK RESULTS
APPEARANCE	WHITE TO OFF-WHITE CRYSTALS OR CRYSTALLINE	OFF-WHITE CRYSTALS
MELTING POINT		73 DEGREES CELSIUS
INFRARED SPECTRUM	CONFORMS TO STRUCTURE AND STANDARD AS ILLUS- TRATED ON PAGE 1020C OF EDITION I, VOLUME 1 OF "THE ALDRICH LIBRARY OF FT-IR SPECTRA".	CONFORMS TO STRUCTURE AND STANDARD AS ILLUS- TRATED ON PAGE 1020C OF EDITION I, VOLUME 1 OF "THE ALDRICH LIBRARY OF FT-IR SPECTRA".
GAS LIQUID CHROMATOGRAPHY	96.5% (MINIMUM)	98.4%

[redacted]

Quality Control
Milwaukee, Wisconsin USA

Used 97% value written on bottle label

[redacted]
10/15/14

RP1616 12/16/2014

TraceCERT®
Traceable Certified Reference Materials

SUPELCO
Solutions within.™
595 North Harrison Road · Bellefonte, PA
16823-0048 USA · Phone(814)359-3441

Certificate of Analysis

Description: Semivolatile Internal Std Mix, 5x1ml, 2000µg/ml in dichloromethane

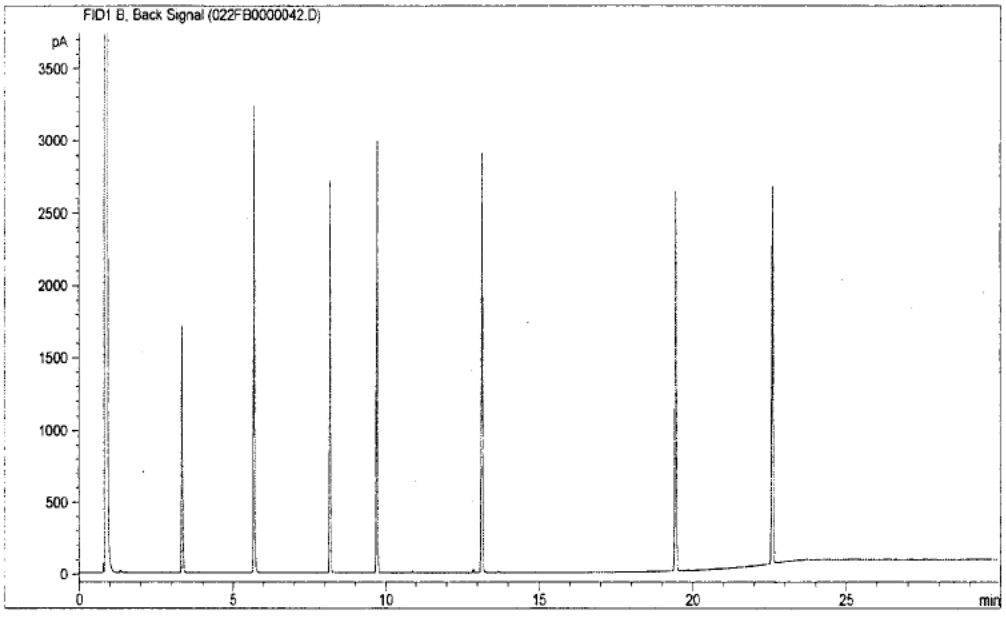
Part Number: CRM5M07296

Lot Number: LC08427V

Expiration Date: June 2017

Storage: Refrigerate

Analytical Method Parameters:
Column: SPB-5 30m x .53mm x 1.5um
100°C (2min) to 310°C (8 min) @ 10°C/min
Detector: FID, 310°C
Injection Volume: 1.0µL



Elution	Analyte	Lot Number	CAS Number	Certified Purity %	Certified Gravimetric Conc. µg/ml	Expanded Uncertainty µg/ml	Analytical Conc. µg/ml
1.	1,4-Dichlorobenzene-D4, CRM	LB94999	3855-82-1	99.9	1998.2	±25.6	2081.9
2.	Naphthalene-D8, CRM	LB94261	1146-65-2	96.3	2000.4	±11.5	2159.1
	Internal Standard	N/A	N/A	N/A	N/A	N/A	N/A
4.	Acenaphthene-D10, CRM	LB93879	15067-26-2	99.8	1998.1	±7.2	2138.1
5.	Phenanthrene-D10, CRM	LB95000	1517-22-2	98.7	1974.4	±16.8	2082.9
6.	Chrysene-D12, CRM	LB93880	1719-03-5	98.8	1976.2	±19.7	1971.7
7.	Perylene-D12, CRM	LB95001	1520-96-3	99.7	1994.2	±19.7	2094.1

ACLASS ACCREDITED TESTING Cert# AT-1607

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER Cert# AR-1606

Produced in double accredited laboratory fulfulling
ISO/IEC 17025 and
ISO Guide 34

SIGMA-ALDRICH®

RP1616 12/16/2014

Certificate of Analysis

SIGMA-ALDRICH

Product Name	*trans*-4-Methyl-1-cyclohexanecarboxylic acid, 98% (MCHC)
Product Number	331600
Product Brand	ALDRICH
CAS Number	13064-83-0
Molecular Formula	$CH_3C_6H_{10}CO_2H$
Molecular Weight	142.20

TEST	LOT 06705JEV RESULTS
APPEARANCE	WHITE CRYSTALS
INFRARED SPECTRUM	CONFORMS TO STRUCTURE.
TITRATION	100.6% (WITH NAOH)
GAS LIQUID CHROMATOGRAPHY	99.7%
QUALITY CONTROL ACCEPTANCE DATE	JULY 2006

[redacted]
Quality Control
Milwaukee, Wisconsin USA

Certificate of Analysis

DESCRIPTION: DRO Calibration Mix

CATALOG NO.: 861287 MFG DATE: Dec-2008

LOT NO.: LB63892 EXPIRATION DATE: Dec-2011

SOLVENT: HEXANE

ANALYTE (1)	CAS NUMBER	PERCENT PURITY(2)	WEIGHT(3) CONCENTRATION	ANALYTICAL(4) CONCENTRATION		STD DEV	SUPELCO LOT NO
CHLOROBENZENE	108-90-7	99.9	500.0	519.0	+/-	5.57	LB47920
N-DECANE	124-18-5	99.7	500.0	510.0	+/-	1.90	LB49351
N-DOCOSANE	629-97-0	99.9	500.0	523.6	+/-	5.14	LB31603
N-DODECANE	112-40-3	99.6	501.0	503.4	+/-	0.49	LB48667
N-EICOSANE	112-95-8	99.6	500.5	516.9	+/-	4.97	LB53790
N-HEXACOSANE	630-01-3	99.9	501.0	522.7	+/-	4.74	LB54320
N-HEXADECANE	544-76-3	99.7	500.5	511.9	+/-	0.50	LB38914
N-OCTACOSANE	630-02-4	99.9	500.5	516.5	+/-	4.27	LB59079
N-OCTADECANE	593-45-3	99.7	500.5	521.7	+/-	3.02	LB59543
N-TETRACOSANE	646-31-1	99.9	500.5	523.3	+/-	3.18	LB52639
N-TETRADECANE	629-59-4	99.9	500.0	508.4	+/-	0.49	LB58771
O-TERPHENYL	84-15-1	99.9	500.0	512.6	+/-	2.71	LB45120

(1) Listed in alphabetical order.
(2) Determined by capillary GC-FID, unless otherwise noted.
(3) NIST traceable weights are used to verify balance calibration with the preparation of each lot. Concentration of analyte in solution is ug/ml +/- 0.5%, uncertainty based upon balance and Class A volumetric glassware. Weights are corrected for analytes less than 98% pure.
(4) Determined by chromatographic analysis against an independently prepared reference lot. Mean of replicate injections.

[redacted]

Quality Control Supervisor

Supelco warrants that its products conform to the information contained in this publication. Purchaser must determine the suitability of the product for its particular use. Please see the latest catalog or order invoice and packing slip for additional terms and conditions of sale.

SUPELCO
595 North Harrison Road
Bellefonte, PA 16823-0048 USA
Phone (814) 359-3441

Certificate of Composition

DESCRIPTION: US EPA

QUOTE 21272078 LOT NO.: LB77103 MFG DATE: Jun-2010

SOLVENT: BENZENE, 99.9+% 20 %
METHYLENE CHLORIDE 80 %

ANALYTE (1)	CAS NUMBER	PERCENT PURITY (2)	WEIGHT CONCENTRATION (3)			SUPELCO LOT NO
ACENAPHTHENE	83-32-9	99.9	1000	+/-	5.0	LB59548
ACENAPHTHYLENE	208-96-8	99.7	1000	+/-	5.0	LB44362
ANTHRACENE	120-12-7	99.9	1000	+/-	5.0	LB56168
AZOBENZENE	103-33-3	99.9	1000	+/-	5.0	LB64683
BENZO (A) ANTHRACENE	56-55-3	99.9 (a)	1000	+/-	5.0	LB69520
BENZO (A) PYRENE	50-32-8	99.2 (a)	1000	+/-	5.0	LB67003
BENZO (B) FLUORANTHENE	205-99-2	99.9	1000	+/-	5.0	LB63048
BENZO (G,H,I) PERYLENE	191-24-2	99.6	1000	+/-	5.0	LB62550
BENZO (K) FLUORANTHENE	207-08-9	99.5	1000	+/-	5.0	LB67001
BENZYL ALCOHOL	100-51-6	99.9	1002	+/-	5.0	LB48374
BENZYL BUTYL PHTHALATE	85-68-7	98.6	1000	+/-	5.0	LB60340
BIS (2-CHLOROETHOXY) METHANE	111-91-1	98.5	1000	+/-	5.0	LB71304
BIS (2-CHLOROETHYL) ETHER	111-44-4	99.9	1000	+/-	5.0	LB33319
BIS (2-CHLOROISOPROPYL) ETHER	108-60-1	97.5	1000	+/-	5.0	LB72187
BIS (2-ETHYLHEXYL) PHTHALATE	117-81-7	99.7	1000	+/-	5.0	LB58359
CARBAZOLE	86-74-8	99.9	1000	+/-	5.0	LB60643
CHRYSENE	218-01-9	99.9	1000	+/-	5.0	LB65398
DI-N-BUTYL PHTHALATE	84-74-2	99.9	1000	+/-	5.0	LB36679
DI-N-OCTYL PHTHALATE	117-84-0	99.2	1000	+/-	5.0	LB44969

(1) Listed in alphabetical order.
(2) Determined by capillary GC-FID, unless otherwise noted.
a) HPLC UV-254NM
(3) NIST traceable weights are used to verify balance calibration with the preparation of each lot. Concentration of analyte in solution is ug/ml +/- 0.5%, uncertainty based upon balance and Class A volumetric glassware. Weights are corrected for analytes less than 98% pure.

[redacted]

QA Manager

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SUPELCO
595 North Harrison Road • Bellefonte, PA
16823-0048 USA • Phone (814) 359-3441

Certificate of Composition

DESCRIPTION: US EPA

QUOTE 21272078 LOT NO.: LB77103 MFG DATE: Jun-2010

SOLVENT: BENZENE, 99.9+% 20 %
METHYLENE CHLORIDE 80 %

ANALYTE (1)	CAS NUMBER	PERCENT PURITY (2)	WEIGHT CONCENTRATION (3)			SUPELCO LOT NO
DIBENZ (A,H) ANTHRACENE	53-70-3	99.9	1000	+/-	5.0	LB51320
DIBENZOFURAN	132-64-9	98.4	1000	+/-	5.0	LB53140
DIETHYL PHTHALATE	84-66-2	99.2	1000	+/-	5.0	LB60384
DIMETHYL PHTHALATE	131-11-3	99.9	1000	+/-	5.0	LB30494
FLUORANTHENE	206-44-0	99.5	1000	+/-	5.0	LB36331
FLUORENE	86-73-7	99.6	1000	+/-	5.0	LB04916
HEXACHLOROBENZENE	118-74-1	99.9	1000	+/-	5.0	LB60010
HEXACHLOROBUTADIENE	87-68-3	96.7	1000	+/-	5.0	LB63273
HEXACHLOROCYCLOPENTADIENE	77-47-4	96.1	1000	+/-	5.0	LB43550
HEXACHLOROETHANE	67-72-1	99.9	1000	+/-	5.0	LB29072
INDENO (1,2,3-CD) PYRENE	193-39-5	99.9	1000	+/-	5.0	LB59565
ISOPHORONE	78-59-1	99.1	1000	+/-	5.0	LB45460
N-NITROSODI-N-PROPYLAMINE	621-64-7	99.9	1000	+/-	5.0	LB68998
N-NITROSODIMETHYLAMINE	62-75-9	99.9	1000	+/-	5.0	LB56172
N-NITROSODIPHENYLAMINE	86-30-6	98.6	1002	+/-	5.0	LB17295
NAPHTHALENE	91-20-3	99.4	1000	+/-	5.0	LB59563
NITROBENZENE	98-95-3	99.9	1000	+/-	5.0	LB47070
PHENANTHRENE	85-01-8	99.1	1000	+/-	5.0	LB68872
PYRENE	129-00-0	96.6	1000	+/-	5.0	LA74472

(1) Listed in alphabetical order.
(2) Determined by capillary GC-FID, unless otherwise noted.
a) HPLC UV-254NM
(3) NIST traceable weights are used to verify balance calibration with the preparation of each lot. Concentration of analyte in solution is ug/ml +/- 0.5%, uncertainty based upon balance and Class A volumetric glassware. Weights are corrected for analytes less than 98% pure.

[redacted]

QA Manager

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SUPELCO
Analytical
595 North Harrison Road • Bellefonte, PA
16823-0048 USA • Phone (814) 359-3441

Certificate of Composition

DESCRIPTION: US EPA

QUOTE 21272078 LOT NO.: LB77103 MFG DATE: Jun-2010

SOLVENT: BENZENE, 99.9+% 20 %
METHYLENE CHLORIDE 80 %

ANALYTE (1)	CAS NUMBER	PERCENT PURITY (2)	WEIGHT CONCENTRATION (3)			SUPELCO LOT NO
PYRIDINE (LOW WATER)	110-86-1	99.9	1004	+/-	5.0	LB52622
1,2-DICHLOROBENZENE	95-50-1	99.9	1000	+/-	5.0	LA96474
1,2,4-TRICHLOROBENZENE	120-82-1	99.5	1000	+/-	5.0	LB48083
1,3-DICHLOROBENZENE	541-73-1	99.9	1000	+/-	5.0	LA72024
1,4-DICHLOROBENZENE	106-46-7	99.9	1000	+/-	5.0	LB69983
2-CHLORONAPHTHALENE	91-58-7	99.4	1000	+/-	5.0	LB48170
2-METHYLNAPHTHALENE	91-57-6	98.3	1004	+/-	5.0	LB44448
2,4-DINITROTOLUENE	121-14-2	96.0	1000	+/-	5.0	LB46632
2,6-DINITROTOLUENE	606-20-2	99.9	1000	+/-	5.0	LB60882
4-BROMOPHENYLPHENYL ETHER	101-55-3	98.8	1000	+/-	5.0	LB63786
4-CHLOROPHENYLPHENYL ETHER	7005-72-3	99.9	1000	+/-	5.0	LB72185

(1) Listed in alphabetical order.
(2) Determined by capillary GC-FID, unless otherwise noted.
a) HPLC UV-254NM
(3) NIST traceable weights are used to verify balance calibration with the preparation of each lot. Concentration of analyte in solution is ug/ml +/- 0.5%, uncertainty based upon balance and Class A volumetric glassware. Weights are corrected for analytes less than 98% pure.

[redacted]

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SUPELCO
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Certificate of Analysis

DESCRIPTION: Decafluorotriphenylphosphine (DFTPP)

CATALOG NO.: 47941 MFG DATE: Apr-2014

LOT NO.: LC07494 EXPIRATION DATE: Apr-2017

SOLVENT: ACETONE

ANALYTE	CAS NUMBER	PERCENT PURITY(1)	WEIGHT(2) CONCENTRATION	ANALYTICAL(3) CONCENTRATION		STD DEV	SUPELCO LOT NO
DFTPP	5074-71-5	99.1	1001	1023	+/-	6.8	LB70119

(1) Determined by capillary GC-FID, unless otherwise noted.

(2) NIST traceable weights are used to verify balance calibration with the preparation of each lot. Concentration of analyte in solution is ug/ml +/- 0.5%, based upon balance and Class A volumetric glassware tolerances. Weights are corrected for analytes less than 98% pure.

(3) Determined by chromatographic analysis against an independently prepared reference lot. Mean of replicate injections.

[redacted]

Quality Manager

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Bellefonte, PA 16823-0048 USA
Phone (814) 359-3441

RP 1616 [redacted] 12/16/14

INSTRUMENT CONTROL PARAMETERS: EnvQnt

D:[redacted]r\GCMS\1\METHODS\RP1616[redacted].M
Tue Dec 16 16:50:51 2014

Control Information

Sample Inlet : GC
Injection Source : GC ALS
Injection Location: Front
Mass Spectrometer : Enabled

No Sample Prep method has been assigned to this method.

GC	
Oven	
Temperature	
Setpoint	On
(Initial)	50 °C
Hold Time	3 min
Post Run	50 °C
Program	
#1 Rate	25 °C/min
#1 Value	200 °C
#1 Hold Time	0 min
#2 Rate	10 °C/min
#2 Value	300 °C
#2 Hold Time	4 min
Equilibration Time	0.5 min
Max Temperature	325 °C
Maximum Temperature Override	Disabled
Slow Fan	Disabled
Cryo	Off
ALS	
Front Injector	
Syringe Size	10 µL
Injection Volume	1 µL
Injection Repetitions	1
Injection Delay	0 sec
Solvent A Washes (PreInj)	2
Solvent A Washes (PostInj)	2
Solvent A Volume	8 µL
Solvent B Washes (PreInj)	4
Solvent B Washes (PostInj)	3
Solvent B Volume	8 µL
Sample Washes	2
Sample Wash Volume	8 µL
Sample Pumps	3
Dwell Time (PreInj)	0 min
Dwell Time (PostInj)	0 min
Solvent Wash Draw Speed	300 µL/min
Solvent Wash Dispense Speed	3000 µL/min
Sample Wash Draw Speed	300 µL/min
Sample Wash Dispense Speed	3000 µL/min
Injection Dispense Speed	6000 µL/min
Viscosity Delay	0 sec
Sample Depth	Disabled

Sample Overlap	
Mode	Sample overlap is not enabled
ALS Errors	Pause for user interaction
Front SS Inlet He	
	Excluded from Affecting GC's Readiness State
Mode	Splitless
Heater	On 250 °C
Pressure	On 27.534 psi
Total Flow	On 34.265 mL/min
Septum Purge Flow	On 3 mL/min
Gas Saver	On 20 After 5 min mL/min
Purge Flow to Split Vent	30 mL/min at 2.5 min
Back SS Inlet He	
	Excluded from Affecting GC's Readiness State
Mode	Split
Heater	Off
Pressure	Off
Total Flow	Off
Septum Purge Flow	On 3 mL/min
Thermal Aux 2 (MSD Transfer Line)	
Temperature	
Setpoint	On
(Initial)	280 °C
Post Run	0 °C
	Excluded from Affecting GC's Readiness State
Column	
Column #1	
Flow	
Setpoint	Off
(Initial)	1.2651 mL/min
Post Run	0.31794 mL/min
Agilent 19091S-577UI: 2689.34800	
HP-5MS UI	
-60 °C–325 °C (325 °C): 20 m x 180 µm x 0.18 µm	
In	Front SS Inlet He
Out	Front Detector µECD
(Initial)	50 °C
Pressure	27.534 psi
Flow	1.2651 mL/min
Average Velocity	43.186 cm/sec
Holdup Time	0.77185 min
Column Outlet Pressure	0 psi
Front Detector µECD	
	Excluded from Affecting GC's Readiness State
Heater	Off
Makeup Flow	Off
Electrometer	On
Aux EPC 1,2,3	
Aux EPC 1 He	
Pressure	
Setpoint	Off
(Initial)	10 psi
Post Run	0 psi

Excluded from Affecting GC's Readiness State

Aux EPC 2 He
Pressure

Setpoint	Off
(Initial)	10 psi
Post Run	0 psi

Excluded from Affecting GC's Readiness State

Aux EPC 3 He
Pressure

Setpoint	Off
(Initial)	10 psi
Post Run	0 psi

Excluded from Affecting GC's Readiness State

Signals

Signal #1: Test Plot

Description	Test Plot
Details	
Save	Off
Data Rate	50 Hz
Dual Injection Assignment	Front Sample

Signal #2: Test Plot

Description	Test Plot
Details	
Save	Off
Data Rate	50 Hz
Dual Injection Assignment	Back Sample

Signal #3: Test Plot

Description	Test Plot
Details	
Save	Off
Data Rate	50 Hz
Dual Injection Assignment	Back Sample

Signal #4: Test Plot

Description	Test Plot
Details	
Save	Off
Data Rate	50 Hz
Dual Injection Assignment	Back Sample

TUNE PARAMETERS for SN: US73347311

Trace Ion Detection is OFF.

EMISSION	:	34.610
ENERGY	:	70.347
REPELLER	:	25.540
IONFOCUS	:	90.157
ENTRANCE_LE	:	0.000

```
EMVOLTS      :    1811.765
                              Actual EMV :  1600
                              GAIN FACTOR :   0.97
AMUGAIN      :    2091.000
AMUOFFSET    :     124.375
FILAMENT     :       1.000
DCPOLARITY   :       0.000
ENTLENSOFFS  :      16.314@  3    16.314@ 50    14.557@ 69    13.302@131    14.306@219    13.804@414
MASSGAIN     :    -461.000
MASSOFFSET   :     -36.000
```

END OF TUNE PARAMETERS

END OF INSTRUMENT CONTROL PARAMETERS

Single Quadrupole Acquisition Method - MS Parameters Report

Method file	D:[redacted]GCMS\1\METHODS\RP1616_[redacted]M
Tune file	dftpp_8-19-2014.u
Ion source	EI
Source temperature (°C)	230
Quad temperature (°C)	150
Fixed Electron energy (eV)	70.3
Acquisition Type	Scan
Stop time (min)	650.00
Solvent delay (min)	3.60
Trace Ion Detection	False
Gain Factor	1
EM Saver	False
EM Saver Limit	N/A

Scan Time Segments

Time	Start Mass	End Mass	Threshold	Scan Speed
3.60	35	550	150	1,562 [N=2]

Timed Events

Time	Type of Event	Parameter

Real-Time Plots

Type of Plot	Label	Low Mass	High Mass
Total Ion	N/A	N/A	N/A
Spectrum	N/A	N/A	N/A
Extracted Ion	Scan 1-1	50	550

DATA ANALYSIS PARAMETERS

Method Name: D:\[redacted]\GCMS\1\methods\RP1616_[redacted]o.M

Percent Report Settings

Sort By: Signal

Output Destination
- Screen: No
- Printer: Yes
- File: No

Integration Events: Meth Default

Generate Report During Run Method: Yes

Signal Correlation Window: 0.020

Qualitative Report Settings

Peak Location of Unknown: Apex

Library to Search	Minimum Quality
C:\Database\NIST11.L	0

Integration Events: RP1616.P

Report Type: Summary

Output Destination
- Screen: Yes
- Printer: No
- File: No

Generate Report During Run Method: Yes

Quantitative Report Settings

Report Type: Summary

Output Destination
    Screen: No
    Printer: Yes
    File: No

Generate Report During Run Method: No

RP1616-MCHM Compounds
Calibration Last Updated: Wed Nov 12 16:18:43 2014

Reference Window: 2.00 Minutes
Non-Reference Window: 1.00 Minutes
Correlation Window: 0.10 minutes
Default Multiplier: 1.00
Default Sample Concentration: 0.00

Compound Information

---

1) 1,4-Dichlorobenzene-d4 (ISTD)

Ret. Time 5.075 min., Extract & Integrate from 4.875 to 5.275 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	152.10			*** METH DEFAULT ***
Q1	150.10	159.70	20.0	*** METH DEFAULT ***
Q2	115.10	65.60	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
1-A	20.000	347711
2-A	20.000	351370
3-A	20.000	353930
4-A	20.000	362805
5-A	20.000	357035
6-A	20.000	360741
7-A	20.000	369513
1-B	20.000	366163
2-B	20.000	363855
3-B	20.000	362171
4-B	20.000	369766
5-B	20.000	363344
6-B	20.000	363629
7-B	20.000	361091

Qualifier Peak Analysis ON ISTD conc: 20.000 ug/mL
Curve Fit: Linear

---

2) MCHM ( )

Ret. Time 5.716 min., Extract & Integrate from 5.216 to 6.216 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration

Tgt	55.10			*** METH DEFAULT ***
Q1	97.20	43.20	20.0	*** METH DEFAULT ***
Q2	110.20	6.00	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
1-A	0.101	-1
2-A	0.507	11844
3-A	1.010	29455
4-A	2.030	64740
5-A	5.070	172653
6-A	10.100	372190
7-A	25.400	952034
1-B	0.101	-1
2-B	0.507	12474
3-B	1.010	30445
4-B	2.030	65551
5-B	5.070	175379
6-B	10.100	378979
7-B	25.200	940682

Qualifier Peak Analysis ON
Curve Fit: Linear

---

3) Naphthalene-d8 (ISTD)

Ret. Time 6.457 min., Extract & Integrate from 6.257 to 6.657 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 136.20			*** METH DEFAULT ***
Q1 68.10	6.50	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
1-A	20.000	1541710
2-A	20.000	1577010
3-A	20.000	1599870
4-A	20.000	1595218
5-A	20.000	1598839
6-A	20.000	1612159
7-A	20.000	1634162
1-B	20.000	1611216
2-B	20.000	1600436
3-B	20.000	1574128
4-B	20.000	1632331
5-B	20.000	1604746
6-B	20.000	1631164
7-B	20.000	1619958

Qualifier Peak Analysis ON ISTD conc: 20.000 ug/mL
Curve Fit: Linear

---

4) PPH ( )

Ret. Time 6.857 min., Extract & Integrate from 6.657 to 7.057 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration

Tgt	94.10			*** METH DEFAULT ***
Q1	152.20	16.70	20.0	*** METH DEFAULT ***
Q2	77.10	26.50	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
1-A	0.991	-1
2-A	0.496	8636
3-A	0.991	26018
4-A	1.980	64574
5-A	4.960	183924
6-A	9.910	421062
7-A	24.800	1105224
1-B	0.991	-1
2-B	0.496	9539
3-B	0.991	28085
4-B	1.980	65990
5-B	4.960	187471
6-B	9.910	432893
7-B	24.800	1085957

Qualifier Peak Analysis ON
Curve Fit: Linear

---

5) Acenaphthene-d10 (ISTD)

Ret. Time 8.210 min., Extract & Integrate from 8.010 to 8.410 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	164.30			*** METH DEFAULT ***
Q1	162.20	95.10	20.0	*** METH DEFAULT ***
Q2	160.20	43.70	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
1-A	20.000	834148
2-A	20.000	832339
3-A	20.000	847928
4-A	20.000	856846
5-A	20.000	852147
6-A	20.000	833662
7-A	20.000	879923
1-B	20.000	850465
2-B	20.000	837489
3-B	20.000	832350
4-B	20.000	863213
5-B	20.000	853187
6-B	20.000	868682
7-B	20.000	872339

Qualifier Peak Analysis ON ISTD conc: 20.000 ug/mL
Curve Fit: Linear

---

6) 1,4-CHDM ( )

Ret. Time 7.487 min., Extract & Integrate from 6.987 to 7.987 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	67.10			*** METH DEFAULT ***
Q1	55.10	59.70	20.0	*** METH DEFAULT ***
Q2	95.20	255.80	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
1-A	0.101	-1
2-A	0.504	1483
3-A	1.010	5608
4-A	2.010	15804
5-A	5.040	50772
6-A	10.100	116256
7-A	25.200	325307
1-B	0.101	-1
2-B	0.504	1557
3-B	1.010	6062
4-B	2.010	16227
5-B	5.040	48895
6-B	10.100	117863
7-B	25.200	318225

Qualifier Peak Analysis ON
Curve Fit: Linear

---

7) 2-Fluorobiphenyl ( )

Ret. Time 7.581 min., Extract & Integrate from 7.381 to 7.781 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	172.20			*** METH DEFAULT ***
Q1	170.20	22.60	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
1-A	0.099	3867
2-A	0.496	23895
3-A	0.991	51972
4-A	1.980	107038
5-A	4.960	278052
6-A	9.910	569192
7-A	24.800	1393457
1-B	0.099	4076
2-B	0.496	25535
3-B	0.991	53490
4-B	1.980	106957
5-B	4.960	275547
6-B	9.910	577382
7-B	24.800	1354759

Qualifier Peak Analysis ON
Curve Fit: Avg. RF

---

8) DM-1,4-CHDC ( )

Ret. Time 7.981 min., Extract & Integrate from 7.781 to 8.181 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	81.20			*** METH DEFAULT ***
Q1	140.20	61.80	20.0	*** METH DEFAULT ***
Q2	168.20	17.70	20.0	*** METH DEFAULT ***

Lvl	ID	Conc (ug/mL)	Response
1-A		0.101	1670
2-A		0.504	10842
3-A		1.010	25992
4-A		2.020	53522
5-A		5.040	142489
6-A		10.100	291232
7-A		25.200	713970
1-B		0.101	1794
2-B		0.504	11590
3-B		1.010	26797
4-B		2.020	55580
5-B		5.040	142723
6-B		10.100	293993
7-B		25.200	706287

Qualifier Peak Analysis ON
Curve Fit: Linear

---

9) di-PPH ( )

Ret. Time 8.540 min., Extract & Integrate from 8.040 to 9.040 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	59.10			*** METH DEFAULT ***
Q1	94.10	28.80	20.0	*** METH DEFAULT ***
Q2	210.20	7.60	20.0	*** METH DEFAULT ***

Lvl	ID	Conc (ug/mL)	Response
1-A		0.100	-1
2-A		0.498	3564
3-A		1.000	12875
4-A		1.990	38165
5-A		4.980	131470
6-A		10.000	327643
7-A		24.900	906336
1-B		0.100	-1
2-B		0.498	4260
3-B		1.000	14022
4-B		1.990	41403
5-B		4.980	131371
6-B		10.000	328030
7-B		24.900	885982

Qualifier Peak Analysis ON
Curve Fit: Linear

---

10) Phenanthrene-d10 (ISTD)

Ret. Time 9.675 min., Extract & Integrate from 9.475 to 9.875 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 188.30			*** METH DEFAULT ***
Q1 94.10	10.00	20.0	*** METH DEFAULT ***
Q2 80.10	11.30	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
1-A	20.000	1285931
2-A	20.000	1279768
3-A	20.000	1300602
4-A	20.000	1319248
5-A	20.000	1292245
6-A	20.000	1297153
7-A	20.000	1365408
1-B	20.000	1333042
2-B	20.000	1303677
3-B	20.000	1284693
4-B	20.000	1333856
5-B	20.000	1295179
6-B	20.000	1353306
7-B	20.000	1337826

Qualifier Peak Analysis ON ISTD conc: 20.000 ug/mL
Curve Fit: Linear

---

11) Chrysene-d12 (ISTD)

Ret. Time 13.957 min., Extract & Integrate from 13.757 to 14.157 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 240.30			*** METH DEFAULT ***
Q1 120.20	14.70	20.0	*** METH DEFAULT ***
Q2 236.30	23.40	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
1-A	20.000	656520
2-A	20.000	618719
3-A	20.000	611560
4-A	20.000	653557
5-A	20.000	648015
6-A	20.000	664509
7-A	20.000	708020
1-B	20.000	689719
2-B	20.000	636249
3-B	20.000	655054
4-B	20.000	698996
5-B	20.000	629469
6-B	20.000	698903
7-B	20.000	698242

Qualifier Peak Analysis ON ISTD conc: 20.000 ug/mL
Curve Fit: Linear

---

12) Perylene-d12 (ISTD)

Ret. Time 16.792 min., Extract & Integrate from 16.592 to 16.992 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	264.30			*** METH DEFAULT ***
Q1	260.30	22.10	20.0	*** METH DEFAULT ***
Q2	265.30	21.60	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
1-A	20.000	390347
2-A	20.000	359744
3-A	20.000	364669
4-A	20.000	395248
5-A	20.000	399799
6-A	20.000	392691
7-A	20.000	445649
1-B	20.000	402344
2-B	20.000	360839
3-B	20.000	383757
4-B	20.000	394979
5-B	20.000	346219
6-B	20.000	415431
7-B	20.000	382745

Qualifier Peak Analysis ON ISTD conc: 20.000 ug/mL
Curve Fit: Linear

END OF DATA ANALYSIS PARAMETERS

Tue Dec 16 16:50:11 2014

DATA ANALYSIS PARAMETERS

Method Name: D:\[redacted]\GCMS\1\methods\RP1616_[redacted]c.M

Percent Report Settings

Sort By: Signal

Output Destination
- Screen: No
- Printer: Yes
- File: No

Integration Events: Meth Default

Generate Report During Run Method: Yes

Signal Correlation Window: 0.020

Qualitative Report Settings

Peak Location of Unknown: Apex

Library to Search	Minimum Quality
C:\Database\NIST11.L	0

Integration Events: RP1616.P

Report Type: Summary

Output Destination
- Screen: Yes
- Printer: No
- File: No

Generate Report During Run Method: Yes

Quantitative Report Settings

Report Type: Summary

Output Destination
    Screen: No
    Printer: Yes
    File: No

Generate Report During Run Method: Yes

RP1616-MCHM Compounds-C
Calibration Last Updated: Fri Nov 21 16:56:58 2014

Reference Window: 2.00 Minutes
Non-Reference Window: 1.00 Minutes
Correlation Window: 0.10 minutes
Default Multiplier: 1.00
Default Sample Concentration: 0.00

Compound Information

---

1) 1,4-Dichlorobenzene-d4 (ISTD)

Ret. Time 5.075 min., Extract & Integrate from 4.575 to 5.575 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 150.10			*** METH DEFAULT ***
Q1 115.10	42.20	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	20.000	651533
B/N	20.000	679923
MCHC	20.000	639557

Qualifier Peak Analysis ON ISTD conc: 20.000 ug/mL
Curve Fit: Linear

---

2) Bis(2-chloroethyl) ether ( )

Ret. Time 4.898 min., Extract & Integrate from 4.398 to 5.398 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 93.10			*** METH DEFAULT ***
Q1 63.10	75.30	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	470093
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

3) n-Decane ( )

Ret. Time 4.969 min., Extract & Integrate from 4.469 to 5.469 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 57.20			*** METH DEFAULT ***
Q1 71.20	36.80	20.0	*** METH DEFAULT ***
Q2 142.30	4.60	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	212168
B/N	10.000	-1
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

4) 1,3-Dichlorobenzene ( )

Ret. Time 5.028 min., Extract & Integrate from 4.528 to 5.528 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 146.10			*** METH DEFAULT ***
Q1 111.10	46.90	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	299324
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

5) 1,4-Dichlorobenzene ( )

Ret. Time 5.092 min., Extract & Integrate from 4.592 to 5.592 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 146.10			*** METH DEFAULT ***
Q1 111.10	47.00	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	562207
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

6) 1,2-Dichlorobenzene ( )

Ret. Time 5.304 min., Extract & Integrate from 4.804 to 5.804 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration

Tgt	146.10			*** METH DEFAULT ***
Q1	111.10	47.90	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	506154
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

7) Benzyl Alcohol ( )

Ret. Time 5.328 min., Extract & Integrate from 4.828 to 5.828 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	79.10		*** METH DEFAULT ***
Q1	108.10	67.10	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	365893
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

8) Bis(2-chloroisopropyl) ether ( )

Ret. Time 5.504 min., Extract & Integrate from 5.004 to 6.004 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	45.10		*** METH DEFAULT ***
Q1	121.10	25.50	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	635468
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

9) Hexachloroethane ( )

Ret. Time 5.622 min., Extract & Integrate from 5.122 to 6.122 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	117.00		*** METH DEFAULT ***
Q1	201.00	74.80	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	201164

MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

10) N-Nitrosodi-N-propylamine ( )

Ret. Time 5.675 min., Extract & Integrate from 5.175 to 6.175 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 70.20			*** METH DEFAULT ***
Q1 130.20	26.40	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	346751
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

11) Nitrobenzene ( )

Ret. Time 5.769 min., Extract & Integrate from 5.269 to 6.269 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 77.10			*** METH DEFAULT ***
Q1 123.10	41.70	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	509001
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

12) 4-Methylcyclohexanecarboxylic acid ( )

Ret. Time 6.728 min., Extract & Integrate from 6.228 to 7.228 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 55.10			*** METH DEFAULT ***
Q1 142.20	23.90	20.0	*** METH DEFAULT ***
Q2 81.10	52.90	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	-1
MCHC	9.000	103179

Qualifier Peak Analysis ON
Curve Fit: Linear

---

13) Naphthalene-d8 (ISTD)

Ret. Time 6.457 min., Extract & Integrate from 6.257 to 6.657 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 136.20			*** METH DEFAULT ***
Q1 68.10	6.50	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	20.000	1670817
B/N	20.000	1703699
MCHC	20.000	1592419

Qualifier Peak Analysis ON ISTD conc: 20.000 ug/mL
Curve Fit: Linear

---

14) n-Dodecane ( )

Ret. Time 6.535 min., Extract & Integrate from 6.035 to 7.035 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 57.20			*** METH DEFAULT ***
Q1 85.20	31.60	20.0	*** METH DEFAULT ***
Q2 170.30	5.20	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	227921
B/N	10.000	-1
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

15) Isophorone ( )

Ret. Time 6.034 min., Extract & Integrate from 5.534 to 6.534 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 82.10			*** METH DEFAULT ***
Q1 138.20	16.80	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	926363
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

16) Bis(2-chloroethoxy) methane ( )

Ret. Time 6.298 min., Extract & Integrate from 5.798 to 6.798 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	93.10			*** METH DEFAULT ***
Q1	63.10	69.20	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	536488
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

17) 1,2,4-Trichlorobenzene ( )

Ret. Time 6.416 min., Extract & Integrate from 5.916 to 6.916 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	180.00			*** METH DEFAULT ***
Q1	145.10	32.90	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	374267
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

18) Napthalene ( )

Ret. Time 6.481 min., Extract & Integrate from 5.981 to 6.981 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	128.20			*** METH DEFAULT ***
Q1	102.10	11.20	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	1188922
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

19) Hexachlorobutadiene ( )

Ret. Time 6.681 min., Extract & Integrate from 6.181 to 7.181 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	225.00			*** METH DEFAULT ***
Q1	259.90	29.50	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1

B/N	10.000	218373
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

20) 2-Methylnapthalene ( )

Ret. Time 7.175 min., Extract & Integrate from 6.675 to 7.675 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	142.20			*** METH DEFAULT ***
Q1	115.10	41.20	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	760726
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

21) Hexachlorocyclopentadiene ( )

Ret. Time 7.404 min., Extract & Integrate from 6.904 to 7.904 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	237.00			*** METH DEFAULT ***
Q1	271.90	13.10	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	78187
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

22) 2-Chloronapthalene ( )

Ret. Time 7.645 min., Extract & Integrate from 7.145 to 8.145 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	162.10			*** METH DEFAULT ***
Q1	127.10	43.30	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	729573
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

23) n-Tetradecane ( )

Ret. Time 7.698 min., Extract & Integrate from 7.198 to 8.198 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	57.20			*** METH DEFAULT ***
Q1	85.20	39.50	20.0	*** METH DEFAULT ***
Q2	198.30	3.90	20.0	*** METH DEFAULT ***

Lvl	ID	Conc (ug/mL)	Response
DRO		5.000	240585
B/N		10.000	-1
MCHC		9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

24) Acenaphthene-d10 (ISTD)

Ret. Time 8.216 min., Extract & Integrate from 8.016 to 8.416 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	164.30			*** METH DEFAULT ***
Q1	162.20	95.10	20.0	*** METH DEFAULT ***
Q2	160.20	43.70	20.0	*** METH DEFAULT ***

Lvl	ID	Conc (ug/mL)	Response
DRO		20.000	905490
B/N		20.000	942421
MCHC		20.000	878030

Qualifier Peak Analysis ON ISTD conc: 20.000 ug/mL
Curve Fit: Linear

---

25) Dimethly Phthalate ( )

Ret. Time 8.039 min., Extract & Integrate from 7.539 to 8.539 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	163.10			*** METH DEFAULT ***
Q1	77.10	31.00	20.0	*** METH DEFAULT ***

Lvl	ID	Conc (ug/mL)	Response
DRO		5.000	-1
B/N		10.000	896521
MCHC		9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

26) Acenaphthylene ( )

Ret. Time 8.051 min., Extract & Integrate from 7.551 to 8.551 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 152.20			*** METH DEFAULT ***
Q1 76.10	10.50	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	815537
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

27) 2,6-Dinitrotoluene ( )

Ret. Time 8.098 min., Extract & Integrate from 7.598 to 8.598 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 165.10			*** METH DEFAULT ***
Q1 89.10	69.20	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	188618
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

28) Acenaphthene ( )

Ret. Time 8.245 min., Extract & Integrate from 7.745 to 8.745 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 153.20			*** METH DEFAULT ***
Q1 76.10	18.90	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	772631
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

29) Dibenzofuran ( )

Ret. Time 8.398 min., Extract & Integrate from 7.898 to 8.898 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 168.20			*** METH DEFAULT ***
Q1 139.20	41.10	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response

DRO	5.000	-1
B/N	10.000	1018030
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

30) 2,4-Dinitrotoluene ( )

Ret. Time 8.469 min., Extract & Integrate from 7.969 to 8.969 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 165.10			*** METH DEFAULT ***
Q1 89.10	88.00	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	234626
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

31) n-Hexadecane ( )

Ret. Time 8.698 min., Extract & Integrate from 8.198 to 9.198 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 57.20			*** METH DEFAULT ***
Q1 85.20	43.90	20.0	*** METH DEFAULT ***
Q2 226.40	3.90	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	249522
B/N	10.000	-1
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

32) Fluorene ( )

Ret. Time 8.733 min., Extract & Integrate from 8.233 to 9.233 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 166.20			*** METH DEFAULT ***
Q1 139.10	10.70	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	821513
MCHC	9.000	-1

Qualifier Peak Analysis ON

Curve Fit: Linear

---

33) Diethyl Phthalate ( )

Ret. Time 8.727 min., Extract & Integrate from 8.227 to 9.227 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 149.10			*** METH DEFAULT ***
Q1 177.20	22.90	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	890052
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

34) 4-Chlorophenylphenyl Ether ( )

Ret. Time 8.751 min., Extract & Integrate from 8.251 to 9.251 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 204.20			*** METH DEFAULT ***
Q1 141.20	71.80	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	412268
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

35) N-Nitrosodiphenylamine ( )

Ret. Time 8.880 min., Extract & Integrate from 8.380 to 9.380 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 169.20			*** METH DEFAULT ***
Q1 83.60	14.90	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	520402
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

36) Azobenzene ( )

Ret. Time 8.904 min., Extract & Integrate from 8.404 to 9.404 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 77.10			*** METH DEFAULT ***
Q1 182.20	24.50	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	1093487
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

37) Phenanthrene-d10 (ISTD)

Ret. Time 9.686 min., Extract & Integrate from 9.486 to 9.886 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 188.30			*** METH DEFAULT ***
Q1 94.10	10.00	20.0	*** METH DEFAULT ***
Q2 80.10	11.30	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	20.000	1418670
B/N	20.000	1502937
MCHC	20.000	1368879

Qualifier Peak Analysis ON ISTD conc: 20.000 ug/mL
Curve Fit: Linear

---

38) 4-Bromophenylphenyl Ether ( )

Ret. Time 9.222 min., Extract & Integrate from 8.722 to 9.722 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 248.10			*** METH DEFAULT ***
Q1 141.20	91.20	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	225343
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

39) Hexachlorobenzene ( )

Ret. Time 9.357 min., Extract & Integrate from 8.857 to 9.857 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 283.90			*** METH DEFAULT ***
Q1 142.00	51.70	20.0	*** METH DEFAULT ***

Lvl	ID	Conc (ug/mL)	Response
DRO		5.000	-1
B/N		10.000	247173
MCHC		9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

40) n-Octadecane ( )

Ret. Time 9.645 min., Extract & Integrate from 9.145 to 10.145 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	57.20			*** METH DEFAULT ***
Q1	85.20	43.10	20.0	*** METH DEFAULT ***
Q2	254.40	1.80	20.0	*** METH DEFAULT ***

Lvl	ID	Conc (ug/mL)	Response
DRO		5.000	252765
B/N		10.000	-1
MCHC		9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

41) Phenanthrene ( )

Ret. Time 9.710 min., Extract & Integrate from 9.210 to 10.210 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	178.20			*** METH DEFAULT ***
Q1	152.20	10.60	20.0	*** METH DEFAULT ***

Lvl	ID	Conc (ug/mL)	Response
DRO		5.000	-1
B/N		10.000	1169665
MCHC		9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

42) Anthracene ( )

Ret. Time 9.757 min., Extract & Integrate from 9.257 to 10.257 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	178.20			*** METH DEFAULT ***
Q1	152.10	9.00	20.0	*** METH DEFAULT ***

Lvl	ID	Conc (ug/mL)	Response
DRO		5.000	-1
B/N		10.000	1182147
MCHC		9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

43) Carbazole ( )

Ret. Time 9.980 min., Extract & Integrate from 9.480 to 10.480 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 167.20			*** METH DEFAULT ***
Q1 139.10	14.10	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	912122
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

44) Dibutyl Phthalate ( )

Ret. Time 10.592 min., Extract & Integrate from 10.092 to 11.092 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 149.10			*** METH DEFAULT ***
Q1 223.20	3.90	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	1497647
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

45) n-Eicosane ( )

Ret. Time 10.751 min., Extract & Integrate from 10.251 to 11.251 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 57.20			*** METH DEFAULT ***
Q1 85.20	47.30	20.0	*** METH DEFAULT ***
Q2 282.40	1.80	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	246192
B/N	10.000	-1
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

46) Fluoranthene ( )

Ret. Time 11.321 min., Extract & Integrate from 10.821 to 11.821 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 202.20			*** METH DEFAULT ***
Q1 101.10	12.60	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	1217566
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

47) Pyrene ( )

Ret. Time 11.668 min., Extract & Integrate from 11.168 to 12.168 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 202.20			*** METH DEFAULT ***
Q1 101.10	14.60	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	1221407
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

48) n-Docosane ( )

Ret. Time 12.033 min., Extract & Integrate from 11.533 to 12.533 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 57.20			*** METH DEFAULT ***
Q1 85.20	46.90	20.0	*** METH DEFAULT ***
Q2 310.50	1.10	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	226247
B/N	10.000	-1
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

49) Chrysene-d12 (ISTD)

Ret. Time 13.974 min., Extract & Integrate from 13.774 to 14.174 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 240.30			*** METH DEFAULT ***

Q1	120.20	14.70	20.0	*** METH DEFAULT ***
Q2	236.30	23.40	20.0	*** METH DEFAULT ***

Lvl	ID	Conc (ug/mL)	Response
	DRO	20.000	774674
	B/N	20.000	930494
	MCHC	20.000	715925

Qualifier Peak Analysis ON ISTD conc: 20.000 ug/mL
Curve Fit: Linear

---

50) Benzyl Butyl Phthalate ( )

Ret. Time 13.157 min., Extract & Integrate from 12.657 to 13.657 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 149.10			*** METH DEFAULT ***
Q1 206.20	21.30	20.0	*** METH DEFAULT ***

Lvl	ID	Conc (ug/mL)	Response
	DRO	5.000	-1
	B/N	10.000	576538
	MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

51) n-Tetracosane ( )

Ret. Time 13.421 min., Extract & Integrate from 12.921 to 13.921 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 57.20			*** METH DEFAULT ***
Q1 85.20	48.10	20.0	*** METH DEFAULT ***
Q2 338.40	1.00	20.0	*** METH DEFAULT ***

Lvl	ID	Conc (ug/mL)	Response
	DRO	5.000	222246
	B/N	10.000	-1
	MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

52) n-Hexacosane ( )

Ret. Time 14.821 min., Extract & Integrate from 14.321 to 15.321 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 57.20			*** METH DEFAULT ***
Q1 85.20	48.30	20.0	*** METH DEFAULT ***
Q2 366.50	0.80	20.0	*** METH DEFAULT ***

Lvl	ID	Conc (ug/mL)	Response

DRO	5.000	196276
B/N	10.000	-1
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

53) n-Octacosane ( )

Ret. Time 16.198 min., Extract & Integrate from 15.698 to 16.698 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 57.10			*** METH DEFAULT ***
Q1 85.20	49.40	20.0	*** METH DEFAULT ***
Q2 394.40	0.40	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	165998
B/N	10.000	-1
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

54) Benz[a]anthracene ( )

Ret. Time 13.927 min., Extract & Integrate from 13.427 to 14.427 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 228.20			*** METH DEFAULT ***
Q1 114.10	11.90	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	715697
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

55) Chrysene ( )

Ret. Time 14.021 min., Extract & Integrate from 13.521 to 14.521 min.

Signal	Rel Resp.	Pct. Unc.(rel)	Integration
Tgt 228.20			*** METH DEFAULT ***
Q1 113.10	12.80	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	722557
MCHC	9.000	-1

Qualifier Peak Analysis ON

Curve Fit: Linear

---

56) Bis(2-ethylhexyl) Phthalate ( )

Ret. Time 14.509 min., Extract & Integrate from 14.009 to 15.009 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	149.10			*** METH DEFAULT ***
Q1	167.10	30.70	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	837447
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

57) Di-n-octyl Phthalate ( )

Ret. Time 15.798 min., Extract & Integrate from 15.298 to 16.298 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	149.10			*** METH DEFAULT ***
Q1	279.30	5.10	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	1148409
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

58) Perylene-d12 (ISTD)

Ret. Time 16.809 min., Extract & Integrate from 16.609 to 17.009 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	264.30			*** METH DEFAULT ***
Q1	260.30	22.10	20.0	*** METH DEFAULT ***
Q2	265.30	21.60	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	20.000	475596
B/N	20.000	564560
MCHC	20.000	420435

Qualifier Peak Analysis ON ISTD conc: 20.000 ug/mL
Curve Fit: Linear

---

59) Benzo[b]fluoranthene ( )

Ret. Time 16.092 min., Extract & Integrate from 15.592 to 16.592 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	252.20			*** METH DEFAULT ***
Q1	126.10	15.00	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	463620
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

60) Benzo(k)fluoranthene ( )

Ret. Time 16.151 min., Extract & Integrate from 15.650 to 16.651 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	252.20			*** METH DEFAULT ***
Q1	126.10	16.20	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	526301
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

61) Benz[a]pyrene ( )

Ret. Time 16.680 min., Extract & Integrate from 16.180 to 17.180 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	252.20			*** METH DEFAULT ***
Q1	126.20	16.80	20.0	*** METH DEFAULT ***

Lvl ID	Conc (ug/mL)	Response
DRO	5.000	-1
B/N	10.000	320022
MCHC	9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

62) Indo[1,2,3-cd]pyrene ( )

Ret. Time 18.686 min., Extract & Integrate from 18.186 to 19.186 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	276.20			*** METH DEFAULT ***
Q1	138.10	22.20	20.0	*** METH DEFAULT ***

Lvl	ID	Conc (ug/mL)	Response
DRO		5.000	-1
B/N		10.000	175524
MCHC		9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

63) Dibenz[a,h]anthracene ( )

Ret. Time 18.756 min., Extract & Integrate from 18.256 to 19.256 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	278.20			*** METH DEFAULT ***
Q1	139.10	20.60	20.0	*** METH DEFAULT ***

Lvl	ID	Conc (ug/mL)	Response
DRO		5.000	-1
B/N		10.000	199860
MCHC		9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

---

64) Benzo[g,h,i]perylene ( )

Ret. Time 19.080 min., Extract & Integrate from 18.580 to 19.580 min.

Signal		Rel Resp.	Pct. Unc.(rel)	Integration
Tgt	276.20			*** METH DEFAULT ***
Q1	138.20	25.90	20.0	*** METH DEFAULT ***

Lvl	ID	Conc (ug/mL)	Response
DRO		5.000	-1
B/N		10.000	229659
MCHC		9.000	-1

Qualifier Peak Analysis ON
Curve Fit: Linear

END OF DATA ANALYSIS PARAMETERS

Tue Dec 16 16:47:54 2014