

# Apex Labs

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Monday, May 11, 2015

Madi Novak  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

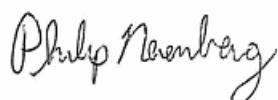
Enclosed are the results of analyses for work order A5D0549, which was received by the laboratory on 4/17/2015 at 2:50:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

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Apex Laboratories



Philip Nerenberg, Lab Director

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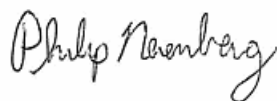
Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

Reported:  
 05/11/15 15:15

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI007-0.5-As Received	A5D0549-01	Soil	04/16/15 13:45	04/17/15 14:50
ISM-AOI007-0.5-After ISM	A5D0549-02	Soil	04/16/15 13:45	04/17/15 14:50
ISM-AOI011-0.5-As Received	A5D0549-03	Soil	04/16/15 16:00	04/17/15 14:50
ISM-AOI011-0.5-After ISM	A5D0549-04	Soil	04/16/15 16:00	04/17/15 14:50
ISM-AOI031-0.5-As Received	A5D0549-05	Soil	04/16/15 14:30	04/17/15 14:50
ISM-AOI031-0.5-After ISM	A5D0549-06	Soil	04/16/15 14:30	04/17/15 14:50
ISM-AOI018-0.5-B-C-As Received	A5D0549-07	Soil	04/16/15 17:30	04/17/15 14:50
ISM-AOI018-0.5-B-C-After ISM	A5D0549-08	Soil	04/16/15 17:30	04/17/15 14:50
ISM-AOI018-0.5-B-A-As Received	A5D0549-09	Soil	04/16/15 16:45	04/17/15 14:50
ISM-AOI018-0.5-B-A-After ISM	A5D0549-10	Soil	04/16/15 16:45	04/17/15 14:50
ISM-AOI018-0.5-B-B-As Received	A5D0549-11	Soil	04/16/15 17:00	04/17/15 14:50
ISM-AOI018-0.5-B-B-After ISM	A5D0549-12	Soil	04/16/15 17:00	04/17/15 14:50
ISM-AOI006-0.5-As Received	A5D0549-13	Soil	04/16/15 13:00	04/17/15 14:50
ISM-AOI006-0.5-After ISM	A5D0549-14	Soil	04/16/15 13:00	04/17/15 14:50
ISM-AOI013-0.5-F-As Received	A5D0549-15	Soil	04/16/15 11:30	04/17/15 14:50
ISM-AOI013-0.5-F-After ISM	A5D0549-16	Soil	04/16/15 11:30	04/17/15 14:50
ISM-AOI018-0.5-F-As Received	A5D0549-17	Soil	04/16/15 18:00	04/17/15 14:50
ISM-AOI018-0.5-F-After ISM	A5D0549-18	Soil	04/16/15 18:00	04/17/15 14:50
ISM-AOI005-0.5-As Received	A5D0549-19	Soil	04/16/15 10:00	04/17/15 14:50
ISM-AOI005-0.5-After ISM	A5D0549-20	Soil	04/16/15 10:00	04/17/15 14:50
ISM-AOI013-0.5-B-As Received	A5D0549-21	Soil	04/16/15 12:00	04/17/15 14:50
ISM-AOI013-0.5-B-After ISM	A5D0549-22	Soil	04/16/15 12:00	04/17/15 14:50
SBS-AOI018-1.0	A5D0549-23	Soil	04/16/15 17:15	04/17/15 14:50
SBS-AOI006-1.0	A5D0549-24	Soil	04/16/15 13:00	04/17/15 14:50
SBS-AOI005-1.0-Dup	A5D0549-25	Soil	04/16/15 10:30	04/17/15 14:50
SBS-AOI005-1.0	A5D0549-26	Soil	04/16/15 10:30	04/17/15 14:50



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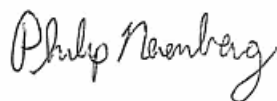
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05/11/15 15:15

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI007-0.5-After ISM (A5D0549-02)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>21000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI011-0.5-After ISM (A5D0549-04)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>13000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI031-0.5-After ISM (A5D0549-06)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI018-0.5-B-C-After ISM (A5D0549-08)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI018-0.5-B-A-After ISM (A5D0549-10)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI018-0.5-B-B-After ISM (A5D0549-12)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI006-0.5-After ISM (A5D0549-14)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI013-0.5-F-After ISM (A5D0549-16)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI018-0.5-F-After ISM (A5D0549-18)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	

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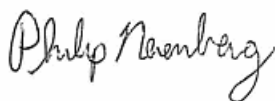
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## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI005-0.5-After ISM (A5D0549-20)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI013-0.5-B-After ISM (A5D0549-22)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>SBS-AOI018-1.0 (A5D0549-23)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>7500</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>SBS-AOI006-1.0 (A5D0549-24)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>10000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>SBS-AOI005-1.0-Dup (A5D0549-25)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>12000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>SBS-AOI005-1.0 (A5D0549-26)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>13000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	



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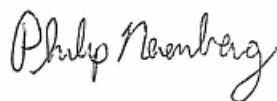
## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI007-0.5-As Received (A5D0549-01)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	72.1	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI007-0.5-After ISM (A5D0549-02)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	97.6	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI011-0.5-As Received (A5D0549-03)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	80.3	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI011-0.5-After ISM (A5D0549-04)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	98.0	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI031-0.5-As Received (A5D0549-05)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	70.6	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI031-0.5-After ISM (A5D0549-06)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	97.6	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI018-0.5-B-C-As Received (A5D0549-07)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	71.2	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI018-0.5-B-C-After ISM (A5D0549-08)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	97.9	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI018-0.5-B-A-As Received (A5D0549-09)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	73.4	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI018-0.5-B-A-After ISM (A5D0549-10)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	97.9	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI018-0.5-B-B-As Received (A5D0549-11)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	71.5	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI018-0.5-B-B-After ISM (A5D0549-12)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	97.9	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI006-0.5-As Received (A5D0549-13)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	76.1	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI006-0.5-After ISM (A5D0549-14)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	97.8	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI013-0.5-F-As Received (A5D0549-15)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	76.2	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI013-0.5-F-After ISM (A5D0549-16)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				

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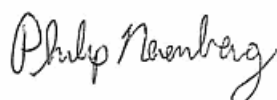
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## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI013-0.5-F-After ISM (A5D0549-16)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	97.8	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI018-0.5-F-As Received (A5D0549-17)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	70.8	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI018-0.5-F-After ISM (A5D0549-18)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	97.6	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI005-0.5-As Received (A5D0549-19)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	75.1	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI005-0.5-After ISM (A5D0549-20)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	97.9	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI013-0.5-B-As Received (A5D0549-21)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	77.8	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI013-0.5-B-After ISM (A5D0549-22)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	97.8	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>SBS-AOI018-1.0 (A5D0549-23)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040633</b>				
% Solids	81.6	---	1.00	% by Weight	1	04/24/15 08:59	EPA 8000C	
<b>SBS-AOI006-1.0 (A5D0549-24)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040633</b>				
% Solids	79.7	---	1.00	% by Weight	1	04/24/15 08:59	EPA 8000C	
<b>SBS-AOI005-1.0-Dup (A5D0549-25)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040633</b>				
% Solids	81.6	---	1.00	% by Weight	1	04/24/15 08:59	EPA 8000C	
<b>SBS-AOI005-1.0 (A5D0549-26)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040633</b>				
% Solids	80.1	---	1.00	% by Weight	1	04/24/15 08:59	EPA 8000C	

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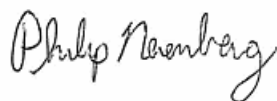
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## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5040707 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5040707-BLK1)</b>						Prepared: 04/27/15 08:42 Analyzed: 04/29/15 15:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5040707-BS1)</b>						Prepared: 04/27/15 08:42 Analyzed: 04/29/15 15:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9300	---		mg/kg	1	10000	---	93	85-115%	---	---	
<b>Duplicate (5040707-DUP1)</b>						Prepared: 04/27/15 08:42 Analyzed: 04/29/15 15:20						
<b>QC Source Sample: ISM-AOI007-0.5-After ISM (A5D0549-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	21000	---	200	mg/kg	1	---	21000	---	---	0.8	20%	
<b>Duplicate (5040707-DUP2)</b>						Prepared: 04/27/15 08:42 Analyzed: 04/29/15 15:20						
<b>QC Source Sample: SBS-AOI005-1.0 (A5D0549-26)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	11000	---	200	mg/kg	1	---	13000	---	---	19	20%	



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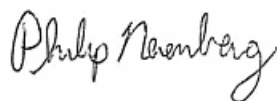
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## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5040555 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5040555-DUP1)</b>						Prepared: 04/21/15 10:38 Analyzed: 04/22/15 09:54						
QC Source Sample: Other (A5D0514-03)												
EPA 8000C												
% Solids	86.5	---	1.00	% by Weight	1	---	86.2	---	---	0.3	20%	
<b>Duplicate (5040555-DUP2)</b>						Prepared: 04/21/15 10:38 Analyzed: 04/22/15 09:54						
QC Source Sample: Other (A5D0521-09)												
EPA 8000C												
% Solids	87.6	---	1.00	% by Weight	1	---	86.9	---	---	0.8	20%	
<b>Duplicate (5040555-DUP3)</b>						Prepared: 04/21/15 10:38 Analyzed: 04/22/15 09:54						
QC Source Sample: Other (A5D0571-03)												
EPA 8000C												
% Solids	84.7	---	1.00	% by Weight	1	---	84.5	---	---	0.2	20%	
<b>Duplicate (5040555-DUP4)</b>						Prepared: 04/21/15 10:38 Analyzed: 04/22/15 09:54						
QC Source Sample: Other (A5D0571-12)												
EPA 8000C												
% Solids	81.5	---	1.00	% by Weight	1	---	81.5	---	---	0	20%	
<b>Duplicate (5040555-DUP5)</b>						Prepared: 04/21/15 15:09 Analyzed: 04/22/15 09:54						
QC Source Sample: ISM-AOI013-0.5-B-As Received (A5D0549-21)												
EPA 8000C												
% Solids	75.4	---	1.00	% by Weight	1	---	77.8	---	---	3	20%	
<b>Duplicate (5040555-DUP6)</b>						Prepared: 04/21/15 15:10 Analyzed: 04/22/15 09:54						
QC Source Sample: Other (A5D0136-17)												
EPA 8000C												
% Solids	70.3	---	1.00	% by Weight	1	---	70.6	---	---	0.4	20%	
<b>Duplicate (5040555-DUP7)</b>						Prepared: 04/21/15 19:05 Analyzed: 04/22/15 09:54						
QC Source Sample: Other (A5D0609-02)												
EPA 8000C												
% Solids	75.4	---	1.00	% by Weight	1	---	75.7	---	---	0.4	20%	
<b>Duplicate (5040555-DUP8)</b>						Prepared: 04/21/15 19:05 Analyzed: 04/22/15 09:54						

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Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

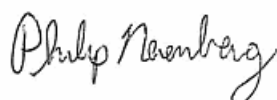
Reported:  
05/11/15 15:15

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5040555 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5040555-DUP8)</b>						Prepared: 04/21/15 19:05 Analyzed: 04/22/15 09:54						
QC Source Sample: Other (A5D0617-02)												
EPA 8000C												
% Solids	77.2	---	1.00	% by Weight	1	---	77.8	---	---	0.8	20%	
<b>Duplicate (5040555-DUP9)</b>						Prepared: 04/21/15 19:05 Analyzed: 04/22/15 09:54						
QC Source Sample: Other (A5D0621-02)												
EPA 8000C												
% Solids	84.0	---	1.00	% by Weight	1	---	83.5	---	---	0.6	20%	
<b>Batch 5040633 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5040633-DUP1)</b>						Prepared: 04/23/15 10:04 Analyzed: 04/24/15 08:59						
QC Source Sample: Other (A5D0552-03)												
EPA 8000C												
% Solids	73.9	---	1.00	% by Weight	1	---	73.9	---	---	0	20%	
<b>Duplicate (5040633-DUP2)</b>						Prepared: 04/23/15 10:04 Analyzed: 04/24/15 08:59						
QC Source Sample: Other (A5D0599-01)												
EPA 8000C												
% Solids	88.1	---	1.00	% by Weight	1	---	88.1	---	---	0	20%	
<b>Duplicate (5040633-DUP3)</b>						Prepared: 04/23/15 10:04 Analyzed: 04/24/15 08:59						
QC Source Sample: Other (A5D0599-07)												
EPA 8000C												
% Solids	73.7	---	1.00	% by Weight	1	---	73.9	---	---	0.3	20%	
<b>Duplicate (5040633-DUP4)</b>						Prepared: 04/23/15 10:04 Analyzed: 04/24/15 08:59						
QC Source Sample: Other (A5D0599-19)												
EPA 8000C												
% Solids	86.1	---	1.00	% by Weight	1	---	86.8	---	---	0.8	20%	
<b>Duplicate (5040633-DUP5)</b>						Prepared: 04/23/15 10:04 Analyzed: 04/24/15 08:59						
QC Source Sample: Other (A5D0672-01)												
EPA 8000C												

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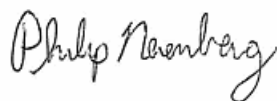
Reported:  
05/11/15 15:15

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5040633 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5040633-DUP5)</b>						Prepared: 04/23/15 10:04 Analyzed: 04/24/15 08:59						
QC Source Sample: Other (A5D0672-01)												
% Solids	93.1	---	1.00	% by Weight	1	---	93.6	---	---	0.5	20%	
<b>Duplicate (5040633-DUP6)</b>						Prepared: 04/23/15 19:14 Analyzed: 04/24/15 08:59						
QC Source Sample: Other (A5D0697-01)												
EPA 8000C												
% Solids	77.7	---	1.00	% by Weight	1	---	78.4	---	---	0.9	20%	
<b>Duplicate (5040633-DUP7)</b>						Prepared: 04/23/15 19:14 Analyzed: 04/24/15 08:59						
QC Source Sample: Other (A5D0701-01)												
EPA 8000C												
% Solids	90.2	---	1.00	% by Weight	1	---	89.8	---	---	0.4	20%	
<b>Duplicate (5040633-DUP8)</b>						Prepared: 04/23/15 19:14 Analyzed: 04/24/15 08:59						
QC Source Sample: Other (A5D0705-02)												
EPA 8000C												
% Solids	77.3	---	1.00	% by Weight	1	---	77.2	---	---	0.1	20%	
<b>Batch 5040757 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5040757-DUP1)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0481-27)												
EPA 8000C												
% Solids	92.3	---	1.00	% by Weight	1	---	92.3	---	---	0	20%	
<b>Duplicate (5040757-DUP2)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0713-01)												
EPA 8000C												
% Solids	46.5	---	1.00	% by Weight	1	---	48.2	---	---	4	20%	
<b>Duplicate (5040757-DUP3)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0731-05)												
EPA 8000C												
% Solids	79.7	---	1.00	% by Weight	1	---	80.5	---	---	1	20%	

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Project Number: 9003.01.39  
Project Manager: Madi Novak

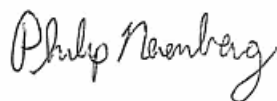
Reported:  
05/11/15 15:15

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5040757 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5040757-DUP4)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0731-15)												
EPA 8000C												
% Solids	93.2	---	1.00	% by Weight	1	---	92.6	---	---	0.6	20%	
<b>Duplicate (5040757-DUP5)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0772-09)												
EPA 8000C												
% Solids	94.2	---	1.00	% by Weight	1	---	94.2	---	---	0	20%	
<b>Duplicate (5040757-DUP6)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0777-05)												
EPA 8000C												
% Solids	92.5	---	1.00	% by Weight	1	---	91.8	---	---	0.8	20%	
<b>Duplicate (5040757-DUP7)</b>						Prepared: 04/28/15 11:26 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0800-06)												
EPA 8000C												
% Solids	77.5	---	1.00	% by Weight	1	---	76.5	---	---	1	20%	
<b>Duplicate (5040757-DUP8)</b>						Prepared: 04/28/15 11:26 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0813-02)												
EPA 8000C												
% Solids	89.0	---	1.00	% by Weight	1	---	89.8	---	---	0.9	20%	
<b>Duplicate (5040757-DUP9)</b>						Prepared: 04/28/15 11:30 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0819-02)												
EPA 8000C												
% Solids	93.3	---	1.00	% by Weight	1	---	92.7	---	---	0.6	20%	
<b>Duplicate (5040757-DUPA)</b>						Prepared: 04/28/15 15:57 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0833-02)												
EPA 8000C												
% Solids	87.1	---	1.00	% by Weight	1	---	87.3	---	---	0.2	20%	
<b>Duplicate (5040757-DUPB)</b>						Prepared: 04/28/15 16:48 Analyzed: 04/29/15 08:58						

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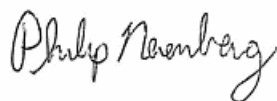
Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

Reported:  
 05/11/15 15:15

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5040757 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5040757-DUPB)</b>						Prepared: 04/28/15 16:48 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0842-02)												
EPA 8000C												
% Solids	78.3	---	1.00	% by Weight	1	---	78.4	---	---	0.1	20%	
<b>Duplicate (5040757-DUPC)</b>						Prepared: 04/28/15 19:25 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0845-03)												
EPA 8000C												
% Solids	80.6	---	1.00	% by Weight	1	---	80.2	---	---	0.5	20%	
<b>Duplicate (5040757-DUPD)</b>						Prepared: 04/28/15 19:25 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0845-11)												
EPA 8000C												
% Solids	80.5	---	1.00	% by Weight	1	---	81.9	---	---	2	20%	
<b>Duplicate (5040757-DUPE)</b>						Prepared: 04/28/15 19:25 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0850-02)												
EPA 8000C												
% Solids	89.0	---	1.00	% by Weight	1	---	89.0	---	---	0	20%	



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 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 05/11/15 15:15

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

#### Prep: PSEP TOC

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5040707</b>							
A5D0549-02	Soil	PSEP/SM 5310B MOD	04/16/15 13:45	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-04	Soil	PSEP/SM 5310B MOD	04/16/15 16:00	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-06	Soil	PSEP/SM 5310B MOD	04/16/15 14:30	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-08	Soil	PSEP/SM 5310B MOD	04/16/15 17:30	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-10	Soil	PSEP/SM 5310B MOD	04/16/15 16:45	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-12	Soil	PSEP/SM 5310B MOD	04/16/15 17:00	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-14	Soil	PSEP/SM 5310B MOD	04/16/15 13:00	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-16	Soil	PSEP/SM 5310B MOD	04/16/15 11:30	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-18	Soil	PSEP/SM 5310B MOD	04/16/15 18:00	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-20	Soil	PSEP/SM 5310B MOD	04/16/15 10:00	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-22	Soil	PSEP/SM 5310B MOD	04/16/15 12:00	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-23	Soil	PSEP/SM 5310B MOD	04/16/15 17:15	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-24	Soil	PSEP/SM 5310B MOD	04/16/15 13:00	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-25	Soil	PSEP/SM 5310B MOD	04/16/15 10:30	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-26	Soil	PSEP/SM 5310B MOD	04/16/15 10:30	04/27/15 08:42	5g/5g	5g/5g	NA

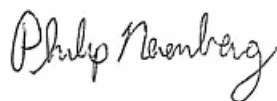
### Percent Dry Weight

#### Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5040555</b>							
A5D0549-01	Soil	EPA 8000C	04/16/15 13:45	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA

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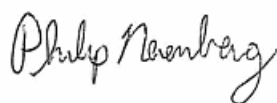
Reported:  
 05/11/15 15:15

## SAMPLE PREPARATION INFORMATION

### Percent Dry Weight

#### Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A5D0549-03	Soil	EPA 8000C	04/16/15 16:00	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-05	Soil	EPA 8000C	04/16/15 14:30	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-07	Soil	EPA 8000C	04/16/15 17:30	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-09	Soil	EPA 8000C	04/16/15 16:45	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-11	Soil	EPA 8000C	04/16/15 17:00	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-13	Soil	EPA 8000C	04/16/15 13:00	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-15	Soil	EPA 8000C	04/16/15 11:30	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-17	Soil	EPA 8000C	04/16/15 18:00	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-19	Soil	EPA 8000C	04/16/15 10:00	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-21	Soil	EPA 8000C	04/16/15 12:00	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA
<b>Batch: 5040633</b>							
A5D0549-23	Soil	EPA 8000C	04/16/15 17:15	04/23/15 10:05	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-24	Soil	EPA 8000C	04/16/15 13:00	04/23/15 10:05	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-25	Soil	EPA 8000C	04/16/15 10:30	04/23/15 10:05	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-26	Soil	EPA 8000C	04/16/15 10:30	04/23/15 10:05	1N/A/1N/A	1N/A/1N/A	NA
<b>Batch: 5040757</b>							
A5D0549-02	Soil	EPA 8000C	04/16/15 13:45	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-04	Soil	EPA 8000C	04/16/15 16:00	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-06	Soil	EPA 8000C	04/16/15 14:30	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-08	Soil	EPA 8000C	04/16/15 17:30	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-10	Soil	EPA 8000C	04/16/15 16:45	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-12	Soil	EPA 8000C	04/16/15 17:00	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-14	Soil	EPA 8000C	04/16/15 13:00	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-16	Soil	EPA 8000C	04/16/15 11:30	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-18	Soil	EPA 8000C	04/16/15 18:00	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-20	Soil	EPA 8000C	04/16/15 10:00	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-22	Soil	EPA 8000C	04/16/15 12:00	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA



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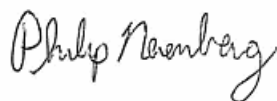
Reported:  
05/11/15 15:15

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- QC
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).







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Lab # ASD0501 of 2

## CHAIN OF CUSTODY

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Maul Foster & Alongi		Project Mgr: Madi Novak / Philip Nerenberg		Project Name: POR		Project # 9003.01.39	
Address: 2001 NW 19th Ave, Suite 200, Portland, OR 97209		Phone: 503-501-5204		Fax:		Email: P.Novak@MaulFoster.com	
Sampled by: Philip Nerenberg / Emily Curtis							
Site Location: OR (WA)	Other:	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST
		ISM-A0E013-G3-B	4-16-15	12:00	SO	1	Priority Metals (13) Al, Sb, As, Ba, Be, Cd, Cr, Cu, Fe, Pb, Hg, Mn, Ni, Se, Zn, Ag, Na, Tl, V, Zn
		SBS-A0I018-1.0	4-17-15	17:15	2	2	RCRA Metals (8) 8081 Chlor. Pest
		SBS-A0E006-1.0	4-18-15	13:00	2	2	8082 PCBs
		SBS-A0I005-1.0-DUP	4-16-15	16:30	2	2	8270 SIM PAHs
		SBS-A0E005-1.0	4-16-15	16:30	2	2	8260 VOCs
							8260 Halo VOCs
							8260 RBDM VOCs
							BTEX
							NWTPH-Gx
							NWTPH-Dx
							NWTPH-CD
Normal Turn Around Time (TAT) = 7-10 Business Days		YES <input checked="" type="radio"/> NO <input type="radio"/>		SPECIAL INSTRUCTIONS:			
TAT Requested (circle)		24 HR	48 HR	72 HR			
		4 DAY	5 DAY	Other: _____			
SAMPLES ARE HELD FOR 30 DAYS							
RELINQUISHED BY:		RECEIVED BY:		RECEIVED BY:			
Signature: Philip Nerenberg		Date: 4-17-15		Signature: [Signature]		Date: 4-17-15	
Printed Name: Philip Nerenberg		Time: 14:50		Printed Name: [Signature]		Time: 14:50	
Company: MFA		Company: [Signature]		Company: [Signature]			

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*Philip Nerenberg*

Philip Nerenberg, Lab Director

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12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Friday, May 22, 2015

Madi Novak  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01

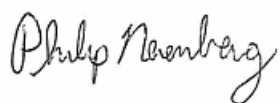
Enclosed are the results of analyses for work order A5D0781, which was received by the laboratory on 4/24/2015 at 1:00:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

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Philip Nerenberg, Lab Director

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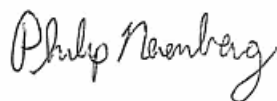
Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01  
 Project Manager: Madi Novak

**Reported:**  
 05/22/15 16:29

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI017-0.5-C-As Received	A5D0781-01	Soil	04/23/15 11:25	04/24/15 13:00
ISM-AOI017-0.5-C-After ISM	A5D0781-02	Soil	04/23/15 11:25	04/24/15 13:00
ISM-AOI012-0.5-As Received	A5D0781-03	Soil	04/23/15 09:00	04/24/15 13:00
ISM-AOI012-0.5-After ISM	A5D0781-04	Soil	04/23/15 09:00	04/24/15 13:00
ISM-AOI029B-0.5-As Received	A5D0781-05	Soil	04/23/15 14:40	04/24/15 13:00
ISM-AOI029B-0.5-After ISM	A5D0781-06	Soil	04/23/15 14:40	04/24/15 13:00
ISM-AOI014-0.5-As Received	A5D0781-07	Soil	04/23/15 13:15	04/24/15 13:00
ISM-AOI014-0.5-After ISM	A5D0781-08	Soil	04/23/15 13:15	04/24/15 13:00
ISM-AOI036-0.5-As Received	A5D0781-09	Soil	04/23/15 14:15	04/24/15 13:00
ISM-AOI036-0.5-After ISM	A5D0781-10	Soil	04/23/15 14:15	04/24/15 13:00
ISM-AOI032-0.5-As Received	A5D0781-11	Soil	04/23/15 13:45	04/24/15 13:00
ISM-AOI032-0.5-After ISM	A5D0781-12	Soil	04/23/15 13:45	04/24/15 13:00
ISM-AOI017-0.5-B-As Received	A5D0781-13	Soil	04/23/15 10:50	04/24/15 13:00
ISM-AOI017-0.5-B-After ISM	A5D0781-14	Soil	04/23/15 10:50	04/24/15 13:00
ISM-AOI015-0.5-As Received	A5D0781-15	Soil	04/23/15 10:00	04/24/15 13:00
ISM-AOI015-0.5-After ISM	A5D0781-16	Soil	04/23/15 10:00	04/24/15 13:00
ISM-AOI017-0.5-A-As Received	A5D0781-17	Soil	04/23/15 10:30	04/24/15 13:00
ISM-AOI017-0.5-A-After ISM	A5D0781-18	Soil	04/23/15 10:30	04/24/15 13:00



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01  
 Project Manager: Madi Novak

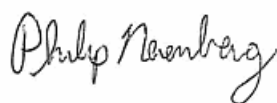
Reported:  
 05/22/15 16:29

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI017-0.5-C-After ISM (A5D0781-02)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	
<b>ISM-AOI012-0.5-After ISM (A5D0781-04)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	
<b>ISM-AOI029B-0.5-After ISM (A5D0781-06)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>13000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	
<b>ISM-AOI014-0.5-After ISM (A5D0781-08)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	
<b>ISM-AOI036-0.5-After ISM (A5D0781-10)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>13000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	
<b>ISM-AOI032-0.5-After ISM (A5D0781-12)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	
<b>ISM-AOI017-0.5-B-After ISM (A5D0781-14)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	
<b>ISM-AOI015-0.5-After ISM (A5D0781-16)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>18000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	
<b>ISM-AOI017-0.5-A-After ISM (A5D0781-18)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	

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 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01  
 Project Manager: Madi Novak

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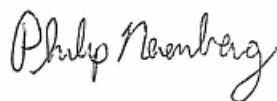
## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI017-0.5-C-As Received (A5D0781-01)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	80.1	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI017-0.5-C-After ISM (A5D0781-02)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	97.5	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI012-0.5-As Received (A5D0781-03)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	79.7	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI012-0.5-After ISM (A5D0781-04)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	97.6	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI029B-0.5-As Received (A5D0781-05)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	81.6	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI029B-0.5-After ISM (A5D0781-06)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	98.0	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI014-0.5-As Received (A5D0781-07)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	80.1	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI014-0.5-After ISM (A5D0781-08)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	97.7	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI036-0.5-As Received (A5D0781-09)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	81.4	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI036-0.5-After ISM (A5D0781-10)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	97.8	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI032-0.5-As Received (A5D0781-11)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	78.0	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI032-0.5-After ISM (A5D0781-12)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	97.6	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI017-0.5-B-As Received (A5D0781-13)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	79.4	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI017-0.5-B-After ISM (A5D0781-14)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	97.5	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI015-0.5-As Received (A5D0781-15)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	79.1	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI015-0.5-After ISM (A5D0781-16)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				

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 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01  
 Project Manager: Madi Novak

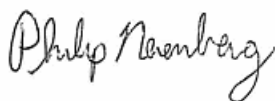
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## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI015-0.5-After ISM (A5D0781-16)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	97.4	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI017-0.5-A-As Received (A5D0781-17)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	79.9	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI017-0.5-A-After ISM (A5D0781-18)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	97.1	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38

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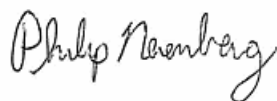
**Reported:**  
 05/22/15 16:29

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050100 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5050100-BLK1)</b>						Prepared: 05/05/15 08:43 Analyzed: 05/07/15 18:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>LCS (5050100-BS1)</b>						Prepared: 05/05/15 08:43 Analyzed: 05/07/15 18:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9300	---		mg/kg	1	10000	---	93	85-115%	---	---	
<b>Duplicate (5050100-DUP1)</b>						Prepared: 05/05/15 08:43 Analyzed: 05/07/15 18:05						
<b>QC Source Sample: ISM-AOI017-0.5-C-After ISM (A5D0781-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	17000	---	200	mg/kg	1	---	17000	---	---	2	20%	
<b>Duplicate (5050100-DUP2)</b>						Prepared: 05/05/15 08:43 Analyzed: 05/07/15 18:05						
<b>QC Source Sample: Other (A5D0913-17)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	12000	---	200	mg/kg	1	---	15000	---	---	21	20%	Q-01

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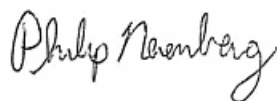
Reported:  
05/22/15 16:29

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5040757 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5040757-DUP1)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0481-27)												
EPA 8000C												
% Solids	92.3	---	1.00	% by Weight	1	---	92.3	---	---	0	20%	
<b>Duplicate (5040757-DUP2)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0713-01)												
EPA 8000C												
% Solids	46.5	---	1.00	% by Weight	1	---	48.2	---	---	4	20%	
<b>Duplicate (5040757-DUP3)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0731-05)												
EPA 8000C												
% Solids	79.7	---	1.00	% by Weight	1	---	80.5	---	---	1	20%	
<b>Duplicate (5040757-DUP4)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0731-15)												
EPA 8000C												
% Solids	93.2	---	1.00	% by Weight	1	---	92.6	---	---	0.6	20%	
<b>Duplicate (5040757-DUP5)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0772-09)												
EPA 8000C												
% Solids	94.2	---	1.00	% by Weight	1	---	94.2	---	---	0	20%	
<b>Duplicate (5040757-DUP6)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0777-05)												
EPA 8000C												
% Solids	92.5	---	1.00	% by Weight	1	---	91.8	---	---	0.8	20%	
<b>Duplicate (5040757-DUP7)</b>						Prepared: 04/28/15 11:26 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0800-06)												
EPA 8000C												
% Solids	77.5	---	1.00	% by Weight	1	---	76.5	---	---	1	20%	
<b>Duplicate (5040757-DUP8)</b>						Prepared: 04/28/15 11:26 Analyzed: 04/29/15 08:58						

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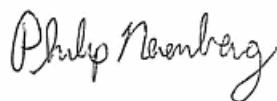
Reported:  
05/22/15 16:29

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5040757 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5040757-DUP8)</b>						Prepared: 04/28/15 11:26 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0813-02)												
EPA 8000C												
% Solids	89.0	---	1.00	% by Weight	1	---	89.8	---	---	0.9	20%	
<b>Duplicate (5040757-DUP9)</b>						Prepared: 04/28/15 11:30 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0819-02)												
EPA 8000C												
% Solids	93.3	---	1.00	% by Weight	1	---	92.7	---	---	0.6	20%	
<b>Duplicate (5040757-DUPA)</b>						Prepared: 04/28/15 15:57 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0833-02)												
EPA 8000C												
% Solids	87.1	---	1.00	% by Weight	1	---	87.3	---	---	0.2	20%	
<b>Duplicate (5040757-DUPB)</b>						Prepared: 04/28/15 16:48 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0842-02)												
EPA 8000C												
% Solids	78.3	---	1.00	% by Weight	1	---	78.4	---	---	0.1	20%	
<b>Duplicate (5040757-DUPC)</b>						Prepared: 04/28/15 19:25 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0845-03)												
EPA 8000C												
% Solids	80.6	---	1.00	% by Weight	1	---	80.2	---	---	0.5	20%	
<b>Duplicate (5040757-DUPD)</b>						Prepared: 04/28/15 19:25 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0845-11)												
EPA 8000C												
% Solids	80.5	---	1.00	% by Weight	1	---	81.9	---	---	2	20%	
<b>Duplicate (5040757-DUPE)</b>						Prepared: 04/28/15 19:25 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0850-02)												
EPA 8000C												
% Solids	89.0	---	1.00	% by Weight	1	---	89.0	---	---	0	20%	

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Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.  
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 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01  
 Project Manager: Madi Novak

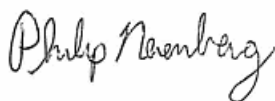
Reported:  
 05/22/15 16:29

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050098 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050098-DUP1)</b>						Prepared: 05/05/15 08:14 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5C0205-33)												
EPA 8000C												
% Solids	90.0	---	1.00	% by Weight	1	---	88.7	---	---	1	20%	Q-38
<b>Duplicate (5050098-DUP2)</b>						Prepared: 05/05/15 08:14 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5D0722-07)												
EPA 8000C												
% Solids	99.9	---	1.00	% by Weight	1	---	99.9	---	---	0	20%	Q-38
<b>Duplicate (5050098-DUP3)</b>						Prepared: 05/05/15 08:14 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5D0722-16)												
EPA 8000C												
% Solids	99.8	---	1.00	% by Weight	1	---	99.8	---	---	0	20%	Q-38
<b>Duplicate (5050098-DUP4)</b>						Prepared: 05/05/15 08:17 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0036-01)												
EPA 8000C												
% Solids	94.0	---	1.00	% by Weight	1	---	94.5	---	---	0.5	20%	Q-38
<b>Duplicate (5050098-DUP5)</b>						Prepared: 05/05/15 08:17 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0073-05)												
EPA 8000C												
% Solids	89.2	---	1.00	% by Weight	1	---	89.5	---	---	0.3	20%	Q-38
<b>Duplicate (5050098-DUP6)</b>						Prepared: 05/05/15 11:22 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0076-03)												
EPA 8000C												
% Solids	49.6	---	1.00	% by Weight	1	---	50.8	---	---	2	20%	Q-38
<b>Duplicate (5050098-DUP7)</b>						Prepared: 05/05/15 19:02 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0101-02)												
EPA 8000C												
% Solids	82.8	---	1.00	% by Weight	1	---	82.8	---	---	0	20%	Q-38
<b>Duplicate (5050098-DUP8)</b>						Prepared: 05/05/15 19:02 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0109-01)												

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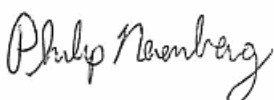
Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01  
 Project Manager: Madi Novak

**Reported:**  
 05/22/15 16:29

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050098 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050098-DUP8)</b>						Prepared: 05/05/15 19:02 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (ASE0109-01)												
EPA 8000C												
% Solids	86.4	---	1.00	% by Weight	1	---	87.1	---	---	0.8	20%	Q-38



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Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01  
 Project Manager: Madi Novak

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 05/22/15 16:29

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

#### Prep: PSEP TOC

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5050100</b>							
A5D0781-02	Soil	PSEP/SM 5310B MOD	04/23/15 11:25	05/05/15 08:43	5g/5g	5g/5g	NA
A5D0781-04	Soil	PSEP/SM 5310B MOD	04/23/15 09:00	05/05/15 08:43	5g/5g	5g/5g	NA
A5D0781-06	Soil	PSEP/SM 5310B MOD	04/23/15 14:40	05/05/15 08:43	5g/5g	5g/5g	NA
A5D0781-08	Soil	PSEP/SM 5310B MOD	04/23/15 13:15	05/05/15 08:43	5g/5g	5g/5g	NA
A5D0781-10	Soil	PSEP/SM 5310B MOD	04/23/15 14:15	05/05/15 08:43	5g/5g	5g/5g	NA
A5D0781-12	Soil	PSEP/SM 5310B MOD	04/23/15 13:45	05/05/15 08:43	5g/5g	5g/5g	NA
A5D0781-14	Soil	PSEP/SM 5310B MOD	04/23/15 10:50	05/05/15 08:43	5g/5g	5g/5g	NA
A5D0781-16	Soil	PSEP/SM 5310B MOD	04/23/15 10:00	05/05/15 08:43	5g/5g	5g/5g	NA
A5D0781-18	Soil	PSEP/SM 5310B MOD	04/23/15 10:30	05/05/15 08:43	5g/5g	5g/5g	NA

### Percent Dry Weight

#### Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5040757</b>							
A5D0781-01	Soil	EPA 8000C	04/23/15 11:25	04/28/15 15:59	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-03	Soil	EPA 8000C	04/23/15 09:00	04/28/15 15:59	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-05	Soil	EPA 8000C	04/23/15 14:40	04/28/15 15:59	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-07	Soil	EPA 8000C	04/23/15 13:15	04/28/15 15:59	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-09	Soil	EPA 8000C	04/23/15 14:15	04/28/15 15:59	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-11	Soil	EPA 8000C	04/23/15 13:45	04/28/15 15:59	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-13	Soil	EPA 8000C	04/23/15 10:50	04/28/15 15:59	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-15	Soil	EPA 8000C	04/23/15 10:00	04/28/15 15:59	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-17	Soil	EPA 8000C	04/23/15 10:30	04/28/15 15:59	1N/A/1N/A	1N/A/1N/A	NA
<b>Batch: 5050098</b>							
A5D0781-02	Soil	EPA 8000C	04/23/15 11:25	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-04	Soil	EPA 8000C	04/23/15 09:00	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA

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 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01  
 Project Manager: Madi Novak

**Reported:**  
 05/22/15 16:29

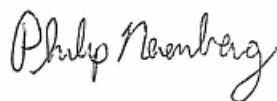
## SAMPLE PREPARATION INFORMATION

### Percent Dry Weight

#### Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A5D0781-06	Soil	EPA 8000C	04/23/15 14:40	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-08	Soil	EPA 8000C	04/23/15 13:15	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-10	Soil	EPA 8000C	04/23/15 14:15	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-12	Soil	EPA 8000C	04/23/15 13:45	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-14	Soil	EPA 8000C	04/23/15 10:50	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-16	Soil	EPA 8000C	04/23/15 10:00	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-18	Soil	EPA 8000C	04/23/15 10:30	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA

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05/22/15 16:29

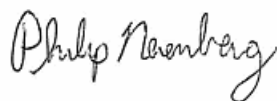
## Notes and Definitions

### Qualifiers:

- Q-01 Spike recovery and/or RPD is outside acceptance limits.  
Q-38 Oven outside of control limits during drying step.

### Notes and Conventions:

- DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.  
Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.  
For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.  
Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.  
--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.  
\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



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Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: 9003.01  
Project Manager: Madi Novak

Reported:  
05/22/15 16:29

Lab **ADDC78** of

### CHAIN OF CUSTODY

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <b>Maul Foster &amp; Alongi</b>		Project Mgr: <b>Madi Novak</b>		Project Name: <b>Port of Ridgefield ISM</b>		Project # <b>9003.01</b>		Email: <b>maul@maul-foster.com</b>	
Address: <b>2001 NW 19th Ave</b>		Phone: <b>503-718-2323</b>		Fax: <b>503-718-0333</b>		TOTAL DISS TCLP		1200-COLS	
Sampled by: <b>Eric Novak</b>		# OF CONTAINERS		MATRIX		TIME		DATE	
Site Location: <b>OR</b> <input checked="" type="radio"/> <b>WA</b>		LAB ID #		DATE		TIME		# OF CONTAINERS	
Other: _____		SAMPLE ID		DATE		TIME		# OF CONTAINERS	
1 ISM-AD1017-0.5-C		11/2/13		11:25		S		1	
2 ISM-AD1017-0.5		11/2/13		10:00		S		1	
3 ISM-AD1017-0.5		11/2/13		14:40		S		1	
4 ISM-AD1017-0.5		11/2/13		13:15		S		1	
5 ISM-AD1017-0.5		11/2/13		14:15		S		1	
6 ISM-AD1017-0.5		11/2/13		13:15		S		1	
7 ISM-AD1017-0.5-B		11/2/13		10:50		S		1	
8 ISM-AD1017-0.5		11/2/13		10:00		S		1	
9 ISM-AD1017-0.5-A		11/2/13		10:30		S		1	
10									

ANALYSIS REQUEST			
Al, Sb, As, Ba, Be, Bi, Br, Cd, Cr, Co, Cu, Fe, Pb, Pt, Se, Si, Sn, Mn, Ni, Rb, Sr, Tl, V, Zn			
TCLP Metals (S)			
RCA Metals (B)			
600 TPO			
8082 PCBs			
8270 SIM PAHs			
8270 SVOC			
8260 BTEX			
8260 RBDM VOCs			
8260 VOC			
NWTH-GX			
NWTH-DX			
NWTH-HCID			

SPECIAL INSTRUCTIONS:			
Normal Turn Around Time (TAT) = 7-10 Business Days	YES	NO	
TAT Requested (circle)	1 Day	2 Day	3 Day
	4 DAY	5 DAY	Other: _____

RECEIVED BY:			
Signature: <i>[Signature]</i>	Date: <b>11/2/13</b>	Signature: <i>[Signature]</i>	Date: <b>4/24/15</b>
Printed Name: <b>Eric Novak</b>	Time: <b>13:00</b>	Printed Name: <b>Madi Novak</b>	Time: <b>13:00</b>
Company: <b>AFA</b>		Company: <b>MAUL FOSTER &amp; ALONGI</b>	

*Philip Nerenberg*

Thursday, June 11, 2015

Madi Novak  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield / 9003.01

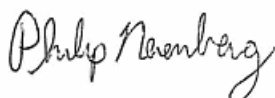
Enclosed are the results of analyses for work order A5D0784, which was received by the laboratory on 4/24/2015 at 1:00:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

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Philip Nerenberg, Lab Director

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Portland, OR 97209

Project: **Port of Ridgefield**

Project Number: 9003.01

Project Manager: Madi Novak

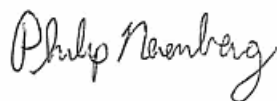
**Reported:**  
06/11/15 09:32

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS-ROW036-0.5	A5D0784-01	Soil	04/23/15 15:10	04/24/15 13:00
SS-ROW036-1.0	A5D0784-02	Soil	04/23/15 15:20	04/24/15 13:00
SBS-AOI032-1.0	A5D0784-03	Soil	04/23/15 15:30	04/24/15 13:00
SS-ROW012-0.5	A5D0784-05	Soil	04/23/15 16:00	04/24/15 13:00
SS-ROW014-0.5	A5D0784-06	Soil	04/23/15 16:20	04/24/15 13:00
SS-ROW014-1.0	A5D0784-07	Soil	04/23/15 16:30	04/24/15 13:00
SBS-AOI017-1.0	A5D0784-08	Soil	04/23/15 16:40	04/24/15 13:00

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Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01  
Project Manager: Madi Novak

**Reported:**  
06/11/15 09:32

## ANALYTICAL CASE NARRATIVE

**Work Order: A5D0784**

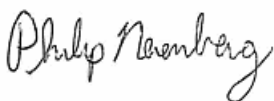
Amended Report Revision 1:

This report supersedes all previous reports.

Additional Analyses-

TOC analysis was added to samples SS-ROW036-1.0 and SS-ROW014-1.0 after the original report was finalized. This revised report contains both the original and the added data.

Philip Nerenberg  
Lab Director  
6/12/15



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01  
 Project Manager: Madi Novak

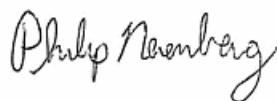
**Reported:**  
 06/11/15 09:32

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SS-ROW036-0.5 (A5D0784-01)</b>			<b>Matrix: Soil</b>					
Batch: 5040846								
<b>Total Organic Carbon</b>	<b>12000</b>	---	200	mg/kg	1	05/05/15 13:30	PSEP/SM 5310B MOD	
<b>SS-ROW036-1.0 (A5D0784-02)</b>			<b>Matrix: Soil</b>					
Batch: 5050889								
<b>Total Organic Carbon</b>	<b>11000</b>	---	200	mg/kg	1	06/01/15 13:45	PSEP/SM 5310B MOD	
<b>SBS-AOI032-1.0 (A5D0784-03)</b>			<b>Matrix: Soil</b>					
Batch: 5040846								
<b>Total Organic Carbon</b>	<b>12000</b>	---	200	mg/kg	1	05/05/15 13:30	PSEP/SM 5310B MOD	
<b>SS-ROW012-0.5 (A5D0784-05)</b>			<b>Matrix: Soil</b>					
Batch: 5040846								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	05/05/15 13:30	PSEP/SM 5310B MOD	
<b>SS-ROW014-0.5 (A5D0784-06)</b>			<b>Matrix: Soil</b>					
Batch: 5040846								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	05/05/15 13:30	PSEP/SM 5310B MOD	
<b>SS-ROW014-1.0 (A5D0784-07)</b>			<b>Matrix: Soil</b>					
Batch: 5050889								
<b>Total Organic Carbon</b>	<b>11000</b>	---	200	mg/kg	1	06/01/15 13:45	PSEP/SM 5310B MOD	
<b>SBS-AOI017-1.0 (A5D0784-08)</b>			<b>Matrix: Soil</b>					
Batch: 5040846								
<b>Total Organic Carbon</b>	<b>11000</b>	---	200	mg/kg	1	05/05/15 13:30	PSEP/SM 5310B MOD	

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Project: **Port of Ridgefield**  
Project Number: 9003.01  
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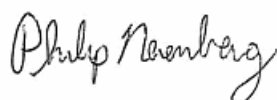
**Reported:**  
06/11/15 09:32

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5040846 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5040846-BLK1)</b>						Prepared: 04/30/15 11:24 Analyzed: 05/04/15 17:15						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5040846-BS1)</b>						Prepared: 04/30/15 11:24 Analyzed: 05/04/15 17:15						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	8900	---		mg/kg	1	10000	---	89	85-115%	---	---	
<b>Duplicate (5040846-DUP1)</b>						Prepared: 04/30/15 11:24 Analyzed: 05/04/15 17:15						
<b>QC Source Sample: Other (A5D0682-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	1200	---	200	mg/kg	1	---	1200	---	---	4	20%	
<b>Duplicate (5040846-DUP2)</b>						Prepared: 04/30/15 11:24 Analyzed: 05/04/15 17:15						
<b>QC Source Sample: Other (A5D0719-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	34000	---	200	mg/kg	1	---	32000	---	---	7	20%	
<b>Batch 5050889 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5050889-BLK1)</b>						Prepared: 05/29/15 13:34 Analyzed: 06/01/15 13:45						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5050889-BS1)</b>						Prepared: 05/29/15 13:34 Analyzed: 06/01/15 13:45						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9700	---		mg/kg	1	10000	---	97	85-115%	---	---	
<b>Duplicate (5050889-DUP1)</b>						Prepared: 05/29/15 13:34 Analyzed: 06/01/15 13:45						
<b>QC Source Sample: Other (A5E0713-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	19000	---	200	mg/kg	1	---	19000	---	---	0.7	20%	

Apex Laboratories



Philip Nerenberg, Lab Director

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01  
 Project Manager: Madi Novak

**Reported:**  
 06/11/15 09:32

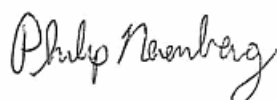
### SAMPLE PREPARATION INFORMATION

#### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b><u>Batch: 5040846</u></b>							
A5D0784-01	Soil	PSEP/SM 5310B MOD	04/23/15 15:10	04/30/15 11:24	5g/5g	5g/5g	NA
A5D0784-03	Soil	PSEP/SM 5310B MOD	04/23/15 15:30	04/30/15 11:24	5g/5g	5g/5g	NA
A5D0784-05	Soil	PSEP/SM 5310B MOD	04/23/15 16:00	04/30/15 11:24	5g/5g	5g/5g	NA
A5D0784-06	Soil	PSEP/SM 5310B MOD	04/23/15 16:20	04/30/15 11:24	5g/5g	5g/5g	NA
A5D0784-08	Soil	PSEP/SM 5310B MOD	04/23/15 16:40	04/30/15 11:24	5g/5g	5g/5g	NA
<b><u>Batch: 5050889</u></b>							
A5D0784-02	Soil	PSEP/SM 5310B MOD	04/23/15 15:20	05/29/15 13:34	5g/5g	5g/5g	NA
A5D0784-07	Soil	PSEP/SM 5310B MOD	04/23/15 16:30	05/29/15 13:34	5g/5g	5g/5g	NA

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Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01  
Project Manager: Madi Novak

**Reported:**  
06/11/15 09:32

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**

Project Number: 9003.01

Project Manager: Madi Novak

Reported:  
06/11/15 09:32

Lab # A500794 of

### CHAIN OF CUSTODY

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Maul Foster & Alongi		Project Mgr: Madi Novak	Project Name: <b>POE opp</b>	Project # 9003.01
Address: 2001 NW 19th Ave Suite 200		Phone:	Fax:	Email: <a href="mailto:emay101@maulfooster.com">emay101@maulfooster.com</a>
Sampled by: Eric Nerenberg		ANALYSIS REQUEST		
Site Location: OR <input checked="" type="checkbox"/>	Other: <input type="checkbox"/>	# OF CONTAINERS	MATRIX	DATE
SAMPLE ID				
1 55-Row036-0.5		2	S	4/23/15 1510
2 55-Row036-1.0		2		1520
3 55-A0102-1.0		2		1530
4 55-Row017-1.0		2		1610
5 55-Row017-0.5		2		1600
6 55-Row014-0.5		2		1620
7 55-Row014-1.0		2		1630
8 55-A0107-1.0		2		1640
9				
10				

Normal Turn Around Time (TAT) = 7-10 Business Days	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
TAT Requested (circle)	1 Day	2 Day
	3 Day	Other: _____
	4 DAY	5 DAY

RELINQUISHED BY:	RECEIVED BY:
Signature: <i>Eric Nerenberg</i>	Signature: <i>Madi Novak</i>
Date: 4/24/15	Date: 4/24/15
Printed Name: Eric Nerenberg	Printed Name: Madi Novak
Time: 1300	Time: 1300

SPECIAL INSTRUCTIONS:

*Philip Nerenberg*

# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Wednesday, May 13, 2015

Madi Novak  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield / 9003.01

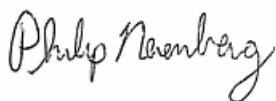
Enclosed are the results of analyses for work order A5D0784, which was received by the laboratory on 4/24/2015 at 1:00:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



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---

Philip Nerenberg, Lab Director



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01  
Project Manager: Madi Novak

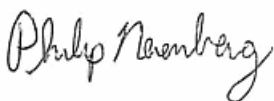
**Reported:**  
05/13/15 16:32

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS-ROW036-0.5	A5D0784-01	Soil	04/23/15 15:10	04/24/15 13:00
SBS-AOI032-1.0	A5D0784-03	Soil	04/23/15 15:30	04/24/15 13:00
SS-ROW012-0.5	A5D0784-05	Soil	04/23/15 16:00	04/24/15 13:00
SS-ROW014-0.5	A5D0784-06	Soil	04/23/15 16:20	04/24/15 13:00
SBS-AOI017-1.0	A5D0784-08	Soil	04/23/15 16:40	04/24/15 13:00

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Philip Nerenberg, Lab Director

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 Portland, OR 97209

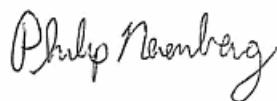
Project: **Port of Ridgefield**  
 Project Number: 9003.01  
 Project Manager: Madi Novak

**Reported:**  
 05/13/15 16:32

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SS-ROW036-0.5 (A5D0784-01)</b>			<b>Matrix: Soil</b>					
Batch: 5040846								
<b>Total Organic Carbon</b>	<b>12000</b>	---	200	mg/kg	1	05/05/15 13:30	PSEP/SM 5310B MOD	
<b>SBS-AOI032-1.0 (A5D0784-03)</b>			<b>Matrix: Soil</b>					
Batch: 5040846								
<b>Total Organic Carbon</b>	<b>12000</b>	---	200	mg/kg	1	05/05/15 13:30	PSEP/SM 5310B MOD	
<b>SS-ROW012-0.5 (A5D0784-05)</b>			<b>Matrix: Soil</b>					
Batch: 5040846								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	05/05/15 13:30	PSEP/SM 5310B MOD	
<b>SS-ROW014-0.5 (A5D0784-06)</b>			<b>Matrix: Soil</b>					
Batch: 5040846								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	05/05/15 13:30	PSEP/SM 5310B MOD	
<b>SBS-AOI017-1.0 (A5D0784-08)</b>			<b>Matrix: Soil</b>					
Batch: 5040846								
<b>Total Organic Carbon</b>	<b>11000</b>	---	200	mg/kg	1	05/05/15 13:30	PSEP/SM 5310B MOD	



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

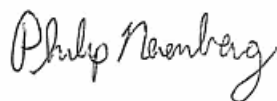
Project: **Port of Ridgefield**  
 Project Number: 9003.01  
 Project Manager: Madi Novak

**Reported:**  
 05/13/15 16:32

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5040846 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5040846-BLK1)</b>						Prepared: 04/30/15 11:24 Analyzed: 05/04/15 17:15						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5040846-BS1)</b>						Prepared: 04/30/15 11:24 Analyzed: 05/04/15 17:15						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	8900	---		mg/kg	1	10000	---	89	85-115%	---	---	
<b>Duplicate (5040846-DUP1)</b>						Prepared: 04/30/15 11:24 Analyzed: 05/04/15 17:15						
<b>QC Source Sample: Other (A5D0682-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	1200	---	200	mg/kg	1	---	1200	---	---	4	20%	
<b>Duplicate (5040846-DUP2)</b>						Prepared: 04/30/15 11:24 Analyzed: 05/04/15 17:15						
<b>QC Source Sample: Other (A5D0719-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	34000	---	200	mg/kg	1	---	32000	---	---	7	20%	



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01  
 Project Manager: Madi Novak

**Reported:**  
 05/13/15 16:32

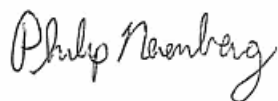
## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5040846</b>							
A5D0784-01	Soil	PSEP/SM 5310B MOD	04/23/15 15:10	04/30/15 11:24	5g/5g	5g/5g	NA
A5D0784-03	Soil	PSEP/SM 5310B MOD	04/23/15 15:30	04/30/15 11:24	5g/5g	5g/5g	NA
A5D0784-05	Soil	PSEP/SM 5310B MOD	04/23/15 16:00	04/30/15 11:24	5g/5g	5g/5g	NA
A5D0784-06	Soil	PSEP/SM 5310B MOD	04/23/15 16:20	04/30/15 11:24	5g/5g	5g/5g	NA
A5D0784-08	Soil	PSEP/SM 5310B MOD	04/23/15 16:40	04/30/15 11:24	5g/5g	5g/5g	NA

Apex Laboratories



Philip Nerenberg, Lab Director

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2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01  
Project Manager: Madi Novak

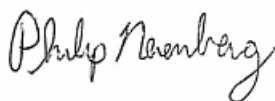
**Reported:**  
05/13/15 16:32

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01  
Project Manager: Madi Novak

Reported:  
05/13/15 16:32

Lab # A500794 of

### CHAIN OF CUSTODY

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Maul Foster & Alongi		Project Mgr: Madi Novak	Project Name: <b>POE opp</b>	Project # 9003.01
Address: 2001 NW 19th Ave Suite 200		Phone:	Fax:	Email: <a href="mailto:maulfo@maulfo.com">maulfo@maulfo.com</a>
Sampled by: Eric Nerenberg		ANALYSIS REQUEST		
Site Location: OR <input checked="" type="checkbox"/>	Other: <input type="checkbox"/>	# OF CONTAINERS	MATRIX	DATE
SAMPLE ID				
1 55-Row036-0.5		2	S	4/23/15 1510
2 55-Row036-1.0		2		1520
3 55-A0102-1.0		2		1530
4 55-Row017-1.0		2		1610
5 55-Row017-0.5		2		1600
6 55-Row014-0.5		2		1620
7 55-Row014-1.0		2		1630
8 55-A0107-1.0		2		1640
9				
10				
Normal Turn Around Time (TAT) = 7-10 Business Days		YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	
TAT Requested (circle)		1 Day	2 Day	3 Day
		4 DAY	5 DAY	Other: _____
SPECIAL INSTRUCTIONS:				
RECEIVED BY: _____				
RECEIVED BY: _____				
Signature: _____ Date: _____				
Printed Name: _____ Time: _____				
Company: _____				

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Tuesday, June 23, 2015

Madi Novak  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

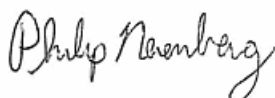
Enclosed are the results of analyses for work order A5D0913, which was received by the laboratory on 4/30/2015 at 2:25:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**

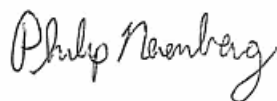
Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 06/23/15 14:28

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI020B-0.5-As Received	A5D0913-01	Soil	04/30/15 08:40	04/30/15 14:25
ISM-AOI020B-0.5-After ISM	A5D0913-02	Soil	04/30/15 08:40	04/30/15 14:25
ISM-AOI021-0.5-As Received	A5D0913-03	Soil	04/30/15 09:25	04/30/15 14:25
ISM-AOI021-0.5-After ISM	A5D0913-04	Soil	04/30/15 09:25	04/30/15 14:25
ISM-AOI030-0.5-As Received	A5D0913-05	Soil	04/30/15 10:00	04/30/15 14:25
ISM-AOI030-0.5-After ISM	A5D0913-06	Soil	04/30/15 10:00	04/30/15 14:25
ISM-AOI024-0.5-As Received	A5D0913-07	Soil	04/30/15 10:30	04/30/15 14:25
ISM-AOI024-0.5-After ISM	A5D0913-08	Soil	04/30/15 10:30	04/30/15 14:25
ISM-AOI025-0.5-As Received	A5D0913-09	Soil	04/30/15 11:10	04/30/15 14:25
ISM-AOI025-0.5-After ISM	A5D0913-10	Soil	04/30/15 11:10	04/30/15 14:25
ISM-AOI027-0.5-As Received	A5D0913-11	Soil	04/30/15 11:40	04/30/15 14:25
ISM-AOI027-0.5-After ISM	A5D0913-12	Soil	04/30/15 11:40	04/30/15 14:25
ISM-AOI029A-0.5-As Received	A5D0913-13	Soil	04/30/15 12:10	04/30/15 14:25
ISM-AOI029A-0.5-After ISM	A5D0913-14	Soil	04/30/15 12:10	04/30/15 14:25
SS-ROW030-0.5	A5D0913-15	Soil	04/30/15 12:40	04/30/15 14:25
SS-ROW030-1.0	A5D0913-16	Soil	04/30/15 12:45	04/30/15 14:25
SBS-A01020B-1.0	A5D0913-17	Soil	04/30/15 13:15	04/30/15 14:25





**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

**Reported:**  
06/23/15 14:28

## ANALYTICAL CASE NARRATIVE

**Work Order: A5D0913**

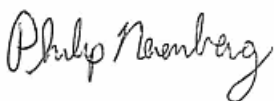
Amended Report Revision 1:

This report supersedes all previous reports.

Additional Analyses-

TOC analysis was added to sample SS-ROW030-1.0 after the original report was finalized. This revised report contains both the original and the added data.

Philip Nerenberg  
Lab Director  
6/23/15



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 06/23/15 14:28

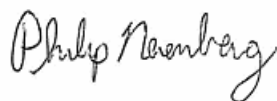
## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI020B-0.5-After ISM (A5D0913-02)</b>			<b>Matrix: Soil</b>					
Batch: 5050270								
<b>Total Organic Carbon</b>	<b>22000</b>	---	200	mg/kg	1	05/12/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI021-0.5-After ISM (A5D0913-04)</b>			<b>Matrix: Soil</b>					
Batch: 5050270								
<b>Total Organic Carbon</b>	<b>11000</b>	---	200	mg/kg	1	05/12/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI030-0.5-After ISM (A5D0913-06)</b>			<b>Matrix: Soil</b>					
Batch: 5050270								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	05/12/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI024-0.5-After ISM (A5D0913-08)</b>			<b>Matrix: Soil</b>					
Batch: 5050270								
<b>Total Organic Carbon</b>	<b>22000</b>	---	200	mg/kg	1	05/12/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI025-0.5-After ISM (A5D0913-10)</b>			<b>Matrix: Soil</b>					
Batch: 5050270								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	05/12/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI027-0.5-After ISM (A5D0913-12)</b>			<b>Matrix: Soil</b>					
Batch: 5050270								
<b>Total Organic Carbon</b>	<b>20000</b>	---	200	mg/kg	1	05/12/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI029A-0.5-After ISM (A5D0913-14)</b>			<b>Matrix: Soil</b>					
Batch: 5050270								
<b>Total Organic Carbon</b>	<b>22000</b>	---	200	mg/kg	1	05/12/15 15:20	PSEP/SM 5310B MOD	
<b>SS-ROW030-0.5 (A5D0913-15)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	
<b>SS-ROW030-1.0 (A5D0913-16)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>9400</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	H-08

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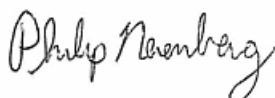
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## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SBS-A01020B-1.0 (A5D0913-17)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	

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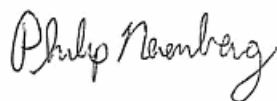
## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
<b>ISM-AOI020B-0.5-As Received (A5D0913-01)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	77.6	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI020B-0.5-After ISM (A5D0913-02)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050208</b>				
% Solids	97.1	---	1.00	% by Weight	1	05/08/15 09:04	EPA 8000C	Q-38
<b>ISM-AOI021-0.5-As Received (A5D0913-03)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	79.7	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI021-0.5-After ISM (A5D0913-04)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050208</b>				
% Solids	97.2	---	1.00	% by Weight	1	05/08/15 09:04	EPA 8000C	Q-38
<b>ISM-AOI030-0.5-As Received (A5D0913-05)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	82.0	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI030-0.5-After ISM (A5D0913-06)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050208</b>				
% Solids	97.3	---	1.00	% by Weight	1	05/08/15 09:04	EPA 8000C	Q-38
<b>ISM-AOI024-0.5-As Received (A5D0913-07)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	78.0	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI024-0.5-After ISM (A5D0913-08)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050208</b>				
% Solids	97.1	---	1.00	% by Weight	1	05/08/15 09:04	EPA 8000C	Q-38
<b>ISM-AOI025-0.5-As Received (A5D0913-09)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	80.6	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI025-0.5-After ISM (A5D0913-10)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050208</b>				
% Solids	97.6	---	1.00	% by Weight	1	05/08/15 09:04	EPA 8000C	Q-38
<b>ISM-AOI027-0.5-As Received (A5D0913-11)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	76.7	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI027-0.5-After ISM (A5D0913-12)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050208</b>				
% Solids	97.4	---	1.00	% by Weight	1	05/08/15 09:04	EPA 8000C	Q-38
<b>ISM-AOI029A-0.5-As Received (A5D0913-13)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	77.4	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI029A-0.5-After ISM (A5D0913-14)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050208</b>				
% Solids	97.5	---	1.00	% by Weight	1	05/08/15 09:04	EPA 8000C	Q-38
<b>SS-ROW030-0.5 (A5D0913-15)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	78.0	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>SBS-A01020B-1.0 (A5D0913-17)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				

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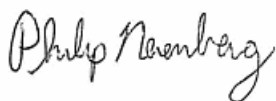
<b>Maul Foster &amp; Alongi, INC.</b> 2001 NW 19th Ave, STE 200 Portland, OR 97209	Project: <b>Port of Ridgefield ISM</b> Project Number: 9003.01.39 Project Manager: Madi Novak	<b>Reported:</b> 06/23/15 14:28
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## ANALYTICAL SAMPLE RESULTS

<b>Percent Dry Weight</b>
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Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SBS-A01020B-1.0 (A5D0913-17)</b>			<b>Matrix: Soil</b>		<b>Batch: 5050098</b>			
% Solids	82.3	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38

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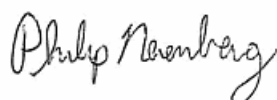
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## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050100 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5050100-BLK1)</b>						Prepared: 05/05/15 08:43 Analyzed: 05/07/15 18:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>LCS (5050100-BS1)</b>						Prepared: 05/05/15 08:43 Analyzed: 05/07/15 18:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9300	---		mg/kg	1	10000	---	93	85-115%	---	---	
<b>Duplicate (5050100-DUP1)</b>						Prepared: 05/05/15 08:43 Analyzed: 05/07/15 18:05						
<b>QC Source Sample: Other (A5D0781-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	17000	---	200	mg/kg	1	---	17000	---	---	2	20%	
<b>Duplicate (5050100-DUP2)</b>						Prepared: 05/05/15 08:43 Analyzed: 05/07/15 18:05						
<b>QC Source Sample: SBS-A01020B-1.0 (A5D0913-17)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	12000	---	200	mg/kg	1	---	15000	---	---	21	20%	Q-01
<b>Batch 5050270 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5050270-BLK1)</b>						Prepared: 05/09/15 09:03 Analyzed: 05/12/15 15:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>LCS (5050270-BS1)</b>						Prepared: 05/09/15 09:03 Analyzed: 05/12/15 15:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9700	---		mg/kg	1	10000	---	97	85-115%	---	---	
<b>Duplicate (5050270-DUP1)</b>						Prepared: 05/09/15 09:03 Analyzed: 05/12/15 15:20						
<b>QC Source Sample: ISM-AOI020B-0.5-After ISM (A5D0913-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	22000	---	200	mg/kg	1	---	22000	---	---	2	20%	
<b>Batch 5060404 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5060404-BLK1)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	

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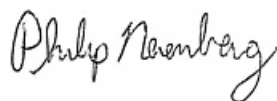
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## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5060404 - PSEP TOC</b>						<b>Soil</b>						
<b>LCS (5060404-BS1)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9800	---		mg/kg	1	10000	---	98	85-115%	---	---	
<b>Duplicate (5060404-DUP1)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>QC Source Sample: SS-ROW030-1.0 (A5D0913-16)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	<b>9200</b>	---	200	mg/kg	1	---	9400	---	---	2	20%	
<b>Duplicate (5060404-DUP2)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>QC Source Sample: Other (A5F0363-17)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	<b>19000</b>	---	200	mg/kg	1	---	19000	---	---	1	20%	

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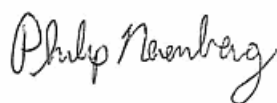
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06/23/15 14:28

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050098 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050098-DUP1)</b>						Prepared: 05/05/15 08:14 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5C0205-33)												
EPA 8000C												
% Solids	90.0	---	1.00	% by Weight	1	---	88.7	---	---	1	20%	Q-38
<b>Duplicate (5050098-DUP2)</b>						Prepared: 05/05/15 08:14 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5D0722-07)												
EPA 8000C												
% Solids	99.9	---	1.00	% by Weight	1	---	99.9	---	---	0	20%	Q-38
<b>Duplicate (5050098-DUP3)</b>						Prepared: 05/05/15 08:14 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5D0722-16)												
EPA 8000C												
% Solids	99.8	---	1.00	% by Weight	1	---	99.8	---	---	0	20%	Q-38
<b>Duplicate (5050098-DUP4)</b>						Prepared: 05/05/15 08:17 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0036-01)												
EPA 8000C												
% Solids	94.0	---	1.00	% by Weight	1	---	94.5	---	---	0.5	20%	Q-38
<b>Duplicate (5050098-DUP5)</b>						Prepared: 05/05/15 08:17 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0073-05)												
EPA 8000C												
% Solids	89.2	---	1.00	% by Weight	1	---	89.5	---	---	0.3	20%	Q-38
<b>Duplicate (5050098-DUP6)</b>						Prepared: 05/05/15 11:22 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0076-03)												
EPA 8000C												
% Solids	49.6	---	1.00	% by Weight	1	---	50.8	---	---	2	20%	Q-38
<b>Duplicate (5050098-DUP7)</b>						Prepared: 05/05/15 19:02 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0101-02)												
EPA 8000C												
% Solids	82.8	---	1.00	% by Weight	1	---	82.8	---	---	0	20%	Q-38
<b>Duplicate (5050098-DUP8)</b>						Prepared: 05/05/15 19:02 Analyzed: 05/06/15 10:18						

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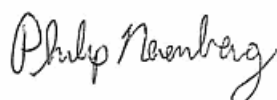
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## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050098 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050098-DUP8)</b>						Prepared: 05/05/15 19:02 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0109-01)												
EPA 8000C												
% Solids	86.4	---	1.00	% by Weight	1	---	87.1	---	---	0.8	20%	Q-38
<b>Batch 5050208 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050208-DUP1)</b>						Prepared: 05/07/15 14:29 Analyzed: 05/08/15 09:04						
QC Source Sample: Other (A5E0156-01)												
EPA 8000C												
% Solids	80.1	---	1.00	% by Weight	1	---	80.6	---	---	0.6	20%	Q-38
<b>Duplicate (5050208-DUP2)</b>						Prepared: 05/07/15 14:29 Analyzed: 05/08/15 09:04						
QC Source Sample: Other (A5E0172-03)												
EPA 8000C												
% Solids	78.0	---	1.00	% by Weight	1	---	77.9	---	---	0.1	20%	Q-38
<b>Duplicate (5050208-DUP3)</b>						Prepared: 05/07/15 18:13 Analyzed: 05/08/15 09:04						
QC Source Sample: Other (A5E0178-05)												
EPA 8000C												
% Solids	74.5	---	1.00	% by Weight	1	---	73.7	---	---	1	20%	Q-38
<b>Duplicate (5050208-DUP4)</b>						Prepared: 05/07/15 18:51 Analyzed: 05/08/15 09:04						
QC Source Sample: Other (A5E0188-01)												
EPA 8000C												
% Solids	82.2	---	1.00	% by Weight	1	---	82.5	---	---	0.4	20%	Q-38
<b>Duplicate (5050208-DUP5)</b>						Prepared: 05/07/15 18:51 Analyzed: 05/08/15 09:04						
QC Source Sample: Other (A5E0193-04)												
EPA 8000C												
% Solids	75.9	---	1.00	% by Weight	1	---	76.4	---	---	0.7	20%	Q-38

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 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 06/23/15 14:28

### SAMPLE PREPARATION INFORMATION

#### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5050100</b>							
A5D0913-15	Soil	PSEP/SM 5310B MOD	04/30/15 12:40	05/05/15 08:43	5g/5g	5g/5g	NA
A5D0913-17	Soil	PSEP/SM 5310B MOD	04/30/15 13:15	05/05/15 08:43	5g/5g	5g/5g	NA
<b>Batch: 5050270</b>							
A5D0913-02	Soil	PSEP/SM 5310B MOD	04/30/15 08:40	05/09/15 09:03	5g/5g	5g/5g	NA
A5D0913-04	Soil	PSEP/SM 5310B MOD	04/30/15 09:25	05/09/15 09:03	5g/5g	5g/5g	NA
A5D0913-06	Soil	PSEP/SM 5310B MOD	04/30/15 10:00	05/09/15 09:03	5g/5g	5g/5g	NA
A5D0913-08	Soil	PSEP/SM 5310B MOD	04/30/15 10:30	05/09/15 09:03	5g/5g	5g/5g	NA
A5D0913-10	Soil	PSEP/SM 5310B MOD	04/30/15 11:10	05/09/15 09:03	5g/5g	5g/5g	NA
A5D0913-12	Soil	PSEP/SM 5310B MOD	04/30/15 11:40	05/09/15 09:03	5g/5g	5g/5g	NA
A5D0913-14	Soil	PSEP/SM 5310B MOD	04/30/15 12:10	05/09/15 09:03	5g/5g	5g/5g	NA
<b>Batch: 5060404</b>							
A5D0913-16	Soil	PSEP/SM 5310B MOD	04/30/15 12:45	06/12/15 08:34	5g/5g	5g/5g	NA

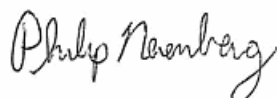
#### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5050098</b>							
A5D0913-01	Soil	EPA 8000C	04/30/15 08:40	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-03	Soil	EPA 8000C	04/30/15 09:25	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-05	Soil	EPA 8000C	04/30/15 10:00	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-07	Soil	EPA 8000C	04/30/15 10:30	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-09	Soil	EPA 8000C	04/30/15 11:10	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-11	Soil	EPA 8000C	04/30/15 11:40	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-13	Soil	EPA 8000C	04/30/15 12:10	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA

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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: 9003.01.39  
 Project Manager: Madi Novak

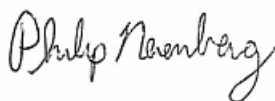
Reported:  
 06/23/15 14:28

### SAMPLE PREPARATION INFORMATION

#### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A5D0913-15	Soil	EPA 8000C	04/30/15 12:40	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-17	Soil	EPA 8000C	04/30/15 13:15	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
<b>Batch: 5050208</b>							
A5D0913-02	Soil	EPA 8000C	04/30/15 08:40	05/07/15 14:29	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-04	Soil	EPA 8000C	04/30/15 09:25	05/07/15 14:29	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-06	Soil	EPA 8000C	04/30/15 10:00	05/07/15 14:29	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-08	Soil	EPA 8000C	04/30/15 10:30	05/07/15 14:29	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-10	Soil	EPA 8000C	04/30/15 11:10	05/07/15 14:29	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-12	Soil	EPA 8000C	04/30/15 11:40	05/07/15 14:29	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-14	Soil	EPA 8000C	04/30/15 12:10	05/07/15 14:29	1N/A/1N/A	1N/A/1N/A	NA



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Reported:  
06/23/15 14:28

## Notes and Definitions

### Qualifiers:

- H-08 Sample hold time extended by freezing at -18 degrees C. Total time at 4 degrees C was less than the standard hold time.
- Q-01 Spike recovery and/or RPD is outside acceptance limits.
- Q-38 Oven outside of control limits during drying step.

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



Monday, July 13, 2015

Madi Novak  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

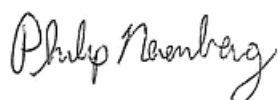
Enclosed are the results of analyses for work order A5D0913, which was received by the laboratory on 4/30/2015 at 2:25:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

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Philip Nerenberg, Lab Director

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Project: **Port of Ridgefield ISM**

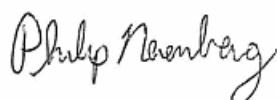
Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 07/13/15 13:52

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI020B-0.5-As Received	A5D0913-01	Soil	04/30/15 08:40	04/30/15 14:25
ISM-AOI020B-0.5-After ISM	A5D0913-02	Soil	04/30/15 08:40	04/30/15 14:25
ISM-AOI021-0.5-As Received	A5D0913-03	Soil	04/30/15 09:25	04/30/15 14:25
ISM-AOI021-0.5-After ISM	A5D0913-04	Soil	04/30/15 09:25	04/30/15 14:25
ISM-AOI030-0.5-As Received	A5D0913-05	Soil	04/30/15 10:00	04/30/15 14:25
ISM-AOI030-0.5-After ISM	A5D0913-06	Soil	04/30/15 10:00	04/30/15 14:25
ISM-AOI024-0.5-As Received	A5D0913-07	Soil	04/30/15 10:30	04/30/15 14:25
ISM-AOI024-0.5-After ISM	A5D0913-08	Soil	04/30/15 10:30	04/30/15 14:25
ISM-AOI025-0.5-As Received	A5D0913-09	Soil	04/30/15 11:10	04/30/15 14:25
ISM-AOI025-0.5-After ISM	A5D0913-10	Soil	04/30/15 11:10	04/30/15 14:25
ISM-AOI027-0.5-As Received	A5D0913-11	Soil	04/30/15 11:40	04/30/15 14:25
ISM-AOI027-0.5-After ISM	A5D0913-12	Soil	04/30/15 11:40	04/30/15 14:25
ISM-AOI029A-0.5-As Received	A5D0913-13	Soil	04/30/15 12:10	04/30/15 14:25
ISM-AOI029A-0.5-After ISM	A5D0913-14	Soil	04/30/15 12:10	04/30/15 14:25
SS-ROW030-0.5	A5D0913-15	Soil	04/30/15 12:40	04/30/15 14:25
SS-ROW030-1.0	A5D0913-16	Soil	04/30/15 12:45	04/30/15 14:25
SBS-AOI020B-1.0	A5D0913-17	Soil	04/30/15 13:15	04/30/15 14:25



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Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

**Reported:**  
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## ANALYTICAL CASE NARRATIVE

**Work Order: A5D0913**

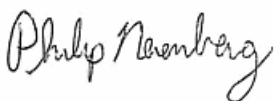
Amended Report Revision 1:

This report supersedes all previous reports.

Additional Analyses-

TOC analysis was added to sample SS-ROW030-1.0 after the original report was finalized. This revised report contains both the original and the added data.

Philip Nerenberg  
Lab Director  
6/23/15





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 Portland, OR 97209

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 Project Number: 9003.01.39  
 Project Manager: Madi Novak

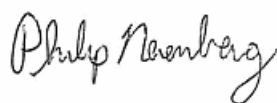
Reported:  
 07/13/15 13:52

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI020B-0.5-After ISM (A5D0913-02)</b>			<b>Matrix: Soil</b>					
Batch: 5050270								
<b>Total Organic Carbon</b>	<b>22000</b>	---	200	mg/kg	1	05/12/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI021-0.5-After ISM (A5D0913-04)</b>			<b>Matrix: Soil</b>					
Batch: 5050270								
<b>Total Organic Carbon</b>	<b>11000</b>	---	200	mg/kg	1	05/12/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI030-0.5-After ISM (A5D0913-06)</b>			<b>Matrix: Soil</b>					
Batch: 5050270								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	05/12/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI024-0.5-After ISM (A5D0913-08)</b>			<b>Matrix: Soil</b>					
Batch: 5050270								
<b>Total Organic Carbon</b>	<b>22000</b>	---	200	mg/kg	1	05/12/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI025-0.5-After ISM (A5D0913-10)</b>			<b>Matrix: Soil</b>					
Batch: 5050270								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	05/12/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI027-0.5-After ISM (A5D0913-12)</b>			<b>Matrix: Soil</b>					
Batch: 5050270								
<b>Total Organic Carbon</b>	<b>20000</b>	---	200	mg/kg	1	05/12/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI029A-0.5-After ISM (A5D0913-14)</b>			<b>Matrix: Soil</b>					
Batch: 5050270								
<b>Total Organic Carbon</b>	<b>22000</b>	---	200	mg/kg	1	05/12/15 15:20	PSEP/SM 5310B MOD	
<b>SS-ROW030-0.5 (A5D0913-15)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	
<b>SS-ROW030-1.0 (A5D0913-16)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>9400</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	H-08

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 Project Manager: Madi Novak

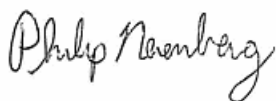
**Reported:**  
 07/13/15 13:52

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SBS-A01020B-1.0 (A5D0913-17)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	

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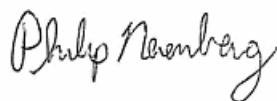
## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
<b>ISM-AOI020B-0.5-As Received (A5D0913-01)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	77.6	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI020B-0.5-After ISM (A5D0913-02)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050208</b>				
% Solids	97.1	---	1.00	% by Weight	1	05/08/15 09:04	EPA 8000C	Q-38
<b>ISM-AOI021-0.5-As Received (A5D0913-03)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	79.7	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI021-0.5-After ISM (A5D0913-04)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050208</b>				
% Solids	97.2	---	1.00	% by Weight	1	05/08/15 09:04	EPA 8000C	Q-38
<b>ISM-AOI030-0.5-As Received (A5D0913-05)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	82.0	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI030-0.5-After ISM (A5D0913-06)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050208</b>				
% Solids	97.3	---	1.00	% by Weight	1	05/08/15 09:04	EPA 8000C	Q-38
<b>ISM-AOI024-0.5-As Received (A5D0913-07)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	78.0	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI024-0.5-After ISM (A5D0913-08)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050208</b>				
% Solids	97.1	---	1.00	% by Weight	1	05/08/15 09:04	EPA 8000C	Q-38
<b>ISM-AOI025-0.5-As Received (A5D0913-09)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	80.6	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI025-0.5-After ISM (A5D0913-10)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050208</b>				
% Solids	97.6	---	1.00	% by Weight	1	05/08/15 09:04	EPA 8000C	Q-38
<b>ISM-AOI027-0.5-As Received (A5D0913-11)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	76.7	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI027-0.5-After ISM (A5D0913-12)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050208</b>				
% Solids	97.4	---	1.00	% by Weight	1	05/08/15 09:04	EPA 8000C	Q-38
<b>ISM-AOI029A-0.5-As Received (A5D0913-13)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	77.4	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI029A-0.5-After ISM (A5D0913-14)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050208</b>				
% Solids	97.5	---	1.00	% by Weight	1	05/08/15 09:04	EPA 8000C	Q-38
<b>SS-ROW030-0.5 (A5D0913-15)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	78.0	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>SBS-AOI020B-1.0 (A5D0913-17)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				

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 Project Number: 9003.01.39  
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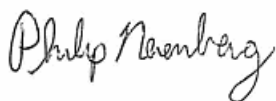
**Reported:**  
 07/13/15 13:52

### ANALYTICAL SAMPLE RESULTS

**Percent Dry Weight**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SBS-A01020B-1.0 (A5D0913-17)</b>			<b>Matrix: Soil</b>		<b>Batch: 5050098</b>			
% Solids	82.3	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38

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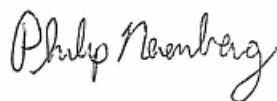
**Reported:**  
07/13/15 13:52

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050100 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5050100-BLK1)</b>						Prepared: 05/05/15 08:43 Analyzed: 05/07/15 18:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>LCS (5050100-BS1)</b>						Prepared: 05/05/15 08:43 Analyzed: 05/07/15 18:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9300	---		mg/kg	1	10000	---	93	85-115%	---	---	
<b>Duplicate (5050100-DUP1)</b>						Prepared: 05/05/15 08:43 Analyzed: 05/07/15 18:05						
<b>QC Source Sample: Other (A5D0781-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	17000	---	200	mg/kg	1	---	17000	---	---	2	20%	
<b>Duplicate (5050100-DUP2)</b>						Prepared: 05/05/15 08:43 Analyzed: 05/07/15 18:05						
<b>QC Source Sample: SBS-A01020B-1.0 (A5D0913-17)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	12000	---	200	mg/kg	1	---	15000	---	---	21	20%	Q-01
<b>Batch 5050270 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5050270-BLK1)</b>						Prepared: 05/09/15 09:03 Analyzed: 05/12/15 15:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>LCS (5050270-BS1)</b>						Prepared: 05/09/15 09:03 Analyzed: 05/12/15 15:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9700	---		mg/kg	1	10000	---	97	85-115%	---	---	
<b>Duplicate (5050270-DUP1)</b>						Prepared: 05/09/15 09:03 Analyzed: 05/12/15 15:20						
<b>QC Source Sample: ISM-AOI020B-0.5-After ISM (A5D0913-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	22000	---	200	mg/kg	1	---	22000	---	---	2	20%	
<b>Batch 5060404 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5060404-BLK1)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

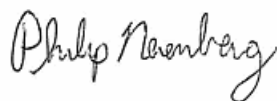
**Reported:**  
 07/13/15 13:52

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5060404 - PSEP TOC</b>						<b>Soil</b>						
<b>LCS (5060404-BS1)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9800	---		mg/kg	1	10000	---	98	85-115%	---	---	
<b>Duplicate (5060404-DUP1)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>QC Source Sample: SS-ROW030-1.0 (A5D0913-16)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	<b>9200</b>	---	200	mg/kg	1	---	9400	---	---	2	20%	
<b>Duplicate (5060404-DUP2)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>QC Source Sample: Other (A5F0363-17)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	<b>19000</b>	---	200	mg/kg	1	---	19000	---	---	1	20%	

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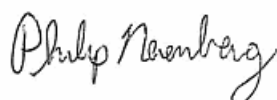
**Reported:**  
07/13/15 13:52

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050098 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050098-DUP1)</b>						Prepared: 05/05/15 08:14 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5C0205-33)												
EPA 8000C												
% Solids	90.0	---	1.00	% by Weight	1	---	88.7	---	---	1	20%	Q-38
<b>Duplicate (5050098-DUP2)</b>						Prepared: 05/05/15 08:14 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5D0722-07)												
EPA 8000C												
% Solids	99.9	---	1.00	% by Weight	1	---	99.9	---	---	0	20%	Q-38
<b>Duplicate (5050098-DUP3)</b>						Prepared: 05/05/15 08:14 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5D0722-16)												
EPA 8000C												
% Solids	99.8	---	1.00	% by Weight	1	---	99.8	---	---	0	20%	Q-38
<b>Duplicate (5050098-DUP4)</b>						Prepared: 05/05/15 08:17 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0036-01)												
EPA 8000C												
% Solids	94.0	---	1.00	% by Weight	1	---	94.5	---	---	0.5	20%	Q-38
<b>Duplicate (5050098-DUP5)</b>						Prepared: 05/05/15 08:17 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0073-05)												
EPA 8000C												
% Solids	89.2	---	1.00	% by Weight	1	---	89.5	---	---	0.3	20%	Q-38
<b>Duplicate (5050098-DUP6)</b>						Prepared: 05/05/15 11:22 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0076-03)												
EPA 8000C												
% Solids	49.6	---	1.00	% by Weight	1	---	50.8	---	---	2	20%	Q-38
<b>Duplicate (5050098-DUP7)</b>						Prepared: 05/05/15 19:02 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0101-02)												
EPA 8000C												
% Solids	82.8	---	1.00	% by Weight	1	---	82.8	---	---	0	20%	Q-38
<b>Duplicate (5050098-DUP8)</b>						Prepared: 05/05/15 19:02 Analyzed: 05/06/15 10:18						

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Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

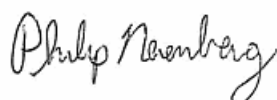
**Reported:**  
07/13/15 13:52

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050098 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050098-DUP8)</b>						Prepared: 05/05/15 19:02 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0109-01)												
EPA 8000C												
% Solids	86.4	---	1.00	% by Weight	1	---	87.1	---	---	0.8	20%	Q-38
<b>Batch 5050208 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050208-DUP1)</b>						Prepared: 05/07/15 14:29 Analyzed: 05/08/15 09:04						
QC Source Sample: Other (A5E0156-01)												
EPA 8000C												
% Solids	80.1	---	1.00	% by Weight	1	---	80.6	---	---	0.6	20%	Q-38
<b>Duplicate (5050208-DUP2)</b>						Prepared: 05/07/15 14:29 Analyzed: 05/08/15 09:04						
QC Source Sample: Other (A5E0172-03)												
EPA 8000C												
% Solids	78.0	---	1.00	% by Weight	1	---	77.9	---	---	0.1	20%	Q-38
<b>Duplicate (5050208-DUP3)</b>						Prepared: 05/07/15 18:13 Analyzed: 05/08/15 09:04						
QC Source Sample: Other (A5E0178-05)												
EPA 8000C												
% Solids	74.5	---	1.00	% by Weight	1	---	73.7	---	---	1	20%	Q-38
<b>Duplicate (5050208-DUP4)</b>						Prepared: 05/07/15 18:51 Analyzed: 05/08/15 09:04						
QC Source Sample: Other (A5E0188-01)												
EPA 8000C												
% Solids	82.2	---	1.00	% by Weight	1	---	82.5	---	---	0.4	20%	Q-38
<b>Duplicate (5050208-DUP5)</b>						Prepared: 05/07/15 18:51 Analyzed: 05/08/15 09:04						
QC Source Sample: Other (A5E0193-04)												
EPA 8000C												
% Solids	75.9	---	1.00	% by Weight	1	---	76.4	---	---	0.7	20%	Q-38

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Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
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### SAMPLE PREPARATION INFORMATION

#### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5050100</b>							
A5D0913-15	Soil	PSEP/SM 5310B MOD	04/30/15 12:40	05/05/15 08:43	5g/5g	5g/5g	NA
A5D0913-17	Soil	PSEP/SM 5310B MOD	04/30/15 13:15	05/05/15 08:43	5g/5g	5g/5g	NA
<b>Batch: 5050270</b>							
A5D0913-02	Soil	PSEP/SM 5310B MOD	04/30/15 08:40	05/09/15 09:03	5g/5g	5g/5g	NA
A5D0913-04	Soil	PSEP/SM 5310B MOD	04/30/15 09:25	05/09/15 09:03	5g/5g	5g/5g	NA
A5D0913-06	Soil	PSEP/SM 5310B MOD	04/30/15 10:00	05/09/15 09:03	5g/5g	5g/5g	NA
A5D0913-08	Soil	PSEP/SM 5310B MOD	04/30/15 10:30	05/09/15 09:03	5g/5g	5g/5g	NA
A5D0913-10	Soil	PSEP/SM 5310B MOD	04/30/15 11:10	05/09/15 09:03	5g/5g	5g/5g	NA
A5D0913-12	Soil	PSEP/SM 5310B MOD	04/30/15 11:40	05/09/15 09:03	5g/5g	5g/5g	NA
A5D0913-14	Soil	PSEP/SM 5310B MOD	04/30/15 12:10	05/09/15 09:03	5g/5g	5g/5g	NA
<b>Batch: 5060404</b>							
A5D0913-16	Soil	PSEP/SM 5310B MOD	04/30/15 12:45	06/12/15 08:34	5g/5g	5g/5g	NA

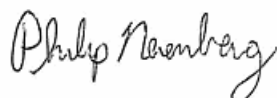
#### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5050098</b>							
A5D0913-01	Soil	EPA 8000C	04/30/15 08:40	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-03	Soil	EPA 8000C	04/30/15 09:25	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-05	Soil	EPA 8000C	04/30/15 10:00	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-07	Soil	EPA 8000C	04/30/15 10:30	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-09	Soil	EPA 8000C	04/30/15 11:10	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-11	Soil	EPA 8000C	04/30/15 11:40	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-13	Soil	EPA 8000C	04/30/15 12:10	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA

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Philip Nerenberg, Lab Director

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 Project Manager: Madi Novak

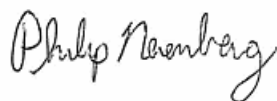
**Reported:**  
 07/13/15 13:52

### SAMPLE PREPARATION INFORMATION

**Percent Dry Weight**

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A5D0913-15	Soil	EPA 8000C	04/30/15 12:40	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-17	Soil	EPA 8000C	04/30/15 13:15	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
<b>Batch: 5050208</b>							
A5D0913-02	Soil	EPA 8000C	04/30/15 08:40	05/07/15 14:29	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-04	Soil	EPA 8000C	04/30/15 09:25	05/07/15 14:29	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-06	Soil	EPA 8000C	04/30/15 10:00	05/07/15 14:29	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-08	Soil	EPA 8000C	04/30/15 10:30	05/07/15 14:29	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-10	Soil	EPA 8000C	04/30/15 11:10	05/07/15 14:29	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-12	Soil	EPA 8000C	04/30/15 11:40	05/07/15 14:29	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-14	Soil	EPA 8000C	04/30/15 12:10	05/07/15 14:29	1N/A/1N/A	1N/A/1N/A	NA



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Reported:  
07/13/15 13:52

## Notes and Definitions

### Qualifiers:

- H-08 Sample hold time extended by freezing at -18 degrees C. Total time at 4 degrees C was less than the standard hold time.
- Q-01 Spike recovery and/or RPD is outside acceptance limits.
- Q-38 Oven outside of control limits during drying step.

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Tuesday, June 9, 2015

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

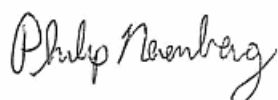
Enclosed are the results of analyses for work order A5E0255, which was received by the laboratory on 5/8/2015 at 9:40:00AM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

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Philip Nerenberg, Lab Director

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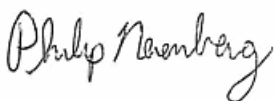
**Reported:**  
06/09/15 17:46

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS-ROW004-0.5	A5E0255-01	Soil	05/07/15 14:05	05/08/15 09:40
SBS-ROW008-0.5	A5E0255-03	Soil	05/07/15 14:30	05/08/15 09:40
ISM-AOI016-0.5-As Received	A5E0255-05	Soil	05/07/15 15:25	05/08/15 09:40
ISM-AOI016-0.5-After ISM	A5E0255-06	Soil	05/07/15 15:25	05/08/15 09:40

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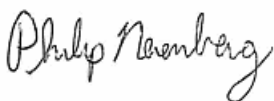
Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 06/09/15 17:46

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SS-ROW004-0.5 (A5E0255-01)</b>			<b>Matrix: Soil</b>					
Batch: 5050493								
<b>Total Organic Carbon</b>	<b>4000</b>	---	200	mg/kg	1	05/20/15 12:15	PSEP/SM 5310B MOD	
<b>SBS-ROW008-0.5 (A5E0255-03)</b>			<b>Matrix: Soil</b>					
Batch: 5050493								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	05/20/15 12:15	PSEP/SM 5310B MOD	
<b>ISM-AOI016-0.5-After ISM (A5E0255-06)</b>			<b>Matrix: Soil</b>					
Batch: 5050493								
<b>Total Organic Carbon</b>	<b>21000</b>	---	200	mg/kg	1	05/20/15 12:15	PSEP/SM 5310B MOD	



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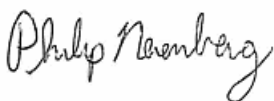
**Reported:**  
 06/09/15 17:46

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI016-0.5-As Received (A5E0255-05)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050405</b>				
% Solids	78.8	---	1.00	% by Weight	1	05/14/15 08:24	EPA 8000C	
<b>ISM-AOI016-0.5-After ISM (A5E0255-06)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050790</b>				
% Solids	96.5	---	1.00	% by Weight	1	05/28/15 08:26	EPA 8000C	

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Philip Nerenberg, Lab Director



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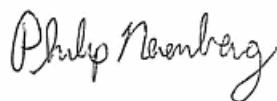
**Reported:**  
 06/09/15 17:46

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050493 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5050493-BLK1)</b>						Prepared: 05/15/15 12:31 Analyzed: 05/20/15 12:15						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5050493-BS1)</b>						Prepared: 05/15/15 12:31 Analyzed: 05/20/15 12:15						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9800	---		mg/kg	1	10000	---	98	85-115%	---	---	
<b>Duplicate (5050493-DUP1)</b>						Prepared: 05/15/15 12:31 Analyzed: 05/20/15 12:15						
<b>QC Source Sample: Other (A5E0213-04)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	3200	---	200	mg/kg	1	---	2800	---	---	13	20%	

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

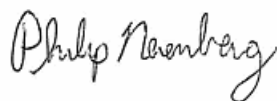
Reported:  
06/09/15 17:46

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050405 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050405-DUP1)</b>						Prepared: 05/13/15 14:18 Analyzed: 05/14/15 08:24						
QC Source Sample: Other (A5E0249-10)												
EPA 8000C												
% Solids	67.8	---	1.00	% by Weight	1	---	67.5	---	---	0.4	20%	
<b>Duplicate (5050405-DUP2)</b>						Prepared: 05/13/15 14:18 Analyzed: 05/14/15 08:24						
QC Source Sample: Other (A5E0305-03)												
EPA 8000C												
% Solids	73.0	---	1.00	% by Weight	1	---	74.1	---	---	1	20%	
<b>Duplicate (5050405-DUP3)</b>						Prepared: 05/13/15 14:19 Analyzed: 05/14/15 08:24						
QC Source Sample: Other (A5E0305-13)												
EPA 8000C												
% Solids	69.5	---	1.00	% by Weight	1	---	68.7	---	---	1	20%	
<b>Duplicate (5050405-DUP4)</b>						Prepared: 05/13/15 18:31 Analyzed: 05/14/15 08:24						
QC Source Sample: Other (A5E0375-01)												
EPA 8000C												
% Solids	86.8	---	1.00	% by Weight	1	---	88.1	---	---	1	20%	
<b>Duplicate (5050405-DUP5)</b>						Prepared: 05/13/15 18:31 Analyzed: 05/14/15 08:24						
QC Source Sample: Other (A5E0379-01)												
EPA 8000C												
% Solids	77.4	---	1.00	% by Weight	1	---	77.1	---	---	0.4	20%	
<b>Duplicate (5050405-DUP6)</b>						Prepared: 05/13/15 19:25 Analyzed: 05/14/15 08:24						
QC Source Sample: Other (A5E0388-02)												
EPA 8000C												
% Solids	81.0	---	1.00	% by Weight	1	---	80.6	---	---	0.5	20%	
<b>Batch 5050790 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050790-DUP1)</b>						Prepared: 05/27/15 11:00 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0711-06)												
EPA 8000C												

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Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

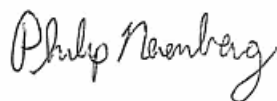
Reported:  
06/09/15 17:46

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050790 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050790-DUP1)</b>						Prepared: 05/27/15 11:00 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0711-06)												
% Solids	89.7	---	1.00	% by Weight	1	---	89.6	---	---	0.1	20%	
<b>Duplicate (5050790-DUP2)</b>						Prepared: 05/27/15 14:32 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0747-02)												
EPA 8000C												
% Solids	79.1	---	1.00	% by Weight	1	---	79.2	---	---	0.1	20%	
<b>Duplicate (5050790-DUP3)</b>						Prepared: 05/27/15 18:25 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0770-05)												
EPA 8000C												
% Solids	74.5	---	1.00	% by Weight	1	---	74.3	---	---	0.3	20%	
<b>Duplicate (5050790-DUP4)</b>						Prepared: 05/27/15 19:43 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0775-01)												
EPA 8000C												
% Solids	75.1	---	1.00	% by Weight	1	---	76.6	---	---	2	20%	
<b>Duplicate (5050790-DUP5)</b>						Prepared: 05/27/15 19:43 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0778-03)												
EPA 8000C												
% Solids	88.8	---	1.00	% by Weight	1	---	88.3	---	---	0.6	20%	
<b>Duplicate (5050790-DUP6)</b>						Prepared: 05/27/15 19:43 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0782-02)												
EPA 8000C												
% Solids	89.3	---	1.00	% by Weight	1	---	89.5	---	---	0.2	20%	

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**Maul Foster & Alongi, INC.**  
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 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 06/09/15 17:46

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

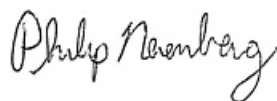
Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5050493</b>							
A5E0255-01	Soil	PSEP/SM 5310B MOD	05/07/15 14:05	05/15/15 12:31	5g/5g	5g/5g	NA
A5E0255-03	Soil	PSEP/SM 5310B MOD	05/07/15 14:30	05/15/15 12:31	5g/5g	5g/5g	NA
A5E0255-06	Soil	PSEP/SM 5310B MOD	05/07/15 15:25	05/15/15 12:31	5g/5g	5g/5g	NA

### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5050405</b>							
A5E0255-05	Soil	EPA 8000C	05/07/15 15:25	05/13/15 14:18	1N/A/1N/A	1N/A/1N/A	NA
<b>Batch: 5050790</b>							
A5E0255-06	Soil	EPA 8000C	05/07/15 15:25	05/27/15 11:00	1N/A/1N/A	1N/A/1N/A	NA

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Project Number: 9003.01.39  
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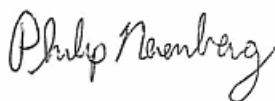
Reported:  
06/09/15 17:46

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
06/09/15 17:46

**CHAIN OF CUSTODY**

Lab # ASG 00551

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

**APEX LABS**      **MAUL FOSTER & ALONGI, INC.**

Company: MFA      Project Mgr: Phil Wiescher      Project Name: Port of Ridgefield      Project # 9003.01.39  
 Address: 2001 NW 19th Ave #200/POX OR      Phone: 5035015209      Fax: \_\_\_\_\_      Email: PWiescher@maulfooster.com  
 Sampled by: PW/EWH

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST	
					YES	NO
1 SS-Row004-0.5	6/7/15	14:05	SO	2		
2 SS-Row004-1.0	"	14:15	SO	2		
3 SS-Row008-0.5	"	14:30	SO	2		
4 SBS-Row008-1.0	"	15:00	SO	2		
5 19M-AOI 016-0.5	6/11/15	15:25	SO	2		
6						
7						
8						
9						
10						

Site Location: OR      Other: (W)

Normal Turn Around Time (TAT) = 7-10 Business Days       YES       NO

TAT Requested (circle):      1 Day      2 Day      3 Day      4 DAY      5 DAY      Other: \_\_\_\_\_

SPECIAL INSTRUCTIONS:  
Letm samples by (sim processing).  
Archive (SBS-Row008-1.0)  
SBS-Row004-1.0

RELINQUISHED BY: Emily Hester      Date: 6/9/15      Signature: [Signature]      Date: \_\_\_\_\_      Time: \_\_\_\_\_  
 PRINTED NAME: Emily Hester      Time: 4:10      Signature: \_\_\_\_\_      Date: \_\_\_\_\_      Time: \_\_\_\_\_  
 Company: MFA      Company: Apex

RECEIVED BY: \_\_\_\_\_      Date: \_\_\_\_\_      Signature: \_\_\_\_\_      Date: \_\_\_\_\_      Time: \_\_\_\_\_

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

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# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Tuesday, June 23, 2015

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

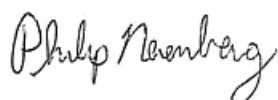
Enclosed are the results of analyses for work order A5E0713, which was received by the laboratory on 5/22/2015 at 10:36:00AM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

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Philip Nerenberg, Lab Director

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Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

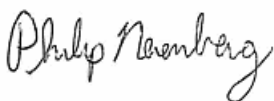
**Reported:**  
06/23/15 13:42

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI008-0.5-As Received	A5E0713-01	Soil	05/21/15 14:40	05/22/15 10:36
ISM-AOI008-0.5-After ISM	A5E0713-02	Soil	05/21/15 14:40	05/22/15 10:36
ISM-AOI030-0.5-As Received	A5E0713-03	Soil	05/21/15 15:15	05/22/15 10:36
ISM-AOI030-0.5-After ISM	A5E0713-04	Soil	05/21/15 15:15	05/22/15 10:36
SS-ROW026-0.5	A5E0713-05	Soil	05/21/15 16:10	05/22/15 10:36

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Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

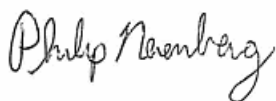
**Reported:**  
 06/23/15 13:42

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI008-0.5-After ISM (A5E0713-02)</b>			<b>Matrix: Soil</b>					
Batch: 5050889								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	06/01/15 13:45	PSEP/SM 5310B MOD	
<b>ISM-AOI030-0.5-After ISM (A5E0713-04)</b>			<b>Matrix: Soil</b>					
Batch: 5050889								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	06/01/15 13:45	PSEP/SM 5310B MOD	
<b>SS-ROW026-0.5 (A5E0713-05)</b>			<b>Matrix: Soil</b>					
Batch: 5050889								
<b>Total Organic Carbon</b>	<b>20000</b>	---	200	mg/kg	1	06/01/15 13:45	PSEP/SM 5310B MOD	

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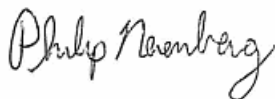
Reported:  
 06/23/15 13:42

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI008-0.5-As Received (A5E0713-01)</b>			<b>Matrix: Soil</b>	<b>Batch: 5060061</b>				
% Solids	79.6	---	1.00	% by Weight	1	06/03/15 08:48	EPA 8000C	
<b>ISM-AOI008-0.5-After ISM (A5E0713-02)</b>			<b>Matrix: Soil</b>	<b>Batch: 5060061</b>				
% Solids	96.8	---	1.00	% by Weight	1	06/03/15 08:48	EPA 8000C	
<b>ISM-AOI030-0.5-As Received (A5E0713-03)</b>			<b>Matrix: Soil</b>	<b>Batch: 5060061</b>				
% Solids	84.5	---	1.00	% by Weight	1	06/03/15 08:48	EPA 8000C	
<b>ISM-AOI030-0.5-After ISM (A5E0713-04)</b>			<b>Matrix: Soil</b>	<b>Batch: 5060061</b>				
% Solids	97.0	---	1.00	% by Weight	1	06/03/15 08:48	EPA 8000C	
<b>SS-ROW026-0.5 (A5E0713-05)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050790</b>				
% Solids	84.9	---	1.00	% by Weight	1	05/28/15 08:26	EPA 8000C	

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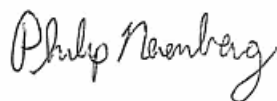
**Reported:**  
 06/23/15 13:42

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050889 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5050889-BLK1)</b>						Prepared: 05/29/15 13:34 Analyzed: 06/01/15 13:45						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5050889-BS1)</b>						Prepared: 05/29/15 13:34 Analyzed: 06/01/15 13:45						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9700	---		mg/kg	1	10000	---	97	85-115%	---	---	
<b>Duplicate (5050889-DUP1)</b>						Prepared: 05/29/15 13:34 Analyzed: 06/01/15 13:45						
<b>QC Source Sample: ISM-AOI008-0.5-After ISM (A5E0713-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	19000	---	200	mg/kg	1	---	19000	---	---	0.7	20%	

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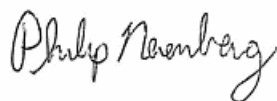
Reported:  
06/23/15 13:42

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050790 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050790-DUP1)</b>						Prepared: 05/27/15 11:00 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0711-06)												
EPA 8000C												
% Solids	89.7	---	1.00	% by Weight	1	---	89.6	---	---	0.1	20%	
<b>Duplicate (5050790-DUP2)</b>						Prepared: 05/27/15 14:32 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0747-02)												
EPA 8000C												
% Solids	79.1	---	1.00	% by Weight	1	---	79.2	---	---	0.1	20%	
<b>Duplicate (5050790-DUP3)</b>						Prepared: 05/27/15 18:25 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0770-05)												
EPA 8000C												
% Solids	74.5	---	1.00	% by Weight	1	---	74.3	---	---	0.3	20%	
<b>Duplicate (5050790-DUP4)</b>						Prepared: 05/27/15 19:43 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0775-01)												
EPA 8000C												
% Solids	75.1	---	1.00	% by Weight	1	---	76.6	---	---	2	20%	
<b>Duplicate (5050790-DUP5)</b>						Prepared: 05/27/15 19:43 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0778-03)												
EPA 8000C												
% Solids	88.8	---	1.00	% by Weight	1	---	88.3	---	---	0.6	20%	
<b>Duplicate (5050790-DUP6)</b>						Prepared: 05/27/15 19:43 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0782-02)												
EPA 8000C												
% Solids	89.3	---	1.00	% by Weight	1	---	89.5	---	---	0.2	20%	
<b>Batch 5060061 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5060061-DUP1)</b>						Prepared: 06/02/15 11:03 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0025-01)												
EPA 8000C												

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

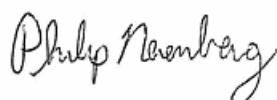
Reported:  
 06/23/15 13:42

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5060061 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5060061-DUP1)</b>						Prepared: 06/02/15 11:03 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0025-01)												
% Solids	88.6	---	1.00	% by Weight	1	---	89.7	---	---	1	20%	
<b>Duplicate (5060061-DUP2)</b>						Prepared: 06/02/15 14:35 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0053-05)												
EPA 8000C												
% Solids	96.9	---	1.00	% by Weight	1	---	96.4	---	---	0.5	20%	
<b>Duplicate (5060061-DUP3)</b>						Prepared: 06/02/15 14:35 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0055-05)												
EPA 8000C												
% Solids	80.7	---	1.00	% by Weight	1	---	81.8	---	---	1	20%	
<b>Duplicate (5060061-DUP4)</b>						Prepared: 06/02/15 14:35 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0056-05)												
EPA 8000C												
% Solids	96.1	---	1.00	% by Weight	1	---	94.8	---	---	1	20%	
<b>Duplicate (5060061-DUP5)</b>						Prepared: 06/02/15 14:36 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0060-04)												
EPA 8000C												
% Solids	99.9	---	1.00	% by Weight	1	---	99.9	---	---	0	20%	
<b>Duplicate (5060061-DUP6)</b>						Prepared: 06/02/15 20:30 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0087-01)												
EPA 8000C												
% Solids	76.7	---	1.00	% by Weight	1	---	76.7	---	---	0	20%	
<b>Duplicate (5060061-DUP7)</b>						Prepared: 06/02/15 20:30 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0089-10)												
EPA 8000C												
% Solids	84.7	---	1.00	% by Weight	1	---	84.6	---	---	0.1	20%	
<b>Duplicate (5060061-DUP8)</b>						Prepared: 06/02/15 20:30 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0096-01)												

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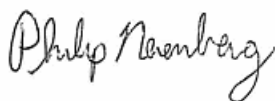
Reported:  
 06/23/15 13:42

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5060061 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5060061-DUP8)</b>						Prepared: 06/02/15 20:30 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0096-01)												
EPA 8000C												
% Solids	90.0	---	1.00	% by Weight	1	---	89.6	---	---	0.4	20%	
<b>Duplicate (5060061-DUP9)</b>						Prepared: 06/02/15 20:30 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0100-02)												
EPA 8000C												
% Solids	89.7	---	1.00	% by Weight	1	---	90.0	---	---	0.3	20%	

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Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 06/23/15 13:42

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

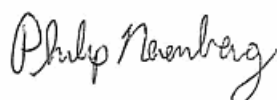
**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5050889</b>							
A5E0713-02	Soil	PSEP/SM 5310B MOD	05/21/15 14:40	05/29/15 13:34	5g/5g	5g/5g	NA
A5E0713-04	Soil	PSEP/SM 5310B MOD	05/21/15 15:15	05/29/15 13:34	5g/5g	5g/5g	NA
A5E0713-05	Soil	PSEP/SM 5310B MOD	05/21/15 16:10	05/29/15 13:34	5g/5g	5g/5g	NA

### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5050790</b>							
A5E0713-05	Soil	EPA 8000C	05/21/15 16:10	05/27/15 14:34	1N/A/1N/A	1N/A/1N/A	NA
<b>Batch: 5060061</b>							
A5E0713-01	Soil	EPA 8000C	05/21/15 14:40	06/02/15 11:03	1N/A/1N/A	1N/A/1N/A	NA
A5E0713-02	Soil	EPA 8000C	05/21/15 14:40	06/02/15 11:03	1N/A/1N/A	1N/A/1N/A	NA
A5E0713-03	Soil	EPA 8000C	05/21/15 15:15	06/02/15 11:03	1N/A/1N/A	1N/A/1N/A	NA
A5E0713-04	Soil	EPA 8000C	05/21/15 15:15	06/02/15 11:03	1N/A/1N/A	1N/A/1N/A	NA



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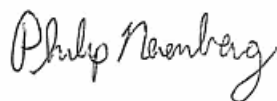
Reported:  
06/23/15 13:42

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).





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2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
06/23/15 13:42

Lab # **AS00713** COE 1 of 1

### CHAIN OF CUSTODY

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <b>MFA</b>	Project Mgr: <b>Phil Wiescher</b>	Project Name: <b>Port of Ridgefield</b>	Project # <b>9003.01.39</b>																																				
Address: <b>2001 NW 19th Ave #200 PDX, OR</b>	Phone: <b>5035015209</b>	Fax:	Email: <b>P.Wiescher@maulfooster.com</b>																																				
Sampled by: <b>Phil Wiescher</b>	ANALYSIS REQUEST																																						
Site Location: <b>OR (WA)</b>	<table border="1"> <tr><td>Al, Sb, As, Ba, Be, Bi, Cd, Cr, Cu, Pb, Fe, Ni, Hg, Mn, Mo, Ni, N, P, Se, Ag, Na, Ti, V, Zn</td><td></td></tr> <tr><td>TCLP Metals (8)</td><td></td></tr> <tr><td>RCRA Metals (8)</td><td></td></tr> <tr><td>600 TTO</td><td></td></tr> <tr><td>8082 PCBs</td><td></td></tr> <tr><td>8270 SIM PAHs</td><td></td></tr> <tr><td>8270 SVOC</td><td></td></tr> <tr><td>8260 RTEX</td><td></td></tr> <tr><td>8260 RBDN VOCs</td><td></td></tr> <tr><td>8260 VOC</td><td></td></tr> <tr><td>NWPH-GX</td><td></td></tr> <tr><td>NWPH-DX</td><td></td></tr> <tr><td>NWPH-HCID</td><td></td></tr> <tr><td># OF CONTAINERS</td><td></td></tr> <tr><td>MATRIX</td><td></td></tr> <tr><td>TIME</td><td></td></tr> <tr><td>DATE</td><td></td></tr> <tr><td>LAB ID #</td><td></td></tr> </table>			Al, Sb, As, Ba, Be, Bi, Cd, Cr, Cu, Pb, Fe, Ni, Hg, Mn, Mo, Ni, N, P, Se, Ag, Na, Ti, V, Zn		TCLP Metals (8)		RCRA Metals (8)		600 TTO		8082 PCBs		8270 SIM PAHs		8270 SVOC		8260 RTEX		8260 RBDN VOCs		8260 VOC		NWPH-GX		NWPH-DX		NWPH-HCID		# OF CONTAINERS		MATRIX		TIME		DATE		LAB ID #	
Al, Sb, As, Ba, Be, Bi, Cd, Cr, Cu, Pb, Fe, Ni, Hg, Mn, Mo, Ni, N, P, Se, Ag, Na, Ti, V, Zn																																							
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8260 VOC																																							
NWPH-GX																																							
NWPH-DX																																							
NWPH-HCID																																							
# OF CONTAINERS																																							
MATRIX																																							
TIME																																							
DATE																																							
LAB ID #																																							
SAMPLE ID	1 <b>ISM-A01008-0.5</b> 2 <b>ISM-A01030-0.5</b> 3 <b>SBS-Row026-0.5</b> 4 <b>SBS-Row026-1.0</b>																																						
Normal Turn Around Time (TAT) = 7-10 Business Days	YES <input checked="" type="radio"/> NO <input type="radio"/>																																						
TAT Requested (circle)	1 Day	2 Day	3 Day																																				
	4 DAY	5 DAY	Other: _____																																				
SAMPLES ARE HELD FOR 30 DAYS	RECEIVED BY: <b>King A</b> Date: <b>6/23/15</b> Signature: <b>King A</b> Date: <b>6/23/15</b> Printed Name: <b>King A</b> Time: <b>1036</b> Company: <b>Apex</b>																																						
RELIQUISHED BY:	RECEIVED BY: _____ Signature: _____ Date: _____ Printed Name: _____ Time: _____ Company: _____																																						
SPECIAL INSTRUCTIONS:	15M Samples by 15M processing. Archival: SBS-Row026-1.0																																						

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

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Monday, August 17, 2015

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

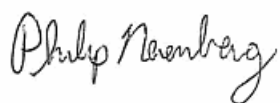
Enclosed are the results of analyses for work order A5E0713, which was received by the laboratory on 5/22/2015 at 10:36:00AM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

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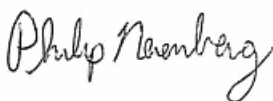
**Reported:**  
08/17/15 17:01

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI008-0.5-As Received	A5E0713-01	Soil	05/21/15 14:40	05/22/15 10:36
ISM-AOI008-0.5-After ISM	A5E0713-02	Soil	05/21/15 14:40	05/22/15 10:36
ISM-AOI030-0.5-As Received	A5E0713-03	Soil	05/21/15 15:15	05/22/15 10:36
ISM-AOI030-0.5-After ISM	A5E0713-04	Soil	05/21/15 15:15	05/22/15 10:36
SS-ROW026-0.5	A5E0713-05	Soil	05/21/15 16:10	05/22/15 10:36
SBS-ROW026-1.0	A5E0713-06	Soil	05/21/15 16:20	05/22/15 10:36

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**Reported:**  
08/17/15 17:01

## ANALYTICAL CASE NARRATIVE

**Work Order: A5E0713**

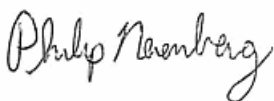
Amended Report Revision 1:

This report supersedes all previous reports.

Additional Analyses-

TOC analysis was added to sample SBS-ROW026-1.0 after the original report was finalized. This revised report contains both the original and the added data.

Philip Nerenberg  
Lab Director  
8/17/15



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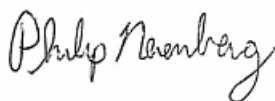
**Reported:**  
 08/17/15 17:01

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI008-0.5-After ISM (A5E0713-02)</b>			<b>Matrix: Soil</b>					
Batch: 5050889								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	06/01/15 13:45	PSEP/SM 5310B MOD	
<b>ISM-AOI030-0.5-After ISM (A5E0713-04)</b>			<b>Matrix: Soil</b>					
Batch: 5050889								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	06/01/15 13:45	PSEP/SM 5310B MOD	
<b>SS-ROW026-0.5 (A5E0713-05)</b>			<b>Matrix: Soil</b>					
Batch: 5050889								
<b>Total Organic Carbon</b>	<b>20000</b>	---	200	mg/kg	1	06/01/15 13:45	PSEP/SM 5310B MOD	
<b>SBS-ROW026-1.0 (A5E0713-06)</b>			<b>Matrix: Soil</b>					
Batch: 5070088								
<b>Total Organic Carbon</b>	<b>12000</b>	---	200	mg/kg	1	07/07/15 11:00	PSEP/SM 5310B MOD	H-08

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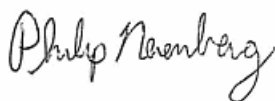
**Reported:**  
 08/17/15 17:01

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI008-0.5-As Received (A5E0713-01)</b>			<b>Matrix: Soil</b>		<b>Batch: 5060061</b>			
% Solids	79.6	---	1.00	% by Weight	1	06/03/15 08:48	EPA 8000C	
<b>ISM-AOI008-0.5-After ISM (A5E0713-02)</b>			<b>Matrix: Soil</b>		<b>Batch: 5060061</b>			
% Solids	96.8	---	1.00	% by Weight	1	06/03/15 08:48	EPA 8000C	
<b>ISM-AOI030-0.5-As Received (A5E0713-03)</b>			<b>Matrix: Soil</b>		<b>Batch: 5060061</b>			
% Solids	84.5	---	1.00	% by Weight	1	06/03/15 08:48	EPA 8000C	
<b>ISM-AOI030-0.5-After ISM (A5E0713-04)</b>			<b>Matrix: Soil</b>		<b>Batch: 5060061</b>			
% Solids	97.0	---	1.00	% by Weight	1	06/03/15 08:48	EPA 8000C	
<b>SS-ROW026-0.5 (A5E0713-05)</b>			<b>Matrix: Soil</b>		<b>Batch: 5050790</b>			
% Solids	84.9	---	1.00	% by Weight	1	05/28/15 08:26	EPA 8000C	

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**Reported:**  
08/17/15 17:01

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050889 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5050889-BLK1)</b>						Prepared: 05/29/15 13:34 Analyzed: 06/01/15 13:45						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5050889-BS1)</b>						Prepared: 05/29/15 13:34 Analyzed: 06/01/15 13:45						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9700	---		mg/kg	1	10000	---	97	85-115%	---	---	
<b>Duplicate (5050889-DUP1)</b>						Prepared: 05/29/15 13:34 Analyzed: 06/01/15 13:45						
<b>QC Source Sample: ISM-AOI008-0.5-After ISM (A5E0713-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	<b>19000</b>	---	200	mg/kg	1	---	19000	---	---	0.7	20%	
<b>Batch 5070088 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5070088-BLK1)</b>						Prepared: 07/06/15 06:59 Analyzed: 07/07/15 11:00						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5070088-BS1)</b>						Prepared: 07/06/15 06:59 Analyzed: 07/07/15 11:00						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9500	---		mg/kg	1	10000	---	95	85-115%	---	---	
<b>Duplicate (5070088-DUP1)</b>						Prepared: 07/06/15 06:59 Analyzed: 07/07/15 11:00						
<b>QC Source Sample: SBS-ROW026-1.0 (A5E0713-06)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	<b>10000</b>	---	200	mg/kg	1	---	12000	---	---	13	20%	

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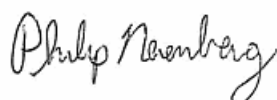
**Reported:**  
08/17/15 17:01

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050790 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050790-DUP1)</b>						Prepared: 05/27/15 11:00 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0711-06)												
EPA 8000C												
% Solids	89.7	---	1.00	% by Weight	1	---	89.6	---	---	0.1	20%	
<b>Duplicate (5050790-DUP2)</b>						Prepared: 05/27/15 14:32 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0747-02)												
EPA 8000C												
% Solids	79.1	---	1.00	% by Weight	1	---	79.2	---	---	0.1	20%	
<b>Duplicate (5050790-DUP3)</b>						Prepared: 05/27/15 18:25 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0770-05)												
EPA 8000C												
% Solids	74.5	---	1.00	% by Weight	1	---	74.3	---	---	0.3	20%	
<b>Duplicate (5050790-DUP4)</b>						Prepared: 05/27/15 19:43 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0775-01)												
EPA 8000C												
% Solids	75.1	---	1.00	% by Weight	1	---	76.6	---	---	2	20%	
<b>Duplicate (5050790-DUP5)</b>						Prepared: 05/27/15 19:43 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0778-03)												
EPA 8000C												
% Solids	88.8	---	1.00	% by Weight	1	---	88.3	---	---	0.6	20%	
<b>Duplicate (5050790-DUP6)</b>						Prepared: 05/27/15 19:43 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0782-02)												
EPA 8000C												
% Solids	89.3	---	1.00	% by Weight	1	---	89.5	---	---	0.2	20%	
<b>Batch 5060061 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5060061-DUP1)</b>						Prepared: 06/02/15 11:03 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0025-01)												
EPA 8000C												

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Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

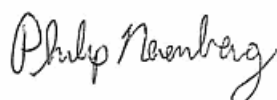
**Reported:**  
08/17/15 17:01

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5060061 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5060061-DUP1)</b>						Prepared: 06/02/15 11:03 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0025-01)												
% Solids	88.6	---	1.00	% by Weight	1	---	89.7	---	---	1	20%	
<b>Duplicate (5060061-DUP2)</b>						Prepared: 06/02/15 14:35 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0053-05)												
EPA 8000C												
% Solids	96.9	---	1.00	% by Weight	1	---	96.4	---	---	0.5	20%	
<b>Duplicate (5060061-DUP3)</b>						Prepared: 06/02/15 14:35 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0055-05)												
EPA 8000C												
% Solids	80.7	---	1.00	% by Weight	1	---	81.8	---	---	1	20%	
<b>Duplicate (5060061-DUP4)</b>						Prepared: 06/02/15 14:35 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0056-05)												
EPA 8000C												
% Solids	96.1	---	1.00	% by Weight	1	---	94.8	---	---	1	20%	
<b>Duplicate (5060061-DUP5)</b>						Prepared: 06/02/15 14:36 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0060-04)												
EPA 8000C												
% Solids	99.9	---	1.00	% by Weight	1	---	99.9	---	---	0	20%	
<b>Duplicate (5060061-DUP6)</b>						Prepared: 06/02/15 20:30 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0087-01)												
EPA 8000C												
% Solids	76.7	---	1.00	% by Weight	1	---	76.7	---	---	0	20%	
<b>Duplicate (5060061-DUP7)</b>						Prepared: 06/02/15 20:30 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0089-10)												
EPA 8000C												
% Solids	84.7	---	1.00	% by Weight	1	---	84.6	---	---	0.1	20%	
<b>Duplicate (5060061-DUP8)</b>						Prepared: 06/02/15 20:30 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0096-01)												

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 Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

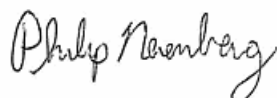
**Reported:**  
 08/17/15 17:01

### QUALITY CONTROL (QC) SAMPLE RESULTS

**Percent Dry Weight**

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5060061 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5060061-DUP8)</b>						Prepared: 06/02/15 20:30 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0096-01)												
EPA 8000C												
% Solids	90.0	---	1.00	% by Weight	1	---	89.6	---	---	0.4	20%	
<b>Duplicate (5060061-DUP9)</b>						Prepared: 06/02/15 20:30 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0100-02)												
EPA 8000C												
% Solids	89.7	---	1.00	% by Weight	1	---	90.0	---	---	0.3	20%	

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Project: **Port of Ridgefield ISM**

Project Number: 9003.01.39

Project Manager: Phil Wiescher

**Reported:**  
08/17/15 17:01

### SAMPLE PREPARATION INFORMATION

#### Conventional Chemistry Parameters

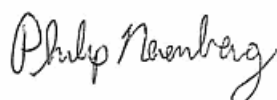
**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5050889</b>							
A5E0713-02	Soil	PSEP/SM 5310B MOD	05/21/15 14:40	05/29/15 13:34	5g/5g	5g/5g	NA
A5E0713-04	Soil	PSEP/SM 5310B MOD	05/21/15 15:15	05/29/15 13:34	5g/5g	5g/5g	NA
A5E0713-05	Soil	PSEP/SM 5310B MOD	05/21/15 16:10	05/29/15 13:34	5g/5g	5g/5g	NA
<b>Batch: 5070088</b>							
A5E0713-06	Soil	PSEP/SM 5310B MOD	05/21/15 16:20	07/06/15 06:59	5g/5g	5g/5g	NA

#### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5050790</b>							
A5E0713-05	Soil	EPA 8000C	05/21/15 16:10	05/27/15 14:34	1N/A/1N/A	1N/A/1N/A	NA
<b>Batch: 5060061</b>							
A5E0713-01	Soil	EPA 8000C	05/21/15 14:40	06/02/15 11:03	1N/A/1N/A	1N/A/1N/A	NA
A5E0713-02	Soil	EPA 8000C	05/21/15 14:40	06/02/15 11:03	1N/A/1N/A	1N/A/1N/A	NA
A5E0713-03	Soil	EPA 8000C	05/21/15 15:15	06/02/15 11:03	1N/A/1N/A	1N/A/1N/A	NA
A5E0713-04	Soil	EPA 8000C	05/21/15 15:15	06/02/15 11:03	1N/A/1N/A	1N/A/1N/A	NA



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Reported:  
08/17/15 17:01

## Notes and Definitions

### Qualifiers:

H-08 Sample hold time extended by freezing at -18 degrees C. Total time at 4 degrees C was less than the standard hold time.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.

Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Monday, July 6, 2015

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

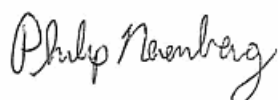
Enclosed are the results of analyses for work order A5F0015, which was received by the laboratory on 5/29/2015 at 4:00:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

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Project Number: 9003.01.39  
Project Manager: Phil Wiescher

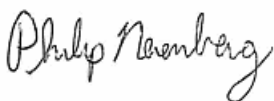
**Reported:**  
07/06/15 15:26

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI038-0.5-After ISM	A5F0015-02	Soil	05/29/15 09:00	05/29/15 16:00
ISM-AOI039-0.5-After ISM	A5F0015-04	Soil	05/29/15 09:45	05/29/15 16:00

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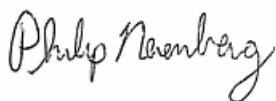
**Reported:**  
 07/06/15 15:26

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI038-0.5-After ISM (A5F0015-02)</b>			<b>Matrix: Soil</b>					
Batch: 5060236								
<b>Total Organic Carbon</b>	<b>20000</b>	---	200	mg/kg	1	06/11/15 11:55	PSEP/SM 5310B MOD	
<b>ISM-AOI039-0.5-After ISM (A5F0015-04)</b>			<b>Matrix: Soil</b>					
Batch: 5060236								
<b>Total Organic Carbon</b>	<b>26000</b>	---	200	mg/kg	1	06/11/15 11:55	PSEP/SM 5310B MOD	

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Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

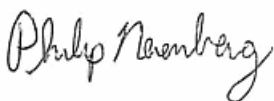
**Reported:**  
 07/06/15 15:26

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI038-0.5-After ISM (A5F0015-02)</b>			<b>Matrix: Soil</b>		<b>Batch: 5060240</b>			
% Solids	96.7	---	1.00	% by Weight	1	06/09/15 08:50	EPA 8000C	
<b>ISM-AOI039-0.5-After ISM (A5F0015-04)</b>			<b>Matrix: Soil</b>		<b>Batch: 5060240</b>			
% Solids	96.4	---	1.00	% by Weight	1	06/09/15 08:50	EPA 8000C	

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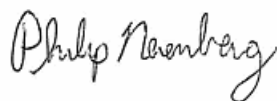
**Reported:**  
 07/06/15 15:26

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5060236 - PSEP Solids in Soil/Sediment</b>						<b>Soil</b>						
<b>Blank (5060236-BLK1)</b>						Prepared: 06/08/15 07:55 Analyzed: 06/11/15 11:55						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5060236-BS1)</b>						Prepared: 06/08/15 07:55 Analyzed: 06/11/15 11:55						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9900	---		mg/kg	1	10000	---	99	85-115%	---	---	
<b>Duplicate (5060236-DUP1)</b>						Prepared: 06/08/15 07:55 Analyzed: 06/11/15 11:55						
<b>QC Source Sample: ISM-AOI038-0.5-After ISM (A5F0015-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	<b>21000</b>	---	200	mg/kg	1	---	20000	---	---	4	20%	

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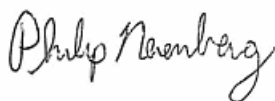
Reported:  
 07/06/15 15:26

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5060240 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5060240-DUP1)</b>						Prepared: 06/08/15 09:15 Analyzed: 06/09/15 08:50						
QC Source Sample: Other (A5E0698-08)												
EPA 8000C												
% Solids	76.1	---	1.00	% by Weight	1	---	75.6	---	---	0.7	10%	
<b>Duplicate (5060240-DUP2)</b>						Prepared: 06/08/15 09:15 Analyzed: 06/09/15 08:50						
QC Source Sample: Other (A5F0230-10)												
EPA 8000C												
% Solids	82.5	---	1.00	% by Weight	1	---	82.5	---	---	0	10%	
<b>Duplicate (5060240-DUP3)</b>						Prepared: 06/08/15 09:15 Analyzed: 06/09/15 08:50						
QC Source Sample: Other (A5F0235-05)												
EPA 8000C												
% Solids	76.5	---	1.00	% by Weight	1	---	76.4	---	---	0.1	10%	
<b>Duplicate (5060240-DUP4)</b>						Prepared: 06/08/15 11:31 Analyzed: 06/09/15 08:50						
QC Source Sample: Other (A5F0251-08)												
EPA 8000C												
% Solids	84.3	---	1.00	% by Weight	1	---	85.5	---	---	1	10%	
<b>Duplicate (5060240-DUP5)</b>						Prepared: 06/08/15 15:31 Analyzed: 06/09/15 08:50						
QC Source Sample: Other (A5F0254-13)												
EPA 8000C												
% Solids	85.3	---	1.00	% by Weight	1	---	89.1	---	---	4	10%	
<b>Duplicate (5060240-DUP6)</b>						Prepared: 06/08/15 18:53 Analyzed: 06/09/15 08:50						
QC Source Sample: Other (A5F0268-02)												
EPA 8000C												
% Solids	76.2	---	1.00	% by Weight	1	---	75.6	---	---	0.8	10%	
<b>Duplicate (5060240-DUP7)</b>						Prepared: 06/08/15 19:12 Analyzed: 06/09/15 08:50						
QC Source Sample: Other (A5F0272-02)												
EPA 8000C												
% Solids	91.9	---	1.00	% by Weight	1	---	91.7	---	---	0.2	10%	

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 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 07/06/15 15:26

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

#### Prep: PSEP Solids in Soil/Sediment

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5060236</b>							
A5F0015-02	Soil	PSEP/SM 5310B MOD	05/29/15 09:00	06/08/15 07:55	5g/5g	5g/5g	NA
A5F0015-04	Soil	PSEP/SM 5310B MOD	05/29/15 09:45	06/08/15 07:55	5g/5g	5g/5g	NA

### Percent Dry Weight

#### Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5060240</b>							
A5F0015-02	Soil	EPA 8000C	05/29/15 09:00	06/08/15 11:38	1N/A/1N/A	1N/A/1N/A	NA
A5F0015-04	Soil	EPA 8000C	05/29/15 09:45	06/08/15 11:38	1N/A/1N/A	1N/A/1N/A	NA

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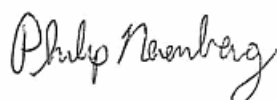
Reported:  
07/06/15 15:26

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
RPD	Relative Percent Difference
MDL	If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
WMSC	Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
Batch QC	In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
Blank Policy	<p>Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.</p> <p>For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.</p> <p>Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.</p>
---	QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
***	Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
07/06/15 15:26

Lab # A5FO015 coc 1 of 1

### CHAIN OF CUSTODY

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <b>MFA</b>		Project Mgr: <b>Phil Wiescher</b>		Project Name: <b>FOR OPP</b>		Project # <b>9003.01.39</b>	
Address: <b>2001 NW 19th Ave. #200 PDX OR</b>		Phone: <b>503.5015209</b>		Fax:		Email: <b>phil.wiescher@maulfooster.com</b>	
Sampled by:							
ANALYSIS REQUEST AL: Sr, As, Ba, Br, Cd, Cr, Cu, Co, Ca, Fe, Pb, Zn Hg: Me, Mn, Mo, Ni, P, Se, Ag, Na, Ti, V, Zr TOTAL DSS TCLP 1200-COLS 1200-Z USEPTA Metals TCEP Metals (S) HCRA Metals (B) 600 TTO 8082 PCBs 8270 SIM PAHs 8270 SVOC 8260 BTEX 8260 RBDN VOCs 8260 VOC NWTH-GA NWTH-DX NWTH-HCID							
1	ISM-A01039-0.5	DATE	5/15/15 9:00	TIME	5:00	MATRIX	1
2	ISM-A01039-0.5	DATE	5/15/15 9:45	TIME	5:00	MATRIX	1
3							
4							
5							
6							
7							
8							
9							
10							
SPECIAL INSTRUCTIONS: Normal Turn Around Time (TAT) = 7-10 Business Days YES NO TAT Requested (circle) 1 Day 2 Day 3 Day 4 DAY 5 DAY Other:							
RELINQUISHED BY:				RECEIVED BY:			
Signature: <i>Emily Curtis</i>				Signature: <i>Phil Wiescher</i>			
Date: _____				Date: _____			
Printed Name: <b>Emily Curtis</b>				Printed Name: <b>Phil Wiescher</b>			
Time: _____				Time: <b>16:00</b>			
Company: <b>MFA</b>				Company: <b>MFA</b>			

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Tuesday, July 28, 2015

Madi Novak  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield / 9003.01.39

Enclosed are the results of analyses for work order A5F0363, which was received by the laboratory on 6/9/2015 at 2:35:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

DRAFT REPORT

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DRAFT REPORT, DATA SUBJECT TO CHANGE

Page 1 of 11

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 07/28/15 14:36

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS-ROW013-0.5	A5F0363-01	Soil	06/08/15 08:00	06/09/15 14:35
SBS-ROW013-1.0	A5F0363-02	Soil	06/08/15 08:05	06/09/15 14:35
SS-ROW005-0.5	A5F0363-03	Soil	06/08/15 08:40	06/09/15 14:35
SBS-ROW005-1.0	A5F0363-04	Soil	06/08/15 08:50	06/09/15 14:35
SS-ROW019-0.5	A5F0363-05	Soil	06/08/15 09:20	06/09/15 14:35
SBS-ROW019-1.0	A5F0363-06	Soil	06/08/15 09:35	06/09/15 14:35
SS-ROW022-0.5	A5F0363-07	Soil	06/08/15 10:00	06/09/15 14:35
SBS-ROW022-1.0	A5F0363-08	Soil	06/08/15 10:15	06/09/15 14:35
SS-ROW016-0.5	A5F0363-09	Soil	06/08/15 10:45	06/09/15 14:35
SBS-ROW016-1.0	A5F0363-10	Soil	06/08/15 10:55	06/09/15 14:35
SS-ROW025-0.5	A5F0363-11	Soil	06/08/15 11:30	06/09/15 14:35
SBS-ROW025-1.0	A5F0363-12	Soil	06/08/15 11:45	06/09/15 14:35
SS-ROW029B-0.5	A5F0363-13	Soil	06/08/15 12:15	06/09/15 14:35
SBS-ROW029B-1.0	A5F0363-14	Soil	06/08/15 12:25	06/09/15 14:35
SS-ROW023-0.5	A5F0363-15	Soil	06/08/15 13:00	06/09/15 14:35
SBS-ROW023-1.0	A5F0363-16	Soil	06/08/15 13:15	06/09/15 14:35
SS-ROW018-0.5	A5F0363-17	Soil	06/08/15 13:40	06/09/15 14:35
SBS-ROW018-1.0	A5F0363-18	Soil	06/08/15 13:55	06/09/15 14:35

DRAFT REPORT

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 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 07/28/15 14:36

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SS-ROW013-0.5 (A5F0363-01)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>20000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW013-1.0 (A5F0363-02)</b>			<b>Matrix: Soil</b>					
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW005-0.5 (A5F0363-03)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW005-1.0 (A5F0363-04)</b>			<b>Matrix: Soil</b>					
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW019-0.5 (A5F0363-05)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>14000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW019-1.0 (A5F0363-06)</b>			<b>Matrix: Soil</b>					
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>10000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW022-0.5 (A5F0363-07)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>21000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW022-1.0 (A5F0363-08)</b>			<b>Matrix: Soil</b>					
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW016-0.5 (A5F0363-09)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>20000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	

DRAFT REPORT

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 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 07/28/15 14:36

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SBS-ROW016-1.0 (A5F0363-10) Matrix: Soil</b>								
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>18000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW025-0.5 (A5F0363-11) Matrix: Soil</b>								
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>21000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW025-1.0 (A5F0363-12) Matrix: Soil</b>								
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>13000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW029B-0.5 (A5F0363-13) Matrix: Soil</b>								
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW029B-1.0 (A5F0363-14) Matrix: Soil</b>								
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW023-0.5 (A5F0363-15) Matrix: Soil</b>								
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>24000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW023-1.0 (A5F0363-16) Matrix: Soil</b>								
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW018-0.5 (A5F0363-17) Matrix: Soil</b>								
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW018-1.0 (A5F0363-18) Matrix: Soil</b>								
Batch: 5070326								
<b>Total Organic Carbon</b>	<b>18000</b>	---	200	mg/kg	1	07/15/15 09:20	PSEP/SM 5310B MOD	H-08

DRAFT REPORT

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

**Reported:**  
07/28/15 14:36

## QUALITY CONTROL (QC) SAMPLE RESULTS

### DRAFT: Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5060404 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5060404-BLK1)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5060404-BS1)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9800	---		mg/kg	1	10000	---	98	85-115%	---	---	
<b>Duplicate (5060404-DUP1)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>QC Source Sample: Other (A5D0913-16)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9200	---	200	mg/kg	1	---	9400	---	---	2	20%	
<b>Duplicate (5060404-DUP2)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>QC Source Sample: SS-ROW018-0.5 (A5F0363-17)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	19000	---	200	mg/kg	1	---	19000	---	---	1	20%	
<b>Batch 5070256 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5070256-BLK1)</b>						Prepared: 07/10/15 08:25 Analyzed: 07/14/15 13:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5070256-BS1)</b>						Prepared: 07/10/15 08:25 Analyzed: 07/14/15 13:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9800	---		mg/kg	1	10000	---	98	85-115%	---	---	
<b>Duplicate (5070256-DUP1)</b>						Prepared: 07/10/15 08:25 Analyzed: 07/14/15 13:20						
<b>QC Source Sample: SBS-ROW013-1.0 (A5F0363-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	14000	---	200	mg/kg	1	---	15000	---	---	13	20%	
<b>Duplicate (5070256-DUP2)</b>						Prepared: 07/10/15 08:25 Analyzed: 07/14/15 13:20						
<b>QC Source Sample: Other (A5G0047-01)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	6600	---	200	mg/kg	1	---	8000	---	---	19	20%	

DRAFT REPORT

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 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 07/28/15 14:36

## QUALITY CONTROL (QC) SAMPLE RESULTS

### DRAFT: Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5070326 - PSEP TOC</b>						<b>Sediment</b>						
<b>Blank (5070326-BLK1)</b>						Prepared: 07/14/15 08:07 Analyzed: 07/15/15 09:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5070326-BS1)</b>						Prepared: 07/14/15 08:07 Analyzed: 07/15/15 09:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9700	---		mg/kg	1	10000	---	97	85-115%	---	---	
<b>Duplicate (5070326-DUP1)</b>						Prepared: 07/14/15 08:07 Analyzed: 07/15/15 09:20						
<b>QC Source Sample: SBS-ROW018-1.0 (A5F0363-18)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	<b>19000</b>	---	200	mg/kg	1	---	18000	---	---	7	20%	

DRAFT REPORT

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 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 07/28/15 14:36

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

#### Prep: PSEP TOC

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 5060404</u>							
A5F0363-01	Soil	PSEP/SM 5310B MOD	06/08/15 08:00	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-03	Soil	PSEP/SM 5310B MOD	06/08/15 08:40	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-05	Soil	PSEP/SM 5310B MOD	06/08/15 09:20	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-07	Soil	PSEP/SM 5310B MOD	06/08/15 10:00	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-09	Soil	PSEP/SM 5310B MOD	06/08/15 10:45	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-11	Soil	PSEP/SM 5310B MOD	06/08/15 11:30	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-13	Soil	PSEP/SM 5310B MOD	06/08/15 12:15	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-15	Soil	PSEP/SM 5310B MOD	06/08/15 13:00	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-17	Soil	PSEP/SM 5310B MOD	06/08/15 13:40	06/12/15 08:34	5g/5g	5g/5g	NA
<u>Batch: 5070256</u>							
A5F0363-02	Soil	PSEP/SM 5310B MOD	06/08/15 08:05	07/10/15 08:25	5g/5g	5g/5g	NA
A5F0363-04	Soil	PSEP/SM 5310B MOD	06/08/15 08:50	07/10/15 08:25	5g/5g	5g/5g	NA
A5F0363-06	Soil	PSEP/SM 5310B MOD	06/08/15 09:35	07/10/15 08:25	5g/5g	5g/5g	NA
A5F0363-08	Soil	PSEP/SM 5310B MOD	06/08/15 10:15	07/10/15 08:25	5g/5g	5g/5g	NA
A5F0363-10	Soil	PSEP/SM 5310B MOD	06/08/15 10:55	07/10/15 08:25	5g/5g	5g/5g	NA
A5F0363-12	Soil	PSEP/SM 5310B MOD	06/08/15 11:45	07/10/15 08:25	5g/5g	5g/5g	NA
A5F0363-14	Soil	PSEP/SM 5310B MOD	06/08/15 12:25	07/10/15 08:25	5g/5g	5g/5g	NA
A5F0363-16	Soil	PSEP/SM 5310B MOD	06/08/15 13:15	07/10/15 08:25	5g/5g	5g/5g	NA

#### Batch: 5070326

DRAFT REPORT

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<b>Maul Foster &amp; Alongi, INC.</b> 2001 NW 19th Ave, STE 200 Portland, OR 97209	Project: <b>Port of Ridgefield</b> Project Number: 9003.01.39 Project Manager: Madi Novak	<b>Reported:</b> 07/28/15 14:36
--	---	------------------------------------

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A5F0363-18	Soil	PSEP/SM 5310B MOD	06/08/15 13:55	07/14/15 08:07	5g/5g	5g/5g	NA

DRAFT REPORT

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

**Reported:**  
07/28/15 14:36

## Notes and Definitions

### Qualifiers:

H-08 Sample hold time extended by freezing at -18 degrees C. Total time at 4 degrees C was less than the standard hold time.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.

Blank Policy Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

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DRAFT REPORT

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Portland, OR 97209

Project: **Port of Ridgefield**

Project Number: 9003.01.39  
Project Manager: Madi Novak

Reported:  
07/28/15 14:36

Lab # ASF0363 COC \_\_\_ of \_\_\_

## CHAIN OF CUSTODY

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <u>Maul Foster Alongi</u>		Project Mgr: <u>Madi Novak/Paul W</u>		Project Name: <u>POE</u>		Project # <u>9003.01.39</u>	
Address: <u>2001 NW 19th Ave, Suite 200, Portland, OR</u>		Phone: <u>503-501-5212</u>		Fax:		Email: <u>maul@mfalongi.com</u>	
Sampled by: <u>Justin Pounds</u>		ANALYSIS REQUEST					
Site Location: <input checked="" type="radio"/> WA	Other: _____	# OF CONTAINERS	MATRIX	DATE	TIME	LAB ID #	
SAMPLE ID							
1	SS - Row 013 - 0.5	2	S	6/18/15	800		
2	SBS - Row 013 - 1.0			6/25			
3	SS - Row 005 - 0.5			5/16			
4	SBS - Row 005 - 1.0			5/30			
5	SS - Row 015 - 0.5			4/20			
6	SBS - Row 015 - 1.0			6/35			
7	SS - Row 022 - 0.5			10/06			
8	SBS - Row 022 - 1.0			10/5			
9	SS - Row 016 - 0.5			10/15			
10	SBS - Row 016 - 1.0			10/55			
Normal Turn Around Time (TAT) = 7-10 Business Days		YES	NO				
TAT Requested (circle)		1 Day	2 Day	3 Day			
		4 DAY	5 DAY	Other:			
SPECIAL INSTRUCTIONS:							
RELINQUISHED BY:				RECEIVED BY:			
Signature: _____				Signature: _____			
Date: <u>6/18/15</u>				Date: <u>6/18/15</u>			
Printed Name: <u>Justin Pounds</u>				Printed Name: <u>Justin Pounds</u>			
Time: <u>14:35</u>				Time: <u>14:35</u>			
Company: <u>MFA</u>				Company: <u>Apex</u>			

DRAFT REPORT

The results provided in this report are PRELIMINARY and are subject to change based on subsequent analysis, QC validation or final data review. Please use these results with the understanding that they may have not been finalized by the laboratory



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
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**Reported:**  
 07/28/15 14:36

Lab # ASF0363 COC ZofZ

### CHAIN OF CUSTODY

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <u>Maul Foster Alongi</u>		Project Mgr: <u>Heidi Neish</u>	Project Name: <u>Port</u>	Project # <u>9003.01.39</u>																					
Address: <u>2001 NW 19th Ave, Ste 200</u>		Phone: <u>Portland OR</u>	Form: <u>PF02</u>	Email: <u>maul-foster@alongi.com</u>																					
Sampled by: <u>Justin Powell</u>																									
Site Location: <u>OR</u> WA																									
Other: _____																									
SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-CID	NWTPH-DX	NWTPH-CX	8260 VOC	8260 RBDN VOC	8260 BTEX	8270 SVOC	8270 SIM PAHs	8082 PCBs	600 TTO	HCPA Metals (8)	TCLP Metals (8)	AL, Si, Ar, Ba, Be, Cd, Cr, Co, Cu, Fe, Pb, Hg, Mn, Ni, Se, Zn	1200-COLS	1200-Z	Drum Labels	TDC Strips	Archive		
SS-Row005-0.5		6/8/15	1330	S	2																	X	X		
SBS-Row005-1.0			1145																			X	X		
SS-Row027B-0.5			1015																			X	X		
SBS-Row027B-1.0			1125																			X	X		
SS-Row023-0.5			1300																			X	X		
SBS-Row023-1.0			1315																			X	X		
SS-Row018-0.5			0940																			X	X		
SBS-Row018-1.0			1355																			X	X		
Normal Turn Around Time (TAT) = 7-10 Business Days		YES <input checked="" type="radio"/> NO <input type="radio"/>																							
TAT Requested (circle)		1 DAY		2 DAY		3 DAY		4 DAY		5 DAY		Other:													
RELEASING BY:		SIGNATURE: _____		DATE: <u>6/15/15</u>		SIGNATURE: _____		DATE: <u>6/15/15</u>		PRINTED NAME: <u>Justin Powell</u>		TIME: <u>1435</u>		RECEIVED BY:		SIGNATURE: _____		DATE: _____		PRINTED NAME: _____		TIME: _____		COMPANY: _____	
MFA																									

DRAFT REPORT

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Tuesday, September 8, 2015

Madi Novak  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield / 9003.01.39

Enclosed are the results of analyses for work order A5F0363, which was received by the laboratory on 6/9/2015 at 2:35:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

**Reported:**  
09/08/15 16:53

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS-ROW013-0.5	A5F0363-01	Soil	06/08/15 08:00	06/09/15 14:35
SBS-ROW013-1.0	A5F0363-02	Soil	06/08/15 08:05	06/09/15 14:35
SS-ROW005-0.5	A5F0363-03	Soil	06/08/15 08:40	06/09/15 14:35
SBS-ROW005-1.0	A5F0363-04	Soil	06/08/15 08:50	06/09/15 14:35
SS-ROW019-0.5	A5F0363-05	Soil	06/08/15 09:20	06/09/15 14:35
SBS-ROW019-1.0	A5F0363-06	Soil	06/08/15 09:35	06/09/15 14:35
SS-ROW022-0.5	A5F0363-07	Soil	06/08/15 10:00	06/09/15 14:35
SBS-ROW022-1.0	A5F0363-08	Soil	06/08/15 10:15	06/09/15 14:35
SS-ROW016-0.5	A5F0363-09	Soil	06/08/15 10:45	06/09/15 14:35
SBS-ROW016-1.0	A5F0363-10	Soil	06/08/15 10:55	06/09/15 14:35
SS-ROW025-0.5	A5F0363-11	Soil	06/08/15 11:30	06/09/15 14:35
SBS-ROW025-1.0	A5F0363-12	Soil	06/08/15 11:45	06/09/15 14:35
SS-ROW029B-0.5	A5F0363-13	Soil	06/08/15 12:15	06/09/15 14:35
SBS-ROW029B-1.0	A5F0363-14	Soil	06/08/15 12:25	06/09/15 14:35
SS-ROW023-0.5	A5F0363-15	Soil	06/08/15 13:00	06/09/15 14:35
SBS-ROW023-1.0	A5F0363-16	Soil	06/08/15 13:15	06/09/15 14:35
SS-ROW018-0.5	A5F0363-17	Soil	06/08/15 13:40	06/09/15 14:35
SBS-ROW018-1.0	A5F0363-18	Soil	06/08/15 13:55	06/09/15 14:35



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Project: **Port of Ridgefield**  
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Reported:  
09/08/15 16:53

## ANALYTICAL CASE NARRATIVE

**Work Order: A5F0363**

Amended Report Revision 1:

This report supersedes all previous reports.

Additional Analyses-

TOC analyses were added to samples:

SBS-ROW-013-1.0  
SBS-ROW-005-1.0  
SBS-ROW-019-1.0  
SBS-ROW-022-1.0  
SBS-ROW-016-1.0  
SBS-ROW-025-1.0  
SBS-ROW-029-1.0  
SBS-ROW-023-1.0  
SBS-ROW-018-1.0

after the original report was finalized. This revised report contains both the original and the added data.

Philip Nerenberg  
Lab Director  
9/8/15

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 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 09/08/15 16:53

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SS-ROW013-0.5 (A5F0363-01)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>20000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW013-1.0 (A5F0363-02)</b>			<b>Matrix: Soil</b>					
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW005-0.5 (A5F0363-03)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW005-1.0 (A5F0363-04)</b>			<b>Matrix: Soil</b>					
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW019-0.5 (A5F0363-05)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>14000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW019-1.0 (A5F0363-06)</b>			<b>Matrix: Soil</b>					
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>10000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW022-0.5 (A5F0363-07)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>21000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW022-1.0 (A5F0363-08)</b>			<b>Matrix: Soil</b>					
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW016-0.5 (A5F0363-09)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>20000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	

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 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 09/08/15 16:53

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SBS-ROW016-1.0 (A5F0363-10)</b>			<b>Matrix: Soil</b>					
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>18000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW025-0.5 (A5F0363-11)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>21000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW025-1.0 (A5F0363-12)</b>			<b>Matrix: Soil</b>					
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>13000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW029B-0.5 (A5F0363-13)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW029B-1.0 (A5F0363-14)</b>			<b>Matrix: Soil</b>					
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW023-0.5 (A5F0363-15)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>24000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW023-1.0 (A5F0363-16)</b>			<b>Matrix: Soil</b>					
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW018-0.5 (A5F0363-17)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW018-1.0 (A5F0363-18)</b>			<b>Matrix: Soil</b>					
Batch: 5070326								
<b>Total Organic Carbon</b>	<b>1.8</b>	---	0.020	% by Weight	1	07/15/15 09:20	PSEP/SM 5310B MOD	H-08

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Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

Reported:  
09/08/15 16:53

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5060404 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5060404-BLK1)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5060404-BS1)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9800	---		mg/kg	1	10000	---	98	85-115%	---	---	
<b>Duplicate (5060404-DUP1)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>QC Source Sample: Other (A5D0913-16)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9200	---	200	mg/kg	1	---	9400	---	---	2	20%	
<b>Duplicate (5060404-DUP2)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>QC Source Sample: SS-ROW018-0.5 (A5F0363-17)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	19000	---	200	mg/kg	1	---	19000	---	---	1	20%	
<b>Batch 5070256 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5070256-BLK1)</b>						Prepared: 07/10/15 08:25 Analyzed: 07/14/15 13:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>LCS (5070256-BS1)</b>						Prepared: 07/10/15 08:25 Analyzed: 07/14/15 13:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9800	---		mg/kg	1	10000	---	98	85-115%	---	---	
<b>Duplicate (5070256-DUP1)</b>						Prepared: 07/10/15 08:25 Analyzed: 07/14/15 13:20						
<b>QC Source Sample: SBS-ROW013-1.0 (A5F0363-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	14000	---	200	mg/kg	1	---	15000	---	---	13	20%	
<b>Duplicate (5070256-DUP2)</b>						Prepared: 07/10/15 08:25 Analyzed: 07/14/15 13:20						
<b>QC Source Sample: Other (A5G0047-01)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	6600	---	200	mg/kg	1	---	8000	---	---	19	20%	

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Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 09/08/15 16:53

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5070326 - PSEP TOC</b>						<b>Sediment</b>						
<b>Blank (5070326-BLK1)</b>						Prepared: 07/14/15 08:07 Analyzed: 07/15/15 09:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	0.020	% by Weight	1	---	---	---	---	---	---	---
<b>LCS (5070326-BS1)</b>						Prepared: 07/14/15 08:07 Analyzed: 07/15/15 09:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9700	---		mg/kg	1	10000	---	97	85-115%	---	---	
<b>Duplicate (5070326-DUP1)</b>						Prepared: 07/14/15 08:07 Analyzed: 07/15/15 09:20						
<b>QC Source Sample: SBS-ROW018-1.0 (A5F0363-18)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	1.9	---	0.020	% by Weight	1	---	1.8	---	---	7	20%	





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 09/08/15 16:53

### SAMPLE PREPARATION INFORMATION


#### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5060404</b>							
A5F0363-01	Soil	PSEP/SM 5310B MOD	06/08/15 08:00	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-03	Soil	PSEP/SM 5310B MOD	06/08/15 08:40	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-05	Soil	PSEP/SM 5310B MOD	06/08/15 09:20	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-07	Soil	PSEP/SM 5310B MOD	06/08/15 10:00	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-09	Soil	PSEP/SM 5310B MOD	06/08/15 10:45	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-11	Soil	PSEP/SM 5310B MOD	06/08/15 11:30	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-13	Soil	PSEP/SM 5310B MOD	06/08/15 12:15	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-15	Soil	PSEP/SM 5310B MOD	06/08/15 13:00	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-17	Soil	PSEP/SM 5310B MOD	06/08/15 13:40	06/12/15 08:34	5g/5g	5g/5g	NA
<b>Batch: 5070256</b>							
A5F0363-02	Soil	PSEP/SM 5310B MOD	06/08/15 08:05	07/10/15 08:25	5g/5g	5g/5g	NA
A5F0363-04	Soil	PSEP/SM 5310B MOD	06/08/15 08:50	07/10/15 08:25	5g/5g	5g/5g	NA
A5F0363-06	Soil	PSEP/SM 5310B MOD	06/08/15 09:35	07/10/15 08:25	5g/5g	5g/5g	NA
A5F0363-08	Soil	PSEP/SM 5310B MOD	06/08/15 10:15	07/10/15 08:25	5g/5g	5g/5g	NA
A5F0363-10	Soil	PSEP/SM 5310B MOD	06/08/15 10:55	07/10/15 08:25	5g/5g	5g/5g	NA
A5F0363-12	Soil	PSEP/SM 5310B MOD	06/08/15 11:45	07/10/15 08:25	5g/5g	5g/5g	NA
A5F0363-14	Soil	PSEP/SM 5310B MOD	06/08/15 12:25	07/10/15 08:25	5g/5g	5g/5g	NA
A5F0363-16	Soil	PSEP/SM 5310B MOD	06/08/15 13:15	07/10/15 08:25	5g/5g	5g/5g	NA

**Batch: 5070326**

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Philip Nerenberg, Lab Director

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Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

**Reported:**  
09/08/15 16:53

### SAMPLE PREPARATION INFORMATION

#### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A5F0363-18	Soil	PSEP/SM 5310B MOD	06/08/15 13:55	07/14/15 08:07	5g/5g	5g/5g	NA

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Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

Reported:  
09/08/15 16:53

## Notes and Definitions

### Qualifiers:

H-08 Sample hold time extended by freezing at -18 degrees C. Total time at 4 degrees C was less than the standard hold time.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.

Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

Reported:  
09/08/15 16:53

Lab # ASF0363 of \_\_\_\_\_

### CHAIN OF CUSTODY

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <b>Maul Foster Alongi</b>		Project Mgr: <b>Madi Novak/Phil W</b>		Project Name: <b>Port</b>		Project # <b>9003.01.39</b>													
Address: <b>2001 NW 15th Ave, Suite 200, Portland, OR</b>		Phone: <b>503-501-5212</b>		Fax: _____		Email: <b>maul@mfalongi.com</b>													
Sampled by: <b>Justin Porebs</b>																			
<b>ANALYSIS REQUEST</b>																			
Site Location: <b>OR WA</b>																			
Other: _____																			
SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-CID	NWTPH-DX												
1 SS - Row 013 - 0.5		6/18/15	800	S	2														
2 SBS - Row 013 - 1.0		6/18/15	605	S															
3 SS - Row 005 - 0.5		6/18/15	916	S															
4 SBS - Row 005 - 1.0		6/18/15	530	S															
5 SS - Row 017 - 0.5		6/18/15	470	S															
6 SBS - Row 017 - 1.0		6/18/15	435	S															
7 SS - Row 022 - 0.5		6/18/15	1000	S															
8 SBS - Row 022 - 1.0		6/18/15	1015	S															
9 SS - Row 016 - 0.5		6/18/15	1015	S															
10 SBS - Row 016 - 1.0		6/18/15	1055	S															
Normal Turn Around Time (TAT) = 7-10 Business Days																			
<table border="0" style="width: 100%;"> <tr> <td>1 Day</td> <td>2 Day</td> <td>3 Day</td> <td>Other: _____</td> </tr> <tr> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> </table>								1 Day	2 Day	3 Day	Other: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
1 Day	2 Day	3 Day	Other: _____																
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																
SPECIAL INSTRUCTIONS:																			
<table border="0" style="width: 100%;"> <tr> <td>RELINQUISHED BY:</td> <td>RECEIVED BY:</td> </tr> <tr> <td>Signature: <i>[Signature]</i></td> <td>Signature: _____</td> </tr> <tr> <td>Date: <b>6/18/15</b></td> <td>Date: _____</td> </tr> <tr> <td>Printed Name: <b>Justin Porebs</b></td> <td>Printed Name: _____</td> </tr> <tr> <td>Time: <b>14:35</b></td> <td>Time: _____</td> </tr> <tr> <td>Company: <b>MFA</b></td> <td>Company: _____</td> </tr> </table>								RELINQUISHED BY:	RECEIVED BY:	Signature: <i>[Signature]</i>	Signature: _____	Date: <b>6/18/15</b>	Date: _____	Printed Name: <b>Justin Porebs</b>	Printed Name: _____	Time: <b>14:35</b>	Time: _____	Company: <b>MFA</b>	Company: _____
RELINQUISHED BY:	RECEIVED BY:																		
Signature: <i>[Signature]</i>	Signature: _____																		
Date: <b>6/18/15</b>	Date: _____																		
Printed Name: <b>Justin Porebs</b>	Printed Name: _____																		
Time: <b>14:35</b>	Time: _____																		
Company: <b>MFA</b>	Company: _____																		
<table border="0" style="width: 100%;"> <tr> <td>RELINQUISHED BY:</td> <td>RECEIVED BY:</td> </tr> <tr> <td>Signature: _____</td> <td>Signature: _____</td> </tr> <tr> <td>Date: _____</td> <td>Date: _____</td> </tr> <tr> <td>Printed Name: _____</td> <td>Printed Name: _____</td> </tr> <tr> <td>Time: _____</td> <td>Time: _____</td> </tr> <tr> <td>Company: _____</td> <td>Company: _____</td> </tr> </table>								RELINQUISHED BY:	RECEIVED BY:	Signature: _____	Signature: _____	Date: _____	Date: _____	Printed Name: _____	Printed Name: _____	Time: _____	Time: _____	Company: _____	Company: _____
RELINQUISHED BY:	RECEIVED BY:																		
Signature: _____	Signature: _____																		
Date: _____	Date: _____																		
Printed Name: _____	Printed Name: _____																		
Time: _____	Time: _____																		
Company: _____	Company: _____																		

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

Reported:  
09/08/15 16:53

Lab # ASF0363 COC ZofZ

### CHAIN OF CUSTODY

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <u>Maul Foster Alongi, Inc.</u>		Project Mgr: <u>Madi Novak</u>		Project Name: <u>Port</u>		Project # <u>9003.01.39</u>	
Address: <u>2001 NW 19th Ave, Ste 200</u>		Phone: <u>503-718-2323</u>		Fax: <u>503-718-0333</u>		Email: <u>maul@mfalongi.com</u>	
Sampled by: <u>Justin Pounds</u>		Site Location: <u>OR</u> WA		ANALYSIS REQUEST			
LAB ID #		DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-CID	NWTPH-DX
SAMPLE ID							
1 SS-Row025-0.5		6/8/15	1330	S	2		
2 SBS-Row025-1.0			1145				
3 SS-Row027B-0.5			1015				
4 SBS-Row027B-1.0			1125				
5 SS-Row023-0.5			1300				
6 SBS-Row023-1.0			1315				
7 SS-Row01K-0.5			1540				
8 SBS-Row01K-1.0			1355				
9							
10							

Normal Turn Around Time (TAT) = 7-10 Business Days		YES <input checked="" type="radio"/> NO <input type="radio"/>	
TAT Requested (circle)	1 Day	2 Day	3 Day
	4 DAY	5 DAY	Other: _____

RELEASING BY:		RECEIVED BY:	
Signature: <u>[Signature]</u>	Date: <u>6/15/15</u>	Signature: <u>[Signature]</u>	Date: _____
Printed Name: <u>Justin Pounds</u>	Time: <u>1:55</u>	Printed Name: <u>Robert</u>	Time: <u>1435</u>
Company: <u>MFA</u>		Company: <u>Apex</u>	

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

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# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Wednesday, July 15, 2015

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

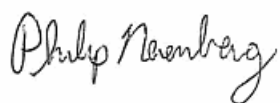
Enclosed are the results of analyses for work order A5F0658, which was received by the laboratory on 6/22/2015 at 12:30:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



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---

Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

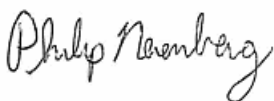
**Reported:**  
07/15/15 12:36

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI019-0.5-As Received	A5F0658-01	Soil	06/22/15 09:00	06/22/15 12:30
ISM-AOI019-0.5-After ISM	A5F0658-02	Soil	06/22/15 09:00	06/22/15 12:30

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

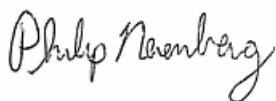
**Reported:**  
 07/15/15 12:36

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI019-0.5-After ISM (A5F0658-02)</b>			<b>Matrix: Soil</b>					
Batch: 5060771								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	06/30/15 12:55	PSEP/SM 5310B MOD	

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

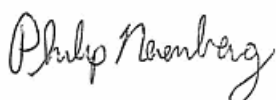
**Reported:**  
 07/15/15 12:36

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI019-0.5-As Received (A5F0658-01)</b>			<b>Matrix: Soil</b>	<b>Batch: 5060702</b>				
% Solids	86.3	---	1.00	% by Weight	1	06/24/15 08:05	EPA 8000C	Q-38
<b>ISM-AOI019-0.5-After ISM (A5F0658-02)</b>			<b>Matrix: Soil</b>	<b>Batch: 5060702</b>				
% Solids	96.6	---	1.00	% by Weight	1	06/24/15 08:05	EPA 8000C	Q-38

Apex Laboratories



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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

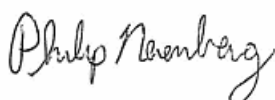
Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 07/15/15 12:36

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5060771 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5060771-BLK1)</b>						Prepared: 06/25/15 08:52 Analyzed: 06/30/15 12:55						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5060771-BS1)</b>						Prepared: 06/25/15 08:52 Analyzed: 06/30/15 12:55						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9600	---		mg/kg	1	10000	---	96	85-115%	---	---	
<b>Duplicate (5060771-DUP1)</b>						Prepared: 06/25/15 08:52 Analyzed: 06/30/15 12:55						
<b>QC Source Sample: ISM-AOI019-0.5-After ISM (A5F0658-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	18000	---	200	mg/kg	1	---	19000	---	---	3	20%	



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

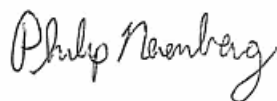
Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
07/15/15 12:36

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5060702 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5060702-DUP1)</b>						Prepared: 06/23/15 14:33 Analyzed: 06/24/15 08:05						
QC Source Sample: Other (A5F0643-18)												
EPA 8000C												
% Solids	98.5	---	1.00	% by Weight	1	---	98.1	---	---	0.4	10%	Q-38
<b>Duplicate (5060702-DUP2)</b>						Prepared: 06/23/15 14:33 Analyzed: 06/24/15 08:05						
QC Source Sample: Other (A5F0666-04)												
EPA 8000C												
% Solids	88.0	---	1.00	% by Weight	1	---	87.9	---	---	0.1	10%	Q-38
<b>Duplicate (5060702-DUP3)</b>						Prepared: 06/23/15 19:12 Analyzed: 06/24/15 08:05						
QC Source Sample: Other (A5F0698-01)												
EPA 8000C												
% Solids	74.4	---	1.00	% by Weight	1	---	74.1	---	---	0.4	10%	Q-38
<b>Duplicate (5060702-DUP4)</b>						Prepared: 06/23/15 19:12 Analyzed: 06/24/15 08:05						
QC Source Sample: Other (A5F0704-02)												
EPA 8000C												
% Solids	86.5	---	1.00	% by Weight	1	---	88.1	---	---	2	10%	Q-38
<b>Duplicate (5060702-DUP5)</b>						Prepared: 06/23/15 19:12 Analyzed: 06/24/15 08:05						
QC Source Sample: Other (A5F0710-02)												
EPA 8000C												
% Solids	83.3	---	1.00	% by Weight	1	---	83.9	---	---	0.7	10%	Q-38



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 07/15/15 12:36

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

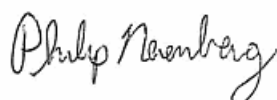
Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5060771</b>							
A5F0658-02	Soil	PSEP/SM 5310B MOD	06/22/15 09:00	06/25/15 08:52	5g/5g	5g/5g	NA

### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5060702</b>							
A5F0658-01	Soil	EPA 8000C	06/22/15 09:00	06/23/15 14:33	1N/A/1N/A	1N/A/1N/A	NA
A5F0658-02	Soil	EPA 8000C	06/22/15 09:00	06/23/15 14:33	1N/A/1N/A	1N/A/1N/A	NA

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
07/15/15 12:36

## Notes and Definitions

### Qualifiers:

Q-38 Oven outside of control limits during drying step.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.

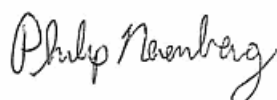
Blank Policy Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
07/15/15 12:36

**CHAIN OF CUSTODY**

Lab # A SF055 COC 1 of 4

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: MFA Project Mgr: Phil Wiescher Project Name: FOR OPP Project # 9003.01.39  
Address: 2001 NW 19th Ave. #200, Portland, OR Phone: 503.504.5209 Fax: \_\_\_\_\_ Email: phil.wiescher@maulfooster.com

Sampled by: \_\_\_\_\_

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST		
					TOTAL HSS TCLP	1200-COLS	USEPA 1413 B
1	7/15/15	05:50	ISM - A6E019 - 0.5	1	AL, SB, AS, BA, BS, CA, CB, CC, CD, CE, CF, CG, CH, CI, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ	XXXX	XXXX
2							
3							
4							
5							
6							
7							
8							
9							
10							

Normal Turn Around Time (TAT) = 7-10 Business Days (YES) NO

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: \_\_\_\_\_

SPECIAL INSTRUCTIONS: \_\_\_\_\_

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: <u>Emily Curtis</u> Signature: _____ Date: _____ Printed Name: <u>Emily Curtis</u> Title: _____	RECEIVED BY: <u>Phil Wiescher</u> Signature: _____ Date: _____ Printed Name: <u>Phil Wiescher</u> Title: _____
Company: <u>MFA</u>	Company: _____

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

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# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Tuesday, August 25, 2015

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield / 9003.01.39

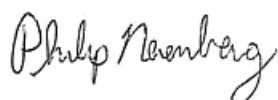
Enclosed are the results of analyses for work order A5G0852, which was received by the laboratory on 7/29/2015 at 12:00:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

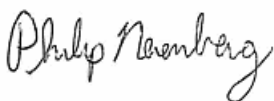
**Reported:**  
08/25/15 15:30

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Comp-AOI004-0.5	A5G0852-02	Soil	07/28/15 14:15	07/29/15 12:00

Apex Laboratories



Philip Nerenberg, Lab Director

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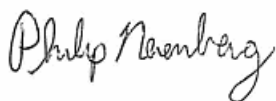
**Reported:**  
 08/25/15 15:30

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>Comp-AOI004-0.5 (A5G0852-02)</b>			<b>Matrix: Soil</b>					
Batch: 5080149								
<b>Total Organic Carbon</b>	<b>21000</b>	---	200	mg/kg	1	08/10/15 12:45	SM 5310B MOD	

Apex Laboratories



Philip Nerenberg, Lab Director

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 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

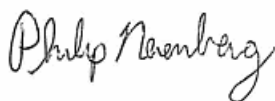
**Reported:**  
 08/25/15 15:30

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5080149 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5080149-BLK1)</b>						Prepared: 08/07/15 06:48 Analyzed: 08/10/15 12:45						
<b>SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5080149-BS1)</b>						Prepared: 08/07/15 06:48 Analyzed: 08/10/15 12:45						
<b>SM 5310B MOD</b>												
Total Organic Carbon	9900	---		mg/kg	1	10000	---	99	85-115%	---	---	
<b>Duplicate (5080149-DUP1)</b>						Prepared: 08/07/15 06:48 Analyzed: 08/10/15 12:45						
<b>QC Source Sample: Comp-AOI004-0.5 (A5G0852-02)</b>												
<b>SM 5310B MOD</b>												
Total Organic Carbon	23000	---	200	mg/kg	1	---	21000	---	---	12	20%	

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Philip Nerenberg, Lab Director

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<b>Maul Foster &amp; Alongi, INC.</b> 2001 NW 19th Ave, STE 200 Portland, OR 97209	Project: <b>Port of Ridgefield</b> Project Number: 9003.01.39 Project Manager: Phil Wiescher	<b>Reported:</b> 08/25/15 15:30
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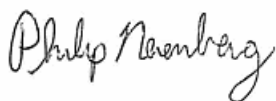
### SAMPLE PREPARATION INFORMATION

#### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5080149</b>							
A5G0852-02	Soil	SM 5310B MOD	07/28/15 14:15	08/07/15 06:48	5g/5g	5g/5g	NA

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Philip Nerenberg, Lab Director

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Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

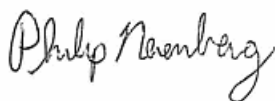
**Reported:**  
08/25/15 15:30

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- QC
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
08/25/15 15:30

**APEX LABS**      **CHAIN OF CUSTODY**      Lab # A590852      Project # 9003.01.39      coc (+ of +)

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

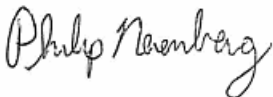
Company: Maul Foster Alongi      Project Mgr: Phil Wiescher      Project Name: Port      Project # 9003.01.39  
 Address: 2001 NW 19th Ave, Suite 200, P.O. Box 012, OR 97209      Phone: 503-501-5205      Fax: \_\_\_\_\_      Email: phil.wiescher@maulfoosteralongi.com  
 Sampled by: Phil Wiescher & Emily Curtis

Site Location: OR      Other: WA

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS		ANALYSIS REQUEST
					YES	NO	
1		7-28	1400	SO	2		1200-Z TOTAL DISS TCLP Se Ag No. TL V. Z Hg Mn Ni Pb Cu Cd Cr Co Ca Cu Fe Pb Al Si As Ba Be Br Cl TCLP Metals (8) RCRA Metals (8) 600 TLO 8082 PCBs 8270 SIM PAHs 8270 SVOC 8260 BTEX 8260 RBDN VOCs 8260 VOC NWTPH-CX NWTPH-LX NWTPH-HCID
2		7-28	1415	SO	2		1200-Z TOTAL DISS TCLP Se Ag No. TL V. Z Hg Mn Ni Pb Cu Cd Cr Co Ca Cu Fe Pb Al Si As Ba Be Br Cl TCLP Metals (8) RCRA Metals (8) 600 TLO 8082 PCBs 8270 SIM PAHs 8270 SVOC 8260 BTEX 8260 RBDN VOCs 8260 VOC NWTPH-CX NWTPH-LX NWTPH-HCID
3							
4							
5							
6							
7							
8							
9							
10							

SPECIAL INSTRUCTIONS:  
 - Archive Sample Comp-A01004-1.0  
 - Digging to Maximum  
 - NO ISM PROCESSING

RELINQUISHED BY: \_\_\_\_\_ RECEIVED BY: \_\_\_\_\_  
 Signature: \_\_\_\_\_ Date: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Printed Name: Emily Curtis Time: 7:29 Printed Name: Blankenshaw Time: 12:00  
 Company: MFA Company: Apex

Apex Laboratories  
  
  
 Philip Nerenberg, Lab Director

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Wednesday, October 28, 2015

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: POR OPP / 9003.01.39

Enclosed are the results of analyses for work order A510106, which was received by the laboratory on 9/2/2015 at 12:45:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
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 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 10/28/15 15:48

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SBS-ROW005-2.0	A5I0106-02	Soil	08/26/15 09:00	09/02/15 12:45
SBS-ROW013-2.0	A5I0106-06	Soil	09/01/15 13:15	09/02/15 12:45
SBS-ROW014-2.0	A5I0106-10	Soil	08/26/15 10:15	09/02/15 12:45
SBS-ROW016-2.0	A5I0106-14	Soil	09/01/15 15:30	09/02/15 12:45
SBS-ROW019-1.5	A5I0106-17	Soil	08/26/15 13:30	09/02/15 12:45
SBS-ROW019-2.0	A5I0106-18	Soil	09/01/15 16:00	09/02/15 12:45
SBS-ROW022-1.5	A5I0106-19	Soil	08/26/15 12:15	09/02/15 12:45
SBS-ROW023-1.5	A5I0106-21	Soil	09/01/15 14:15	09/02/15 12:45
SBS-ROW023-2.0	A5I0106-22	Soil	09/01/15 14:30	09/02/15 12:45
SBS-ROW025-1.5	A5I0106-25	Soil	08/26/15 14:00	09/02/15 12:45
SBS-ROW026-1.5	A5I0106-27	Soil	08/26/15 15:30	09/02/15 12:45
SBS-ROW026-2.0	A5I0106-28	Soil	08/26/15 15:45	09/02/15 12:45
SBS-ROW029B-1.5	A5I0106-29	Soil	08/26/15 14:45	09/02/15 12:45



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2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
10/28/15 15:48

## ANALYTICAL CASE NARRATIVE

**Work Order: A5I0106**

Amended Report Revision 1:

This report supersedes all previous reports.

Additional Analyses-

TOC analysis was added to samples SBS-ROW026-2.0, SBS-ROW019-2.0, and SBS-ROW023-1.5 after the original report was finalized. This revised report contains both the original and the added data.

Philip Nerenberg  
Lab Director  
6/12/15-





**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 10/28/15 15:48

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SBS-ROW005-2.0 (A5I0106-02)</b>			<b>Matrix: Soil</b>					
Batch: 5090182								
<b>Total Organic Carbon</b>	<b>9900</b>	---	200	mg/kg	1	09/09/15 14:25	PSEP/SM 5310B MOD	
<b>SBS-ROW013-2.0 (A5I0106-06)</b>			<b>Matrix: Soil</b>					
Batch: 5090182								
<b>Total Organic Carbon</b>	<b>6800</b>	---	200	mg/kg	1	09/09/15 14:25	PSEP/SM 5310B MOD	
<b>SBS-ROW014-2.0 (A5I0106-10)</b>			<b>Matrix: Soil</b>					
Batch: 5090182								
<b>Total Organic Carbon</b>	<b>8400</b>	---	200	mg/kg	1	09/09/15 14:25	PSEP/SM 5310B MOD	
<b>SBS-ROW016-2.0 (A5I0106-14)</b>			<b>Matrix: Soil</b>					
Batch: 5090182								
<b>Total Organic Carbon</b>	<b>3800</b>	---	200	mg/kg	1	09/09/15 14:25	PSEP/SM 5310B MOD	
<b>SBS-ROW019-1.5 (A5I0106-17)</b>			<b>Matrix: Soil</b>					
Batch: 5090182								
<b>Total Organic Carbon</b>	<b>9100</b>	---	200	mg/kg	1	09/09/15 14:25	PSEP/SM 5310B MOD	
<b>SBS-ROW019-2.0 (A5I0106-18)</b>			<b>Matrix: Soil</b>					
Batch: 5100292								
<b>Total Organic Carbon</b>	<b>4000</b>	---	200	mg/kg	1	10/12/15 14:15	PSEP/SM 5310B MOD	H-08
<b>SBS-ROW022-1.5 (A5I0106-19)</b>			<b>Matrix: Soil</b>					
Batch: 5090182								
<b>Total Organic Carbon</b>	<b>14000</b>	---	200	mg/kg	1	09/09/15 14:25	PSEP/SM 5310B MOD	
<b>SBS-ROW023-1.5 (A5I0106-21)</b>			<b>Matrix: Soil</b>					
Batch: 5100292								
<b>Total Organic Carbon</b>	<b>10000</b>	---	200	mg/kg	1	10/12/15 14:15	PSEP/SM 5310B MOD	H-08
<b>SBS-ROW023-2.0 (A5I0106-22)</b>			<b>Matrix: Soil</b>					
Batch: 5090182								
<b>Total Organic Carbon</b>	<b>11000</b>	---	200	mg/kg	1	09/09/15 14:25	PSEP/SM 5310B MOD	

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Philip Nerenberg, Lab Director

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Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
10/28/15 15:48

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SBS-ROW025-1.5 (A5I0106-25)</b>			<b>Matrix: Soil</b>					
Batch: 5090182								
<b>Total Organic Carbon</b>	<b>9200</b>	---	200	mg/kg	1	09/09/15 14:25	PSEP/SM 5310B MOD	
<b>SBS-ROW026-1.5 (A5I0106-27)</b>			<b>Matrix: Soil</b>					
Batch: 5090182								
<b>Total Organic Carbon</b>	<b>9600</b>	---	200	mg/kg	1	09/09/15 14:25	PSEP/SM 5310B MOD	
<b>SBS-ROW026-2.0 (A5I0106-28)</b>			<b>Matrix: Soil</b>					
Batch: 5100292								
<b>Total Organic Carbon</b>	<b>7900</b>	---	200	mg/kg	1	10/12/15 14:15	PSEP/SM 5310B MOD	H-08
<b>SBS-ROW029B-1.5 (A5I0106-29)</b>			<b>Matrix: Soil</b>					
Batch: 5090182								
<b>Total Organic Carbon</b>	<b>13000</b>	---	200	mg/kg	1	09/09/15 14:25	PSEP/SM 5310B MOD	

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Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
10/28/15 15:48

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5090182 - PSEP Solids in Soil/Sediment</b>						<b>Soil</b>						
<b>Blank (5090182-BLK1)</b>						Prepared: 09/08/15 09:58 Analyzed: 09/09/15 14:25						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>LCS (5090182-BS1)</b>						Prepared: 09/08/15 09:58 Analyzed: 09/09/15 14:25						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9900	---		mg/kg	1	10000	---	99	85-115%	---	---	
<b>Duplicate (5090182-DUP1)</b>						Prepared: 09/08/15 09:58 Analyzed: 09/09/15 14:25						
<b>QC Source Sample: SBS-ROW005-2.0 (A510106-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	<b>9800</b>	---	200	mg/kg	1	---	9900	---	---	0.6	20%	
<b>Batch 5100292 - PSEP TOC</b>						<b>Sediment</b>						
<b>Blank (5100292-BLK1)</b>						Prepared: 10/09/15 13:53 Analyzed: 10/12/15 14:15						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>LCS (5100292-BS1)</b>						Prepared: 10/09/15 13:53 Analyzed: 10/12/15 14:15						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9300	---		mg/kg	1	10000	---	93	85-115%	---	---	
<b>Duplicate (5100292-DUP1)</b>						Prepared: 10/09/15 13:53 Analyzed: 10/12/15 14:15						
<b>QC Source Sample: SBS-ROW019-2.0 (A510106-18)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	<b>3800</b>	---	200	mg/kg	1	---	4000	---	---	5	20%	H-08

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 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 10/28/15 15:48

### SAMPLE PREPARATION INFORMATION

#### Conventional Chemistry Parameters

**Prep: PSEP Solids in Soil/Sediment**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5090182</b>							
A5I0106-02	Soil	PSEP/SM 5310B MOD	08/26/15 09:00	09/08/15 09:58	5g/5g	5g/5g	NA
A5I0106-06	Soil	PSEP/SM 5310B MOD	09/01/15 13:15	09/08/15 09:58	5g/5g	5g/5g	NA
A5I0106-10	Soil	PSEP/SM 5310B MOD	08/26/15 10:15	09/08/15 09:58	5g/5g	5g/5g	NA
A5I0106-14	Soil	PSEP/SM 5310B MOD	09/01/15 15:30	09/08/15 09:58	5g/5g	5g/5g	NA
A5I0106-17	Soil	PSEP/SM 5310B MOD	08/26/15 13:30	09/08/15 09:58	5g/5g	5g/5g	NA
A5I0106-19	Soil	PSEP/SM 5310B MOD	08/26/15 12:15	09/08/15 09:58	5g/5g	5g/5g	NA
A5I0106-22	Soil	PSEP/SM 5310B MOD	09/01/15 14:30	09/08/15 09:58	5g/5g	5g/5g	NA
A5I0106-25	Soil	PSEP/SM 5310B MOD	08/26/15 14:00	09/08/15 09:58	5g/5g	5g/5g	NA
A5I0106-27	Soil	PSEP/SM 5310B MOD	08/26/15 15:30	09/08/15 09:58	5g/5g	5g/5g	NA
A5I0106-29	Soil	PSEP/SM 5310B MOD	08/26/15 14:45	09/08/15 09:58	5g/5g	5g/5g	NA

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5100292</b>							
A5I0106-18	Soil	PSEP/SM 5310B MOD	09/01/15 16:00	10/09/15 13:53	5g/5g	5g/5g	NA
A5I0106-21	Soil	PSEP/SM 5310B MOD	09/01/15 14:15	10/09/15 13:53	5g/5g	5g/5g	NA
A5I0106-28	Soil	PSEP/SM 5310B MOD	08/26/15 15:45	10/09/15 13:53	5g/5g	5g/5g	NA

Apex Laboratories



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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
10/28/15 15:48

## Notes and Definitions

### Qualifiers:

H-08 Sample hold time extended by freezing at -18 degrees C. Total time at 4 degrees C was less than the standard hold time.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.

Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
10/28/15 15:48

**APEX LABS**      **CHAIN OF CUSTODY**      Lab # A510106      coc 1 of 3

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <b>Maul Foster &amp; Alongi</b>		Project Mgr: <b>Phil Wiescher</b>		Project Name: <b>POR OPP</b>		Project # <b>9003.01.39</b>	
Address: <b>2001 NW 19th Ave. #200 Portland, OR</b>		Phone: <b>503.501.5209</b>		Fax:		Email: <b>Phil.Wiescher@maulfoalongs.com</b>	
Sampled by: <b>PW/EC/IEH</b>							
ANALYSIS REQUEST							
Site Location: <b>OR</b>	AL, SB, AS, BA, BE, CA, CR, CS, CU, CN, FE, PH, HG, MG, MN, MO, NI, K, SE, AP, NA, TL, V, ZN, TOTAL DISS TCLP						
Other: <b>WA</b>	TCLP Metals (8) RCRA Metals (8) 600 TTO 8082 PCBs 8270 SIM PAHs 8270 SVOC 8260 BTEX 8260 RBDM VOCs 8260 VOC NTPH-Gx NTPH-Dx NTPH-HCID						
SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	SPECIAL INSTRUCTIONS: •Dioxins to Maximum •No ISM processing	
1 SBS-ROW005-1.5	82415	0815	0915	SO 2	2		
2 SBS-ROW005-2.0			0900				
3 SBS-ROW005-2.5			0915				
4 SBS-ROW005-3.0			0930				
5 SBS-ROW013-1.5	91115	1300					
6 SBS-ROW013-2.0			1315				
7 SBS-ROW013-2.5			1330				
8 SBS-ROW013-3.0			1345				
9 SBS-ROW014-1.5	0-26	1000					
10 SBS-ROW014-2.0			1015				
Normal Turn Around Time (TAT) = 7-10 Business Days TAT Requested (circle): <b>3 DAY</b> YES      NO							
RELINQUISHED BY:				RECEIVED BY:			
Signature: <i>Emily Curtis</i>		Date: <b>9-2-15</b>		Signature: <i>Phil Wiescher</i>		Date: <b>9/2/15</b>	
Printed Name: <b>EMILY CURTIS</b>		Time: <b>12:45</b>		Printed Name: <b>Phil Wiescher</b>		Time: <b>12:45</b>	
Company: <b>MFA</b>		Company: <b>Apex</b>		Company: <b>Apex</b>		Company: <b>Apex</b>	

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
10/28/15 15:48

**APEX LABS**      **CHAIN OF CUSTODY**      Lab # AS10100      coc Z-013

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Maul Foster & Alongi		Project Mgr: Phil Wiescher		Project Name: POR OPP		Project # 9003.01.39	
Address: 2001 NW 19th Ave, #200 Portland, OR		Phone: 503.501.5209		Fax:		Email: P.WIESCHER@maulfooster.com	
Sampled by: P.W/EC/LEH							
Site Location: OR	Other: WA	ANALYSIS REQUEST					
SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-CID	NWTPH-DX
1 SBS-Rowo14-2.5	8265	1030	1030	SO2			
2 SBS-Rowo14-3.0		1045	1045				
3 SBS-Rowo16-1.5		1115	1515				
4 SBS-Rowo16-2.0		1130	1530				
5 SBS-Rowo16-2.5		1145	1545				
6 SBS-Rowo19-3.0		1145	1545				
7 SBS-Rowo19-1.5		1130	1330				
8 SBS-Rowo19-2.0		1115	1600				
9 SBS-Rowo22-1.5		1115	1215				
10 SBS-Rowo22-2.0		1130	1230				
Normal Turn Around Time (TAT) = 7-10 Business Days		YES <input checked="" type="radio"/> NO <input type="radio"/>					
TAT Requested (circle)		1 Day	2 Day	3 Day	Other: _____		
SAMPLES ARE HELD FOR 30 DAYS		4 DAY	5 DAY				
RELINQUISHED BY: _____				RECEIVED BY: _____			
Signature: Emily Muecke		Date: 9/2/15		Signature: _____		Date: _____	
Printed Name: Emily Muecke		Time: _____		Printed Name: _____		Time: _____	
Company: MAF		Company: Apex					

SPECIAL INSTRUCTIONS:  
• Dioxins to Maxcam  
• No ISM processing

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
10/28/15 15:48

Lab # 151010 coc 5 of 3

**CHAIN OF CUSTODY**

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Maul Foster & Alongi		Project Mgr: Phil Wiescher		Project Name: POR OPP		Project # 9003.01.39	
Address: 2001 NW 19th Ave, Ste 200 Portland, OR		Phone: 503.501.5209		Fax:		Email: P.Wiescher@maul-foster.com	
Sampled by: PW/EC/EH							
Site Location: OR		ANALYSIS REQUEST					
Other: (NA)							
LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-CID	NWTPH-DX	NWTPH-CX
1 SB5-ROW023-1.5	9-15	1415	SO	2			
2 SB5-ROW023-2.0		1430					
3 SB5-ROW023-2.5		1445					
4 SB5-ROW023-3.0		1445					
5 SB5-ROW025-1.5	9-20-15	1400					
6 SB5-ROW025-2.0		1415					
7 SB5-ROW026-1.5		1530					
8 SB5-ROW026-2.0		1545					
9 SB5-ROW028-1.5		1445					
10 SB5-ROW024R-2.0		1500					
Normal Turn Around Time (TAT) = 7-10 Business Days		YES <input checked="" type="radio"/>		NO <input type="radio"/>			
TAT Requested (circle)		1 Day	2 Day	3 Day	Other: _____		
		4 DAY	5 DAY				
SPECIAL INSTRUCTIONS:							
• Dioxins to Maxam • NO ISM processing							
RELINQUISHED BY:				RECEIVED BY:			
Signature: Emily Murtin		Date: 9-2-15		Signature: <i>Jonathan Smith</i>		Date: 9/2/15	
Printed Name: Emily Murtin		Time: _____		Printed Name: J. Smith		Time: 12:45	
Company: M.F.A.		Company: Apex		Company: _____		Company: _____	

*Philip Nerenberg*



# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Thursday, October 15, 2015

Madi Novak  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: POR OPP / 9003.01.39

Enclosed are the results of analyses for work order A510609, which was received by the laboratory on 9/21/2015 at 2:20:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

---

Philip Nerenberg, Lab Director

Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

Reported:  
10/15/15 17:05

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI026-0.5-As Received	A5I0609-01	Soil	09/21/15 11:00	09/21/15 14:20
ISM-AOI026-0.5-After ISM	A5I0609-02	Soil	09/21/15 11:00	09/21/15 14:20

Apex Laboratories



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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 10/15/15 17:05

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI026-0.5-After ISM (A5I0609-02)</b>			<b>Matrix: Soil</b>					
Batch: 5090724								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	10/02/15 15:45	PSEP/SM 5310B MOD	

Apex Laboratories



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 10/15/15 17:05

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI026-0.5-As Received (A5I0609-01)</b>			<b>Matrix: Soil</b>		<b>Batch: 5090696</b>			
% Solids	87.6	---	1.00	% by Weight	1	09/26/15 11:10	EPA 8000C	
<b>ISM-AOI026-0.5-After ISM (A5I0609-02)</b>			<b>Matrix: Soil</b>		<b>Batch: 5090696</b>			
% Solids	97.2	---	1.00	% by Weight	1	09/26/15 11:10	EPA 8000C	

Apex Laboratories



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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 10/15/15 17:05

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5090724 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5090724-BLK1)</b>						Prepared: 09/25/15 14:42 Analyzed: 10/02/15 15:45						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5090724-BS1)</b>						Prepared: 09/25/15 14:42 Analyzed: 10/02/15 15:45						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	10000	---		mg/kg	1	10000	---	102	85-115%	---	---	
<b>Duplicate (5090724-DUP1)</b>						Prepared: 09/25/15 14:42 Analyzed: 10/02/15 15:45						
<b>QC Source Sample: ISM-AOI026-0.5-After ISM (A510609-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	17000	---	200	mg/kg	1	---	16000	---	---	5	20%	



Maul Foster & Alongi, INC.  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

Reported:  
 10/15/15 17:05

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5090696 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5090696-DUP1)</b>						Prepared: 09/25/15 10:04 Analyzed: 09/26/15 11:10						
QC Source Sample: Other (A510679-02)												
EPA 8000C												
% Solids	79.5	---	1.00	% by Weight	1	---	79.6	---	---	0.2	10%	
<b>Duplicate (5090696-DUP2)</b>						Prepared: 09/25/15 16:14 Analyzed: 09/26/15 11:10						
QC Source Sample: Other (A510717-08)												
EPA 8000C												
% Solids	76.1	---	1.00	% by Weight	1	---	75.7	---	---	0.4	10%	
<b>Duplicate (5090696-DUP3)</b>						Prepared: 09/25/15 16:16 Analyzed: 09/26/15 11:10						
QC Source Sample: Other (A510753-01)												
EPA 8000C												
% Solids	73.9	---	1.00	% by Weight	1	---	73.5	---	---	0.5	10%	
<b>Duplicate (5090696-DUP4)</b>						Prepared: 09/25/15 17:51 Analyzed: 09/26/15 11:10						
QC Source Sample: Other (A510762-01)												
EPA 8000C												
% Solids	81.4	---	1.00	% by Weight	1	---	83.3	---	---	2	10%	
<b>Duplicate (5090696-DUP5)</b>						Prepared: 09/25/15 18:09 Analyzed: 09/26/15 11:10						
QC Source Sample: Other (A510766-04)												
EPA 8000C												
% Solids	90.1	---	1.00	% by Weight	1	---	90.1	---	---	0.08	10%	
<b>Duplicate (5090696-DUP6)</b>						Prepared: 09/25/15 18:09 Analyzed: 09/26/15 11:10						
QC Source Sample: Other (A510767-03)												
EPA 8000C												
% Solids	74.1	---	1.00	% by Weight	1	---	74.2	---	---	0.2	10%	
<b>Duplicate (5090696-DUP7)</b>						Prepared: 09/25/15 19:22 Analyzed: 09/26/15 11:10						
QC Source Sample: Other (A510774-02)												
EPA 8000C												
% Solids	79.7	---	1.00	% by Weight	1	---	79.6	---	---	0.1	10%	
<b>Duplicate (5090696-DUP8)</b>						Prepared: 09/25/15 19:22 Analyzed: 09/26/15 11:10						

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 10/15/15 17:05

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5090696 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5090696-DUP8)</b>						Prepared: 09/25/15 19:22 Analyzed: 09/26/15 11:10						
QC Source Sample: Other (A510777-06)												
EPA 8000C												
% Solids	75.9	---	1.00	% by Weight	1	---	75.7	---	---	0.2	10%	

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Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 10/15/15 17:05

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5090724</b>							
A5I0609-02	Soil	PSEP/SM 5310B MOD	09/21/15 11:00	09/25/15 14:42	5g/5g	5g/5g	NA

### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5090696</b>							
A5I0609-01	Soil	EPA 8000C	09/21/15 11:00	09/25/15 19:22	1N/A/1N/A	1N/A/1N/A	NA
A5I0609-02	Soil	EPA 8000C	09/21/15 11:00	09/25/15 19:22	1N/A/1N/A	1N/A/1N/A	NA

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

**Reported:**  
10/15/15 17:05

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

Reported:  
10/15/15 17:05

**CHAIN OF CUSTODY**

Lab # AST1001 coc 1 of 1

**APEX LABS**      12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Maul Foster & Alongi	Project Mgr: Madi Novak	Project Name: Port of Regfield opp	Project # 9003.01.39
Address: 402 E Mill Plain Blvd #400 Vancouver WA 98660	Phone: 98660	Enmit: mnovak@maulfosteralongi.com	
Sampled by: Philip Nerenberg & Emily Hrus			

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-DX	NWTPH-GX	8260 VOC	8260 RBDM VOCs	8260 BTEX	8270 SVOC	8270 SIM PAHs	8082 PCBs	600 TTO	RERA Metals (8)	TCLP Metals (8)	Al, Sb, As, Ba, Be, Cd, Cr, Cu, Co, Ni, Pb, Hg, Mn, Mo, Ni, Rb, Se, Ag, Na, TL, V, Zn	TOTAL DISS TCLP	1200-COLS	1200-Z	Dioxin PCBs	TIC KERSM		
1 Ism-A01026-0.5	9/21/15	11:00	SO	1																				
2																								
3																								
4																								
5																								
6																								
7																								
8																								
9																								
10																								

ANALYSIS REQUEST

SPECIAL INSTRUCTIONS: *ISM Processing*

Normal Turn Around Time (TAT) = 7-10 Business Days      YES      NO

TAT Requested (circle):      1 Day      2 Day      3 Day      4 DAY      5 DAY      Other: \_\_\_\_\_

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: <i>PN</i>	RECEIVED BY: _____
Signature: _____	Signature: _____
Date: 9-21-15	Date: _____
Printed Name: Philip Nerenberg	Printed Name: _____
Time: 14:20	Time: _____
Company: MFA	Company: _____

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Thursday, January 14, 2016

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: POR OPP / 9003.39.01

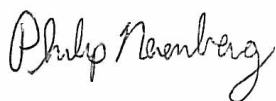
Enclosed are the results of analyses for work order A5K0059, which was received by the laboratory on 11/3/2015 at 10:20:00AM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



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---

Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.39.01  
 Project Manager: Phil Wiescher


**Reported:**  
 01/14/16 09:12

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS-ROW038S-0.5	A5K0059-01	Sediment	11/02/15 08:55	11/03/15 10:20
SS-ROW029BS-0.5	A5K0059-04	Sediment	11/02/15 09:40	11/03/15 10:20
SBS-ROW029BS-1.5	A5K0059-06	Sediment	11/02/15 09:50	11/03/15 10:20
SS-ROW010W-0.5	A5K0059-07	Sediment	11/02/15 10:30	11/03/15 10:20
SBS-ROW010W-1.5	A5K0059-09	Sediment	11/02/15 10:40	11/03/15 10:20
SS-ROW010E-0.5	A5K0059-10	Sediment	11/02/15 11:30	11/03/15 10:20
SS-ROW022W-0.5	A5K0059-13	Sediment	11/02/15 12:15	11/03/15 10:20
SBS-ROW022W-1.5	A5K0059-15	Sediment	11/02/15 12:25	11/03/15 10:20
SS-ROW022E-0.5	A5K0059-16	Sediment	11/02/15 12:45	11/03/15 10:20
SS-ROW022E-0.5-DUP	A5K0059-17	Sediment	11/02/15 12:45	11/03/15 10:20
SS-ROW033W-0.5	A5K0059-20	Sediment	11/02/15 14:10	11/03/15 10:20
SBS-ROW033W-1.5	A5K0059-22	Sediment	11/02/15 14:20	11/03/15 10:20

Apex Laboratories



Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.39.01  
Project Manager: Phil Wiescher


Reported:  
01/14/16 09:12

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SS-ROW038S-0.5 (A5K0059-01)</b>			<b>Matrix: Sediment</b>					
Batch: 5110203								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	11/10/15 13:46	PSEP/SM 5310B MOD	
<b>SS-ROW029BS-0.5 (A5K0059-04)</b>			<b>Matrix: Sediment</b>					
Batch: 5110203								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	11/10/15 13:46	PSEP/SM 5310B MOD	
<b>SBS-ROW029BS-1.5 (A5K0059-06)</b>			<b>Matrix: Sediment</b>					
Batch: 5120217								
<b>Total Organic Carbon</b>	<b>9200</b>	---	200	mg/kg	1	12/15/15 13:55	PSEP/SM 5310B MOD	H-08
<b>SS-ROW010W-0.5 (A5K0059-07)</b>			<b>Matrix: Sediment</b>					
Batch: 5110203								
<b>Total Organic Carbon</b>	<b>21000</b>	---	200	mg/kg	1	11/10/15 13:46	PSEP/SM 5310B MOD	
<b>SBS-ROW010W-1.5 (A5K0059-09)</b>			<b>Matrix: Sediment</b>					
Batch: 5120217								
<b>Total Organic Carbon</b>	<b>8400</b>	---	200	mg/kg	1	12/15/15 13:55	PSEP/SM 5310B MOD	H-08
<b>SS-ROW010E-0.5 (A5K0059-10)</b>			<b>Matrix: Sediment</b>					
Batch: 5120217								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	12/15/15 13:55	PSEP/SM 5310B MOD	H-08
<b>SS-ROW022W-0.5 (A5K0059-13)</b>			<b>Matrix: Sediment</b>					
Batch: 5110203								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	11/10/15 13:46	PSEP/SM 5310B MOD	
<b>SBS-ROW022W-1.5 (A5K0059-15)</b>			<b>Matrix: Sediment</b>					
Batch: 5120217								
<b>Total Organic Carbon</b>	<b>12000</b>	---	200	mg/kg	1	12/15/15 13:55	PSEP/SM 5310B MOD	H-08
<b>SS-ROW022E-0.5 (A5K0059-16)</b>			<b>Matrix: Sediment</b>					
Batch: 5120217								
<b>Total Organic Carbon</b>	<b>14000</b>	---	200	mg/kg	1	12/15/15 13:55	PSEP/SM 5310B MOD	H-08

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.39.01  
 Project Manager: Phil Wiescher

**Reported:**  
 01/14/16 09:12

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SS-ROW022E-0.5-DUP (A5K0059-17)</b>			<b>Matrix: Sediment</b>					
Batch: 5120217								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	12/15/15 13:55	PSEP/SM 5310B MOD	H-08
<b>SS-ROW033W-0.5 (A5K0059-20)</b>			<b>Matrix: Sediment</b>					
Batch: 5110203								
<b>Total Organic Carbon</b>	<b>22000</b>	---	200	mg/kg	1	11/10/15 13:46	PSEP/SM 5310B MOD	
<b>SBS-ROW033W-1.5 (A5K0059-22)</b>			<b>Matrix: Sediment</b>					
Batch: 5120217								
<b>Total Organic Carbon</b>	<b>14000</b>	---	200	mg/kg	1	12/15/15 13:55	PSEP/SM 5310B MOD	H-08

Apex Laboratories



Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209


Project: **POR OPP**  
 Project Number: 9003.39.01  
 Project Manager: Phil Wiescher

Reported:  
 01/14/16 09:12

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5110203 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5110203-BLK1)</b>						Prepared: 11/06/15 11:01 Analyzed: 11/10/15 13:46						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>LCS (5110203-BS1)</b>						Prepared: 11/06/15 11:01 Analyzed: 11/10/15 13:46						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9500	---		mg/kg	1	10000	---	95	85-115%	---	---	
<b>Duplicate (5110203-DUP1)</b>						Prepared: 11/06/15 11:01 Analyzed: 11/10/15 13:46						
<b>QC Source Sample: SS-ROW038S-0.5 (A5K0059-01)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	18000	---	200	mg/kg	1	---	17000	---	---	10	20%	
<b>Batch 5120217 - PSEP TOC</b>						<b>Sediment</b>						
<b>Blank (5120217-BLK1)</b>						Prepared: 12/08/15 07:45 Analyzed: 12/15/15 13:55						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>LCS (5120217-BS1)</b>						Prepared: 12/08/15 07:45 Analyzed: 12/15/15 13:55						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9500	---		mg/kg	1	10000	---	95	85-115%	---	---	
<b>Duplicate (5120217-DUP1)</b>						Prepared: 12/08/15 07:45 Analyzed: 12/15/15 13:55						
<b>QC Source Sample: SBS-ROW029BS-1.5 (A5K0059-06)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	8900	---	200	mg/kg	1	---	9200	---	---	3	20%	H-08



**Maul Foster & Alongi, INC.**  
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 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.39.01  
 Project Manager: Phil Wiescher

**Reported:**  
 01/14/16 09:12

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

#### Prep: PSEP TOC

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5110203</b>							
A5K0059-01	Sediment	PSEP/SM 5310B MOD	11/02/15 08:55	11/06/15 11:01	5g/5g	5g/5g	NA
A5K0059-04	Sediment	PSEP/SM 5310B MOD	11/02/15 09:40	11/06/15 11:01	5g/5g	5g/5g	NA
A5K0059-07	Sediment	PSEP/SM 5310B MOD	11/02/15 10:30	11/06/15 11:01	5g/5g	5g/5g	NA
A5K0059-13	Sediment	PSEP/SM 5310B MOD	11/02/15 12:15	11/06/15 11:01	5g/5g	5g/5g	NA
A5K0059-20	Sediment	PSEP/SM 5310B MOD	11/02/15 14:10	11/06/15 11:01	5g/5g	5g/5g	NA
<b>Batch: 5120217</b>							
A5K0059-06	Sediment	PSEP/SM 5310B MOD	11/02/15 09:50	12/08/15 07:45	5g/5g	5g/5g	NA
A5K0059-09	Sediment	PSEP/SM 5310B MOD	11/02/15 10:40	12/08/15 07:45	5g/5g	5g/5g	NA
A5K0059-10	Sediment	PSEP/SM 5310B MOD	11/02/15 11:30	12/08/15 07:45	5g/5g	5g/5g	NA
A5K0059-15	Sediment	PSEP/SM 5310B MOD	11/02/15 12:25	12/08/15 07:45	5g/5g	5g/5g	NA
A5K0059-16	Sediment	PSEP/SM 5310B MOD	11/02/15 12:45	12/08/15 07:45	5g/5g	5g/5g	NA
A5K0059-17	Sediment	PSEP/SM 5310B MOD	11/02/15 12:45	12/08/15 07:45	5g/5g	5g/5g	NA
A5K0059-22	Sediment	PSEP/SM 5310B MOD	11/02/15 14:20	12/08/15 07:45	5g/5g	5g/5g	NA





**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.39.01  
Project Manager: Phil Wiescher

**Reported:**  
01/14/16 09:12

## Notes and Definitions

### Qualifiers:

H-08 Sample hold time extended by freezing at -18 degrees C. Total time at 4 degrees C was less than the standard hold time.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.

Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.39.01  
Project Manager: Phil Wiescher

Reported:  
01/14/16 09:12

A5K005A  
coc 1 of 3

### CHAIN OF CUSTODY

### APEX LABS

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <b>MFA</b>		Project Mgr: <b>Phil Wiescher</b>		Project Name: <b>POR opp</b>		Project # <b>9003.39.01</b>	
Address: <b>2001 NW 19th Ave, Suite 200, Portland, OR</b>		Phone: <b>503-501-8209</b>		Fax: _____		Email: <b>pwiescher@maulfooster.com</b>	
Sampled by: <b>PW/ENH</b>		Lab # _____		Lab ID # _____		Date: _____	
Site Location: <b>OR</b> (WA)		Other: _____		Matrix		# OF CONTAINERS	
SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-CID	NWTPH-DX	NWTPH-GX
1 SS-ROW0385-0.5	11/15/15	0855	S	2			
2 SB-ROW0385-1.0	"	0900	S	2			
3 SB5-ROW0385-1.5	"	0905	S	2			
4 SB5-ROW02985-0.5	"	0940	S	2			
5 SB5-ROW02985-1.0	"	0945	S	2			
6 SB5-ROW02985-1.5	"	0950	S	2			
7 SS-ROW010W-0.5	"	1030	S	2			
8 SB5-ROW010W-1.0	"	1035	S	2			
9 SB5-ROW010W-1.5	"	1040	S	2			
10 SS-ROW010E-0.5	"	1130	S	2			

ANALYSIS REQUEST			
AL, SB, AS, BA, BE, CA	TCMP Metals (8)	TCMP Metals (8)	
Ca, Cr, Co, Cu, Fe, Ni, Pb, Hg, Mg, Mn, Mo, Ni, Zn	600 TTO	8082 PCBs	
Sr, Ag, Na, TL, V, Zn	8270 SIM PAHs	8270 SVOC	
TOTAL DISS TCLP	8260 BTEX	8260 RBDM VOCs	
	8260 VOC		

SPECIAL INSTRUCTIONS:			
Dioxins to Maxam.			

TAT Requested (circle)			
1 Day	2 Day	3 Day	Other: _____
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

SAMPLES ARE HELD FOR 30 DAYS			
RELINQUISHED BY:	RECEIVED BY:	Signature:	Signature:
Date: 1/3	Date: 11/17/15	Time: 10:20	Time: 10:20
Printed Name: <b>Phil Wiescher</b>	Printed Name: <b>Phil Wiescher</b>	Company: <b>Apex</b>	Company: <b>Apex</b>

Apex Laboratories

*Philip Nerenberg*

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Philip Nerenberg, Lab Director

Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.39.01  
Project Manager: Phil Wiescher

Reported:  
01/14/16 09:12

Lab # A5K0039  
COC 2 of 3

### CHAIN OF CUSTODY

### APEX LABS

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <b>MFA</b>		Project Mgr: <b>Phil Wiescher</b>		Project Name: <b>POR OPP</b>		Project # <b>9003.39.01</b>	
Address: <b>Portland, OR</b>		Phone:		Fax:		Email:	
Sampled by: <b>PW/ENH</b>		Site Location: <b>OR</b> (WA)		Other:		ANALYSIS REQUEST	
LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-CID	NWTPH-DX	NWTPH-GX
1	11/21/15	1135	S	2			
2	"	1140	S	2			
3	"	1215	S	2			
4	"	1220	S	2			
5	"	1225	S	2			
6	"	1245	S	2			
7	"	1245	S	2			
8	"	1255	S	2			
9	"	1305	S	2			
10	"	1410	S	2			

AL, SB, AS, BA, BE, CA, CR, CO, CU, FE, PB, HG, MG, MN, MO, NI, R, SE, Ag, Na, TL, V, Zn	
TOTAL DISS TCTP	
1200-Z	
1200-COLS	
TCR Metals (8)	
RCRA Metals (8)	
600 TTO	
8082 PCBs	
8270 SIM PAHs	
8270 SVOC	
8260 BTEX	
8260 RBDM VOCs	
8260 VOC	

SPECIAL INSTRUCTIONS: **Dioxins to Maxam.**

TAT Requested (circle)	1 Day	2 Day	3 Day	Other:
			<input checked="" type="radio"/>	

Normal Turn Around Time (TAT) = 7-10 Business Days

RELINQUISHED BY:	RECEIVED BY:
Signature: <i>[Signature]</i>	Signature: <i>[Signature]</i>
Date: <b>11/3</b>	Date: <b>11/3</b>
Printed Name: <b>Phil Wiescher</b>	Printed Name: <b>[Name]</b>
Time: <b>10:20</b>	Time: <b>[Time]</b>
Company: <b>MFA</b>	Company: <b>[Company]</b>

*Philip Nerenberg*

Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.39.01  
Project Manager: Phil Wiescher

Reported:  
01/14/16 09:12

Lab # A5K0059      COC 3 of 3

### CHAIN OF CUSTODY

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <u>MFA</u>		Project Mgr: <u>Phil Wiescher</u>		Project Name: <u>POR OPP</u>		Project # <u>9003.39.01</u>	
Address: <u>Portland, OR</u>		Phone: _____		Fax: _____		Email: _____	
Sampled by: <u>PW   ENH</u>		ANALYSIS REQUEST					
Site Location: <u>OR</u>	Other: <u>WA</u>						
SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-DX
1 <u>SBS-ROW033W-1.0</u>		<u>1/2/15</u>	<u>1415</u>	<u>S</u>	<u>2</u>		
2 <u>SBS-ROW033W-1.5</u>		<u>"</u>	<u>1420</u>	<u>S</u>	<u>2</u>		
3							
4							
5							
6							
7							
8							
9							
10							

Normal Turn Around Time (TAT) = 7-10 Business Days	YES	NO				
TAT Requested (circle)	1 Day	2 Day	3 Day	4 DAY	5 DAY	Other: _____

SPECIAL INSTRUCTIONS: Dioxins to Maximum.

RELINQUISHED BY:	RECEIVED BY:
Signature: <u>[Signature]</u>	Signature: _____
Date: <u>1/13</u>	Date: _____
Printed Name: <u>Kyle [Name]</u>	Printed Name: _____
Time: <u>10:28</u>	Time: _____
Company: <u>MFA</u>	Company: _____

Apex Laboratories

*Philip Nerenberg*

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# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Wednesday, January 13, 2016

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

Enclosed are the results of analyses for work order A5K0831, which was received by the laboratory on 11/20/2015 at 1:57:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
01/13/16 10:58

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-A0I009-0.5-As Received	A5K0831-01	Soil	11/20/15 09:15	11/20/15 13:57
ISM-A0I009-0.5-After ISM	A5K0831-02	Soil	11/20/15 09:15	11/20/15 13:57
COMP-A0I001-0.5	A5K0831-03	Soil	11/20/15 10:20	11/20/15 13:57
ISM-A0I002-0.5-As Received	A5K0831-04	Soil	11/20/15 11:00	11/20/15 13:57
ISM-A0I002-0.5-After ISM	A5K0831-05	Soil	11/20/15 11:00	11/20/15 13:57
ISM-A0I037-0.5-As Received	A5K0831-06	Soil	11/20/15 11:30	11/20/15 13:57
ISM-A0I037-0.5-After ISM	A5K0831-07	Soil	11/20/15 11:30	11/20/15 13:57

Apex Laboratories



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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 01/13/16 10:58

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-A0I009-0.5-After ISM (A5K0831-02)</b>			<b>Matrix: Soil</b>					
Batch: 5120050								
<b>Total Organic Carbon</b>	<b>14000</b>	---	200	mg/kg	1	12/04/15 14:20	PSEP/SM 5310B MOD	
<b>COMP-A0I001-0.5 (A5K0831-03)</b>			<b>Matrix: Soil</b>					
Batch: 5120050								
<b>Total Organic Carbon</b>	<b>18000</b>	---	200	mg/kg	1	12/04/15 14:20	PSEP/SM 5310B MOD	
<b>ISM-A0I002-0.5-After ISM (A5K0831-05)</b>			<b>Matrix: Soil</b>					
Batch: 5120050								
<b>Total Organic Carbon</b>	<b>18000</b>	---	200	mg/kg	1	12/04/15 14:20	PSEP/SM 5310B MOD	
<b>ISM-A0I037-0.5-After ISM (A5K0831-07)</b>			<b>Matrix: Soil</b>					
Batch: 5120050								
<b>Total Organic Carbon</b>	<b>23000</b>	---	200	mg/kg	1	12/04/15 14:20	PSEP/SM 5310B MOD	

Apex Laboratories



Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 01/13/16 10:58

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-A0I009-0.5-As Received (A5K0831-01)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120201</b>				
% Solids	79.1	---	1.00	% by Weight	1	12/08/15 07:54	EPA 8000C	
<b>ISM-A0I009-0.5-After ISM (A5K0831-02)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120201</b>				
% Solids	97.3	---	1.00	% by Weight	1	12/08/15 07:54	EPA 8000C	
<b>COMP-A0I001-0.5 (A5K0831-03)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120201</b>				
% Solids	76.9	---	1.00	% by Weight	1	12/08/15 07:54	EPA 8000C	
<b>ISM-A0I002-0.5-As Received (A5K0831-04)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120201</b>				
% Solids	76.3	---	1.00	% by Weight	1	12/08/15 07:54	EPA 8000C	
<b>ISM-A0I002-0.5-After ISM (A5K0831-05)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120201</b>				
% Solids	97.6	---	1.00	% by Weight	1	12/08/15 07:54	EPA 8000C	
<b>ISM-A0I037-0.5-As Received (A5K0831-06)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120201</b>				
% Solids	77.9	---	1.00	% by Weight	1	12/08/15 07:54	EPA 8000C	
<b>ISM-A0I037-0.5-After ISM (A5K0831-07)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120201</b>				
% Solids	97.7	---	1.00	% by Weight	1	12/08/15 07:54	EPA 8000C	

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher


**Reported:**  
 01/13/16 10:58

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5120050 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5120050-BLK1)</b>						Prepared: 12/02/15 09:37 Analyzed: 12/04/15 14:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5120050-BS1)</b>						Prepared: 12/02/15 09:37 Analyzed: 12/04/15 14:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9400	---		mg/kg	1	10000	---	94	85-115%	---	---	
<b>Duplicate (5120050-DUP1)</b>						Prepared: 12/02/15 09:37 Analyzed: 12/04/15 14:20						
<b>QC Source Sample: COMP-A01001-0.5 (A5K0831-03)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	18000	---	200	mg/kg	1	---	18000	---	---	2	20%	

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Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 01/13/16 10:58

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5120201 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5120201-DUP1)</b>						Prepared: 12/07/15 14:45 Analyzed: 12/08/15 07:54						
QC Source Sample: Other (A5L0116-01)												
EPA 8000C												
% Solids	91.5	---	1.00	% by Weight	1	---	91.3	---	---	0.3	10%	
<b>Duplicate (5120201-DUP2)</b>						Prepared: 12/07/15 14:51 Analyzed: 12/08/15 07:54						
QC Source Sample: Other (A5L0167-06)												
EPA 8000C												
% Solids	86.9	---	1.00	% by Weight	1	---	87.9	---	---	1	10%	
<b>Duplicate (5120201-DUP3)</b>						Prepared: 12/07/15 19:42 Analyzed: 12/08/15 07:54						
QC Source Sample: Other (A5L0224-01)												
EPA 8000C												
% Solids	72.9	---	1.00	% by Weight	1	---	73.3	---	---	0.5	10%	
<b>Duplicate (5120201-DUP4)</b>						Prepared: 12/07/15 19:42 Analyzed: 12/08/15 07:54						
QC Source Sample: Other (A5L0232-02)												
EPA 8000C												
% Solids	68.0	---	1.00	% by Weight	1	---	67.8	---	---	0.3	10%	



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Project: **Port of Ridgefield ISM**  
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 Project Manager: Phil Wiescher

Reported:  
 01/13/16 10:58

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5120050</b>							
A5K0831-02	Soil	PSEP/SM 5310B MOD	11/20/15 09:15	12/02/15 09:37	5g/5g	5g/5g	NA
A5K0831-03	Soil	PSEP/SM 5310B MOD	11/20/15 10:20	12/02/15 09:37	5g/5g	5g/5g	NA
A5K0831-05	Soil	PSEP/SM 5310B MOD	11/20/15 11:00	12/02/15 09:37	5g/5g	5g/5g	NA
A5K0831-07	Soil	PSEP/SM 5310B MOD	11/20/15 11:30	12/02/15 09:37	5g/5g	5g/5g	NA

### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5120201</b>							
A5K0831-01	Soil	EPA 8000C	11/20/15 09:15	12/07/15 14:51	1N/A/1N/A	1N/A/1N/A	NA
A5K0831-02	Soil	EPA 8000C	11/20/15 09:15	12/07/15 14:51	1N/A/1N/A	1N/A/1N/A	NA
A5K0831-03	Soil	EPA 8000C	11/20/15 10:20	12/07/15 14:54	1N/A/1N/A	1N/A/1N/A	NA
A5K0831-04	Soil	EPA 8000C	11/20/15 11:00	12/07/15 14:51	1N/A/1N/A	1N/A/1N/A	NA
A5K0831-05	Soil	EPA 8000C	11/20/15 11:00	12/07/15 14:51	1N/A/1N/A	1N/A/1N/A	NA
A5K0831-06	Soil	EPA 8000C	11/20/15 11:30	12/07/15 14:51	1N/A/1N/A	1N/A/1N/A	NA
A5K0831-07	Soil	EPA 8000C	11/20/15 11:30	12/07/15 14:51	1N/A/1N/A	1N/A/1N/A	NA



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Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
01/13/16 10:58

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



Maul Foster & Alongi, INC.  
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Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
01/13/16 10:58

Lab # A5K0831 of 1

### CHAIN OF CUSTODY

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <u>MFA</u>		Project Mgr: <u>P. Wiescher</u>		Project Name: <u>9003.01.39</u>		Project # <u>Port Ridgefield</u>																						
Address: <u>2001 NW 19th Ave Ste 200, Portland, OR 97209</u>		Phone: <u>503.501.5209</u>		Fax: <u></u>		Email: <u>pw.wiescher@maulalongi.com</u>																						
Sampled by: <u>TRW/AV</u>																												
Site Location: <u>OR</u> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">WA</span>	Other: <u></u>																											
SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-DX	NWTPH-GX	8260 VOC	8260 RBDM VOCs	8260 BTEX	8270 SVOC	8270 SIM PAHs	8082 PCBs	600 TTO	RCRA Metals (8)	TCLP Metals (8)	Al, Sb, As, Ba, Be, Bi, Cd, Cr, Co, Cu, Fe, Pb, Hg, Mn, Mo, Ni, N, K, P, Se, Ag, Na, Ti, V, Zn	TOTAL DISS TCLP	1200-COLS	1200-Z	1413B Oils	134FP TOL	ISM Trip	Attn:			
1 <u>ISM-ADIE09-0.5</u>		<u>11-20-16</u>	<u>9:15</u>	<u>50</u>	<u>1</u>																							
2 <u>LOMP-ADIE01-0.5</u>		<u>11-20-16</u>	<u>10:20</u>	<u>1</u>	<u>4</u>																							
3 <u>ISM-ADIE02-0.5</u>		<u>11-20-16</u>	<u>11:00</u>	<u>1</u>	<u>1</u>																							
4 <u>ISM-ADIE03-0.5</u>		<u>11-20-16</u>	<u>11:30</u>	<u>1</u>	<u>1</u>																							
5																												
6																												
7																												
8																												
9																												
10																												
Normal Turn Around Time (TAT) = 7-10 Business Days										SPECIAL INSTRUCTIONS:																		
TAT Requested (circle): <u>1 DAY</u> 2 Day 3 Day 4 DAY 5 DAY Other: _____										SPECIAL INSTRUCTIONS: <u>ISM processing for 3 of 4 samples</u>																		
RECEIVED BY: <u>[Signature]</u> Date: <u>11-20-16</u> Time: <u>13:57</u>										RECEIVED BY: _____																		
Signature: <u>Phil Wiescher</u> Date: <u>11-20-16</u> Time: <u>13:57</u>										Signature: _____																		
Printed Name: <u>Phil Wiescher</u> Date: <u>11-20-16</u> Time: <u>13:57</u>										Printed Name: _____																		
Company: <u>MFA</u>										Company: <u>Apex Labs</u>																		

*Philip Nerenberg*

# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Wednesday, January 13, 2016

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

Enclosed are the results of analyses for work order A5L0163, which was received by the laboratory on 12/2/2015 at 3:25:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 01/13/16 09:46

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI028B-0.5-As Received	A5L0163-01	Soil	12/02/15 10:40	12/02/15 15:25
ISM-AOI028B-0.5-After ISM	A5L0163-02	Soil	12/02/15 10:40	12/02/15 15:25
ISM-AOI034-0.5-As Received	A5L0163-03	Soil	12/02/15 11:00	12/02/15 15:25
ISM-AOI034-0.5-After ISM	A5L0163-04	Soil	12/02/15 11:00	12/02/15 15:25
ISM-AOI028A-0.5-As Received	A5L0163-05	Soil	12/02/15 11:50	12/02/15 15:25
ISM-AOI028A-0.5-After ISM	A5L0163-06	Soil	12/02/15 11:50	12/02/15 15:25
ISM-AOI022-0.5-As Received	A5L0163-07	Soil	12/02/15 12:30	12/02/15 15:25
ISM-AOI022-0.5-After ISM	A5L0163-08	Soil	12/02/15 12:30	12/02/15 15:25
ISM-AOI010-0.5-As Received	A5L0163-09	Soil	12/02/15 13:40	12/02/15 15:25
ISM-AOI010-0.5-After ISM	A5L0163-10	Soil	12/02/15 13:40	12/02/15 15:25

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Philip Nerenberg, Lab Director

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 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 01/13/16 09:46

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI028B-0.5-After ISM (A5L0163-02)</b>			<b>Matrix: Soil</b>					
Batch: 5120406								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	12/16/15 13:00	PSEP/SM 5310B MOD	
<b>ISM-AOI034-0.5-After ISM (A5L0163-04)</b>			<b>Matrix: Soil</b>					
Batch: 5120406								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	12/16/15 13:00	PSEP/SM 5310B MOD	
<b>ISM-AOI028A-0.5-After ISM (A5L0163-06)</b>			<b>Matrix: Soil</b>					
Batch: 5120406								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	12/16/15 13:00	PSEP/SM 5310B MOD	
<b>ISM-AOI022-0.5-After ISM (A5L0163-08)</b>			<b>Matrix: Soil</b>					
Batch: 5120406								
<b>Total Organic Carbon</b>	<b>14000</b>	---	200	mg/kg	1	12/16/15 13:00	PSEP/SM 5310B MOD	
<b>ISM-AOI010-0.5-After ISM (A5L0163-10)</b>			<b>Matrix: Soil</b>					
Batch: 5120406								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	12/16/15 13:00	PSEP/SM 5310B MOD	





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Project: **Port of Ridgefield ISM**  
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Reported:  
01/13/16 09:46

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI028B-0.5-As Received (A5L0163-01)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120337</b>				
% Solids	76.3	---	1.00	% by Weight	1	12/11/15 07:55	EPA 8000C	
<b>ISM-AOI028B-0.5-After ISM (A5L0163-02)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120337</b>				
% Solids	96.4	---	1.00	% by Weight	1	12/11/15 07:55	EPA 8000C	
<b>ISM-AOI034-0.5-As Received (A5L0163-03)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120337</b>				
% Solids	79.0	---	1.00	% by Weight	1	12/11/15 07:55	EPA 8000C	
<b>ISM-AOI034-0.5-After ISM (A5L0163-04)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120337</b>				
% Solids	96.3	---	1.00	% by Weight	1	12/11/15 07:55	EPA 8000C	
<b>ISM-AOI028A-0.5-As Received (A5L0163-05)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120337</b>				
% Solids	78.2	---	1.00	% by Weight	1	12/11/15 07:55	EPA 8000C	
<b>ISM-AOI028A-0.5-After ISM (A5L0163-06)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120337</b>				
% Solids	96.8	---	1.00	% by Weight	1	12/11/15 07:55	EPA 8000C	
<b>ISM-AOI022-0.5-As Received (A5L0163-07)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120337</b>				
% Solids	80.0	---	1.00	% by Weight	1	12/11/15 07:55	EPA 8000C	
<b>ISM-AOI022-0.5-After ISM (A5L0163-08)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120337</b>				
% Solids	96.8	---	1.00	% by Weight	1	12/11/15 07:55	EPA 8000C	
<b>ISM-AOI010-0.5-As Received (A5L0163-09)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120337</b>				
% Solids	78.6	---	1.00	% by Weight	1	12/11/15 07:55	EPA 8000C	
<b>ISM-AOI010-0.5-After ISM (A5L0163-10)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120337</b>				
% Solids	96.6	---	1.00	% by Weight	1	12/11/15 07:55	EPA 8000C	

Apex Laboratories



Philip Nerenberg, Lab Director

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 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 01/13/16 09:46

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5120406 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5120406-BLK1)</b>						Prepared: 12/14/15 10:02 Analyzed: 12/16/15 13:00						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5120406-BS1)</b>						Prepared: 12/14/15 10:02 Analyzed: 12/16/15 13:00						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9300	---		mg/kg	1	10000	---	93	85-115%	---	---	
<b>LCS (5120406-BS2)</b>						Prepared: 12/14/15 10:02 Analyzed: 12/21/15 12:30						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9600	---		mg/kg	1	10000	---	96	85-115%	---	---	
<b>Duplicate (5120406-DUP1)</b>						Prepared: 12/14/15 10:02 Analyzed: 12/16/15 13:00						
<b>QC Source Sample: ISM-AOI028B-0.5-After ISM (A5L0163-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	20000	---	200	mg/kg	1	---	19000	---	---	4	20%	
<b>Duplicate (5120406-DUP2)</b>						Prepared: 12/14/15 10:02 Analyzed: 12/21/15 12:30						
<b>QC Source Sample: Other (A5L0393-07)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	8200	---	200	mg/kg	1	---	11000	---	---	27	20%	Q-01



Maul Foster & Alongi, INC.  
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Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
01/13/16 09:46

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5120337 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5120337-DUP1)</b>						Prepared: 12/10/15 13:54 Analyzed: 12/11/15 07:55						
QC Source Sample: Other (A5L0258-02)												
EPA 8000C												
% Solids	87.5	---	1.00	% by Weight	1	---	87.5	---	---	0.07	10%	
<b>Duplicate (5120337-DUP2)</b>						Prepared: 12/10/15 13:56 Analyzed: 12/11/15 07:55						
QC Source Sample: Other (A5L0341-04)												
EPA 8000C												
% Solids	74.7	---	1.00	% by Weight	1	---	74.6	---	---	0.09	10%	
<b>Duplicate (5120337-DUP3)</b>						Prepared: 12/10/15 13:57 Analyzed: 12/11/15 07:55						
QC Source Sample: Other (A5L0341-10)												
EPA 8000C												
% Solids	75.7	---	1.00	% by Weight	1	---	76.0	---	---	0.3	10%	
<b>Duplicate (5120337-DUP4)</b>						Prepared: 12/10/15 15:27 Analyzed: 12/11/15 07:55						
QC Source Sample: Other (A5L0370-02)												
EPA 8000C												
% Solids	82.3	---	1.00	% by Weight	1	---	80.9	---	---	2	10%	
<b>Duplicate (5120337-DUP5)</b>						Prepared: 12/10/15 18:03 Analyzed: 12/11/15 07:55						
QC Source Sample: Other (A5L0394-01)												
EPA 8000C												
% Solids	78.6	---	1.00	% by Weight	1	---	78.5	---	---	0.08	10%	
<b>Duplicate (5120337-DUP6)</b>						Prepared: 12/10/15 19:45 Analyzed: 12/11/15 07:55						
QC Source Sample: Other (A5L0403-02)												
EPA 8000C												
% Solids	85.3	---	1.00	% by Weight	1	---	87.1	---	---	2	10%	

Apex Laboratories



Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 01/13/16 09:46

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

#### Prep: PSEP TOC

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5120406</b>							
A5L0163-02	Soil	PSEP/SM 5310B MOD	12/02/15 10:40	12/14/15 10:02	5g/5g	5g/5g	NA
A5L0163-04	Soil	PSEP/SM 5310B MOD	12/02/15 11:00	12/14/15 10:02	5g/5g	5g/5g	NA
A5L0163-06	Soil	PSEP/SM 5310B MOD	12/02/15 11:50	12/14/15 10:02	5g/5g	5g/5g	NA
A5L0163-08	Soil	PSEP/SM 5310B MOD	12/02/15 12:30	12/14/15 10:02	5g/5g	5g/5g	NA
A5L0163-10	Soil	PSEP/SM 5310B MOD	12/02/15 13:40	12/14/15 10:02	5g/5g	5g/5g	NA

### Percent Dry Weight

#### Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5120337</b>							
A5L0163-01	Soil	EPA 8000C	12/02/15 10:40	12/10/15 13:57	1N/A/1N/A	1N/A/1N/A	NA
A5L0163-02	Soil	EPA 8000C	12/02/15 10:40	12/10/15 13:57	1N/A/1N/A	1N/A/1N/A	NA
A5L0163-03	Soil	EPA 8000C	12/02/15 11:00	12/10/15 13:57	1N/A/1N/A	1N/A/1N/A	NA
A5L0163-04	Soil	EPA 8000C	12/02/15 11:00	12/10/15 13:57	1N/A/1N/A	1N/A/1N/A	NA
A5L0163-05	Soil	EPA 8000C	12/02/15 11:50	12/10/15 13:57	1N/A/1N/A	1N/A/1N/A	NA
A5L0163-06	Soil	EPA 8000C	12/02/15 11:50	12/10/15 13:57	1N/A/1N/A	1N/A/1N/A	NA
A5L0163-07	Soil	EPA 8000C	12/02/15 12:30	12/10/15 13:57	1N/A/1N/A	1N/A/1N/A	NA
A5L0163-08	Soil	EPA 8000C	12/02/15 12:30	12/10/15 13:57	1N/A/1N/A	1N/A/1N/A	NA
A5L0163-09	Soil	EPA 8000C	12/02/15 13:40	12/10/15 13:57	1N/A/1N/A	1N/A/1N/A	NA
A5L0163-10	Soil	EPA 8000C	12/02/15 13:40	12/10/15 13:57	1N/A/1N/A	1N/A/1N/A	NA

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
01/13/16 09:46

## Notes and Definitions

### Qualifiers:

Q-01 Spike recovery and/or RPD is outside acceptance limits.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.

Blank Policy Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
01/13/16 09:46

Lab # A5L0103 of \_\_\_\_\_  
COC \_\_\_\_\_

### CHAIN OF CUSTODY

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <b>MFA</b>		Project Mgr: <b>Phil Wiescher</b>		Project Name: <b>Port opp</b>		Project # <b>9003.01.39</b>	
Address: <b>Portland OR</b>		Phone: _____		Fax: _____		Email: <b>PWiescher@maulfoal.com</b>	
Sampled by: _____ Site Location: <b>OR</b> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">WA</span> Other: _____							
LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-CID	NWTPH-DX	NWTPH-GX
1	12/21/15	10:40	SO	1			
2	"	11:00	SO	1			
3	"	11:50	SO	1			
4	"	12:30	SO	1			
5	"	13:40	SO	1			
6							
7							
8							
9							
10							

ANALYSIS REQUEST	AL, SI, AS, BA, BE, CA, CR, CO, CU, FE, PB, HG, MG, MN, MO, NI, K, SE, AG, NA, TI, V, ZN	TOTAL DISS TCLP	1200-Z	Dioxin-1613B	TCLP Metals (8)	RORA Metals (8)	600 TTO	8082 PCBs	8270 SIM PAHs	8270 SVOC	8260 BTEX	8260 RBDM VOCs	8260 VOC	15m processing
------------------	--	-----------------	--------	--------------	-----------------	-----------------	---------	-----------	---------------	-----------	-----------	----------------	----------	----------------

SPECIAL INSTRUCTIONS:			
Normal Turn Around Time (TAT) = 7-10 Business Days	YES <input checked="" type="radio"/>	NO <input type="radio"/>	
TAT Requested (circle)	1 Day	2 Day	3 Day
	4 DAY	5 DAY	Other: _____

RECEIVED BY:	RECEIVED BY:
Signature: <i>[Signature]</i>	Signature: _____
Date: <b>12-21-15</b>	Date: _____
Time: _____	Time: _____
Company: <b>MFA</b>	Company: _____

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Your Project #: A5E0713  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/06/17**  
Report #: R3468440  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5A4222**

**Received: 2015/06/02, 15:15**

Sample Matrix: Soil  
# Samples Received: 3

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	2	2015/06/06	2015/06/10	BRL SOP-00410	EPA 1613B m
Dioxins/Furans in Soil (1613B) (1)	1	2015/06/06	2015/06/11	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation in Soil	3	N/A	2015/06/16	BRL SOP-00406	EPA 8290A m
Moisture	3	N/A	2015/06/04	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		AJL537	AJL538	AJL539			
Sampling Date		2015/05/21 14:40	2015/05/21 15:15	2015/05/21 16:10			
COC Number		na	na	na			
	Units	ISM-AOI008-0. 5-AFTER ISM	ISM-AOI030-0. 5-AFTER ISM	SS-ROW026-0.5	RDL	MDL	QC Batch
Moisture	%	2.6	2.6	15	1.0	0.040	4051616
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							



Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AJL537							
Sampling Date		2015/05/21 14:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI008-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.87	0.119	0.200	0.0400	1.00	1.87		4059381
1,2,3,7,8-Penta CDD *	pg/g	1.92	0.127	1.00	0.0400	1.00	1.92		4059381
1,2,3,4,7,8-Hexa CDD *	pg/g	3.19	0.128	1.00	0.0400	0.100	0.319		4059381
1,2,3,6,7,8-Hexa CDD *	pg/g	12.7	0.134	1.00	0.0400	0.100	1.27		4059381
1,2,3,7,8,9-Hexa CDD *	pg/g	8.79	0.131	1.00	0.0400	0.100	0.879		4059381
1,2,3,4,6,7,8-Hepta CDD *	pg/g	288	0.255	1.00	0.0400	0.0100	2.88		4059381
Octa CDD *	pg/g	1720	0.116	2.00	0.0800	0.000300	0.516		4059381
Total Tetra CDD *	pg/g	4.37	0.119	0.200	0.0400			7	4059381
Total Penta CDD *	pg/g	9.15	0.127	1.00	0.0400			10	4059381
Total Hexa CDD *	pg/g	67.7	0.131	1.00	0.0400			7	4059381
Total Hepta CDD *	pg/g	468	0.255	1.00	0.0400			2	4059381
2,3,7,8-Tetra CDF **	pg/g	1.42	0.0659	0.200	0.0400	0.100	0.142		4059381
1,2,3,7,8-Penta CDF **	pg/g	0.829	0.101	1.00	0.0400	0.0300	0.0249		4059381
2,3,4,7,8-Penta CDF **	pg/g	0.999	0.100	1.00	0.0400	0.300	0.300		4059381
1,2,3,4,7,8-Hexa CDF **	pg/g	4.07	0.185	1.00	0.0400	0.100	0.407		4059381
1,2,3,6,7,8-Hexa CDF **	pg/g	2.15	0.189	1.00	0.0400	0.100	0.215		4059381
2,3,4,6,7,8-Hexa CDF **	pg/g	1.46	0.175	1.00	0.0400	0.100	0.146		4059381
1,2,3,7,8,9-Hexa CDF **	pg/g	0.276	0.182	1.00	0.0400	0.100	0.0276		4059381
1,2,3,4,6,7,8-Hepta CDF **	pg/g	46.8	0.175	1.00	0.0400	0.0100	0.468		4059381
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.76	0.176	1.00	0.0400	0.0100	0.0276		4059381
Octa CDF **	pg/g	90.2	0.113	2.00	0.0800	0.000300	0.0271		4059381
Total Tetra CDF **	pg/g	6.97	0.0659	0.200	0.0400			13	4059381
Total Penta CDF **	pg/g	9.77	0.101	1.00	0.0400			10	4059381
Total Hexa CDF **	pg/g	50.7	0.183	1.00	0.0400			11	4059381
Total Hepta CDF **	pg/g	132	0.176	1.00	0.0400			4	4059381
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.95	0.11	1.0	0.90	0.100	0.0950		4068022
TOTAL TOXIC EQUIVALENCY	pg/g						11.4		

**Surrogate Recovery (%)**

37CL4 2378 Tetra CDD *	%	103							4059381
------------------------	---	-----	--	--	--	--	--	--	---------

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AJL537							
Sampling Date		2015/05/21 14:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI008-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	104							4059381
C13-1234678 HeptaCDF **	%	88							4059381
C13-123478 HexaCDD *	%	85							4059381
C13-123478 HexaCDF **	%	83							4059381
C13-1234789 HeptaCDF **	%	86							4059381
C13-123678 HexaCDD *	%	99							4059381
C13-123678 HexaCDF **	%	84							4059381
C13-12378 PentaCDD *	%	114							4059381
C13-12378 PentaCDF **	%	107							4059381
C13-123789 HexaCDF **	%	89							4059381
C13-234678 HexaCDF **	%	86							4059381
C13-23478 PentaCDF **	%	120							4059381
C13-2378 TetraCDD *	%	95							4059381
C13-2378 TetraCDF **	%	99							4059381
C13-OCDD *	%	101							4059381
Confirmation C13-2378 TetraCDF **	%	95							4068022

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AJL538							
Sampling Date		2015/05/21 15:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI030-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.265	0.117	0.200	0.0400	1.00	0.265		4059381
1,2,3,7,8-Penta CDD *	pg/g	2.15	0.103	1.00	0.0400	1.00	2.15		4059381
1,2,3,4,7,8-Hexa CDD *	pg/g	4.41	0.133	1.00	0.0400	0.100	0.441		4059381
1,2,3,6,7,8-Hexa CDD *	pg/g	15.3	0.139	1.00	0.0400	0.100	1.53		4059381
1,2,3,7,8,9-Hexa CDD *	pg/g	12.3	0.136	1.00	0.0400	0.100	1.23		4059381
1,2,3,4,6,7,8-Hepta CDD *	pg/g	337	0.198	1.00	0.0400	0.0100	3.37		4059381
Octa CDD *	pg/g	1720	0.359	2.00	0.0800	0.000300	0.516		4059381
Total Tetra CDD *	pg/g	2.37	0.117	0.200	0.0400			8	4059381
Total Penta CDD *	pg/g	11.7	0.103	1.00	0.0400			11	4059381
Total Hexa CDD *	pg/g	92.6	0.136	1.00	0.0400			7	4059381
Total Hepta CDD *	pg/g	571	0.198	1.00	0.0400			2	4059381
2,3,7,8-Tetra CDF **	pg/g	1.12	0.0875	0.200	0.0400	0.100	0.112		4059381
1,2,3,7,8-Penta CDF **	pg/g	0.926	0.0796	1.00	0.0400	0.0300	0.0278		4059381
2,3,4,7,8-Penta CDF **	pg/g	1.20	0.0786	1.00	0.0400	0.300	0.360		4059381
1,2,3,4,7,8-Hexa CDF **	pg/g	5.30	0.130	1.00	0.0400	0.100	0.530		4059381
1,2,3,6,7,8-Hexa CDF **	pg/g	2.47	0.133	1.00	0.0400	0.100	0.247		4059381
2,3,4,6,7,8-Hexa CDF **	pg/g	1.69	0.123	1.00	0.0400	0.100	0.169		4059381
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.165 (1)	0.165	1.00	0.0400	0.100	0.0165		4059381
1,2,3,4,6,7,8-Hepta CDF **	pg/g	45.1	0.249	1.00	0.0400	0.0100	0.451		4059381
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.45	0.250	1.00	0.0400	0.0100	0.0245		4059381
Octa CDF **	pg/g	74.4	0.143	2.00	0.0800	0.000300	0.0223		4059381
Total Tetra CDF **	pg/g	5.63	0.0875	0.200	0.0400			12	4059381
Total Penta CDF **	pg/g	11.9	0.0791	1.00	0.0400			11	4059381
Total Hexa CDF **	pg/g	61.3	0.128	1.00	0.0400			9	4059381
Total Hepta CDF **	pg/g	120	0.250	1.00	0.0400			4	4059381
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.699	0.084	1.0	0.90	0.100	0.0699		4068022
TOTAL TOXIC EQUIVALENCY	pg/g						11.4		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AJL538							
<b>Sampling Date</b>		2015/05/21 15:15							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI030-0. 5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	106							4059381
C13-1234678 HeptaCDD *	%	95							4059381
C13-1234678 HeptaCDF **	%	87							4059381
C13-123478 HexaCDD *	%	81							4059381
C13-123478 HexaCDF **	%	82							4059381
C13-1234789 HeptaCDF **	%	90							4059381
C13-123678 HexaCDD *	%	92							4059381
C13-123678 HexaCDF **	%	82							4059381
C13-12378 PentaCDD *	%	112							4059381
C13-12378 PentaCDF **	%	102							4059381
C13-123789 HexaCDF **	%	88							4059381
C13-234678 HexaCDF **	%	82							4059381
C13-23478 PentaCDF **	%	117							4059381
C13-2378 TetraCDD *	%	92							4059381
C13-2378 TetraCDF **	%	96							4059381
C13-OCDD *	%	96							4059381
Confirmation C13-2378 TetraCDF **	%	92							4068022

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AL539							
Sampling Date		2015/05/21 16:10							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW026-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.494	0.107	0.200	0.0400	1.00	0.494		4059381
1,2,3,7,8-Penta CDD *	pg/g	2.59	0.116	1.00	0.0400	1.00	2.59		4059381
1,2,3,4,7,8-Hexa CDD *	pg/g	5.27	0.0979	1.00	0.0400	0.100	0.527		4059381
1,2,3,6,7,8-Hexa CDD *	pg/g	18.8	0.102	1.00	0.0400	0.100	1.88		4059381
1,2,3,7,8,9-Hexa CDD *	pg/g	13.1	0.100	1.00	0.0400	0.100	1.31		4059381
1,2,3,4,6,7,8-Hepta CDD *	pg/g	424	0.118	1.00	0.0400	0.0100	4.24		4059381
Octa CDD *	pg/g	2470	0.109	2.00	0.0800	0.000300	0.741		4059381
Total Tetra CDD *	pg/g	4.57	0.107	0.200	0.0400			11	4059381
Total Penta CDD *	pg/g	15.4	0.116	1.00	0.0400			11	4059381
Total Hexa CDD *	pg/g	106	0.100	1.00	0.0400			7	4059381
Total Hepta CDD *	pg/g	749	0.118	1.00	0.0400			2	4059381
2,3,7,8-Tetra CDF **	pg/g	1.38	0.104	0.200	0.0400	0.100	0.138		4059381
1,2,3,7,8-Penta CDF **	pg/g	1.42	0.109	1.00	0.0400	0.0300	0.0426		4059381
2,3,4,7,8-Penta CDF **	pg/g	1.88	0.108	1.00	0.0400	0.300	0.564		4059381
1,2,3,4,7,8-Hexa CDF **	pg/g	8.48	0.105	1.00	0.0400	0.100	0.848		4059381
1,2,3,6,7,8-Hexa CDF **	pg/g	3.95	0.108	1.00	0.0400	0.100	0.395		4059381
2,3,4,6,7,8-Hexa CDF **	pg/g	2.10	0.0995	1.00	0.0400	0.100	0.210		4059381
1,2,3,7,8,9-Hexa CDF **	pg/g	0.220	0.103	1.00	0.0400	0.100	0.0220		4059381
1,2,3,4,6,7,8-Hepta CDF **	pg/g	72.2	0.104	1.00	0.0400	0.0100	0.722		4059381
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.80	0.105	1.00	0.0400	0.0100	0.0380		4059381
Octa CDF **	pg/g	77.8	0.116	2.00	0.0800	0.000300	0.0233		4059381
Total Tetra CDF **	pg/g	8.44	0.104	0.200	0.0400			13	4059381
Total Penta CDF **	pg/g	20.4	0.108	1.00	0.0400			11	4059381
Total Hexa CDF **	pg/g	103	0.104	1.00	0.0400			12	4059381
Total Hepta CDF **	pg/g	175	0.105	1.00	0.0400			3	4059381
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.937	0.086	1.0	0.90	0.100	0.0937		4068022
TOTAL TOXIC EQUIVALENCY	pg/g						14.7		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	108							4059381
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AJL539							
Sampling Date		2015/05/21 16:10							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW026-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	109							4059381
C13-1234678 HeptaCDF **	%	100							4059381
C13-123478 HexaCDD *	%	90							4059381
C13-123478 HexaCDF **	%	96							4059381
C13-1234789 HeptaCDF **	%	100							4059381
C13-123678 HexaCDD *	%	109							4059381
C13-123678 HexaCDF **	%	94							4059381
C13-12378 PentaCDD *	%	113							4059381
C13-12378 PentaCDF **	%	109							4059381
C13-123789 HexaCDF **	%	107							4059381
C13-234678 HexaCDF **	%	98							4059381
C13-23478 PentaCDF **	%	124							4059381
C13-2378 TetraCDD *	%	100							4059381
C13-2378 TetraCDF **	%	106							4059381
C13-OCDD *	%	116							4059381
Confirmation C13-2378 TetraCDF **	%	98							4068022

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

\* CDD = Chloro Dibenzo-p-Dioxin

\*\* CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**TEST SUMMARY**

**Maxxam ID:** AJL537  
**Sample ID:** ISM-AOI008-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/05/21  
**Shipped:**  
**Received:** 2015/06/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4059381	2015/06/06	2015/06/10	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4068022	N/A	2015/06/16	Vica Cioranic
Moisture	BAL	4051616	N/A	2015/06/04	Valentina Kaftani

**Maxxam ID:** AJL538  
**Sample ID:** ISM-AOI030-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/05/21  
**Shipped:**  
**Received:** 2015/06/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4059381	2015/06/06	2015/06/10	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4068022	N/A	2015/06/16	Vica Cioranic
Moisture	BAL	4051616	N/A	2015/06/04	Valentina Kaftani

**Maxxam ID:** AJL539  
**Sample ID:** SS-ROW026-0.5  
**Matrix:** Soil

**Collected:** 2015/05/21  
**Shipped:**  
**Received:** 2015/06/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4059381	2015/06/06	2015/06/11	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4068022	N/A	2015/06/16	Vica Cioranic
Moisture	BAL	4051616	N/A	2015/06/04	Valentina Kaftani

**Maxxam ID:** AJL539 Dup  
**Sample ID:** SS-ROW026-0.5  
**Matrix:** Soil

**Collected:** 2015/05/21  
**Shipped:**  
**Received:** 2015/06/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4059381	2015/06/06	2015/06/11	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4068022	N/A	2015/06/16	Vica Cioranic

Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.9°C
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**Results relate only to the items tested.**



Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
4051616	BOP	RPD - Sample/Sample Dup	Moisture	2015/06/04	9.2		%	20
4059381	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/06/10		105	%	35 - 197
			C13-1234678 HeptaCDD	2015/06/10		96	%	23 - 140
			C13-1234678 HeptaCDF	2015/06/10		106	%	28 - 143
			C13-123478 HexaCDD	2015/06/10		89	%	32 - 141
			C13-123478 HexaCDF	2015/06/10		93	%	26 - 152
			C13-1234789 HeptaCDF	2015/06/10		97	%	26 - 138
			C13-123678 HexaCDD	2015/06/10		106	%	28 - 130
			C13-123678 HexaCDF	2015/06/10		96	%	26 - 123
			C13-12378 PentaCDD	2015/06/10		104	%	25 - 181
			C13-12378 PentaCDF	2015/06/10		99	%	24 - 185
			C13-123789 HexaCDF	2015/06/10		99	%	29 - 147
			C13-234678 HexaCDF	2015/06/10		94	%	28 - 136
			C13-23478 PentaCDF	2015/06/10		112	%	21 - 178
			C13-2378 TetraCDD	2015/06/10		91	%	25 - 164
			C13-2378 TetraCDF	2015/06/10		92	%	24 - 169
			C13-OCDD	2015/06/10		97	%	17 - 157
			2,3,7,8-Tetra CDD	2015/06/10		118	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/06/10		118	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/06/10		115	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/06/10		127	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/06/10		106	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/06/10		107	%	70 - 140
			Octa CDD	2015/06/10		115	%	78 - 144
			2,3,7,8-Tetra CDF	2015/06/10		122	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/06/10		119	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/06/10		116	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/06/10		117	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/06/10		118	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/06/10		110	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/06/10		101	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/06/10		101	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/06/10		122	%	78 - 138
			Octa CDF	2015/06/10		109	%	63 - 170
4059381	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/06/10		103	%	35 - 197
			C13-1234678 HeptaCDD	2015/06/10		95	%	23 - 140
			C13-1234678 HeptaCDF	2015/06/10		94	%	28 - 143
			C13-123478 HexaCDD	2015/06/10		88	%	32 - 141
			C13-123478 HexaCDF	2015/06/10		95	%	26 - 152
			C13-1234789 HeptaCDF	2015/06/10		84	%	26 - 138
			C13-123678 HexaCDD	2015/06/10		103	%	28 - 130
			C13-123678 HexaCDF	2015/06/10		93	%	26 - 123
			C13-12378 PentaCDD	2015/06/10		102	%	25 - 181
			C13-12378 PentaCDF	2015/06/10		98	%	24 - 185
			C13-123789 HexaCDF	2015/06/10		95	%	29 - 147
			C13-234678 HexaCDF	2015/06/10		91	%	28 - 136
			C13-23478 PentaCDF	2015/06/10		109	%	21 - 178
			C13-2378 TetraCDD	2015/06/10		89	%	25 - 164
			C13-2378 TetraCDF	2015/06/10		93	%	24 - 169
			C13-OCDD	2015/06/10		96	%	17 - 157
			2,3,7,8-Tetra CDD	2015/06/10	<0.0623, EDL=0.0623		pg/g	
			1,2,3,7,8-Penta CDD	2015/06/10	<0.117, EDL=0.117		pg/g	

Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/06/10	<0.0861, EDL=0.0861		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/06/10	<0.0901, EDL=0.0901		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/06/10	<0.0880, EDL=0.0880		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/06/10	0.0961, EDL=0.0854		pg/g	
			Octa CDD	2015/06/10	<0.233, EDL=0.233 (1)		pg/g	
			Total Tetra CDD	2015/06/10	<0.0623, EDL=0.0623		pg/g	
			Total Penta CDD	2015/06/10	<0.117, EDL=0.117		pg/g	
			Total Hexa CDD	2015/06/10	<0.125, EDL=0.125 (1)		pg/g	
			Total Hepta CDD	2015/06/10	0.0961, EDL=0.0854		pg/g	
			2,3,7,8-Tetra CDF	2015/06/10	<0.0738, EDL=0.0738		pg/g	
			1,2,3,7,8-Penta CDF	2015/06/10	<0.0754, EDL=0.0754		pg/g	
			2,3,4,7,8-Penta CDF	2015/06/10	<0.0745, EDL=0.0745		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/06/10	<0.0734, EDL=0.0734		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/06/10	<0.0751, EDL=0.0751		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/06/10	<0.0694, EDL=0.0694		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/06/10	<0.0722, EDL=0.0722		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/06/10	<0.0622, EDL=0.0622		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2015/06/10	<0.0624, EDL=0.0624		pg/g	
			Octa CDF	2015/06/10	<0.122, EDL=0.122		pg/g	
			Total Tetra CDF	2015/06/10	<0.0738, EDL=0.0738		pg/g	
			Total Penta CDF	2015/06/10	<0.0749, EDL=0.0749		pg/g	
			Total Hexa CDF	2015/06/10	<0.0724, EDL=0.0724		pg/g	
			Total Hepta CDF	2015/06/10	<0.0623, EDL=0.0623		pg/g	
4059381	OBC	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/06/11	NC		%	25
			1,2,3,7,8-Penta CDD	2015/06/11	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/06/11	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2015/06/11	1.7		%	25
			1,2,3,7,8,9-Hexa CDD	2015/06/11	4.4		%	25

Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			1,2,3,4,6,7,8-Hepta CDD	2015/06/11	1.2		%	25
			Octa CDD	2015/06/11	1.4		%	25
			Total Tetra CDD	2015/06/11	34 (2)		%	25
			Total Penta CDD	2015/06/11	20		%	25
			Total Hexa CDD	2015/06/11	3.4		%	25
			Total Hepta CDD	2015/06/11	1.9		%	25
			2,3,7,8-Tetra CDF	2015/06/11	2.2		%	25
			1,2,3,7,8-Penta CDF	2015/06/11	NC		%	25
			2,3,4,7,8-Penta CDF	2015/06/11	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/06/11	2.8		%	25
			1,2,3,6,7,8-Hexa CDF	2015/06/11	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/06/11	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/06/11	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/06/11	7.4		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/06/11	NC		%	25
			Octa CDF	2015/06/11	3.9		%	25
			Total Tetra CDF	2015/06/11	24		%	25
			Total Penta CDF	2015/06/11	29 (2)		%	25
			Total Hexa CDF	2015/06/11	18		%	25
			Total Hepta CDF	2015/06/11	7.6		%	25
4068022	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/06/16	<0.097, EDL=0.097		pg/g	
			Confirmation C13-2378 TetraCDF	2015/06/16		91	%	40 - 135
4068022	VCI	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/06/16	NC		%	100

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

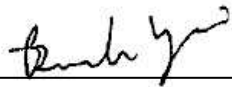
(2) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Branko Vrzic, A.S.C.T., Senior Analyst, HRMS Services



Cristina Carriere, Scientific Services



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

---

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5F0059  
Your C.O.C. #: NA

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/06/20**  
Report #: R3473075  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5A5395**

**Received: 2015/06/03, 14:30**

Sample Matrix: Water  
# Samples Received: 1

Analyses	Date		Laboratory Method	Reference
	Quantity Extracted	Date Analyzed		
Dioxins/Furans in Water (1613B) (1)	1	2015/06/10	2015/06/17 BRL SOP-00410	EPA 1613B m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT

Email: MDiGrazia@maxxam.ca

Phone# (905) 817-5700

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B5A5395  
Report Date: 2015/06/20

Apex Laboratories  
Client Project #: A5F0059

**DIOXINS AND FURANS BY HRMS (WATER)**

Maxxam ID		AJR503							
Sampling Date		2015/06/01 14:30							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	Units	RINSATE-SA-2	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/L	<1.12	1.12	10.9	4.00	1.00	1.12		4069087
1,2,3,7,8-Penta CDD *	pg/L	<1.10	1.10	54.3	4.00	1.00	1.10		4069087
1,2,3,4,7,8-Hexa CDD *	pg/L	<1.10	1.10	54.3	4.00	0.100	0.110		4069087
1,2,3,6,7,8-Hexa CDD *	pg/L	<1.15	1.15	54.3	4.00	0.100	0.115		4069087
1,2,3,7,8,9-Hexa CDD *	pg/L	<1.13	1.13	54.3	4.00	0.100	0.113		4069087
1,2,3,4,6,7,8-Hepta CDD *	pg/L	<1.12	1.12	54.3	4.00	0.0100	0.0112		4069087
Octa CDD *	pg/L	<1.18	1.18	109	8.00	0.000300	0.000354		4069087
Total Tetra CDD *	pg/L	<1.12	1.12	10.9	4.00				4069087
Total Penta CDD *	pg/L	<1.10	1.10	54.3	4.00				4069087
Total Hexa CDD *	pg/L	<1.28 (1)	1.28	54.3	4.00				4069087
Total Hepta CDD *	pg/L	<1.12	1.12	54.3	4.00				4069087
2,3,7,8-Tetra CDF **	pg/L	<1.12	1.12	10.9	4.00	0.100	0.112		4069087
1,2,3,7,8-Penta CDF **	pg/L	<1.14	1.14	54.3	4.00	0.0300	0.0342		4069087
2,3,4,7,8-Penta CDF **	pg/L	<1.11	1.11	54.3	4.00	0.300	0.333		4069087
1,2,3,4,7,8-Hexa CDF **	pg/L	<1.11	1.11	54.3	4.00	0.100	0.111		4069087
1,2,3,6,7,8-Hexa CDF **	pg/L	<1.15	1.15	54.3	4.00	0.100	0.115		4069087
2,3,4,6,7,8-Hexa CDF **	pg/L	<1.05	1.05	54.3	4.00	0.100	0.105		4069087
1,2,3,7,8,9-Hexa CDF **	pg/L	<1.10	1.10	54.3	4.00	0.100	0.110		4069087
1,2,3,4,6,7,8-Hepta CDF **	pg/L	<1.16	1.16	54.3	4.00	0.0100	0.0116		4069087
1,2,3,4,7,8,9-Hepta CDF **	pg/L	<1.16	1.16	54.3	4.00	0.0100	0.0116		4069087
Octa CDF **	pg/L	<1.15	1.15	109	8.00	0.000300	0.000345		4069087
Total Tetra CDF **	pg/L	<1.12	1.12	10.9	4.00				4069087
Total Penta CDF **	pg/L	<1.12	1.12	54.3	4.00				4069087
Total Hexa CDF **	pg/L	<1.10	1.10	54.3	4.00				4069087
Total Hepta CDF **	pg/L	<1.16	1.16	54.3	4.00				4069087
TOTAL TOXIC EQUIVALENCY	pg/L						3.51		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B5A5395  
Report Date: 2015/06/20

Apex Laboratories  
Client Project #: A5F0059

**DIOXINS AND FURANS BY HRMS (WATER)**

Maxxam ID		AJR503							
Sampling Date		2015/06/01 14:30							
COC Number		NA	TOXIC EQUIVALENCY					# of	
	Units	RINSATE-SA-2	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	93							4069087
C13-1234678 HeptaCDD *	%	77							4069087
C13-1234678 HeptaCDF **	%	88							4069087
C13-123478 HexaCDD *	%	69							4069087
C13-123478 HexaCDF **	%	68							4069087
C13-1234789 HeptaCDF **	%	81							4069087
C13-123678 HexaCDD *	%	84							4069087
C13-123678 HexaCDF **	%	67							4069087
C13-12378 PentaCDD *	%	116							4069087
C13-12378 PentaCDF **	%	107							4069087
C13-123789 HexaCDF **	%	81							4069087
C13-234678 HexaCDF **	%	74							4069087
C13-23478 PentaCDF **	%	128							4069087
C13-2378 TetraCDD *	%	84							4069087
C13-2378 TetraCDF **	%	91							4069087
C13-OCDD *	%	80							4069087
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

Maxxam Job #: B5A5395  
Report Date: 2015/06/20

Apex Laboratories  
Client Project #: A5F0059

**TEST SUMMARY**

**Maxxam ID:** AJR503  
**Sample ID:** RINSATE-SA-2  
**Matrix:** Water

**Collected:** 2015/06/01  
**Shipped:**  
**Received:** 2015/06/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Water (1613B)	HRMS/MS	4069087	2015/06/10	2015/06/17	Owen Cosby



Maxxam Job #: B5A5395  
Report Date: 2015/06/20

Apex Laboratories  
Client Project #: A5F0059

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.7°C
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**Results relate only to the items tested.**

Maxxam Job #: B5A5395  
Report Date: 2015/06/20

Apex Laboratories  
Client Project #: A5F0059

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits		
4069087	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/06/17		93	%	35 - 197		
			C13-1234678 HeptaCDD	2015/06/17		91	%	23 - 140		
			C13-1234678 HeptaCDF	2015/06/17		85	%	28 - 143		
			C13-123478 HexaCDD	2015/06/17		61	%	32 - 141		
			C13-123478 HexaCDF	2015/06/17		63	%	26 - 152		
			C13-1234789 HeptaCDF	2015/06/17		92	%	28 - 143		
			C13-123678 HexaCDD	2015/06/17		77	%	28 - 130		
			C13-123678 HexaCDF	2015/06/17		63	%	26 - 123		
			C13-12378 PentaCDD	2015/06/17		111	%	25 - 181		
			C13-12378 PentaCDF	2015/06/17		112	%	24 - 185		
			C13-123789 HexaCDF	2015/06/17		94	%	28 - 136		
			C13-234678 HexaCDF	2015/06/17		67	%	29 - 147		
			C13-23478 PentaCDF	2015/06/17		127	%	21 - 178		
			C13-2378 TetraCDD	2015/06/17		87	%	24 - 164		
			C13-2378 TetraCDF	2015/06/17		96	%	24 - 169		
			C13-OCDD	2015/06/17		88	%	17 - 157		
			2,3,7,8-Tetra CDD	2015/06/17		110	%	67 - 158		
			1,2,3,7,8-Penta CDD	2015/06/17		104	%	25 - 181		
			1,2,3,4,7,8-Hexa CDD	2015/06/17		104	%	70 - 164		
			1,2,3,6,7,8-Hexa CDD	2015/06/17		102	%	76 - 134		
			1,2,3,7,8,9-Hexa CDD	2015/06/17		113	%	64 - 162		
			1,2,3,4,6,7,8-Hepta CDD	2015/06/17		88	%	70 - 140		
			Octa CDD	2015/06/17		100	%	78 - 144		
			2,3,7,8-Tetra CDF	2015/06/17		112	%	75 - 158		
			1,2,3,7,8-Penta CDF	2015/06/17		102	%	80 - 134		
			2,3,4,7,8-Penta CDF	2015/06/17		104	%	68 - 160		
			1,2,3,4,7,8-Hexa CDF	2015/06/17		102	%	72 - 134		
			1,2,3,6,7,8-Hexa CDF	2015/06/17		101	%	84 - 130		
			2,3,4,6,7,8-Hexa CDF	2015/06/17		102	%	70 - 156		
			1,2,3,7,8,9-Hexa CDF	2015/06/17		103	%	78 - 130		
			1,2,3,4,6,7,8-Hepta CDF	2015/06/17		105	%	82 - 122		
			1,2,3,4,7,8,9-Hepta CDF	2015/06/17		110	%	78 - 138		
			Octa CDF	2015/06/17		106	%	63 - 170		
4069087	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/06/17		84	%	35 - 197		
			C13-1234678 HeptaCDD	2015/06/17		79	%	23 - 140		
			C13-1234678 HeptaCDF	2015/06/17		70	%	28 - 143		
			C13-123478 HexaCDD	2015/06/17		54	%	32 - 141		
			C13-123478 HexaCDF	2015/06/17		58	%	26 - 152		
			C13-1234789 HeptaCDF	2015/06/17		74	%	28 - 143		
			C13-123678 HexaCDD	2015/06/17		57	%	28 - 130		
			C13-123678 HexaCDF	2015/06/17		55	%	26 - 123		
			C13-12378 PentaCDD	2015/06/17		97	%	25 - 181		
			C13-12378 PentaCDF	2015/06/17		92	%	24 - 185		
			C13-123789 HexaCDF	2015/06/17		77	%	28 - 136		
			C13-234678 HexaCDF	2015/06/17		60	%	29 - 147		
			C13-23478 PentaCDF	2015/06/17		107	%	21 - 178		
			C13-2378 TetraCDD	2015/06/17		74	%	24 - 164		
			C13-2378 TetraCDF	2015/06/17		84	%	24 - 169		
			C13-OCDD	2015/06/17		71	%	17 - 157		
			2,3,7,8-Tetra CDD	2015/06/17		<1.20, EDL=1.20			pg/L	
			1,2,3,7,8-Penta CDD	2015/06/17		<1.15, EDL=1.15			pg/L	

Maxxam Job #: B5A5395  
Report Date: 2015/06/20

Apex Laboratories  
Client Project #: A5F0059

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/06/17	<1.15, EDL=1.15		pg/L	
			1,2,3,6,7,8-Hexa CDD	2015/06/17	<1.20, EDL=1.20		pg/L	
			1,2,3,7,8,9-Hexa CDD	2015/06/17	1.44, EDL=1.18		pg/L	
			1,2,3,4,6,7,8-Hepta CDD	2015/06/17	<1.21, EDL=1.21		pg/L	
			Octa CDD	2015/06/17	<2.53, EDL=2.53 (1)		pg/L	
			Total Tetra CDD	2015/06/17	<1.20, EDL=1.20		pg/L	
			Total Penta CDD	2015/06/17	<987, EDL=987 (1)		pg/L	
			Total Hexa CDD	2015/06/17	1.44, EDL=1.18		pg/L	
			Total Hepta CDD	2015/06/17	<1.21, EDL=1.21		pg/L	
			2,3,7,8-Tetra CDF	2015/06/17	<1.11, EDL=1.11		pg/L	
			1,2,3,7,8-Penta CDF	2015/06/17	<1.11, EDL=1.11		pg/L	
			2,3,4,7,8-Penta CDF	2015/06/17	1.71, EDL=1.08		pg/L	
			1,2,3,4,7,8-Hexa CDF	2015/06/17	<1.12, EDL=1.12		pg/L	
			1,2,3,6,7,8-Hexa CDF	2015/06/17	<1.16, EDL=1.16		pg/L	
			2,3,4,6,7,8-Hexa CDF	2015/06/17	<1.06, EDL=1.06		pg/L	
			1,2,3,7,8,9-Hexa CDF	2015/06/17	1.65, EDL=1.11		pg/L	
			1,2,3,4,6,7,8-Hepta CDF	2015/06/17	<1.13, EDL=1.13		pg/L	
			1,2,3,4,7,8,9-Hepta CDF	2015/06/17	<1.14, EDL=1.14		pg/L	
			Octa CDF	2015/06/17	1.45, EDL=1.10		pg/L	
			Total Tetra CDF	2015/06/17	<1.11, EDL=1.11		pg/L	
			Total Penta CDF	2015/06/17	1.71, EDL=1.10		pg/L	
			Total Hexa CDF	2015/06/17	1.65, EDL=1.11		pg/L	

Maxxam Job #: B5A5395  
Report Date: 2015/06/20

Apex Laboratories  
Client Project #: A5F0059

**QUALITY ASSURANCE REPORT(CONT'D)**


QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			Total Hepta CDF	2015/06/17	<1.14, EDL=1.14		pg/L	
<p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p> <p>(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.</p>								

Maxxam Job #: B5A5395  
Report Date: 2015/06/20

Apex Laboratories  
Client Project #: A5F0059

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Your Project #: A5D0913  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/10/06**  
Report #: R3712159  
Version: 3 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B5B1038**

**Received: 2015/06/10, 14:08**

Sample Matrix: Soil  
# Samples Received: 1

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2015/06/13	2015/06/18	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2015/09/25	BRL SOP-00406	EPA M8290A / M1613
Moisture	1	N/A	2015/06/11	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**RESULTS OF ANALYSES OF SOIL**

<b>Maxxam ID</b>		AKR642			
<b>Sampling Date</b>		2015/04/30 12:45			
<b>COC Number</b>		na			
	<b>UNITS</b>	<b>SS-ROW030-1.0</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	17	1.0	0.50	4062229
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AKR642							
Sampling Date		2015/04/30 12:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW030-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.158	0.120	0.200	0.0400	1.00	0.158		4068018
1,2,3,7,8-Penta CDD *	pg/g	1.67	0.120	1.00	0.0400	1.00	1.67		4068018
1,2,3,4,7,8-Hexa CDD *	pg/g	3.05	0.104	1.00	0.0400	0.100	0.305		4068018
1,2,3,6,7,8-Hexa CDD *	pg/g	9.45	0.109	1.00	0.0400	0.100	0.945		4068018
1,2,3,7,8,9-Hexa CDD *	pg/g	7.98	0.106	1.00	0.0400	0.100	0.798		4068018
1,2,3,4,6,7,8-Hepta CDD *	pg/g	199	0.107	1.00	0.0400	0.0100	1.99		4068018
Octa CDD *	pg/g	924	0.109	2.00	0.0800	0.000300	0.277		4068018
Total Tetra CDD *	pg/g	1.04	0.120	0.200	0.0400			4	4068018
Total Penta CDD *	pg/g	6.13	0.120	1.00	0.0400			9	4068018
Total Hexa CDD *	pg/g	50.9	0.106	1.00	0.0400			7	4068018
Total Hepta CDD *	pg/g	322	0.107	1.00	0.0400			2	4068018
2,3,7,8-Tetra CDF **	pg/g	0.423	0.106	0.200	0.0400	0.100	0.0423		4068018
1,2,3,7,8-Penta CDF **	pg/g	0.703	0.101	1.00	0.0400	0.0300	0.0211		4068018
2,3,4,7,8-Penta CDF **	pg/g	0.934	0.100	1.00	0.0400	0.300	0.280		4068018
1,2,3,4,7,8-Hexa CDF **	pg/g	3.63	0.104	1.00	0.0400	0.100	0.363		4068018
1,2,3,6,7,8-Hexa CDF **	pg/g	1.84	0.106	1.00	0.0400	0.100	0.184		4068018
2,3,4,6,7,8-Hexa CDF **	pg/g	1.19	0.0980	1.00	0.0400	0.100	0.119		4068018
1,2,3,7,8,9-Hexa CDF **	pg/g	0.275	0.102	1.00	0.0400	0.100	0.0275		4068018
1,2,3,4,6,7,8-Hepta CDF **	pg/g	23.9	0.102	1.00	0.0400	0.0100	0.239		4068018
1,2,3,4,7,8,9-Hepta CDF **	pg/g	1.53	0.102	1.00	0.0400	0.0100	0.0153		4068018
Octa CDF **	pg/g	32.4	0.107	2.00	0.0800	0.000300	0.00972		4068018
Total Tetra CDF **	pg/g	2.29	0.106	0.200	0.0400			8	4068018
Total Penta CDF **	pg/g	11.6	0.101	1.00	0.0400			8	4068018
Total Hexa CDF **	pg/g	42.0	0.102	1.00	0.0400			10	4068018
Total Hepta CDF **	pg/g	60.1	0.102	1.00	0.0400			4	4068018
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.34	0.34	1.0	0.90	0.100	0.0340		4205624
TOTAL TOXIC EQUIVALENCY	pg/g						7.44		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	94							4068018
C13-1234678 HeptaCDD *	%	81							4068018
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AKR642							
Sampling Date		2015/04/30 12:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW030-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	81							4068018
C13-123478 HexaCDD *	%	68							4068018
C13-123478 HexaCDF **	%	72							4068018
C13-1234789 HeptaCDF **	%	81							4068018
C13-123678 HexaCDD *	%	81							4068018
C13-123678 HexaCDF **	%	71							4068018
C13-12378 PentaCDD *	%	108							4068018
C13-12378 PentaCDF **	%	94							4068018
C13-123789 HexaCDF **	%	80							4068018
C13-234678 HexaCDF **	%	71							4068018
C13-23478 PentaCDF **	%	114							4068018
C13-2378 TetraCDD *	%	85							4068018
C13-2378 TetraCDF **	%	90							4068018
C13-OCDD *	%	81							4068018
Confirmation C13-2378 TetraCDF **	%	81							4205624

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**TEST SUMMARY**

**Maxxam ID:** AKR642  
**Sample ID:** SS-ROW030-1.0  
**Matrix:** Soil

**Collected:** 2015/04/30  
**Shipped:**  
**Received:** 2015/06/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4068018	2015/06/13	2015/06/18	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4205624	N/A	2015/09/25	Leila Azzam
Moisture	BAL	4062229	N/A	2015/06/11	Valentina Kaftani

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.3°C
-----------	-------

Report revised to reflect addition of missed TCDF confirmations.

**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4062229	BOP	RPD - Sample/Sample Dup	Moisture	2015/06/11	1.1		%	20
4068018	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/06/18		93	%	35 - 197
			C13-1234678 HeptaCDD	2015/06/18		87	%	23 - 140
			C13-1234678 HeptaCDF	2015/06/18		73	%	28 - 143
			C13-123478 HexaCDD	2015/06/18		64	%	32 - 141
			C13-123478 HexaCDF	2015/06/18		66	%	26 - 152
			C13-1234789 HeptaCDF	2015/06/18		76	%	26 - 138
			C13-123678 HexaCDD	2015/06/18		73	%	28 - 130
			C13-123678 HexaCDF	2015/06/18		64	%	26 - 123
			C13-12378 PentaCDD	2015/06/18		113	%	25 - 181
			C13-12378 PentaCDF	2015/06/18		99	%	24 - 185
			C13-123789 HexaCDF	2015/06/18		79	%	29 - 147
			C13-234678 HexaCDF	2015/06/18		65	%	28 - 136
			C13-23478 PentaCDF	2015/06/18		120	%	21 - 178
			C13-2378 TetraCDD	2015/06/18		86	%	25 - 164
			C13-2378 TetraCDF	2015/06/18		95	%	24 - 169
			C13-OCDD	2015/06/18		74	%	17 - 157
			2,3,7,8-Tetra CDD	2015/06/18		110	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/06/18		101	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/06/18		109	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/06/18		97	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/06/18		127	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/06/18		99	%	70 - 140
			Octa CDD	2015/06/18		100	%	78 - 144
			2,3,7,8-Tetra CDF	2015/06/18		109	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/06/18		104	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/06/18		96	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/06/18		104	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/06/18		109	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/06/18		113	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/06/18		105	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/06/18		107	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/06/18		105	%	78 - 138
			Octa CDF	2015/06/18		95	%	63 - 170
4068018	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/06/18		96	%	35 - 197
			C13-1234678 HeptaCDD	2015/06/18		83	%	23 - 140
			C13-1234678 HeptaCDF	2015/06/18		86	%	28 - 143
			C13-123478 HexaCDD	2015/06/18		66	%	32 - 141
			C13-123478 HexaCDF	2015/06/18		74	%	26 - 152
			C13-1234789 HeptaCDF	2015/06/18		85	%	26 - 138
			C13-123678 HexaCDD	2015/06/18		80	%	28 - 130
			C13-123678 HexaCDF	2015/06/18		73	%	26 - 123
			C13-12378 PentaCDD	2015/06/18		118	%	25 - 181
			C13-12378 PentaCDF	2015/06/18		104	%	24 - 185
			C13-123789 HexaCDF	2015/06/18		83	%	29 - 147
			C13-234678 HexaCDF	2015/06/18		75	%	28 - 136
			C13-23478 PentaCDF	2015/06/18		130	%	21 - 178
			C13-2378 TetraCDD	2015/06/18		90	%	25 - 164
			C13-2378 TetraCDF	2015/06/18		100	%	24 - 169
			C13-OCDD	2015/06/18		79	%	17 - 157
			2,3,7,8-Tetra CDD	2015/06/18	<0.113, EDL=0.113		pg/g	
			1,2,3,7,8-Penta CDD	2015/06/18	<0.127, EDL=0.127		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/06/18	<0.112, EDL=0.112		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/06/18	<0.117, EDL=0.117		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/06/18	<0.115, EDL=0.115		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/06/18	<0.112, EDL=0.112		pg/g	
			Octa CDD	2015/06/18	0.224, EDL=0.116		pg/g	
			Total Tetra CDD	2015/06/18	<0.113, EDL=0.113		pg/g	
			Total Penta CDD	2015/06/18	<0.127, EDL=0.127		pg/g	
			Total Hexa CDD	2015/06/18	<0.115, EDL=0.115		pg/g	
			Total Hepta CDD	2015/06/18	<0.112, EDL=0.112		pg/g	
			2,3,7,8-Tetra CDF	2015/06/18	<0.103, EDL=0.103		pg/g	
			1,2,3,7,8-Penta CDF	2015/06/18	<0.112, EDL=0.112		pg/g	
			2,3,4,7,8-Penta CDF	2015/06/18	<0.111, EDL=0.111		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/06/18	<0.113, EDL=0.113		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/06/18	<0.116, EDL=0.116		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/06/18	<0.107, EDL=0.107		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/06/18	<0.111, EDL=0.111		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/06/18	<0.101, EDL=0.101		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2015/06/18	<0.102, EDL=0.102		pg/g	
			Octa CDF	2015/06/18	<0.103, EDL=0.103		pg/g	
			Total Tetra CDF	2015/06/18	<0.103, EDL=0.103		pg/g	
			Total Penta CDF	2015/06/18	<0.112, EDL=0.112		pg/g	
			Total Hexa CDF	2015/06/18	<0.112, EDL=0.112		pg/g	
			Total Hepta CDF	2015/06/18	<0.102, EDL=0.102		pg/g	
4205624	LAZ	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/09/25	<0.12, EDL=0.12		pg/g	
			Confirmation C13-2378 TetraCDF	2015/09/25		73	%	40 - 135

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC				Date		%		
Batch	Init	QC Type	Parameter	Analyzed	Value	Recovery	UNITS	QC Limits
4205624	LAZ	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/09/25	NC		%	100
<p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p> <p>NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples &lt; 5x RDL).</p>								

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist



Kay Shaw, C. Chem, Sr Scientific Specialist, HRMS Services



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5F0015  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/06/25**  
Report #: R3495415  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5B3319**

**Received: 2015/06/12, 13:35**

Sample Matrix: Soil  
# Samples Received: 2

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	2	2015/06/16	2015/06/22	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation in Soil	2	N/A	2015/06/22	BRL SOP-00406	EPA 8290A m
Moisture	2	N/A	2015/06/15	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B5B3319  
Report Date: 2015/06/25

Apex Laboratories  
Client Project #: A5F0015

**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		ALC368	ALC369			
Sampling Date		2015/05/29 09:00	2015/05/29 09:45			
COC Number		na	na			
	Units	ISM-AOI038-0. 5-AFTER ISM	ISM-AOI039-0. 5-AFTER ISM	RDL	MDL	QC Batch
Moisture	%	4.7	2.7	1.0	1.0	4065928
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						

Maxxam Job #: B5B3319  
Report Date: 2015/06/25

Apex Laboratories  
Client Project #: A5F0015

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALC368							
Sampling Date		2015/05/29 09:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI038-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.81	0.102	0.200	0.0400	1.00	1.81		4073864
1,2,3,7,8-Penta CDD *	pg/g	6.94	0.0826	1.00	0.0400	1.00	6.94		4073864
1,2,3,4,7,8-Hexa CDD *	pg/g	14.1	0.118	1.00	0.0400	0.100	1.41		4073864
1,2,3,6,7,8-Hexa CDD *	pg/g	37.5	0.124	1.00	0.0400	0.100	3.75		4073864
1,2,3,7,8,9-Hexa CDD *	pg/g	37.7	0.121	1.00	0.0400	0.100	3.77		4073864
1,2,3,4,6,7,8-Hepta CDD *	pg/g	747	0.0780	1.00	0.0400	0.0100	7.47		4073864
Octa CDD *	pg/g	3960	0.416	2.00	0.0800	0.000300	1.19		4073864
Total Tetra CDD *	pg/g	8.14	0.102	0.200	0.0400			12	4073864
Total Penta CDD *	pg/g	34.4	0.0826	1.00	0.0400			12	4073864
Total Hexa CDD *	pg/g	260	0.121	1.00	0.0400			7	4073864
Total Hepta CDD *	pg/g	1280	0.0780	1.00	0.0400			2	4073864
2,3,7,8-Tetra CDF **	pg/g	2.40	0.0999	0.200	0.0400	0.100	0.240		4073864
1,2,3,7,8-Penta CDF **	pg/g	1.86	0.172	1.00	0.0400	0.0300	0.0558		4073864
2,3,4,7,8-Penta CDF **	pg/g	2.67	0.169	1.00	0.0400	0.300	0.801		4073864
1,2,3,4,7,8-Hexa CDF **	pg/g	13.1	0.132	1.00	0.0400	0.100	1.31		4073864
1,2,3,6,7,8-Hexa CDF **	pg/g	7.06	0.135	1.00	0.0400	0.100	0.706		4073864
2,3,4,6,7,8-Hexa CDF **	pg/g	4.97	0.125	1.00	0.0400	0.100	0.497		4073864
1,2,3,7,8,9-Hexa CDF **	pg/g	0.283	0.130	1.00	0.0400	0.100	0.0283		4073864
1,2,3,4,6,7,8-Hepta CDF **	pg/g	129	0.119	1.00	0.0400	0.0100	1.29		4073864
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.61	0.119	1.00	0.0400	0.0100	0.0661		4073864
Octa CDF **	pg/g	282	0.113	2.00	0.0800	0.000300	0.0846		4073864
Total Tetra CDF **	pg/g	13.5	0.0999	0.200	0.0400			13	4073864
Total Penta CDF **	pg/g	27.1	0.171	1.00	0.0400			10	4073864
Total Hexa CDF **	pg/g	156	0.130	1.00	0.0400			11	4073864
Total Hepta CDF **	pg/g	359	0.119	1.00	0.0400			4	4073864
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.51	0.059	1.0	0.90	0.100	0.151		4077299
TOTAL TOXIC EQUIVALENCY	pg/g						31.3		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	106							4073864
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

Maxxam Job #: B5B3319  
Report Date: 2015/06/25

Apex Laboratories  
Client Project #: A5F0015

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALC368							
Sampling Date		2015/05/29 09:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI038-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	107							4073864
C13-1234678 HeptaCDF **	%	92							4073864
C13-123478 HexaCDD *	%	79							4073864
C13-123478 HexaCDF **	%	78							4073864
C13-1234789 HeptaCDF **	%	96							4073864
C13-123678 HexaCDD *	%	94							4073864
C13-123678 HexaCDF **	%	76							4073864
C13-12378 PentaCDD *	%	113							4073864
C13-12378 PentaCDF **	%	97							4073864
C13-123789 HexaCDF **	%	93							4073864
C13-234678 HexaCDF **	%	78							4073864
C13-23478 PentaCDF **	%	114							4073864
C13-2378 TetraCDD *	%	93							4073864
C13-2378 TetraCDF **	%	94							4073864
C13-OCDD *	%	108							4073864
Confirmation C13-2378 TetraCDF **	%	90							4077299

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B5B3319  
Report Date: 2015/06/25

Apex Laboratories  
Client Project #: A5F0015

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALC369							
Sampling Date		2015/05/29 09:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI039-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	2.45	0.123	0.200	0.0400	1.00	2.45		4073864
1,2,3,7,8-Penta CDD *	pg/g	2.71	0.0816	1.00	0.0400	1.00	2.71		4073864
1,2,3,4,7,8-Hexa CDD *	pg/g	4.77	0.123	1.00	0.0400	0.100	0.477		4073864
1,2,3,6,7,8-Hexa CDD *	pg/g	19.0	0.128	1.00	0.0400	0.100	1.90		4073864
1,2,3,7,8,9-Hexa CDD *	pg/g	12.1	0.125	1.00	0.0400	0.100	1.21		4073864
1,2,3,4,6,7,8-Hepta CDD *	pg/g	428	0.0985	1.00	0.0400	0.0100	4.28		4073864
Octa CDD *	pg/g	2580	0.282	2.00	0.0800	0.000300	0.774		4073864
Total Tetra CDD *	pg/g	7.12	0.123	0.200	0.0400			9	4073864
Total Penta CDD *	pg/g	16.1	0.0816	1.00	0.0400			10	4073864
Total Hexa CDD *	pg/g	103	0.126	1.00	0.0400			7	4073864
Total Hepta CDD *	pg/g	716	0.0985	1.00	0.0400			2	4073864
2,3,7,8-Tetra CDF **	pg/g	2.36	0.0852	0.200	0.0400	0.100	0.236		4073864
1,2,3,7,8-Penta CDF **	pg/g	1.33	0.0928	1.00	0.0400	0.0300	0.0399		4073864
2,3,4,7,8-Penta CDF **	pg/g	2.43	0.0916	1.00	0.0400	0.300	0.729		4073864
1,2,3,4,7,8-Hexa CDF **	pg/g	17.4	0.100	1.00	0.0400	0.100	1.74		4073864
1,2,3,6,7,8-Hexa CDF **	pg/g	4.85	0.103	1.00	0.0400	0.100	0.485		4073864
2,3,4,6,7,8-Hexa CDF **	pg/g	3.11	0.0948	1.00	0.0400	0.100	0.311		4073864
1,2,3,7,8,9-Hexa CDF **	pg/g	0.231	0.0986	1.00	0.0400	0.100	0.0231		4073864
1,2,3,4,6,7,8-Hepta CDF **	pg/g	94.7	0.174	1.00	0.0400	0.0100	0.947		4073864
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.60	0.175	1.00	0.0400	0.0100	0.0660		4073864
Octa CDF **	pg/g	140	0.109	2.00	0.0800	0.000300	0.0420		4073864
Total Tetra CDF **	pg/g	14.5	0.0852	0.200	0.0400			13	4073864
Total Penta CDF **	pg/g	24.7	0.0922	1.00	0.0400			10	4073864
Total Hexa CDF **	pg/g	143	0.0990	1.00	0.0400			11	4073864
Total Hepta CDF **	pg/g	284	0.175	1.00	0.0400			4	4073864
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.34	0.057	1.0	0.90	0.100	0.134		4077299
TOTAL TOXIC EQUIVALENCY	pg/g						18.3		

**Surrogate Recovery (%)**

37CL4 2378 Tetra CDD *	%	113							4073864
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EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B5B3319  
Report Date: 2015/06/25

Apex Laboratories  
Client Project #: A5F0015

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALC369							
Sampling Date		2015/05/29 09:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI039-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	104							4073864
C13-1234678 HeptaCDF **	%	90							4073864
C13-123478 HexaCDD *	%	83							4073864
C13-123478 HexaCDF **	%	82							4073864
C13-1234789 HeptaCDF **	%	96							4073864
C13-123678 HexaCDD *	%	99							4073864
C13-123678 HexaCDF **	%	82							4073864
C13-12378 PentaCDD *	%	108							4073864
C13-12378 PentaCDF **	%	91							4073864
C13-123789 HexaCDF **	%	95							4073864
C13-234678 HexaCDF **	%	82							4073864
C13-23478 PentaCDF **	%	107							4073864
C13-2378 TetraCDD *	%	94							4073864
C13-2378 TetraCDF **	%	90							4073864
C13-OCDD *	%	107							4073864
Confirmation C13-2378 TetraCDF **	%	91							4077299

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B5B3319  
Report Date: 2015/06/25

Apex Laboratories  
Client Project #: A5F0015

**TEST SUMMARY**

**Maxxam ID:** ALC368  
**Sample ID:** ISM-AOI038-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/05/29  
**Shipped:**  
**Received:** 2015/06/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4073864	2015/06/16	2015/06/22	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4077299	N/A	2015/06/22	Vica Cioranic
Moisture	BAL	4065928	N/A	2015/06/15	Chamika Deeyagaha

**Maxxam ID:** ALC369  
**Sample ID:** ISM-AOI039-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/05/29  
**Shipped:**  
**Received:** 2015/06/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4073864	2015/06/16	2015/06/22	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4077299	N/A	2015/06/22	Vica Cioranic
Moisture	BAL	4065928	N/A	2015/06/15	Chamika Deeyagaha

Maxxam Job #: B5B3319  
Report Date: 2015/06/25

Apex Laboratories  
Client Project #: A5F0015

### GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	12.5°C
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#### DIOXINS AND FURANS BY HRMS (SOIL)

Spiked Blank Dioxins/Furans in Soil (1613B): \*\* Native percent recoveries calculated with respect to the Method Spike \*\*

**Results relate only to the items tested.**

Maxxam Job #: B5B3319  
Report Date: 2015/06/25

Apex Laboratories  
Client Project #: A5F0015

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
4065928	BOP	RPD - Sample/Sample Dup	Moisture	2015/06/15	0		%	20
4073864	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/06/21		96	%	35 - 197
			C13-1234678 HeptaCDD	2015/06/21		93	%	23 - 140
			C13-1234678 HeptaCDF	2015/06/21		86	%	28 - 143
			C13-123478 HexaCDD	2015/06/21		62	%	32 - 141
			C13-123478 HexaCDF	2015/06/21		64	%	26 - 152
			C13-1234789 HeptaCDF	2015/06/21		94	%	26 - 138
			C13-123678 HexaCDD	2015/06/21		78	%	28 - 130
			C13-123678 HexaCDF	2015/06/21		64	%	26 - 123
			C13-12378 PentaCDD	2015/06/21		111	%	25 - 181
			C13-12378 PentaCDF	2015/06/21		111	%	24 - 185
			C13-123789 HexaCDF	2015/06/21		96	%	29 - 147
			C13-234678 HexaCDF	2015/06/21		68	%	28 - 136
			C13-23478 PentaCDF	2015/06/21		126	%	21 - 178
			C13-2378 TetraCDD	2015/06/21		87	%	25 - 164
			C13-2378 TetraCDF	2015/06/21		96	%	24 - 169
			C13-OCDD	2015/06/21		89	%	17 - 157
			2,3,7,8-Tetra CDD	2015/06/21		97	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/06/21		98	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/06/21		100	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/06/21		91	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/06/21		120	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/06/21		77	%	70 - 140
			Octa CDD	2015/06/21		52 (1)	%	78 - 144
			2,3,7,8-Tetra CDF	2015/06/21		91	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/06/21		96	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/06/21		98	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/06/21		99	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/06/21		108	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/06/21		98	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/06/21		94	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/06/21		88	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/06/21		90	%	78 - 138
			Octa CDF	2015/06/21		96	%	63 - 170
4073864	OBC	RPD	2,3,7,8-Tetra CDD	2015/06/21	8.9		%	25
			1,2,3,7,8-Penta CDD	2015/06/21	2.0		%	25
			1,2,3,4,7,8-Hexa CDD	2015/06/21	4.1		%	25
			1,2,3,6,7,8-Hexa CDD	2015/06/21	4.3		%	25
			1,2,3,7,8,9-Hexa CDD	2015/06/21	6.9		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/06/21	19		%	25
			Octa CDD	2015/06/21	36 (1)		%	25
			2,3,7,8-Tetra CDF	2015/06/21	8.4		%	25
			1,2,3,7,8-Penta CDF	2015/06/21	3.1		%	25
			2,3,4,7,8-Penta CDF	2015/06/21	2.0		%	25
			1,2,3,4,7,8-Hexa CDF	2015/06/21	1.0		%	25
			1,2,3,6,7,8-Hexa CDF	2015/06/21	1.8		%	25
			2,3,4,6,7,8-Hexa CDF	2015/06/21	2.0		%	25
			1,2,3,7,8,9-Hexa CDF	2015/06/21	8.2		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/06/21	1.1		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/06/21	2.2		%	25
			Octa CDF	2015/06/21	4.3		%	25
4073864	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/06/21		86	%	35 - 197
			C13-1234678 HeptaCDD	2015/06/21		81	%	23 - 140
			C13-1234678 HeptaCDF	2015/06/21		71	%	28 - 143



Maxxam Job #: B5B3319  
Report Date: 2015/06/25

Apex Laboratories  
Client Project #: A5F0015

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			C13-123478 HexaCDD	2015/06/21		56	%	32 - 141
			C13-123478 HexaCDF	2015/06/21		59	%	26 - 152
			C13-1234789 HeptaCDF	2015/06/21		76	%	26 - 138
			C13-123678 HexaCDD	2015/06/21		58	%	28 - 130
			C13-123678 HexaCDF	2015/06/21		56	%	26 - 123
			C13-12378 PentaCDD	2015/06/21		97	%	25 - 181
			C13-12378 PentaCDF	2015/06/21		92	%	24 - 185
			C13-123789 HexaCDF	2015/06/21		78	%	29 - 147
			C13-234678 HexaCDF	2015/06/21		61	%	28 - 136
			C13-23478 PentaCDF	2015/06/21		107	%	21 - 178
			C13-2378 TetraCDD	2015/06/21		75	%	25 - 164
			C13-2378 TetraCDF	2015/06/21		84	%	24 - 169
			C13-OCDD	2015/06/21		73	%	17 - 157
			2,3,7,8-Tetra CDD	2015/06/21	<0.0981, EDL=0.0981		pg/g	
			1,2,3,7,8-Penta CDD	2015/06/21	<0.154, EDL=0.154		pg/g	
			1,2,3,4,7,8-Hexa CDD	2015/06/21	<0.0809, EDL=0.0809		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/06/21	<0.0847, EDL=0.0847		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/06/21	0.130, EDL=0.0827		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/06/21	<0.0815, EDL=0.0815		pg/g	
			Octa CDD	2015/06/21	<0.231, EDL=0.231 (2)		pg/g	
			Total Tetra CDD	2015/06/21	<0.0981, EDL=0.0981		pg/g	
			Total Penta CDD	2015/06/21	<89.7, EDL=89.7 (2)		pg/g	
			Total Hexa CDD	2015/06/21	0.130, EDL=0.0829		pg/g	
			Total Hepta CDD	2015/06/21	<0.0815, EDL=0.0815		pg/g	
			2,3,7,8-Tetra CDF	2015/06/21	<0.0961, EDL=0.0961		pg/g	
			1,2,3,7,8-Penta CDF	2015/06/21	<0.106, EDL=0.106		pg/g	
			2,3,4,7,8-Penta CDF	2015/06/21	<0.104, EDL=0.104		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/06/21	<0.0865, EDL=0.0865		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/06/21	<0.0884, EDL=0.0884		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/06/21	<0.0818, EDL=0.0818		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/06/21	0.152, EDL=0.0850		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/06/21	<0.0907, EDL=0.0907		pg/g	

Maxxam Job #: B5B3319  
Report Date: 2015/06/25

Apex Laboratories  
Client Project #: A5F0015

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			1,2,3,4,7,8,9-Hepta CDF	2015/06/21	<0.0911, EDL=0.0911		pg/g	
			Octa CDF	2015/06/21	0.134, EDL=0.101		pg/g	
			Total Tetra CDF	2015/06/21	<0.0961, EDL=0.0961		pg/g	
			Total Penta CDF	2015/06/21	<0.105, EDL=0.105		pg/g	
			Total Hexa CDF	2015/06/21	0.152, EDL=0.0853		pg/g	
			Total Hepta CDF	2015/06/21	<0.0909, EDL=0.0909		pg/g	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

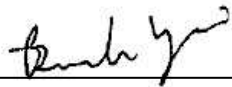
(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B5B3319  
Report Date: 2015/06/25

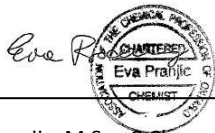
Apex Laboratories  
Client Project #: A5F0015

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Branko Vrzic, A.S.C.T., Senior Analyst, HRMS Services



Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

---

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5F0363  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/07/02**  
Report #: R3530145  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5B5514**

**Received: 2015/06/16, 15:20**

Sample Matrix: Soil  
# Samples Received: 9

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2015/06/18	2015/06/23	BRL SOP-00410	EPA 1613B m
Dioxins/Furans in Soil (1613B) (1)	8	2015/06/18	2015/06/24	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation in Soil	9	N/A	2015/06/24	BRL SOP-00406	EPA 8290A m
Moisture	9	N/A	2015/06/17	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT

Email: MDiGrazia@maxxam.ca

Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		ALN385	ALN386	ALN387	ALN388	ALN389			
Sampling Date		2015/06/08 08:00	2015/06/08 08:40	2015/06/08 09:20	2015/06/08 10:00	2015/06/08 10:45			
COC Number		na	na	na	na	na			
	Units	SS-ROW-013-0.5	SS-ROW-005-0.5	SS-ROW-019-0.5	SS-ROW-022-0.5	SS-ROW-016-0.5	RDL	MDL	QC Batch
Moisture	%	7.5	7.0	8.9	21	16	1.0	1.0	4070782
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									

Maxxam ID		ALN390	ALN391	ALN392	ALN393			
Sampling Date		2015/06/08 11:30	2015/06/08 12:15	2015/06/08 13:00	2015/06/08 13:40			
COC Number		na	na	na	na			
	Units	SS-ROW-025-0.5	SS-ROW-029B-0.5	SS-ROW-023-0.5	SS-ROW-018-0.5	RDL	MDL	QC Batch
Moisture	%	15	13	13	14	1.0	1.0	4070782
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN385							
Sampling Date		2015/06/08 08:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-013-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.49	0.119	0.200	0.0400	1.00	1.49		4076658
1,2,3,7,8-Penta CDD *	pg/g	23.4	0.149	1.00	0.0400	1.00	23.4		4076658
1,2,3,4,7,8-Hexa CDD *	pg/g	70.7	0.0804	1.00	0.0400	0.100	7.07		4076658
1,2,3,6,7,8-Hexa CDD *	pg/g	378	0.0843	1.00	0.0400	0.100	37.8		4076658
1,2,3,7,8,9-Hexa CDD *	pg/g	188	0.0839	1.00	0.0400	0.100	18.8		4076658
1,2,3,4,6,7,8-Hepta CDD *	pg/g	8550 (1)	2.08	20.0	0.0400	0.0100	85.5		4076658
Octa CDD *	pg/g	50400 (1)	2.05	39.9	0.0800	0.000300	15.1		4076658
Total Tetra CDD *	pg/g	13.4	0.119	0.200	0.0400			12	4076658
Total Penta CDD *	pg/g	112	0.149	1.00	0.0400			12	4076658
Total Hexa CDD *	pg/g	1640	0.0832	1.00	0.0400			7	4076658
Total Hepta CDD *	pg/g	14900 (1)	2.08	20.0	0.0400			2	4076658
2,3,7,8-Tetra CDF **	pg/g	11.4	0.115	0.200	0.0400	0.100	1.14		4076658
1,2,3,7,8-Penta CDF **	pg/g	36.3	0.156	1.00	0.0400	0.0300	1.09		4076658
2,3,4,7,8-Penta CDF **	pg/g	58.6	0.152	1.00	0.0400	0.300	17.6		4076658
1,2,3,4,7,8-Hexa CDF **	pg/g	280	0.347	1.00	0.0400	0.100	28.0		4076658
1,2,3,6,7,8-Hexa CDF **	pg/g	109	0.362	1.00	0.0400	0.100	10.9		4076658
2,3,4,6,7,8-Hexa CDF **	pg/g	60.3	0.328	1.00	0.0400	0.100	6.03		4076658
1,2,3,7,8,9-Hexa CDF **	pg/g	4.57	0.350	1.00	0.0400	0.100	0.457		4076658
1,2,3,4,6,7,8-Hepta CDF **	pg/g	1120	0.0922	1.00	0.0400	0.0100	11.2		4076658
1,2,3,4,7,8,9-Hepta CDF **	pg/g	71.6	0.0919	1.00	0.0400	0.0100	0.716		4076658
Octa CDF **	pg/g	1080	0.339	2.00	0.0800	0.000300	0.324		4076658
Total Tetra CDF **	pg/g	57.4	0.115	0.200	0.0400			15	4076658
Total Penta CDF **	pg/g	462	0.154	1.00	0.0400			13	4076658
Total Hexa CDF **	pg/g	2940	0.346	1.00	0.0400			12	4076658
Total Hepta CDF **	pg/g	3070	0.0920	1.00	0.0400			4	4076658
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<9.5 (2)	9.5	1.0	0.90	0.100	0.950		4078908
TOTAL TOXIC EQUIVALENCY	pg/g						266		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 20X Dilution \*\*  
(2) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN385							
Sampling Date		2015/06/08 08:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-013-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	93							4076658
C13-1234678 HeptaCDD *	%	80 (1)							4076658
C13-1234678 HeptaCDF **	%	83							4076658
C13-123478 HexaCDD *	%	77							4076658
C13-123478 HexaCDF **	%	82							4076658
C13-1234789 HeptaCDF **	%	85							4076658
C13-123678 HexaCDD *	%	90							4076658
C13-123678 HexaCDF **	%	80							4076658
C13-12378 PentaCDD *	%	90							4076658
C13-12378 PentaCDF **	%	86							4076658
C13-123789 HexaCDF **	%	87							4076658
C13-234678 HexaCDF **	%	82							4076658
C13-23478 PentaCDF **	%	100							4076658
C13-2378 TetraCDD *	%	84							4076658
C13-2378 TetraCDF **	%	87							4076658
C13-OCDD *	%	96 (1)							4076658
Confirmation C13-2378 TetraCDF **	%	84							4078908

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 20X Dilution \*\*

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN386							
Sampling Date		2015/06/08 08:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-005-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.664	0.165	0.200	0.0399	1.00	0.664		4076658
1,2,3,7,8-Penta CDD *	pg/g	7.09	0.113	0.998	0.0399	1.00	7.09		4076658
1,2,3,4,7,8-Hexa CDD *	pg/g	16.5	0.136	0.998	0.0399	0.100	1.65		4076658
1,2,3,6,7,8-Hexa CDD *	pg/g	65.3	0.143	0.998	0.0399	0.100	6.53		4076658
1,2,3,7,8,9-Hexa CDD *	pg/g	45.4	0.142	0.998	0.0399	0.100	4.54		4076658
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1400	0.194	0.998	0.0399	0.0100	14.0		4076658
Octa CDD *	pg/g	8630 (1)	0.505	9.98	0.0798	0.000300	2.59		4076658
Total Tetra CDD *	pg/g	4.92	0.165	0.200	0.0399			7	4076658
Total Penta CDD *	pg/g	31.6	0.113	0.998	0.0399			11	4076658
Total Hexa CDD *	pg/g	330	0.141	0.998	0.0399			7	4076658
Total Hepta CDD *	pg/g	2380	0.194	0.998	0.0399			2	4076658
2,3,7,8-Tetra CDF **	pg/g	2.87	0.0927	0.200	0.0399	0.100	0.287		4076658
1,2,3,7,8-Penta CDF **	pg/g	4.43	0.166	0.998	0.0399	0.0300	0.133		4076658
2,3,4,7,8-Penta CDF **	pg/g	6.08	0.161	0.998	0.0399	0.300	1.82		4076658
1,2,3,4,7,8-Hexa CDF **	pg/g	31.6	0.247	0.998	0.0399	0.100	3.16		4076658
1,2,3,6,7,8-Hexa CDF **	pg/g	14.9	0.257	0.998	0.0399	0.100	1.49		4076658
2,3,4,6,7,8-Hexa CDF **	pg/g	8.70	0.233	0.998	0.0399	0.100	0.870		4076658
1,2,3,7,8,9-Hexa CDF **	pg/g	0.712	0.249	0.998	0.0399	0.100	0.0712		4076658
1,2,3,4,6,7,8-Hepta CDF **	pg/g	194	0.117	0.998	0.0399	0.0100	1.94		4076658
1,2,3,4,7,8,9-Hepta CDF **	pg/g	12.3	0.117	0.998	0.0399	0.0100	0.123		4076658
Octa CDF **	pg/g	257	0.195	2.00	0.0798	0.000300	0.0771		4076658
Total Tetra CDF **	pg/g	13.0	0.0927	0.200	0.0399			12	4076658
Total Penta CDF **	pg/g	56.7	0.163	0.998	0.0399			11	4076658
Total Hexa CDF **	pg/g	382	0.246	0.998	0.0399			11	4076658
Total Hepta CDF **	pg/g	519	0.117	0.998	0.0399			4	4076658
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.84	0.11	1.0	0.90	0.100	0.184		4078908
TOTAL TOXIC EQUIVALENCY	pg/g						46.9		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	93							4076658
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) ** From 5X Dilution **									



Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN386							
Sampling Date		2015/06/08 08:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-005-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	87							4076658
C13-1234678 HeptaCDF **	%	80							4076658
C13-123478 HexaCDD *	%	75							4076658
C13-123478 HexaCDF **	%	80							4076658
C13-1234789 HeptaCDF **	%	85							4076658
C13-123678 HexaCDD *	%	89							4076658
C13-123678 HexaCDF **	%	78							4076658
C13-12378 PentaCDD *	%	92							4076658
C13-12378 PentaCDF **	%	86							4076658
C13-123789 HexaCDF **	%	85							4076658
C13-234678 HexaCDF **	%	80							4076658
C13-23478 PentaCDF **	%	100							4076658
C13-2378 TetraCDD *	%	81							4076658
C13-2378 TetraCDF **	%	84							4076658
C13-OCDD *	%	113 (1)							4076658
Confirmation C13-2378 TetraCDF **	%	79							4078908

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution \*\*

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN387							
Sampling Date		2015/06/08 09:20							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-019-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.803	0.161	0.199	0.0398	1.00	0.803		4076658
1,2,3,7,8-Penta CDD *	pg/g	3.23	0.0938	0.996	0.0398	1.00	3.23		4076658
1,2,3,4,7,8-Hexa CDD *	pg/g	7.15	0.114	0.996	0.0398	0.100	0.715		4076658
1,2,3,6,7,8-Hexa CDD *	pg/g	31.9	0.119	0.996	0.0398	0.100	3.19		4076658
1,2,3,7,8,9-Hexa CDD *	pg/g	20.1	0.119	0.996	0.0398	0.100	2.01		4076658
1,2,3,4,6,7,8-Hepta CDD *	pg/g	673	0.298	0.996	0.0398	0.0100	6.73		4076658
Octa CDD *	pg/g	3540	0.274	1.99	0.0797	0.000300	1.06		4076658
Total Tetra CDD *	pg/g	1.28	0.161	0.199	0.0398			3	4076658
Total Penta CDD *	pg/g	12.4	0.0938	0.996	0.0398			11	4076658
Total Hexa CDD *	pg/g	144	0.118	0.996	0.0398			7	4076658
Total Hepta CDD *	pg/g	1080	0.298	0.996	0.0398			2	4076658
2,3,7,8-Tetra CDF **	pg/g	1.13	0.166	0.199	0.0398	0.100	0.113		4076658
1,2,3,7,8-Penta CDF **	pg/g	2.77	0.126	0.996	0.0398	0.0300	0.0831		4076658
2,3,4,7,8-Penta CDF **	pg/g	4.11	0.122	0.996	0.0398	0.300	1.23		4076658
1,2,3,4,7,8-Hexa CDF **	pg/g	19.6	0.120	0.996	0.0398	0.100	1.96		4076658
1,2,3,6,7,8-Hexa CDF **	pg/g	7.93	0.125	0.996	0.0398	0.100	0.793		4076658
2,3,4,6,7,8-Hexa CDF **	pg/g	4.55	0.114	0.996	0.0398	0.100	0.455		4076658
1,2,3,7,8,9-Hexa CDF **	pg/g	0.473	0.121	0.996	0.0398	0.100	0.0473		4076658
1,2,3,4,6,7,8-Hepta CDF **	pg/g	93.5	0.0979	0.996	0.0398	0.0100	0.935		4076658
1,2,3,4,7,8,9-Hepta CDF **	pg/g	5.15	0.0976	0.996	0.0398	0.0100	0.0515		4076658
Octa CDF **	pg/g	87.4	0.255	1.99	0.0797	0.000300	0.0262		4076658
Total Tetra CDF **	pg/g	2.41	0.166	0.199	0.0398			3	4076658
Total Penta CDF **	pg/g	30.8	0.124	0.996	0.0398			10	4076658
Total Hexa CDF **	pg/g	192	0.120	0.996	0.0398			11	4076658
Total Hepta CDF **	pg/g	229	0.0978	0.996	0.0398			4	4076658
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.21	0.12	1.0	0.90	0.100	0.121		4078908
TOTAL TOXIC EQUIVALENCY	pg/g						23.4		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	93							4076658
C13-1234678 HeptaCDD *	%	90							4076658
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN387							
Sampling Date		2015/06/08 09:20							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-019-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	85							4076658
C13-123478 HexaCDD *	%	80							4076658
C13-123478 HexaCDF **	%	84							4076658
C13-1234789 HeptaCDF **	%	90							4076658
C13-123678 HexaCDD *	%	94							4076658
C13-123678 HexaCDF **	%	85							4076658
C13-12378 PentaCDD *	%	96							4076658
C13-12378 PentaCDF **	%	90							4076658
C13-123789 HexaCDF **	%	90							4076658
C13-234678 HexaCDF **	%	85							4076658
C13-23478 PentaCDF **	%	106							4076658
C13-2378 TetraCDD *	%	83							4076658
C13-2378 TetraCDF **	%	79							4076658
C13-OCDD *	%	105							4076658
Confirmation C13-2378 TetraCDF **	%	76							4078908

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN388							
Sampling Date		2015/06/08 10:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-022-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.430	0.180	0.199	0.0399	1.00	0.430		4076658
1,2,3,7,8-Penta CDD *	pg/g	2.98	0.0987	0.997	0.0399	1.00	2.98		4076658
1,2,3,4,7,8-Hexa CDD *	pg/g	7.19	0.107	0.997	0.0399	0.100	0.719		4076658
1,2,3,6,7,8-Hexa CDD *	pg/g	26.2	0.112	0.997	0.0399	0.100	2.62		4076658
1,2,3,7,8,9-Hexa CDD *	pg/g	20.1	0.112	0.997	0.0399	0.100	2.01		4076658
1,2,3,4,6,7,8-Hepta CDD *	pg/g	572	0.275	0.997	0.0399	0.0100	5.72		4076658
Octa CDD *	pg/g	3220	0.770	1.99	0.0797	0.000300	0.966		4076658
Total Tetra CDD *	pg/g	3.04	0.180	0.199	0.0399			6	4076658
Total Penta CDD *	pg/g	15.4	0.0987	0.997	0.0399			10	4076658
Total Hexa CDD *	pg/g	142	0.111	0.997	0.0399			7	4076658
Total Hepta CDD *	pg/g	987	0.275	0.997	0.0399			2	4076658
2,3,7,8-Tetra CDF **	pg/g	2.03	0.0778	0.199	0.0399	0.100	0.203		4076658
1,2,3,7,8-Penta CDF **	pg/g	1.79	0.112	0.997	0.0399	0.0300	0.0537		4076658
2,3,4,7,8-Penta CDF **	pg/g	2.76	0.109	0.997	0.0399	0.300	0.828		4076658
1,2,3,4,7,8-Hexa CDF **	pg/g	11.3	0.0901	0.997	0.0399	0.100	1.13		4076658
1,2,3,6,7,8-Hexa CDF **	pg/g	5.68	0.0940	0.997	0.0399	0.100	0.568		4076658
2,3,4,6,7,8-Hexa CDF **	pg/g	3.71	0.0852	0.997	0.0399	0.100	0.371		4076658
1,2,3,7,8,9-Hexa CDF **	pg/g	0.278	0.0908	0.997	0.0399	0.100	0.0278		4076658
1,2,3,4,6,7,8-Hepta CDF **	pg/g	84.6	0.127	0.997	0.0399	0.0100	0.846		4076658
1,2,3,4,7,8,9-Hepta CDF **	pg/g	4.88	0.127	0.997	0.0399	0.0100	0.0488		4076658
Octa CDF **	pg/g	193	0.205	1.99	0.0797	0.000300	0.0579		4076658
Total Tetra CDF **	pg/g	12.3	0.0778	0.199	0.0399			12	4076658
Total Penta CDF **	pg/g	29.8	0.110	0.997	0.0399			10	4076658
Total Hexa CDF **	pg/g	156	0.0899	0.997	0.0399			11	4076658
Total Hepta CDF **	pg/g	237	0.127	0.997	0.0399			4	4076658
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.18	0.083	1.0	0.90	0.100	0.118		4078908
TOTAL TOXIC EQUIVALENCY	pg/g						19.5		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	97							4076658
C13-1234678 HeptaCDD *	%	90							4076658
EDL = Estimated Detection Limit									
RDL = Reportable Detection Limit									
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,									
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.									
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds									
QC Batch = Quality Control Batch									
* CDD = Chloro Dibenzo-p-Dioxin									
** CDF = Chloro Dibenzo-p-Furan									

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN388							
Sampling Date		2015/06/08 10:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-022-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	84							4076658
C13-123478 HexaCDD *	%	78							4076658
C13-123478 HexaCDF **	%	81							4076658
C13-1234789 HeptaCDF **	%	89							4076658
C13-123678 HexaCDD *	%	91							4076658
C13-123678 HexaCDF **	%	82							4076658
C13-12378 PentaCDD *	%	104							4076658
C13-12378 PentaCDF **	%	94							4076658
C13-123789 HexaCDF **	%	89							4076658
C13-234678 HexaCDF **	%	82							4076658
C13-23478 PentaCDF **	%	121							4076658
C13-2378 TetraCDD *	%	87							4076658
C13-2378 TetraCDF **	%	89							4076658
C13-OCDD *	%	105							4076658
Confirmation C13-2378 TetraCDF **	%	85							4078908

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN389							
Sampling Date		2015/06/08 10:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-016-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.435	0.0833	0.200	0.0400	1.00	0.435		4076658
1,2,3,7,8-Penta CDD *	pg/g	4.05	0.115	0.999	0.0400	1.00	4.05		4076658
1,2,3,4,7,8-Hexa CDD *	pg/g	8.74	0.197	0.999	0.0400	0.100	0.874		4076658
1,2,3,6,7,8-Hexa CDD *	pg/g	34.2	0.207	0.999	0.0400	0.100	3.42		4076658
1,2,3,7,8,9-Hexa CDD *	pg/g	23.6	0.206	0.999	0.0400	0.100	2.36		4076658
1,2,3,4,6,7,8-Hepta CDD *	pg/g	665	0.153	0.999	0.0400	0.0100	6.65		4076658
Octa CDD *	pg/g	3860	0.150	2.00	0.0800	0.000300	1.16		4076658
Total Tetra CDD *	pg/g	1.87	0.0833	0.200	0.0400			6	4076658
Total Penta CDD *	pg/g	21.8	0.115	0.999	0.0400			12	4076658
Total Hexa CDD *	pg/g	190	0.204	0.999	0.0400			7	4076658
Total Hepta CDD *	pg/g	1200	0.153	0.999	0.0400			2	4076658
2,3,7,8-Tetra CDF **	pg/g	1.72	0.159	0.200	0.0400	0.100	0.172		4076658
1,2,3,7,8-Penta CDF **	pg/g	2.78	0.122	0.999	0.0400	0.0300	0.0834		4076658
2,3,4,7,8-Penta CDF **	pg/g	4.09	0.119	0.999	0.0400	0.300	1.23		4076658
1,2,3,4,7,8-Hexa CDF **	pg/g	17.3	0.138	0.999	0.0400	0.100	1.73		4076658
1,2,3,6,7,8-Hexa CDF **	pg/g	8.35	0.144	0.999	0.0400	0.100	0.835		4076658
2,3,4,6,7,8-Hexa CDF **	pg/g	5.23	0.130	0.999	0.0400	0.100	0.523		4076658
1,2,3,7,8,9-Hexa CDF **	pg/g	0.353	0.139	0.999	0.0400	0.100	0.0353		4076658
1,2,3,4,6,7,8-Hepta CDF **	pg/g	105	0.159	0.999	0.0400	0.0100	1.05		4076658
1,2,3,4,7,8,9-Hepta CDF **	pg/g	5.25	0.158	0.999	0.0400	0.0100	0.0525		4076658
Octa CDF **	pg/g	133	0.287	2.00	0.0800	0.000300	0.0399		4076658
Total Tetra CDF **	pg/g	5.38	0.159	0.200	0.0400			9	4076658
Total Penta CDF **	pg/g	43.9	0.120	0.999	0.0400			11	4076658
Total Hexa CDF **	pg/g	213	0.137	0.999	0.0400			12	4076658
Total Hepta CDF **	pg/g	270	0.159	0.999	0.0400			4	4076658
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.56	0.10	1.0	0.90	0.100	0.156		4078908
TOTAL TOXIC EQUIVALENCY	pg/g						24.7		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	94							4076658
C13-1234678 HeptaCDD *	%	86							4076658
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN389							
Sampling Date		2015/06/08 10:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-016-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	79							4076658
C13-123478 HexaCDD *	%	78							4076658
C13-123478 HexaCDF **	%	82							4076658
C13-1234789 HeptaCDF **	%	85							4076658
C13-123678 HexaCDD *	%	91							4076658
C13-123678 HexaCDF **	%	81							4076658
C13-12378 PentaCDD *	%	91							4076658
C13-12378 PentaCDF **	%	84							4076658
C13-123789 HexaCDF **	%	90							4076658
C13-234678 HexaCDF **	%	83							4076658
C13-23478 PentaCDF **	%	98							4076658
C13-2378 TetraCDD *	%	86							4076658
C13-2378 TetraCDF **	%	79							4076658
C13-OCDD *	%	98							4076658
Confirmation C13-2378 TetraCDF **	%	79							4078908

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN390							
Sampling Date		2015/06/08 11:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-025-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.715	0.137	0.199	0.0399	1.00	0.715		4076658
1,2,3,7,8-Penta CDD *	pg/g	8.46	0.127	0.997	0.0399	1.00	8.46		4076658
1,2,3,4,7,8-Hexa CDD *	pg/g	22.3	0.160	0.997	0.0399	0.100	2.23		4076658
1,2,3,6,7,8-Hexa CDD *	pg/g	63.6	0.168	0.997	0.0399	0.100	6.36		4076658
1,2,3,7,8,9-Hexa CDD *	pg/g	55.6	0.167	0.997	0.0399	0.100	5.56		4076658
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1430	0.173	0.997	0.0399	0.0100	14.3		4076658
Octa CDD *	pg/g	8360 (1)	0.507	9.97	0.0798	0.000300	2.51		4076658
Total Tetra CDD *	pg/g	6.55	0.137	0.199	0.0399			10	4076658
Total Penta CDD *	pg/g	41.7	0.127	0.997	0.0399			12	4076658
Total Hexa CDD *	pg/g	373	0.166	0.997	0.0399			7	4076658
Total Hepta CDD *	pg/g	2390	0.173	0.997	0.0399			2	4076658
2,3,7,8-Tetra CDF **	pg/g	2.30	0.116	0.199	0.0399	0.100	0.230		4076658
1,2,3,7,8-Penta CDF **	pg/g	2.99	0.151	0.997	0.0399	0.0300	0.0897		4076658
2,3,4,7,8-Penta CDF **	pg/g	3.59	0.147	0.997	0.0399	0.300	1.08		4076658
1,2,3,4,7,8-Hexa CDF **	pg/g	17.5	0.187	0.997	0.0399	0.100	1.75		4076658
1,2,3,6,7,8-Hexa CDF **	pg/g	10.9	0.195	0.997	0.0399	0.100	1.09		4076658
2,3,4,6,7,8-Hexa CDF **	pg/g	6.85	0.177	0.997	0.0399	0.100	0.685		4076658
1,2,3,7,8,9-Hexa CDF **	pg/g	0.456	0.189	0.997	0.0399	0.100	0.0456		4076658
1,2,3,4,6,7,8-Hepta CDF **	pg/g	186	0.173	0.997	0.0399	0.0100	1.86		4076658
1,2,3,4,7,8,9-Hepta CDF **	pg/g	12.1	0.173	0.997	0.0399	0.0100	0.121		4076658
Octa CDF **	pg/g	385	0.157	1.99	0.0798	0.000300	0.116		4076658
Total Tetra CDF **	pg/g	17.9	0.116	0.199	0.0399			13	4076658
Total Penta CDF **	pg/g	47.8	0.149	0.997	0.0399			10	4076658
Total Hexa CDF **	pg/g	285	0.187	0.997	0.0399			12	4076658
Total Hepta CDF **	pg/g	512	0.173	0.997	0.0399			4	4076658
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.73	0.097	1.0	0.90	0.100	0.173		4078908
TOTAL TOXIC EQUIVALENCY	pg/g						47.1		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	100							4076658
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) ** From 5X Dilution Run **									



Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN390							
Sampling Date		2015/06/08 11:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-025-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	98							4076658
C13-1234678 HeptaCDF **	%	90							4076658
C13-123478 HexaCDD *	%	85							4076658
C13-123478 HexaCDF **	%	91							4076658
C13-1234789 HeptaCDF **	%	93							4076658
C13-123678 HexaCDD *	%	103							4076658
C13-123678 HexaCDF **	%	91							4076658
C13-12378 PentaCDD *	%	104							4076658
C13-12378 PentaCDF **	%	94							4076658
C13-123789 HexaCDF **	%	97							4076658
C13-234678 HexaCDF **	%	91							4076658
C13-23478 PentaCDF **	%	110							4076658
C13-2378 TetraCDD *	%	92							4076658
C13-2378 TetraCDF **	%	94							4076658
C13-OCDD *	%	118 (1)							4076658
Confirmation C13-2378 TetraCDF **	%	91							4078908

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution Run \*\*

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN391							
Sampling Date		2015/06/08 12:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-029B-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.573	0.126	0.200	0.0400	1.00	0.573		4076658
1,2,3,7,8-Penta CDD *	pg/g	6.05	0.121	1.00	0.0400	1.00	6.05		4076658
1,2,3,4,7,8-Hexa CDD *	pg/g	16.2	0.109	1.00	0.0400	0.100	1.62		4076658
1,2,3,6,7,8-Hexa CDD *	pg/g	45.4	0.114	1.00	0.0400	0.100	4.54		4076658
1,2,3,7,8,9-Hexa CDD *	pg/g	43.2	0.114	1.00	0.0400	0.100	4.32		4076658
1,2,3,4,6,7,8-Hepta CDD *	pg/g	990	0.123	1.00	0.0400	0.0100	9.90		4076658
Octa CDD *	pg/g	5360 (1)	0.506	10.0	0.0800	0.000300	1.61		4076658
Total Tetra CDD *	pg/g	4.35	0.126	0.200	0.0400			9	4076658
Total Penta CDD *	pg/g	31.5	0.121	1.00	0.0400			12	4076658
Total Hexa CDD *	pg/g	303	0.113	1.00	0.0400			7	4076658
Total Hepta CDD *	pg/g	1810	0.123	1.00	0.0400			2	4076658
2,3,7,8-Tetra CDF **	pg/g	2.06	0.101	0.200	0.0400	0.100	0.206		4076658
1,2,3,7,8-Penta CDF **	pg/g	2.39	0.108	1.00	0.0400	0.0300	0.0717		4076658
2,3,4,7,8-Penta CDF **	pg/g	3.45	0.105	1.00	0.0400	0.300	1.04		4076658
1,2,3,4,7,8-Hexa CDF **	pg/g	17.4	0.114	1.00	0.0400	0.100	1.74		4076658
1,2,3,6,7,8-Hexa CDF **	pg/g	8.97	0.119	1.00	0.0400	0.100	0.897		4076658
2,3,4,6,7,8-Hexa CDF **	pg/g	6.46	0.108	1.00	0.0400	0.100	0.646		4076658
1,2,3,7,8,9-Hexa CDF **	pg/g	0.366	0.115	1.00	0.0400	0.100	0.0366		4076658
1,2,3,4,6,7,8-Hepta CDF **	pg/g	152	0.122	1.00	0.0400	0.0100	1.52		4076658
1,2,3,4,7,8,9-Hepta CDF **	pg/g	9.96	0.122	1.00	0.0400	0.0100	0.0996		4076658
Octa CDF **	pg/g	311	0.103	2.00	0.0800	0.000300	0.0933		4076658
Total Tetra CDF **	pg/g	10.9	0.101	0.200	0.0400			13	4076658
Total Penta CDF **	pg/g	37.7	0.106	1.00	0.0400			11	4076658
Total Hexa CDF **	pg/g	209	0.114	1.00	0.0400			12	4076658
Total Hepta CDF **	pg/g	424	0.122	1.00	0.0400			4	4076658
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.34	0.11	1.0	0.90	0.100	0.134		4078908
TOTAL TOXIC EQUIVALENCY	pg/g						34.9		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	102							4076658
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) 5X dilution									

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN391							
Sampling Date		2015/06/08 12:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-029B-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	102							4076658
C13-1234678 HeptaCDF **	%	90							4076658
C13-123478 HexaCDD *	%	82							4076658
C13-123478 HexaCDF **	%	86							4076658
C13-1234789 HeptaCDF **	%	101							4076658
C13-123678 HexaCDD *	%	99							4076658
C13-123678 HexaCDF **	%	86							4076658
C13-12378 PentaCDD *	%	103							4076658
C13-12378 PentaCDF **	%	93							4076658
C13-123789 HexaCDF **	%	97							4076658
C13-234678 HexaCDF **	%	90							4076658
C13-23478 PentaCDF **	%	110							4076658
C13-2378 TetraCDD *	%	92							4076658
C13-2378 TetraCDF **	%	92							4076658
C13-OCDD *	%	102							4076658
Confirmation C13-2378 TetraCDF **	%	93							4078908

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN392							
Sampling Date		2015/06/08 13:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-023-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.484	0.153	0.200	0.0400	1.00	0.484		4076658
1,2,3,7,8-Penta CDD *	pg/g	6.08	0.136	1.00	0.0400	1.00	6.08		4076658
1,2,3,4,7,8-Hexa CDD *	pg/g	17.0	0.0974	1.00	0.0400	0.100	1.70		4076658
1,2,3,6,7,8-Hexa CDD *	pg/g	53.6	0.102	1.00	0.0400	0.100	5.36		4076658
1,2,3,7,8,9-Hexa CDD *	pg/g	42.5	0.102	1.00	0.0400	0.100	4.25		4076658
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1240	0.121	1.00	0.0400	0.0100	12.4		4076658
Octa CDD *	pg/g	6530 (1)	0.501	10.0	0.0800	0.000300	1.96		4076658
Total Tetra CDD *	pg/g	2.76	0.153	0.200	0.0400			6	4076658
Total Penta CDD *	pg/g	26.1	0.136	1.00	0.0400			11	4076658
Total Hexa CDD *	pg/g	277	0.101	1.00	0.0400			7	4076658
Total Hepta CDD *	pg/g	1970	0.121	1.00	0.0400			2	4076658
2,3,7,8-Tetra CDF **	pg/g	1.40	0.123	0.200	0.0400	0.100	0.140		4076658
1,2,3,7,8-Penta CDF **	pg/g	2.34	0.141	1.00	0.0400	0.0300	0.0702		4076658
2,3,4,7,8-Penta CDF **	pg/g	3.09	0.137	1.00	0.0400	0.300	0.927		4076658
1,2,3,4,7,8-Hexa CDF **	pg/g	20.2	0.100	1.00	0.0400	0.100	2.02		4076658
1,2,3,6,7,8-Hexa CDF **	pg/g	9.45	0.105	1.00	0.0400	0.100	0.945		4076658
2,3,4,6,7,8-Hexa CDF **	pg/g	6.75	0.0948	1.00	0.0400	0.100	0.675		4076658
1,2,3,7,8,9-Hexa CDF **	pg/g	0.439	0.101	1.00	0.0400	0.100	0.0439		4076658
1,2,3,4,6,7,8-Hepta CDF **	pg/g	284	0.100	1.00	0.0400	0.0100	2.84		4076658
1,2,3,4,7,8,9-Hepta CDF **	pg/g	21.4	0.100	1.00	0.0400	0.0100	0.214		4076658
Octa CDF **	pg/g	783	0.109	2.00	0.0800	0.000300	0.235		4076658
Total Tetra CDF **	pg/g	5.01	0.123	0.200	0.0400			10	4076658
Total Penta CDF **	pg/g	23.7	0.139	1.00	0.0400			10	4076658
Total Hexa CDF **	pg/g	285	0.100	1.00	0.0400			12	4076658
Total Hepta CDF **	pg/g	946	0.100	1.00	0.0400			4	4076658
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.11	0.11	1.0	0.90	0.100	0.111		4078908
TOTAL TOXIC EQUIVALENCY	pg/g						40.3		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	89							4076658
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) 5X dilution									

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN392							
Sampling Date		2015/06/08 13:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-023-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	95							4076658
C13-1234678 HeptaCDF **	%	86							4076658
C13-123478 HexaCDD *	%	78							4076658
C13-123478 HexaCDF **	%	81							4076658
C13-1234789 HeptaCDF **	%	94							4076658
C13-123678 HexaCDD *	%	93							4076658
C13-123678 HexaCDF **	%	81							4076658
C13-12378 PentaCDD *	%	94							4076658
C13-12378 PentaCDF **	%	84							4076658
C13-123789 HexaCDF **	%	91							4076658
C13-234678 HexaCDF **	%	83							4076658
C13-23478 PentaCDF **	%	100							4076658
C13-2378 TetraCDD *	%	79							4076658
C13-2378 TetraCDF **	%	78							4076658
C13-OCDD *	%	103							4076658
Confirmation C13-2378 TetraCDF **	%	75							4078908

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN393							
Sampling Date		2015/06/08 13:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-018-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.396	0.148	0.199	0.0398	1.00	0.396		4076658
1,2,3,7,8-Penta CDD *	pg/g	3.29	0.110	0.995	0.0398	1.00	3.29		4076658
1,2,3,4,7,8-Hexa CDD *	pg/g	7.71	0.105	0.995	0.0398	0.100	0.771		4076658
1,2,3,6,7,8-Hexa CDD *	pg/g	22.8	0.110	0.995	0.0398	0.100	2.28		4076658
1,2,3,7,8,9-Hexa CDD *	pg/g	20.4	0.110	0.995	0.0398	0.100	2.04		4076658
1,2,3,4,6,7,8-Hepta CDD *	pg/g	521	0.121	0.995	0.0398	0.0100	5.21		4076658
Octa CDD *	pg/g	2910	0.105	1.99	0.0796	0.000300	0.873		4076658
Total Tetra CDD *	pg/g	2.49	0.148	0.199	0.0398			6	4076658
Total Penta CDD *	pg/g	18.5	0.110	0.995	0.0398			12	4076658
Total Hexa CDD *	pg/g	146	0.109	0.995	0.0398			7	4076658
Total Hepta CDD *	pg/g	916	0.121	0.995	0.0398			2	4076658
2,3,7,8-Tetra CDF **	pg/g	1.43	0.110	0.199	0.0398	0.100	0.143		4076658
1,2,3,7,8-Penta CDF **	pg/g	1.31	0.112	0.995	0.0398	0.0300	0.0393		4076658
2,3,4,7,8-Penta CDF **	pg/g	1.54	0.109	0.995	0.0398	0.300	0.462		4076658
1,2,3,4,7,8-Hexa CDF **	pg/g	7.33	0.109	0.995	0.0398	0.100	0.733		4076658
1,2,3,6,7,8-Hexa CDF **	pg/g	4.41	0.114	0.995	0.0398	0.100	0.441		4076658
2,3,4,6,7,8-Hexa CDF **	pg/g	2.71	0.103	0.995	0.0398	0.100	0.271		4076658
1,2,3,7,8,9-Hexa CDF **	pg/g	0.216	0.110	0.995	0.0398	0.100	0.0216		4076658
1,2,3,4,6,7,8-Hepta CDF **	pg/g	84.3	0.110	0.995	0.0398	0.0100	0.843		4076658
1,2,3,4,7,8,9-Hepta CDF **	pg/g	5.87	0.109	0.995	0.0398	0.0100	0.0587		4076658
Octa CDF **	pg/g	199	0.113	1.99	0.0796	0.000300	0.0597		4076658
Total Tetra CDF **	pg/g	6.25	0.110	0.199	0.0398			12	4076658
Total Penta CDF **	pg/g	18.7	0.111	0.995	0.0398			10	4076658
Total Hexa CDF **	pg/g	115	0.109	0.995	0.0398			11	4076658
Total Hepta CDF **	pg/g	251	0.109	0.995	0.0398			4	4076658
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.87	0.12	1.0	0.90	0.100	0.0870		4078908
TOTAL TOXIC EQUIVALENCY	pg/g						17.9		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	100							4076658
C13-1234678 HeptaCDD *	%	97							4076658
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN393							
Sampling Date		2015/06/08 13:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-018-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	87							4076658
C13-123478 HexaCDD *	%	84							4076658
C13-123478 HexaCDF **	%	85							4076658
C13-1234789 HeptaCDF **	%	95							4076658
C13-123678 HexaCDD *	%	103							4076658
C13-123678 HexaCDF **	%	83							4076658
C13-12378 PentaCDD *	%	115							4076658
C13-12378 PentaCDF **	%	98							4076658
C13-123789 HexaCDF **	%	93							4076658
C13-234678 HexaCDF **	%	86							4076658
C13-23478 PentaCDF **	%	118							4076658
C13-2378 TetraCDD *	%	92							4076658
C13-2378 TetraCDF **	%	90							4076658
C13-OCDD *	%	117							4076658
Confirmation C13-2378 TetraCDF **	%	91							4078908

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**TEST SUMMARY**

**Maxxam ID:** ALN385  
**Sample ID:** SS-ROW-013-0.5  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4076658	2015/06/18	2015/06/23	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	4078908	N/A	2015/06/24	Vica Cioranic
Moisture	BAL	4070782	N/A	2015/06/17	Valentina Kaftani

**Maxxam ID:** ALN386  
**Sample ID:** SS-ROW-005-0.5  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4076658	2015/06/18	2015/06/24	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	4078908	N/A	2015/06/24	Vica Cioranic
Moisture	BAL	4070782	N/A	2015/06/17	Valentina Kaftani

**Maxxam ID:** ALN387  
**Sample ID:** SS-ROW-019-0.5  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4076658	2015/06/18	2015/06/24	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	4078908	N/A	2015/06/24	Vica Cioranic
Moisture	BAL	4070782	N/A	2015/06/17	Valentina Kaftani

**Maxxam ID:** ALN388  
**Sample ID:** SS-ROW-022-0.5  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4076658	2015/06/18	2015/06/24	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	4078908	N/A	2015/06/24	Vica Cioranic
Moisture	BAL	4070782	N/A	2015/06/17	Valentina Kaftani

**Maxxam ID:** ALN388 Dup  
**Sample ID:** SS-ROW-022-0.5  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4076658	2015/06/18	2015/06/24	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	4078908	N/A	2015/06/24	Vica Cioranic

**Maxxam ID:** ALN389  
**Sample ID:** SS-ROW-016-0.5  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4076658	2015/06/18	2015/06/24	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	4078908	N/A	2015/06/24	Vica Cioranic
Moisture	BAL	4070782	N/A	2015/06/17	Valentina Kaftani



Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**TEST SUMMARY**

**Maxxam ID:** ALN390  
**Sample ID:** SS-ROW-025-0.5  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4076658	2015/06/18	2015/06/24	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	4078908	N/A	2015/06/24	Vica Cioranic
Moisture	BAL	4070782	N/A	2015/06/17	Valentina Kaftani

**Maxxam ID:** ALN391  
**Sample ID:** SS-ROW-029B-0.5  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4076658	2015/06/18	2015/06/24	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	4078908	N/A	2015/06/24	Vica Cioranic
Moisture	BAL	4070782	N/A	2015/06/17	Valentina Kaftani

**Maxxam ID:** ALN392  
**Sample ID:** SS-ROW-023-0.5  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4076658	2015/06/18	2015/06/24	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	4078908	N/A	2015/06/24	Vica Cioranic
Moisture	BAL	4070782	N/A	2015/06/17	Valentina Kaftani

**Maxxam ID:** ALN393  
**Sample ID:** SS-ROW-018-0.5  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4076658	2015/06/18	2015/06/24	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	4078908	N/A	2015/06/24	Vica Cioranic
Moisture	BAL	4070782	N/A	2015/06/17	Valentina Kaftani

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.0°C
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**Results relate only to the items tested.**

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
4070782	BOP	RPD - Sample/Sample Dup	Moisture	2015/06/17	4.1		%	20
4076658	KKS	Spiked Blank	37CL4 2378 Tetra CDD	2015/06/24		102	%	35 - 197
			C13-1234678 HeptaCDD	2015/06/24		91	%	23 - 140
			C13-1234678 HeptaCDF	2015/06/24		85	%	28 - 143
			C13-123478 HexaCDD	2015/06/24		88	%	32 - 141
			C13-123478 HexaCDF	2015/06/24		85	%	26 - 152
			C13-1234789 HeptaCDF	2015/06/24		91	%	26 - 138
			C13-123678 HexaCDD	2015/06/24		100	%	28 - 130
			C13-123678 HexaCDF	2015/06/24		87	%	26 - 123
			C13-12378 PentaCDD	2015/06/24		104	%	25 - 181
			C13-12378 PentaCDF	2015/06/24		94	%	24 - 185
			C13-123789 HexaCDF	2015/06/24		97	%	29 - 147
			C13-234678 HexaCDF	2015/06/24		91	%	28 - 136
			C13-23478 PentaCDF	2015/06/24		110	%	21 - 178
			C13-2378 TetraCDD	2015/06/24		89	%	25 - 164
			C13-2378 TetraCDF	2015/06/24		88	%	24 - 169
			C13-OCDD	2015/06/24		97	%	17 - 157
			2,3,7,8-Tetra CDD	2015/06/24		106	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/06/24		98	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/06/24		105	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/06/24		94	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/06/24		115	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/06/24		104	%	70 - 140
			Octa CDD	2015/06/24		101	%	78 - 144
			2,3,7,8-Tetra CDF	2015/06/24		103	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/06/24		104	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/06/24		94	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/06/24		104	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/06/24		102	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/06/24		103	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/06/24		99	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/06/24		106	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/06/24		102	%	78 - 138
			Octa CDF	2015/06/24		97	%	63 - 170
4076658	KKS	Method Blank	37CL4 2378 Tetra CDD	2015/06/23		98	%	35 - 197
			C13-1234678 HeptaCDD	2015/06/23		103	%	23 - 140
			C13-1234678 HeptaCDF	2015/06/23		99	%	28 - 143
			C13-123478 HexaCDD	2015/06/23		96	%	32 - 141
			C13-123478 HexaCDF	2015/06/23		99	%	26 - 152
			C13-1234789 HeptaCDF	2015/06/23		105	%	26 - 138
			C13-123678 HexaCDD	2015/06/23		113	%	28 - 130
			C13-123678 HexaCDF	2015/06/23		99	%	26 - 123
			C13-12378 PentaCDD	2015/06/23		116	%	25 - 181
			C13-12378 PentaCDF	2015/06/23		108	%	24 - 185
			C13-123789 HexaCDF	2015/06/23		108	%	29 - 147
			C13-234678 HexaCDF	2015/06/23		102	%	28 - 136
			C13-23478 PentaCDF	2015/06/23		128	%	21 - 178
			C13-2378 TetraCDD	2015/06/23		99	%	25 - 164
			C13-2378 TetraCDF	2015/06/23		104	%	24 - 169
			C13-OCDD	2015/06/23		105	%	17 - 157
			2,3,7,8-Tetra CDD	2015/06/23	<0.104, EDL=0.104		pg/g	
			1,2,3,7,8-Penta CDD	2015/06/23	<0.106, EDL=0.106		pg/g	

Maxxam Job #: B5B5514  
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**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/06/23	<0.0857, EDL=0.0857		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/06/23	<0.0899, EDL=0.0899		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/06/23	<0.0895, EDL=0.0895		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/06/23	0.296, EDL=0.0952		pg/g	
			Octa CDD	2015/06/23	3.64, EDL=0.268		pg/g	
			Total Tetra CDD	2015/06/23	<0.104, EDL=0.104		pg/g	
			Total Penta CDD	2015/06/23	<0.106, EDL=0.106		pg/g	
			Total Hexa CDD	2015/06/23	<0.0887, EDL=0.0887		pg/g	
			Total Hepta CDD	2015/06/23	0.296, EDL=0.0952		pg/g	
			2,3,7,8-Tetra CDF	2015/06/23	<0.0962, EDL=0.0962		pg/g	
			1,2,3,7,8-Penta CDF	2015/06/23	<0.0694, EDL=0.0694		pg/g	
			2,3,4,7,8-Penta CDF	2015/06/23	<0.0676, EDL=0.0676		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/06/23	<0.0717, EDL=0.0717		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/06/23	<0.0747, EDL=0.0747		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/06/23	<0.0678, EDL=0.0678		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/06/23	<0.0722, EDL=0.0722		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/06/23	<0.0700, EDL=0.0700		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2015/06/23	<0.0698, EDL=0.0698		pg/g	
			Octa CDF	2015/06/23	0.284, EDL=0.141		pg/g	
			Total Tetra CDF	2015/06/23	<0.0962, EDL=0.0962		pg/g	
			Total Penta CDF	2015/06/23	<0.0685, EDL=0.0685		pg/g	
			Total Hexa CDF	2015/06/23	<0.0715, EDL=0.0715		pg/g	
			Total Hepta CDF	2015/06/23	0.114, EDL=0.0699		pg/g	
4076658	KKS	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/06/24	NC		%	25
			1,2,3,7,8-Penta CDD	2015/06/24	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/06/24	4.3		%	25
			1,2,3,6,7,8-Hexa CDD	2015/06/24	5.0		%	25
			1,2,3,7,8,9-Hexa CDD	2015/06/24	4.9		%	25

Maxxam Job #: B5B5514  
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**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			1,2,3,4,6,7,8-Hepta CDD	2015/06/24	14		%	25
			Octa CDD	2015/06/24	12		%	25
			Total Tetra CDD	2015/06/24	48 (1)		%	25
			Total Penta CDD	2015/06/24	4.4		%	25
			Total Hexa CDD	2015/06/24	2.3		%	25
			Total Hepta CDD	2015/06/24	13		%	25
			2,3,7,8-Tetra CDF	2015/06/24	24		%	25
			1,2,3,7,8-Penta CDF	2015/06/24	NC		%	25
			2,3,4,7,8-Penta CDF	2015/06/24	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/06/24	1.3		%	25
			1,2,3,6,7,8-Hexa CDF	2015/06/24	5.3		%	25
			2,3,4,6,7,8-Hexa CDF	2015/06/24	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/06/24	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/06/24	30 (1)		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/06/24	NC		%	25
			Octa CDF	2015/06/24	68 (1)		%	25
			Total Tetra CDF	2015/06/24	56 (1)		%	25
			Total Penta CDF	2015/06/24	3.4		%	25
			Total Hexa CDF	2015/06/24	12		%	25
			Total Hepta CDF	2015/06/24	51 (1)		%	25
4078908	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/06/24	<0.092, EDL=0.092		pg/g	
			Confirmation C13-2378 TetraCDF	2015/06/24		84	%	40 - 135
4078908	VCI	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/06/24	NC		%	100

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist



Kay Shaw, C. Chem, Sr Scientific Specialist, HRMS Services



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5F0658  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/10/02**  
**Report #: R3707749**  
**Version: 2R**

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B5C4634**

**Received: 2015/06/26, 13:25**

Sample Matrix: Soil  
# Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Dioxins/Furans in Soil (1613B) (1)	1	2015/06/30	2015/07/04	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2015/09/29	BRL SOP-00406	EPA M8290A / M1613
Moisture	1	N/A	2015/06/30	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.  
\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Total cover pages: 1

Maxxam Job #: B5C4634  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5F0658

**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		ANG978			
Sampling Date		2015/06/22 09:00			
COC Number		na			
	<b>Units</b>	<b>ISM-AOI019-0.5-AFTER ISM</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>

Moisture	%	2.3	1.0	0.50	4086742
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RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch



Maxxam Job #: B5C4634  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5F0658

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ANG978							
Sampling Date		2015/06/22 09:00							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI019-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	2.69	0.152	0.200	0.0400	1.00	2.69		4091157
1,2,3,7,8-Penta CDD	pg/g	3.27	0.107	1.00	0.0400	1.00	3.27		4091157
1,2,3,4,7,8-Hexa CDD	pg/g	5.92	0.223	1.00	0.0400	0.100	0.592		4091157
1,2,3,6,7,8-Hexa CDD	pg/g	30.1	0.234	1.00	0.0400	0.100	3.01		4091157
1,2,3,7,8,9-Hexa CDD	pg/g	16.9	0.233	1.00	0.0400	0.100	1.69		4091157
1,2,3,4,6,7,8-Hepta CDD	pg/g	529	0.187	1.00	0.0400	0.0100	5.29		4091157
Octa CDD	pg/g	2540	0.897	2.00	0.0800	0.000300	0.762		4091157
Total Tetra CDD	pg/g	7.32	0.152	0.200	0.0400			9	4091157
Total Penta CDD	pg/g	16.1	0.107	1.00	0.0400			10	4091157
Total Hexa CDD	pg/g	141	0.231	1.00	0.0400			7	4091157
Total Hepta CDD	pg/g	866	0.187	1.00	0.0400			2	4091157
2,3,7,8-Tetra CDF **	pg/g	2.42	0.138	0.200	0.0400	0.100	0.242		4091157
1,2,3,7,8-Penta CDF	pg/g	2.18	0.142	1.00	0.0400	0.0300	0.0654		4091157
2,3,4,7,8-Penta CDF	pg/g	3.23	0.139	1.00	0.0400	0.300	0.969		4091157
1,2,3,4,7,8-Hexa CDF	pg/g	17.2	0.100	1.00	0.0400	0.100	1.72		4091157
1,2,3,6,7,8-Hexa CDF	pg/g	6.87	0.105	1.00	0.0400	0.100	0.687		4091157
2,3,4,6,7,8-Hexa CDF	pg/g	4.57	0.0948	1.00	0.0400	0.100	0.457		4091157
1,2,3,7,8,9-Hexa CDF	pg/g	0.304	0.101	1.00	0.0400	0.100	0.0304		4091157
1,2,3,4,6,7,8-Hepta CDF	pg/g	81.3	0.103	1.00	0.0400	0.0100	0.813		4091157
1,2,3,4,7,8,9-Hepta CDF	pg/g	4.46	0.103	1.00	0.0400	0.0100	0.0446		4091157
Octa CDF	pg/g	67.4	0.198	2.00	0.0800	0.000300	0.0202		4091157
Total Tetra CDF	pg/g	20.4	0.138	0.200	0.0400			15	4091157
Total Penta CDF	pg/g	62.1	0.141	1.00	0.0400			10	4091157
Total Hexa CDF	pg/g	188	0.100	1.00	0.0400			11	4091157
Total Hepta CDF	pg/g	206	0.103	1.00	0.0400			4	4091157
Confirmation 2,3,7,8-Tetra CDF	pg/g	1.25	0.19	1.0	0.90	0.100	0.125		4203313
TOTAL TOXIC EQUIVALENCY	pg/g						22.2		

RDL = Reportable Detection Limit

EDL = Estimated Detection Limit

QC Batch = Quality Control Batch

\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B5C4634  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5F0658

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ANG978							
Sampling Date		2015/06/22 09:00							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI019-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	92							4091157
C13-1234678 HeptaCDD	%	105							4091157
C13-1234678 HeptaCDF **	%	95							4091157
C13-123478 HexaCDD	%	88							4091157
C13-123478 HexaCDF	%	82							4091157
C13-1234789 HeptaCDF	%	93							4091157
C13-123678 HexaCDD	%	85							4091157
C13-123678 HexaCDF	%	89							4091157
C13-12378 PentaCDD	%	91							4091157
C13-12378 PentaCDF	%	82							4091157
C13-123789 HexaCDF	%	91							4091157
C13-234678 HexaCDF	%	87							4091157
C13-23478 PentaCDF	%	103							4091157
C13-2378 TetraCDD	%	79							4091157
C13-2378 TetraCDF	%	89							4091157
C13-OCDD	%	133							4091157
Confirmation C13-2378 TetraCDF	%	69							4203313

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B5C4634  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5F0658

**Test Summary**

**Maxxam ID** ANG978  
**Sample ID** ISM-AOI019-0.5-AFTER ISM  
**Matrix** Soil

**Collected** 2015/06/22  
**Shipped**  
**Received** 2015/06/26

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4091157	2015/06/30	2015/07/04	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203313	N/A	2015/09/29	Leila Azzam
Moisture	BAL	4086742	N/A	2015/06/30	Valentina Kaftani

Maxxam Job #: B5C4634  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5F0658

Package 1	16.2°C
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Each temperature is the average of up to three cooler temperatures taken at receipt

**GENERAL COMMENTS**

Report revised to reflect addition of missed TCDF confirmations.

**Results relate only to the items tested.**

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5F0658  
P.O. #:  
Site Location:

**Quality Assurance Report**

Maxxam Job Number: GB5C4634

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
4086742 MYG	RPD - Sample/Sample						
	Dup	Moisture	2015/06/30	2.6		%	20
4091157 OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/07/03		86	%	35 - 197
	Spiked Blank DUP	37CL4 2378 Tetra CDD	2015/07/03		100	%	35 - 197
	Spiked Blank	C13-1234678 HeptaCDD	2015/07/03		94	%	23 - 140
	Spiked Blank DUP	C13-1234678 HeptaCDD	2015/07/03		104	%	23 - 140
	Spiked Blank	C13-1234678 HeptaCDF	2015/07/03		85	%	28 - 143
	Spiked Blank DUP	C13-1234678 HeptaCDF	2015/07/03		96	%	28 - 143
	Spiked Blank	C13-123478 HexaCDD	2015/07/03		81	%	32 - 141
	Spiked Blank DUP	C13-123478 HexaCDD	2015/07/03		91	%	32 - 141
	Spiked Blank	C13-123478 HexaCDF	2015/07/03		79	%	26 - 152
	Spiked Blank DUP	C13-123478 HexaCDF	2015/07/03		88	%	26 - 152
	Spiked Blank	C13-1234789 HeptaCDF	2015/07/03		79	%	26 - 138
	Spiked Blank DUP	C13-1234789 HeptaCDF	2015/07/03		82	%	26 - 138
	Spiked Blank	C13-123678 HexaCDD	2015/07/03		80	%	28 - 130
	Spiked Blank DUP	C13-123678 HexaCDD	2015/07/03		88	%	28 - 130
	Spiked Blank	C13-123678 HexaCDF	2015/07/03		85	%	26 - 123
	Spiked Blank DUP	C13-123678 HexaCDF	2015/07/03		93	%	26 - 123
	Spiked Blank	C13-12378 PentaCDD	2015/07/03		85	%	25 - 181
	Spiked Blank DUP	C13-12378 PentaCDD	2015/07/03		92	%	25 - 181
	Spiked Blank	C13-12378 PentaCDF	2015/07/03		74	%	24 - 185
	Spiked Blank DUP	C13-12378 PentaCDF	2015/07/03		77	%	24 - 185
	Spiked Blank	C13-123789 HexaCDF	2015/07/03		87	%	29 - 147
	Spiked Blank DUP	C13-123789 HexaCDF	2015/07/03		91	%	29 - 147
	Spiked Blank	C13-234678 HexaCDF	2015/07/03		79	%	28 - 136
	Spiked Blank DUP	C13-234678 HexaCDF	2015/07/03		88	%	28 - 136
	Spiked Blank	C13-23478 PentaCDF	2015/07/03		89	%	21 - 178
	Spiked Blank DUP	C13-23478 PentaCDF	2015/07/03		95	%	21 - 178
	Spiked Blank	C13-2378 TetraCDD	2015/07/03		78	%	25 - 164
	Spiked Blank DUP	C13-2378 TetraCDD	2015/07/03		87	%	25 - 164
	Spiked Blank	C13-2378 TetraCDF	2015/07/03		82	%	24 - 169
	Spiked Blank DUP	C13-2378 TetraCDF	2015/07/03		85	%	24 - 169
	Spiked Blank	C13-OCDD	2015/07/03		110	%	17 - 157
	Spiked Blank DUP	C13-OCDD	2015/07/03		136	%	17 - 157
	Spiked Blank	2,3,7,8-Tetra CDD	2015/07/03		109	%	67 - 158
	Spiked Blank DUP	2,3,7,8-Tetra CDD	2015/07/03		108	%	67 - 158
	RPD	2,3,7,8-Tetra CDD	2015/07/03	0.92		%	25
	Spiked Blank	1,2,3,7,8-Penta CDD	2015/07/03		111	%	25 - 181
	Spiked Blank DUP	1,2,3,7,8-Penta CDD	2015/07/03		108	%	25 - 181
	RPD	1,2,3,7,8-Penta CDD	2015/07/03	2.7		%	25
	Spiked Blank	1,2,3,4,7,8-Hexa CDD	2015/07/03		117	%	70 - 164
	Spiked Blank DUP	1,2,3,4,7,8-Hexa CDD	2015/07/03		113	%	70 - 164
	RPD	1,2,3,4,7,8-Hexa CDD	2015/07/03	3.5		%	25
	Spiked Blank	1,2,3,6,7,8-Hexa CDD	2015/07/03		125	%	76 - 134
	Spiked Blank DUP	1,2,3,6,7,8-Hexa CDD	2015/07/03		122	%	76 - 134
	RPD	1,2,3,6,7,8-Hexa CDD	2015/07/03	2.4		%	25
	Spiked Blank	1,2,3,7,8,9-Hexa CDD	2015/07/03		137	%	64 - 162
	Spiked Blank DUP	1,2,3,7,8,9-Hexa CDD	2015/07/03		128	%	64 - 162
	RPD	1,2,3,7,8,9-Hexa CDD	2015/07/03	6.8		%	25
	Spiked Blank	1,2,3,4,6,7,8-Hepta CDD	2015/07/03		108	%	70 - 140
	Spiked Blank DUP	1,2,3,4,6,7,8-Hepta CDD	2015/07/03		106	%	70 - 140
	RPD	1,2,3,4,6,7,8-Hepta CDD	2015/07/03	1.9		%	25
	Spiked Blank	Octa CDD	2015/07/03		90	%	78 - 144
	Spiked Blank DUP	Octa CDD	2015/07/03		87	%	78 - 144

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5F0658  
P.O. #:  
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: GB5C4634

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
4091157 OBC	RPD	Octa CDD	2015/07/03	3.4		%	25
	Spiked Blank	2,3,7,8-Tetra CDF	2015/07/03		110	%	75 - 158
	Spiked Blank DUP	2,3,7,8-Tetra CDF	2015/07/03		106	%	75 - 158
	RPD	2,3,7,8-Tetra CDF	2015/07/03	3.7		%	25
	Spiked Blank	1,2,3,7,8-Penta CDF	2015/07/03		118	%	80 - 134
	Spiked Blank DUP	1,2,3,7,8-Penta CDF	2015/07/03		116	%	80 - 134
	RPD	1,2,3,7,8-Penta CDF	2015/07/03	1.7		%	25
	Spiked Blank	2,3,4,7,8-Penta CDF	2015/07/03		104	%	68 - 160
	Spiked Blank DUP	2,3,4,7,8-Penta CDF	2015/07/03		100	%	68 - 160
	RPD	2,3,4,7,8-Penta CDF	2015/07/03	3.9		%	25
	Spiked Blank	1,2,3,4,7,8-Hexa CDF	2015/07/03		121	%	72 - 134
	Spiked Blank DUP	1,2,3,4,7,8-Hexa CDF	2015/07/03		118	%	72 - 134
	RPD	1,2,3,4,7,8-Hexa CDF	2015/07/03	2.5		%	25
	Spiked Blank	1,2,3,6,7,8-Hexa CDF	2015/07/03		116	%	84 - 130
	Spiked Blank DUP	1,2,3,6,7,8-Hexa CDF	2015/07/03		114	%	84 - 130
	RPD	1,2,3,6,7,8-Hexa CDF	2015/07/03	1.7		%	25
	Spiked Blank	2,3,4,6,7,8-Hexa CDF	2015/07/03		118	%	70 - 156
	Spiked Blank DUP	2,3,4,6,7,8-Hexa CDF	2015/07/03		116	%	70 - 156
	RPD	2,3,4,6,7,8-Hexa CDF	2015/07/03	1.7		%	25
	Spiked Blank	1,2,3,7,8,9-Hexa CDF	2015/07/03		114	%	78 - 130
	Spiked Blank DUP	1,2,3,7,8,9-Hexa CDF	2015/07/03		110	%	78 - 130
	RPD	1,2,3,7,8,9-Hexa CDF	2015/07/03	3.6		%	25
	Spiked Blank	1,2,3,4,6,7,8-Hepta CDF	2015/07/03		114	%	82 - 122
	Spiked Blank DUP	1,2,3,4,6,7,8-Hepta CDF	2015/07/03		111	%	82 - 122
	RPD	1,2,3,4,6,7,8-Hepta CDF	2015/07/03	2.7		%	25
	Spiked Blank	1,2,3,4,7,8,9-Hepta CDF	2015/07/03		119	%	78 - 138
	Spiked Blank DUP	1,2,3,4,7,8,9-Hepta CDF	2015/07/03		113	%	78 - 138
	RPD	1,2,3,4,7,8,9-Hepta CDF	2015/07/03	5.2		%	25
	Spiked Blank	Octa CDF	2015/07/03		86	%	63 - 170
	Spiked Blank DUP	Octa CDF	2015/07/03		71	%	63 - 170
	RPD	Octa CDF	2015/07/03	19		%	25
	Method Blank	37CL4 2378 Tetra CDD	2015/07/03		91	%	35 - 197
		C13-1234678 HeptaCDD	2015/07/03		93	%	23 - 140
		C13-1234678 HeptaCDF	2015/07/03		85	%	28 - 143
		C13-123478 HexaCDD	2015/07/03		78	%	32 - 141
		C13-123478 HexaCDF	2015/07/03		78	%	26 - 152
		C13-1234789 HeptaCDF	2015/07/03		81	%	26 - 138
		C13-123678 HexaCDD	2015/07/03		80	%	28 - 130
		C13-123678 HexaCDF	2015/07/03		84	%	26 - 123
		C13-12378 PentaCDD	2015/07/03		81	%	25 - 181
		C13-12378 PentaCDF	2015/07/03		69	%	24 - 185
		C13-123789 HexaCDF	2015/07/03		85	%	29 - 147
		C13-234678 HexaCDF	2015/07/03		79	%	28 - 136
		C13-23478 PentaCDF	2015/07/03		83	%	21 - 178
		C13-2378 TetraCDD	2015/07/03		78	%	25 - 164
		C13-2378 TetraCDF	2015/07/03		82	%	24 - 169
		C13-OCDD	2015/07/03		115	%	17 - 157
		2,3,7,8-Tetra CDD	2015/07/03	<0.0919, EDL=0.0919		pg/g	
		1,2,3,7,8-Penta CDD	2015/07/03	<0.120, EDL=0.120		pg/g	
		1,2,3,4,7,8-Hexa CDD	2015/07/03	<0.106, EDL=0.106		pg/g	
		1,2,3,6,7,8-Hexa CDD	2015/07/03	<0.111, EDL=0.111		pg/g	
		1,2,3,7,8,9-Hexa CDD	2015/07/03	<0.111, EDL=0.111		pg/g	
		1,2,3,4,6,7,8-Hepta CDD	2015/07/03	<0.0888, EDL=0.0888		pg/g	
		Octa CDD	2015/07/03	0.308, EDL=0.125		pg/g	
		Total Tetra CDD	2015/07/03	<0.0919, EDL=0.0919		pg/g	

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5F0658  
P.O. #:  
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: GB5C4634

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
4091157 OBC	Method Blank	Total Penta CDD	2015/07/03	<0.120, EDL=0.120		pg/g	
		Total Hexa CDD	2015/07/03	<0.110, EDL=0.110		pg/g	
		Total Hepta CDD	2015/07/03	<0.0888, EDL=0.0888		pg/g	
		2,3,7,8-Tetra CDF	2015/07/03	<0.0643, EDL=0.0643		pg/g	
		1,2,3,7,8-Penta CDF	2015/07/03	<0.0889, EDL=0.0889		pg/g	
		2,3,4,7,8-Penta CDF	2015/07/03	<0.0865, EDL=0.0865		pg/g	
		1,2,3,4,7,8-Hexa CDF	2015/07/03	<0.0671, EDL=0.0671		pg/g	
		1,2,3,6,7,8-Hexa CDF	2015/07/03	<0.0699, EDL=0.0699		pg/g	
		2,3,4,6,7,8-Hexa CDF	2015/07/03	<0.0634, EDL=0.0634		pg/g	
		1,2,3,7,8,9-Hexa CDF	2015/07/03	<0.0676, EDL=0.0676		pg/g	
		1,2,3,4,6,7,8-Hepta CDF	2015/07/03	<0.115, EDL=0.115		pg/g	
		1,2,3,4,7,8,9-Hepta CDF	2015/07/03	<0.115, EDL=0.115		pg/g	
		Octa CDF	2015/07/03	<0.124, EDL=0.124		pg/g	
		Total Tetra CDF	2015/07/03	<0.0643, EDL=0.0643		pg/g	
		Total Penta CDF	2015/07/03	<0.0877, EDL=0.0877		pg/g	
		Total Hexa CDF	2015/07/03	<0.0669, EDL=0.0669		pg/g	
		Total Hepta CDF	2015/07/03	<0.115, EDL=0.115		pg/g	
		4203313 LAZ	Method Blank	Confirmation C13-2378 TetraCDF	2015/09/29		92
Confirmation 2,3,7,8-Tetra CDF	2015/09/29			<0.12, EDL=0.12		pg/g	
RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF		2015/09/29	NC		%	100

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.  
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.  
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.  
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.  
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

**Validation Signature Page**

**Maxxam Job #: B5C4634**

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The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



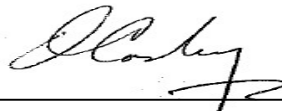
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Branko Vrzic, A.S.C.T., Senior Analyst, HRMS Services



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Cristina Carriere, Scientific Services



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Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.





Your Project #: A5E0713  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/07/08**  
Report #: R3566542  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5C7784**

**Received: 2015/07/02, 08:00**

Sample Matrix: Soil  
# Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2015/07/04	2015/07/06	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation in Soil	1	N/A	2015/07/07	BRL SOP-00406	EPA 8290A m
Moisture	1	N/A	2015/07/03	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B5C7784  
Report Date: 2015/07/08

Apex Laboratories  
Client Project #: A5E0713

**RESULTS OF ANALYSES OF SOIL**

<b>Maxxam ID</b>		ANW939			
<b>Sampling Date</b>		2015/05/21 16:20			
<b>COC Number</b>		na			
	<b>Units</b>	<b>SBS-ROW026-1.0</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	29	1.0	1.0	4090646
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					

Maxxam Job #: B5C7784  
Report Date: 2015/07/08

Apex Laboratories  
Client Project #: A5E0713

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ANW939							
Sampling Date		2015/05/21 16:20							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SBS-ROW026-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.566	0.101	0.200	0.0400	1.00	0.566		4093368
1,2,3,7,8-Penta CDD *	pg/g	3.50	0.107	1.00	0.0400	1.00	3.50		4093368
1,2,3,4,7,8-Hexa CDD *	pg/g	7.46	0.0997	1.00	0.0400	0.100	0.746		4093368
1,2,3,6,7,8-Hexa CDD *	pg/g	36.2	0.105	1.00	0.0400	0.100	3.62		4093368
1,2,3,7,8,9-Hexa CDD *	pg/g	23.3	0.104	1.00	0.0400	0.100	2.33		4093368
1,2,3,4,6,7,8-Hepta CDD *	pg/g	653	0.106	1.00	0.0400	0.0100	6.53		4093368
Octa CDD *	pg/g	3190	0.109	2.00	0.0800	0.000300	0.957		4093368
Total Tetra CDD *	pg/g	5.07	0.101	0.200	0.0400			10	4093368
Total Penta CDD *	pg/g	19.4	0.107	1.00	0.0400			10	4093368
Total Hexa CDD *	pg/g	181	0.103	1.00	0.0400			6	4093368
Total Hepta CDD *	pg/g	1100	0.106	1.00	0.0400			2	4093368
2,3,7,8-Tetra CDF **	pg/g	2.11	0.103	0.200	0.0400	0.100	0.211		4093368
1,2,3,7,8-Penta CDF **	pg/g	2.43	0.110	1.00	0.0400	0.0300	0.0729		4093368
2,3,4,7,8-Penta CDF **	pg/g	3.09	0.107	1.00	0.0400	0.300	0.927		4093368
1,2,3,4,7,8-Hexa CDF **	pg/g	16.1	0.102	1.00	0.0400	0.100	1.61		4093368
1,2,3,6,7,8-Hexa CDF **	pg/g	7.05	0.107	1.00	0.0400	0.100	0.705		4093368
2,3,4,6,7,8-Hexa CDF **	pg/g	4.12	0.0968	1.00	0.0400	0.100	0.412		4093368
1,2,3,7,8,9-Hexa CDF **	pg/g	0.284	0.103	1.00	0.0400	0.100	0.0284		4093368
1,2,3,4,6,7,8-Hepta CDF **	pg/g	131	0.103	1.00	0.0400	0.0100	1.31		4093368
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.46	0.103	1.00	0.0400	0.0100	0.0646		4093368
Octa CDF **	pg/g	102	0.108	2.00	0.0800	0.000300	0.0306		4093368
Total Tetra CDF **	pg/g	12.8	0.103	0.200	0.0400			13	4093368
Total Penta CDF **	pg/g	37.0	0.108	1.00	0.0400			11	4093368
Total Hexa CDF **	pg/g	201	0.102	1.00	0.0400			11	4093368
Total Hepta CDF **	pg/g	309	0.103	1.00	0.0400			4	4093368
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.52	0.12	1.0	0.90	0.100	0.152		4095053
TOTAL TOXIC EQUIVALENCY	pg/g						23.6		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	98							4093368
C13-1234678 HeptaCDD *	%	102							4093368
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

Maxxam Job #: B5C7784  
Report Date: 2015/07/08

Apex Laboratories  
Client Project #: A5E0713

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ANW939							
Sampling Date		2015/05/21 16:20							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SBS-ROW026-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	96							4093368
C13-123478 HexaCDD *	%	83							4093368
C13-123478 HexaCDF **	%	83							4093368
C13-1234789 HeptaCDF **	%	89							4093368
C13-123678 HexaCDD *	%	82							4093368
C13-123678 HexaCDF **	%	91							4093368
C13-12378 PentaCDD *	%	87							4093368
C13-12378 PentaCDF **	%	84							4093368
C13-123789 HexaCDF **	%	92							4093368
C13-234678 HexaCDF **	%	86							4093368
C13-23478 PentaCDF **	%	101							4093368
C13-2378 TetraCDD *	%	85							4093368
C13-2378 TetraCDF **	%	95							4093368
C13-OCDD *	%	126							4093368
Confirmation C13-2378 TetraCDF **	%	91							4095053

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

Maxxam Job #: B5C7784  
Report Date: 2015/07/08

Apex Laboratories  
Client Project #: A5E0713

**TEST SUMMARY**

**Maxxam ID:** ANW939  
**Sample ID:** SBS-ROW026-1.0  
**Matrix:** Soil

**Collected:** 2015/05/21  
**Shipped:**  
**Received:** 2015/07/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4093368	2015/07/04	2015/07/06	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4095053	N/A	2015/07/07	Vica Cioranic
Moisture	BAL	4090646	N/A	2015/07/03	Min Yang

**Maxxam ID:** ANW939 Dup  
**Sample ID:** SBS-ROW026-1.0  
**Matrix:** Soil

**Collected:** 2015/05/21  
**Shipped:**  
**Received:** 2015/07/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4090646	N/A	2015/07/03	Min Yang

Maxxam Job #: B5C7784  
Report Date: 2015/07/08

Apex Laboratories  
Client Project #: A5E0713

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.6°C
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**Results relate only to the items tested.**

Maxxam Job #: B5C7784  
Report Date: 2015/07/08

Apex Laboratories  
Client Project #: A5E0713

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
4090646	MYG	RPD - Sample/Sample Dup	Moisture	2015/07/03	4.4		%	20
4093368	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/07/06		90	%	35 - 197
			C13-1234678 HeptaCDD	2015/07/06		99	%	23 - 140
			C13-1234678 HeptaCDF	2015/07/06		93	%	28 - 143
			C13-123478 HexaCDD	2015/07/06		83	%	32 - 141
			C13-123478 HexaCDF	2015/07/06		83	%	26 - 152
			C13-1234789 HeptaCDF	2015/07/06		86	%	26 - 138
			C13-123678 HexaCDD	2015/07/06		85	%	28 - 130
			C13-123678 HexaCDF	2015/07/06		92	%	26 - 123
			C13-12378 PentaCDD	2015/07/06		84	%	25 - 181
			C13-12378 PentaCDF	2015/07/06		81	%	24 - 185
			C13-123789 HexaCDF	2015/07/06		92	%	29 - 147
			C13-234678 HexaCDF	2015/07/06		85	%	28 - 136
			C13-23478 PentaCDF	2015/07/06		98	%	21 - 178
			C13-2378 TetraCDD	2015/07/06		85	%	25 - 164
			C13-2378 TetraCDF	2015/07/06		93	%	24 - 169
			C13-OCDD	2015/07/06		103	%	17 - 157
			2,3,7,8-Tetra CDD	2015/07/06		110	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/07/06		96	%	70 - 142
			1,2,3,4,7,8-Hexa CDD	2015/07/06		96	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/07/06		96	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/07/06		100	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/07/06		92	%	70 - 140
			Octa CDD	2015/07/06		98	%	78 - 144
			2,3,7,8-Tetra CDF	2015/07/06		96	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/07/06		95	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/07/06		98	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/07/06		96	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/07/06		99	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/07/06		96	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/07/06		95	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/07/06		97	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/07/06		98	%	78 - 138
			Octa CDF	2015/07/06		104	%	63 - 170
4093368	OBC	RPD	2,3,7,8-Tetra CDD	2015/07/06	3.6		%	25
			1,2,3,7,8-Penta CDD	2015/07/06	4.1		%	25
			1,2,3,4,7,8-Hexa CDD	2015/07/06	2.1		%	25
			1,2,3,6,7,8-Hexa CDD	2015/07/06	3.1		%	25
			1,2,3,7,8,9-Hexa CDD	2015/07/06	3.9		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/07/06	6.3		%	25
			Octa CDD	2015/07/06	2.0		%	25
			2,3,7,8-Tetra CDF	2015/07/06	5.1		%	25
			1,2,3,7,8-Penta CDF	2015/07/06	2.1		%	25
			2,3,4,7,8-Penta CDF	2015/07/06	2.0		%	25
			1,2,3,4,7,8-Hexa CDF	2015/07/06	3.1		%	25
			1,2,3,6,7,8-Hexa CDF	2015/07/06	1.0		%	25
			2,3,4,6,7,8-Hexa CDF	2015/07/06	1.0		%	25
			1,2,3,7,8,9-Hexa CDF	2015/07/06	4.1		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/07/06	2.0		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/07/06	2.0		%	25
			Octa CDF	2015/07/06	3.9		%	25
4093368	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/07/06		84	%	35 - 197
			C13-1234678 HeptaCDD	2015/07/06		89	%	23 - 140
			C13-1234678 HeptaCDF	2015/07/06		88	%	28 - 143

Maxxam Job #: B5C7784  
Report Date: 2015/07/08

Apex Laboratories  
Client Project #: A5E0713

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			C13-123478 HexaCDD	2015/07/06		75	%	32 - 141
			C13-123478 HexaCDF	2015/07/06		77	%	26 - 152
			C13-1234789 HeptaCDF	2015/07/06		75	%	26 - 138
			C13-123678 HexaCDD	2015/07/06		83	%	28 - 130
			C13-123678 HexaCDF	2015/07/06		84	%	26 - 123
			C13-12378 PentaCDD	2015/07/06		85	%	25 - 181
			C13-12378 PentaCDF	2015/07/06		78	%	24 - 185
			C13-123789 HexaCDF	2015/07/06		87	%	29 - 147
			C13-234678 HexaCDF	2015/07/06		80	%	28 - 136
			C13-23478 PentaCDF	2015/07/06		95	%	21 - 178
			C13-2378 TetraCDD	2015/07/06		76	%	25 - 164
			C13-2378 TetraCDF	2015/07/06		81	%	24 - 169
			C13-OCDD	2015/07/06		97	%	17 - 157
			2,3,7,8-Tetra CDD	2015/07/06	<0.105, EDL=0.105		pg/g	
			1,2,3,7,8-Penta CDD	2015/07/06	<0.101, EDL=0.101		pg/g	
			1,2,3,4,7,8-Hexa CDD	2015/07/06	<0.0996, EDL=0.0996		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/07/06	<0.105, EDL=0.105		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/07/06	<0.104, EDL=0.104		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/07/06	<0.106, EDL=0.106		pg/g	
			Octa CDD	2015/07/06	<0.105, EDL=0.105		pg/g	
			Total Tetra CDD	2015/07/06	<0.105, EDL=0.105		pg/g	
			Total Penta CDD	2015/07/06	<0.101, EDL=0.101		pg/g	
			Total Hexa CDD	2015/07/06	<0.103, EDL=0.103		pg/g	
			Total Hepta CDD	2015/07/06	<0.106, EDL=0.106		pg/g	
			2,3,7,8-Tetra CDF	2015/07/06	<0.108, EDL=0.108		pg/g	
			1,2,3,7,8-Penta CDF	2015/07/06	<0.110, EDL=0.110		pg/g	
			2,3,4,7,8-Penta CDF	2015/07/06	<0.107, EDL=0.107		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/07/06	<0.102, EDL=0.102		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/07/06	<0.107, EDL=0.107		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/07/06	<0.0968, EDL=0.0968		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/07/06	<0.103, EDL=0.103		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/07/06	<0.107, EDL=0.107		pg/g	



Maxxam Job #: B5C7784  
Report Date: 2015/07/08

Apex Laboratories  
Client Project #: A5E0713

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			1,2,3,4,7,8,9-Hepta CDF	2015/07/06	<0.106, EDL=0.106		pg/g	
			Octa CDF	2015/07/06	<0.106, EDL=0.106		pg/g	
			Total Tetra CDF	2015/07/06	<0.108, EDL=0.108		pg/g	
			Total Penta CDF	2015/07/06	<0.109, EDL=0.109		pg/g	
			Total Hexa CDF	2015/07/06	<0.102, EDL=0.102		pg/g	
			Total Hepta CDF	2015/07/06	<0.107, EDL=0.107		pg/g	
4095053	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/07/07	<0.11, EDL=0.11		pg/g	
			Confirmation C13-2378 TetraCDF	2015/07/07		81	%	40 - 135

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

Maxxam Job #: B5C7784  
Report Date: 2015/07/08

Apex Laboratories  
Client Project #: A5E0713

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

---

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Your Project #: A5F0363  
Your C.O.C. #: NA

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/10/06**  
Report #: R3712161  
Version: 2 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B5D4823**

**Received: 2015/07/10, 12:09**

Sample Matrix: Soil  
# Samples Received: 9

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	6	2015/07/13	2015/07/17	BRL SOP-00410	EPA 1613B m
Dioxins/Furans in Soil (1613B) (1)	1	2015/07/13	2015/07/18	BRL SOP-00410	EPA 1613B m
Dioxins/Furans in Soil (1613B) (1)	2	2015/07/13	2015/07/24	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	6	N/A	2015/07/21	BRL SOP-00406	EPA M8290A / M1613
2378TCDF Confirmation (M8290A/M1613)	2	N/A	2015/07/24	BRL SOP-00406	EPA M8290A / M1613
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2015/09/25	BRL SOP-00406	EPA M8290A / M1613
Moisture	9	N/A	2015/07/13	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT

Email: MDiGrazia@maxxam.ca

Phone# (905) 817-5700

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		APH343	APH344	APH345	APH346	APH347			
Sampling Date		2015/06/08 08:05	2015/06/08 08:50	2015/06/08 09:35	2015/06/08 10:15	2015/06/08 10:55			
COC Number		NA	NA	NA	NA	NA			
	<b>UNITS</b>	<b>SBS-ROW013-1.0</b>	<b>SBS-ROW005-1.0</b>	<b>SBS-ROW019-1.0</b>	<b>SBS-ROW022-1.0</b>	<b>SBS-ROW016-1.0</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	12	9.5	11	19	17	1.0	0.50	4102231
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									

Maxxam ID		APH348	APH349	APH350	APH351			
Sampling Date		2015/06/08 11:45	2015/06/08 12:25	2015/06/08 13:15	2015/06/08 13:55			
COC Number		NA	NA	NA	NA			
	<b>UNITS</b>	<b>SBS-ROW025-1.0</b>	<b>SBS-ROW029B-1.0</b>	<b>SBS-ROW023-1.0</b>	<b>SBS-ROW018-1.0</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	17	13	15	14	1.0	0.50	4102231
RDL = Reportable Detection Limit QC Batch = Quality Control Batch								

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH343							
Sampling Date		2015/06/08 08:05							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW013-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<2.00	2.00	3.99	0.0399	1.00	2.00		4106052
1,2,3,7,8-Penta CDD *	pg/g	16.3	2.02	19.9	0.0399	1.00	16.3		4106052
1,2,3,4,7,8-Hexa CDD *	pg/g	50.5	1.92	19.9	0.0399	0.100	5.05		4106052
1,2,3,6,7,8-Hexa CDD *	pg/g	367	2.04	19.9	0.0399	0.100	36.7		4106052
1,2,3,7,8,9-Hexa CDD *	pg/g	142	2.05	19.9	0.0399	0.100	14.2		4106052
1,2,3,4,6,7,8-Hepta CDD *	pg/g	7280	2.00	19.9	0.0399	0.0100	72.8		4106052
Octa CDD *	pg/g	38300	2.02	39.9	0.0798	0.000300	11.5		4106052
Total Tetra CDD *	pg/g	<2.00	2.00	3.99	0.0399			0	4106052
Total Penta CDD *	pg/g	48.0	2.02	19.9	0.0399			7	4106052
Total Hexa CDD *	pg/g	1330	2.04	19.9	0.0399			7	4106052
Total Hepta CDD *	pg/g	11800	2.00	19.9	0.0399			2	4106052
2,3,7,8-Tetra CDF **	pg/g	9.96	2.04	3.99	0.0399	0.100	0.996		4106052
1,2,3,7,8-Penta CDF **	pg/g	37.4 (1)	2.02	19.9	0.0399	0.0300	1.12		4106052
2,3,4,7,8-Penta CDF **	pg/g	63.0	2.00	19.9	0.0399	0.300	18.9		4106052
1,2,3,4,7,8-Hexa CDF **	pg/g	331	2.01	19.9	0.0399	0.100	33.1		4106052
1,2,3,6,7,8-Hexa CDF **	pg/g	107	2.10	19.9	0.0399	0.100	10.7		4106052
2,3,4,6,7,8-Hexa CDF **	pg/g	66.7	1.96	19.9	0.0399	0.100	6.67		4106052
1,2,3,7,8,9-Hexa CDF **	pg/g	5.01	2.08	19.9	0.0399	0.100	0.501		4106052
1,2,3,4,6,7,8-Hepta CDF **	pg/g	1080	2.06	19.9	0.0399	0.0100	10.8		4106052
1,2,3,4,7,8,9-Hepta CDF **	pg/g	68.2	2.01	19.9	0.0399	0.0100	0.682		4106052
Octa CDF **	pg/g	531	2.05	39.9	0.0798	0.000300	0.159		4106052
Total Tetra CDF **	pg/g	15.3	2.04	3.99	0.0399			3	4106052
Total Penta CDF **	pg/g	423	2.01	19.9	0.0399			9	4106052
Total Hexa CDF **	pg/g	2180	2.04	19.9	0.0399			10	4106052
Total Hepta CDF **	pg/g	2870	2.04	19.9	0.0399			4	4106052
Confirmation 2,3,7,8-Tetra CDF **	pg/g	11.5	0.11	1.0	0.90	0.100	1.15		4115506
TOTAL TOXIC EQUIVALENCY	pg/g						242		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	107							4106052
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) Archived portion analyzed at x20dilution									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH343							
Sampling Date		2015/06/08 08:05							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW013-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	117							4106052
C13-1234678 HeptaCDF **	%	74							4106052
C13-123478 HexaCDD *	%	95							4106052
C13-123478 HexaCDF **	%	66							4106052
C13-1234789 HeptaCDF **	%	98							4106052
C13-123678 HexaCDD *	%	98							4106052
C13-123678 HexaCDF **	%	84							4106052
C13-12378 PentaCDD *	%	104							4106052
C13-12378 PentaCDF **	%	98							4106052
C13-123789 HexaCDF **	%	103							4106052
C13-234678 HexaCDF **	%	93							4106052
C13-23478 PentaCDF **	%	113							4106052
C13-2378 TetraCDD *	%	78							4106052
C13-2378 TetraCDF **	%	73							4106052
C13-OCDD *	%	148							4106052
Confirmation C13-2378 TetraCDF **	%	88 (1)							4115506

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) Recovery meets EPA 1613B criteria

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH344							
Sampling Date		2015/06/08 08:50							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW005-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.503	0.503	1.00	0.0400	1.00	0.503		4106052
1,2,3,7,8-Penta CDD *	pg/g	5.05	0.520	5.00	0.0400	1.00	5.05		4106052
1,2,3,4,7,8-Hexa CDD *	pg/g	13.6	0.473	5.00	0.0400	0.100	1.36		4106052
1,2,3,6,7,8-Hexa CDD *	pg/g	59.1	0.504	5.00	0.0400	0.100	5.91		4106052
1,2,3,7,8,9-Hexa CDD *	pg/g	35.8	0.505	5.00	0.0400	0.100	3.58		4106052
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1230	0.505	5.00	0.0400	0.0100	12.3		4106052
Octa CDD *	pg/g	6600	0.503	10.0	0.0800	0.000300	1.98		4106052
Total Tetra CDD *	pg/g	<0.583 (1)	0.583	1.00	0.0400			0	4106052
Total Penta CDD *	pg/g	24.2	0.520	5.00	0.0400			9	4106052
Total Hexa CDD *	pg/g	294	0.502	5.00	0.0400			7	4106052
Total Hepta CDD *	pg/g	2100	0.505	5.00	0.0400			2	4106052
2,3,7,8-Tetra CDF **	pg/g	1.83	0.502	1.00	0.0400	0.100	0.183		4106052
1,2,3,7,8-Penta CDF **	pg/g	2.68	0.505	5.00	0.0400	0.0300	0.0804		4106052
2,3,4,7,8-Penta CDF **	pg/g	4.10	0.500	5.00	0.0400	0.300	1.23		4106052
1,2,3,4,7,8-Hexa CDF **	pg/g	24.0	0.498	5.00	0.0400	0.100	2.40		4106052
1,2,3,6,7,8-Hexa CDF **	pg/g	11.0	0.518	5.00	0.0400	0.100	1.10		4106052
2,3,4,6,7,8-Hexa CDF **	pg/g	7.90	0.485	5.00	0.0400	0.100	0.790		4106052
1,2,3,7,8,9-Hexa CDF **	pg/g	0.667	0.514	5.00	0.0400	0.100	0.0667		4106052
1,2,3,4,6,7,8-Hepta CDF **	pg/g	175	0.508	5.00	0.0400	0.0100	1.75		4106052
1,2,3,4,7,8,9-Hepta CDF **	pg/g	11.4	0.497	5.00	0.0400	0.0100	0.114		4106052
Octa CDF **	pg/g	210	0.503	10.0	0.0800	0.000300	0.0630		4106052
Total Tetra CDF **	pg/g	6.54	0.502	1.00	0.0400			6	4106052
Total Penta CDF **	pg/g	55.4	0.502	5.00	0.0400			8	4106052
Total Hexa CDF **	pg/g	308	0.503	5.00	0.0400			10	4106052
Total Hepta CDF **	pg/g	474	0.503	5.00	0.0400			4	4106052
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.60 (2)	0.11	1.0	0.90	0.100	0.160		4115506
TOTAL TOXIC EQUIVALENCY	pg/g						38.4		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.  
(2) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		APH344							
<b>Sampling Date</b>		2015/06/08 08:50							
<b>COC Number</b>		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>SBS-ROW005-1.0</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	98							4106052
C13-1234678 HeptaCDD *	%	92							4106052
C13-1234678 HeptaCDF **	%	80							4106052
C13-123478 HexaCDD *	%	76							4106052
C13-123478 HexaCDF **	%	72							4106052
C13-1234789 HeptaCDF **	%	79							4106052
C13-123678 HexaCDD *	%	78							4106052
C13-123678 HexaCDF **	%	77							4106052
C13-12378 PentaCDD *	%	84							4106052
C13-12378 PentaCDF **	%	82							4106052
C13-123789 HexaCDF **	%	79							4106052
C13-234678 HexaCDF **	%	74							4106052
C13-23478 PentaCDF **	%	90							4106052
C13-2378 TetraCDD *	%	75							4106052
C13-2378 TetraCDF **	%	81							4106052
C13-OCDD *	%	113							4106052
Confirmation C13-2378 TetraCDF **	%	100							4115506

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan



### DIOXINS AND FURANS BY HRMS (SOIL)

Maxxam ID		APH345							
Sampling Date		2015/06/08 09:35							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW019-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.333	0.126	0.199	0.0398	1.00	0.333		4106052
1,2,3,7,8-Penta CDD *	pg/g	1.66	0.130	0.995	0.0398	1.00	1.66		4106052
1,2,3,4,7,8-Hexa CDD *	pg/g	4.82	0.117	0.995	0.0398	0.100	0.482		4106052
1,2,3,6,7,8-Hexa CDD *	pg/g	24.1	0.123	0.995	0.0398	0.100	2.41		4106052
1,2,3,7,8,9-Hexa CDD *	pg/g	13.2	0.120	0.995	0.0398	0.100	1.32		4106052
1,2,3,4,6,7,8-Hepta CDD *	pg/g	437	0.118	0.995	0.0398	0.0100	4.37		4106052
Octa CDD *	pg/g	2400	0.105	1.99	0.0796	0.000300	0.720		4106052
Total Tetra CDD *	pg/g	0.892	0.126	0.199	0.0398			3	4106052
Total Penta CDD *	pg/g	6.57	0.130	0.995	0.0398			8	4106052
Total Hexa CDD *	pg/g	103	0.120	0.995	0.0398			7	4106052
Total Hepta CDD *	pg/g	735	0.118	0.995	0.0398			2	4106052
2,3,7,8-Tetra CDF **	pg/g	0.668	0.144	0.199	0.0398	0.100	0.0668		4106052
1,2,3,7,8-Penta CDF **	pg/g	1.62	0.134	0.995	0.0398	0.0300	0.0486		4106052
2,3,4,7,8-Penta CDF **	pg/g	2.55	0.132	0.995	0.0398	0.300	0.765		4106052
1,2,3,4,7,8-Hexa CDF **	pg/g	16.2	0.130	0.995	0.0398	0.100	1.62		4106052
1,2,3,6,7,8-Hexa CDF **	pg/g	6.27	0.132	0.995	0.0398	0.100	0.627		4106052
2,3,4,6,7,8-Hexa CDF **	pg/g	3.78	0.123	0.995	0.0398	0.100	0.378		4106052
1,2,3,7,8,9-Hexa CDF **	pg/g	0.240	0.127	0.995	0.0398	0.100	0.0240		4106052
1,2,3,4,6,7,8-Hepta CDF **	pg/g	69.1	0.117	0.995	0.0398	0.0100	0.691		4106052
1,2,3,4,7,8,9-Hepta CDF **	pg/g	4.74	0.117	0.995	0.0398	0.0100	0.0474		4106052
Octa CDF **	pg/g	46.3	0.123	1.99	0.0796	0.000300	0.0139		4106052
Total Tetra CDF **	pg/g	4.26	0.144	0.199	0.0398			6	4106052
Total Penta CDF **	pg/g	48.2	0.133	0.995	0.0398			9	4106052
Total Hexa CDF **	pg/g	163	0.128	0.995	0.0398			10	4106052
Total Hepta CDF **	pg/g	178	0.117	0.995	0.0398			4	4106052
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.64	0.11	1.0	0.90	0.100	0.0640		4205624
TOTAL TOXIC EQUIVALENCY	pg/g						15.6		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	97							4106052
C13-1234678 HeptaCDD *	%	95							4106052
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH345							
Sampling Date		2015/06/08 09:35							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW019-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	77							4106052
C13-123478 HexaCDD *	%	82							4106052
C13-123478 HexaCDF **	%	67							4106052
C13-1234789 HeptaCDF **	%	68							4106052
C13-123678 HexaCDD *	%	80							4106052
C13-123678 HexaCDF **	%	71							4106052
C13-12378 PentaCDD *	%	91							4106052
C13-12378 PentaCDF **	%	70							4106052
C13-123789 HexaCDF **	%	83							4106052
C13-234678 HexaCDF **	%	71							4106052
C13-23478 PentaCDF **	%	90							4106052
C13-2378 TetraCDD *	%	86							4106052
C13-2378 TetraCDF **	%	82							4106052
C13-OCDD *	%	110							4106052
Confirmation C13-2378 TetraCDF **	%	74							4205624

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH346							
Sampling Date		2015/06/08 10:15							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW022-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.352	0.140	0.200	0.0399	1.00	0.352		4106052
1,2,3,7,8-Penta CDD *	pg/g	3.54	0.130	0.998	0.0399	1.00	3.54		4106052
1,2,3,4,7,8-Hexa CDD *	pg/g	8.06	0.120	0.998	0.0399	0.100	0.806		4106052
1,2,3,6,7,8-Hexa CDD *	pg/g	36.5	0.126	0.998	0.0399	0.100	3.65		4106052
1,2,3,7,8,9-Hexa CDD *	pg/g	24.3	0.123	0.998	0.0399	0.100	2.43		4106052
1,2,3,4,6,7,8-Hepta CDD *	pg/g	600	0.116	0.998	0.0399	0.0100	6.00		4106052
Octa CDD *	pg/g	3000	0.126	2.00	0.0798	0.000300	0.900		4106052
Total Tetra CDD *	pg/g	3.38	0.140	0.200	0.0399			7	4106052
Total Penta CDD *	pg/g	18.9	0.130	0.998	0.0399			11	4106052
Total Hexa CDD *	pg/g	179	0.123	0.998	0.0399			7	4106052
Total Hepta CDD *	pg/g	1040	0.116	0.998	0.0399			2	4106052
2,3,7,8-Tetra CDF **	pg/g	2.46	0.130	0.200	0.0399	0.100	0.246		4106052
1,2,3,7,8-Penta CDF **	pg/g	2.34	0.117	0.998	0.0399	0.0300	0.0702		4106052
2,3,4,7,8-Penta CDF **	pg/g	3.57	0.116	0.998	0.0399	0.300	1.07		4106052
1,2,3,4,7,8-Hexa CDF **	pg/g	15.7	0.135	0.998	0.0399	0.100	1.57		4106052
1,2,3,6,7,8-Hexa CDF **	pg/g	7.71	0.138	0.998	0.0399	0.100	0.771		4106052
2,3,4,6,7,8-Hexa CDF **	pg/g	5.08	0.128	0.998	0.0399	0.100	0.508		4106052
1,2,3,7,8,9-Hexa CDF **	pg/g	0.311	0.133	0.998	0.0399	0.100	0.0311		4106052
1,2,3,4,6,7,8-Hepta CDF **	pg/g	107	0.122	0.998	0.0399	0.0100	1.07		4106052
1,2,3,4,7,8,9-Hepta CDF **	pg/g	7.29	0.123	0.998	0.0399	0.0100	0.0729		4106052
Octa CDF **	pg/g	173	0.127	2.00	0.0798	0.000300	0.0519		4106052
Total Tetra CDF **	pg/g	27.1	0.130	0.200	0.0399			15	4106052
Total Penta CDF **	pg/g	95.9	0.117	0.998	0.0399			9	4106052
Total Hexa CDF **	pg/g	196	0.134	0.998	0.0399			10	4106052
Total Hepta CDF **	pg/g	320	0.122	0.998	0.0399			4	4106052
Confirmation 2,3,7,8-Tetra CDF **	pg/g	2.05	0.087	1.0	0.90	0.100	0.205		4115506
TOTAL TOXIC EQUIVALENCY	pg/g						23.1		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	97							4106052
C13-1234678 HeptaCDD *	%	91							4106052
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH346							
Sampling Date		2015/06/08 10:15							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW022-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	71							4106052
C13-123478 HexaCDD *	%	81							4106052
C13-123478 HexaCDF **	%	68							4106052
C13-1234789 HeptaCDF **	%	67							4106052
C13-123678 HexaCDD *	%	77							4106052
C13-123678 HexaCDF **	%	71							4106052
C13-12378 PentaCDD *	%	92							4106052
C13-12378 PentaCDF **	%	73							4106052
C13-123789 HexaCDF **	%	81							4106052
C13-234678 HexaCDF **	%	72							4106052
C13-23478 PentaCDF **	%	89							4106052
C13-2378 TetraCDD *	%	81							4106052
C13-2378 TetraCDF **	%	77							4106052
C13-OCDD *	%	109							4106052
Confirmation C13-2378 TetraCDF **	%	88							4115506

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH347							
Sampling Date		2015/06/08 10:55							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW016-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.426	0.139	0.200	0.0400	1.00	0.426		4106052
1,2,3,7,8-Penta CDD *	pg/g	4.90 (1)	0.124	1.00	0.0400	1.00	4.90		4106052
1,2,3,4,7,8-Hexa CDD *	pg/g	11.0	0.138	1.00	0.0400	0.100	1.10		4106052
1,2,3,6,7,8-Hexa CDD *	pg/g	50.5	0.145	1.00	0.0400	0.100	5.05		4106052
1,2,3,7,8,9-Hexa CDD *	pg/g	28.1	0.141	1.00	0.0400	0.100	2.81		4106052
1,2,3,4,6,7,8-Hepta CDD *	pg/g	861	0.107	1.00	0.0400	0.0100	8.61		4106052
Octa CDD *	pg/g	4460 (2)	1.37	10.0	0.0800	0.000300	1.34		4106052
Total Tetra CDD *	pg/g	5.22	0.139	0.200	0.0400			8	4106052
Total Penta CDD *	pg/g	25.0	0.124	1.00	0.0400			11	4106052
Total Hexa CDD *	pg/g	246	0.142	1.00	0.0400			7	4106052
Total Hepta CDD *	pg/g	1540	0.107	1.00	0.0400			2	4106052
2,3,7,8-Tetra CDF **	pg/g	2.23	0.131	0.200	0.0400	0.100	0.223		4106052
1,2,3,7,8-Penta CDF **	pg/g	3.58	0.123	1.00	0.0400	0.0300	0.107		4106052
2,3,4,7,8-Penta CDF **	pg/g	4.92	0.121	1.00	0.0400	0.300	1.48		4106052
1,2,3,4,7,8-Hexa CDF **	pg/g	24.6	0.122	1.00	0.0400	0.100	2.46		4106052
1,2,3,6,7,8-Hexa CDF **	pg/g	11.3	0.124	1.00	0.0400	0.100	1.13		4106052
2,3,4,6,7,8-Hexa CDF **	pg/g	6.65	0.115	1.00	0.0400	0.100	0.665		4106052
1,2,3,7,8,9-Hexa CDF **	pg/g	0.419	0.120	1.00	0.0400	0.100	0.0419		4106052
1,2,3,4,6,7,8-Hepta CDF **	pg/g	115	0.134	1.00	0.0400	0.0100	1.15		4106052
1,2,3,4,7,8,9-Hepta CDF **	pg/g	8.26	0.134	1.00	0.0400	0.0100	0.0826		4106052
Octa CDF **	pg/g	112	0.137	2.00	0.0800	0.000300	0.0336		4106052
Total Tetra CDF **	pg/g	20.6	0.131	0.200	0.0400			13	4106052
Total Penta CDF **	pg/g	134	0.122	1.00	0.0400			9	4106052
Total Hexa CDF **	pg/g	306	0.120	1.00	0.0400			11	4106052
Total Hepta CDF **	pg/g	320	0.134	1.00	0.0400			4	4106052
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.11 (3)	0.11	1.0	0.90	0.100	0.0110		4115506
TOTAL TOXIC EQUIVALENCY	pg/g						31.4		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.  
(2) Result from 5X dilution  
(3) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH347							
Sampling Date		2015/06/08 10:55							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW016-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	105							4106052
C13-1234678 HeptaCDD *	%	95							4106052
C13-1234678 HeptaCDF **	%	89							4106052
C13-123478 HexaCDD *	%	85							4106052
C13-123478 HexaCDF **	%	72							4106052
C13-1234789 HeptaCDF **	%	74							4106052
C13-123678 HexaCDD *	%	88							4106052
C13-123678 HexaCDF **	%	75							4106052
C13-12378 PentaCDD *	%	93							4106052
C13-12378 PentaCDF **	%	74							4106052
C13-123789 HexaCDF **	%	87							4106052
C13-234678 HexaCDF **	%	79							4106052
C13-23478 PentaCDF **	%	91							4106052
C13-2378 TetraCDD *	%	92							4106052
C13-2378 TetraCDF **	%	88							4106052
C13-OCDD *	%	138							4106052
Confirmation C13-2378 TetraCDF **	%	101							4115506

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH348							
Sampling Date		2015/06/08 11:45							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW025-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.188 (1)	0.188	0.199	0.0399	1.00	0.188		4106052
1,2,3,7,8-Penta CDD *	pg/g	2.62	0.133	0.997	0.0399	1.00	2.62		4106052
1,2,3,4,7,8-Hexa CDD *	pg/g	5.44	0.125	0.997	0.0399	0.100	0.544		4106052
1,2,3,6,7,8-Hexa CDD *	pg/g	22.4	0.131	0.997	0.0399	0.100	2.24		4106052
1,2,3,7,8,9-Hexa CDD *	pg/g	15.5	0.127	0.997	0.0399	0.100	1.55		4106052
1,2,3,4,6,7,8-Hepta CDD *	pg/g	395	0.136	0.997	0.0399	0.0100	3.95		4106052
Octa CDD *	pg/g	1930	0.126	1.99	0.0798	0.000300	0.579		4106052
Total Tetra CDD *	pg/g	2.19	0.133	0.199	0.0399			4	4106052
Total Penta CDD *	pg/g	12.5	0.133	0.997	0.0399			10	4106052
Total Hexa CDD *	pg/g	118	0.128	0.997	0.0399			7	4106052
Total Hepta CDD *	pg/g	666	0.136	0.997	0.0399			2	4106052
2,3,7,8-Tetra CDF **	pg/g	1.05	0.134	0.199	0.0399	0.100	0.105		4106052
1,2,3,7,8-Penta CDF **	pg/g	1.11	0.135	0.997	0.0399	0.0300	0.0333		4106052
2,3,4,7,8-Penta CDF **	pg/g	1.40	0.133	0.997	0.0399	0.300	0.420		4106052
1,2,3,4,7,8-Hexa CDF **	pg/g	6.64	0.132	0.997	0.0399	0.100	0.664		4106052
1,2,3,6,7,8-Hexa CDF **	pg/g	4.16	0.135	0.997	0.0399	0.100	0.416		4106052
2,3,4,6,7,8-Hexa CDF **	pg/g	2.81	0.125	0.997	0.0399	0.100	0.281		4106052
1,2,3,7,8,9-Hexa CDF **	pg/g	0.190	0.130	0.997	0.0399	0.100	0.0190		4106052
1,2,3,4,6,7,8-Hepta CDF **	pg/g	60.8	0.114	0.997	0.0399	0.0100	0.608		4106052
1,2,3,4,7,8,9-Hepta CDF **	pg/g	4.26	0.114	0.997	0.0399	0.0100	0.0426		4106052
Octa CDF **	pg/g	87.7	0.111	1.99	0.0798	0.000300	0.0263		4106052
Total Tetra CDF **	pg/g	12.0	0.134	0.199	0.0399			14	4106052
Total Penta CDF **	pg/g	41.0	0.134	0.997	0.0399			10	4106052
Total Hexa CDF **	pg/g	97.4	0.130	0.997	0.0399			10	4106052
Total Hepta CDF **	pg/g	174	0.114	0.997	0.0399			4	4106052
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.787	0.074	1.0	0.90	0.100	0.0787		4115506
TOTAL TOXIC EQUIVALENCY	pg/g						14.3		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	92							4106052
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH348							
Sampling Date		2015/06/08 11:45							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW025-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	84							4106052
C13-1234678 HeptaCDF **	%	67							4106052
C13-123478 HexaCDD *	%	82							4106052
C13-123478 HexaCDF **	%	67							4106052
C13-1234789 HeptaCDF **	%	64							4106052
C13-123678 HexaCDD *	%	80							4106052
C13-123678 HexaCDF **	%	72							4106052
C13-12378 PentaCDD *	%	88							4106052
C13-12378 PentaCDF **	%	68							4106052
C13-123789 HexaCDF **	%	78							4106052
C13-234678 HexaCDF **	%	68							4106052
C13-23478 PentaCDF **	%	86							4106052
C13-2378 TetraCDD *	%	79							4106052
C13-2378 TetraCDF **	%	75							4106052
C13-OCDD *	%	101							4106052
Confirmation C13-2378 TetraCDF **	%	85							4115506

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH349							
Sampling Date		2015/06/08 12:25							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW029B-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.342	0.126	0.200	0.0400	1.00	0.342		4106052
1,2,3,7,8-Penta CDD *	pg/g	3.69	0.136	0.999	0.0400	1.00	3.69		4106052
1,2,3,4,7,8-Hexa CDD *	pg/g	8.12	0.136	0.999	0.0400	0.100	0.812		4106052
1,2,3,6,7,8-Hexa CDD *	pg/g	28.9	0.142	0.999	0.0400	0.100	2.89		4106052
1,2,3,7,8,9-Hexa CDD *	pg/g	21.7	0.139	0.999	0.0400	0.100	2.17		4106052
1,2,3,4,6,7,8-Hepta CDD *	pg/g	523	0.108	0.999	0.0400	0.0100	5.23		4106052
Octa CDD *	pg/g	2540	0.112	2.00	0.0799	0.000300	0.762		4106052
Total Tetra CDD *	pg/g	3.73	0.126	0.200	0.0400			9	4106052
Total Penta CDD *	pg/g	15.3	0.136	0.999	0.0400			9	4106052
Total Hexa CDD *	pg/g	174	0.139	0.999	0.0400			7	4106052
Total Hepta CDD *	pg/g	995	0.108	0.999	0.0400			2	4106052
2,3,7,8-Tetra CDF **	pg/g	1.49	0.125	0.200	0.0400	0.100	0.149		4106052
1,2,3,7,8-Penta CDF **	pg/g	1.66	0.143	0.999	0.0400	0.0300	0.0498		4106052
2,3,4,7,8-Penta CDF **	pg/g	2.45	0.142	0.999	0.0400	0.300	0.735		4106052
1,2,3,4,7,8-Hexa CDF **	pg/g	11.8	0.121	0.999	0.0400	0.100	1.18		4106052
1,2,3,6,7,8-Hexa CDF **	pg/g	<5.98 (1)	5.98	0.999	0.0400	0.100	0.598		4106052
2,3,4,6,7,8-Hexa CDF **	pg/g	3.46	0.115	0.999	0.0400	0.100	0.346		4106052
1,2,3,7,8,9-Hexa CDF **	pg/g	0.268	0.119	0.999	0.0400	0.100	0.0268		4106052
1,2,3,4,6,7,8-Hepta CDF **	pg/g	84.4	0.115	0.999	0.0400	0.0100	0.844		4106052
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.76	0.115	0.999	0.0400	0.0100	0.0676		4106052
Octa CDF **	pg/g	127	0.114	2.00	0.0799	0.000300	0.0381		4106052
Total Tetra CDF **	pg/g	14.9	0.125	0.200	0.0400			14	4106052
Total Penta CDF **	pg/g	60.6	0.143	0.999	0.0400			11	4106052
Total Hexa CDF **	pg/g	145	0.120	0.999	0.0400			11	4106052
Total Hepta CDF **	pg/g	250	0.115	0.999	0.0400			4	4106052
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.32	0.093	1.0	0.90	0.100	0.132		4115506
TOTAL TOXIC EQUIVALENCY	pg/g						19.9		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH349							
Sampling Date		2015/06/08 12:25							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW029B-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	94							4106052
C13-1234678 HeptaCDD *	%	100							4106052
C13-1234678 HeptaCDF **	%	85							4106052
C13-123478 HexaCDD *	%	89							4106052
C13-123478 HexaCDF **	%	77							4106052
C13-1234789 HeptaCDF **	%	75							4106052
C13-123678 HexaCDD *	%	93							4106052
C13-123678 HexaCDF **	%	81							4106052
C13-12378 PentaCDD *	%	98							4106052
C13-12378 PentaCDF **	%	79							4106052
C13-123789 HexaCDF **	%	92							4106052
C13-234678 HexaCDF **	%	86							4106052
C13-23478 PentaCDF **	%	105							4106052
C13-2378 TetraCDD *	%	93							4106052
C13-2378 TetraCDF **	%	86							4106052
C13-OCDD *	%	123							4106052
Confirmation C13-2378 TetraCDF **	%	96							4115506

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH350							
Sampling Date		2015/06/08 13:15							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW023-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.466	0.161	0.200	0.0399	1.00	0.466		4106052
1,2,3,7,8-Penta CDD *	pg/g	6.75	0.118	0.998	0.0399	1.00	6.75		4106052
1,2,3,4,7,8-Hexa CDD *	pg/g	14.0	0.145	0.998	0.0399	0.100	1.40		4106052
1,2,3,6,7,8-Hexa CDD *	pg/g	60.6	0.152	0.998	0.0399	0.100	6.06		4106052
1,2,3,7,8,9-Hexa CDD *	pg/g	37.5	0.148	0.998	0.0399	0.100	3.75		4106052
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1080	0.126	0.998	0.0399	0.0100	10.8		4106052
Octa CDD *	pg/g	5150 (1)	1.26	9.98	0.0798	0.000300	1.55		4106052
Total Tetra CDD *	pg/g	4.08	0.161	0.200	0.0399			7	4106052
Total Penta CDD *	pg/g	30.9	0.118	0.998	0.0399			10	4106052
Total Hexa CDD *	pg/g	278	0.149	0.998	0.0399			7	4106052
Total Hepta CDD *	pg/g	1740	0.126	0.998	0.0399			2	4106052
2,3,7,8-Tetra CDF **	pg/g	1.71	0.142	0.200	0.0399	0.100	0.171		4106052
1,2,3,7,8-Penta CDF **	pg/g	2.81 (2)	0.122	0.998	0.0399	0.0300	0.0843		4106052
2,3,4,7,8-Penta CDF **	pg/g	3.74	0.120	0.998	0.0399	0.300	1.12		4106052
1,2,3,4,7,8-Hexa CDF **	pg/g	21.8	0.137	0.998	0.0399	0.100	2.18		4106052
1,2,3,6,7,8-Hexa CDF **	pg/g	10.2	0.140	0.998	0.0399	0.100	1.02		4106052
2,3,4,6,7,8-Hexa CDF **	pg/g	6.76	0.130	0.998	0.0399	0.100	0.676		4106052
1,2,3,7,8,9-Hexa CDF **	pg/g	0.410	0.135	0.998	0.0399	0.100	0.0410		4106052
1,2,3,4,6,7,8-Hepta CDF **	pg/g	240	0.138	0.998	0.0399	0.0100	2.40		4106052
1,2,3,4,7,8,9-Hepta CDF **	pg/g	19.5	0.138	0.998	0.0399	0.0100	0.195		4106052
Octa CDF **	pg/g	469	0.139	2.00	0.0798	0.000300	0.141		4106052
Total Tetra CDF **	pg/g	15.0	0.142	0.200	0.0399			13	4106052
Total Penta CDF **	pg/g	66.1	0.121	0.998	0.0399			7	4106052
Total Hexa CDF **	pg/g	331	0.135	0.998	0.0399			11	4106052
Total Hepta CDF **	pg/g	852	0.138	0.998	0.0399			4	4106052
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<1.7 (3)	1.7	1.0	0.90	0.100	0.170		4115506

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) Result from 5X dilution  
(2) RT > 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.  
(3) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH350							
Sampling Date		2015/06/08 13:15							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW023-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
TOTAL TOXIC EQUIVALENCY	pg/g						38.8		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	58							4106052
C13-1234678 HeptaCDD *	%	62							4106052
C13-1234678 HeptaCDF **	%	52							4106052
C13-123478 HexaCDD *	%	58							4106052
C13-123478 HexaCDF **	%	48							4106052
C13-1234789 HeptaCDF **	%	47							4106052
C13-123678 HexaCDD *	%	57							4106052
C13-123678 HexaCDF **	%	49							4106052
C13-12378 PentaCDD *	%	64							4106052
C13-12378 PentaCDF **	%	49							4106052
C13-123789 HexaCDF **	%	57							4106052
C13-234678 HexaCDF **	%	50							4106052
C13-23478 PentaCDF **	%	63							4106052
C13-2378 TetraCDD *	%	57							4106052
C13-2378 TetraCDF **	%	55							4106052
C13-OCDD *	%	77							4106052
Confirmation C13-2378 TetraCDF **	%	62							4115506

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH351							
Sampling Date		2015/06/08 13:55							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW018-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.249	0.0976	0.199	0.0399	1.00	0.249		4106052
1,2,3,7,8-Penta CDD *	pg/g	1.62	0.108	0.997	0.0399	1.00	1.62		4106052
1,2,3,4,7,8-Hexa CDD *	pg/g	3.61	0.121	0.997	0.0399	0.100	0.361		4106052
1,2,3,6,7,8-Hexa CDD *	pg/g	15.9	0.127	0.997	0.0399	0.100	1.59		4106052
1,2,3,7,8,9-Hexa CDD *	pg/g	11.3	0.124	0.997	0.0399	0.100	1.13		4106052
1,2,3,4,6,7,8-Hepta CDD *	pg/g	298	0.0689	0.997	0.0399	0.0100	2.98		4106052
Octa CDD *	pg/g	1650	0.146	1.99	0.0797	0.000300	0.495		4106052
Total Tetra CDD *	pg/g	2.71	0.0976	0.199	0.0399			6	4106052
Total Penta CDD *	pg/g	8.45	0.108	0.997	0.0399			9	4106052
Total Hexa CDD *	pg/g	85.2	0.124	0.997	0.0399			7	4106052
Total Hepta CDD *	pg/g	526	0.0689	0.997	0.0399			2	4106052
2,3,7,8-Tetra CDF **	pg/g	1.34	0.106	0.199	0.0399	0.100	0.134		4106052
1,2,3,7,8-Penta CDF **	pg/g	0.776	0.0985	0.997	0.0399	0.0300	0.0233		4106052
2,3,4,7,8-Penta CDF **	pg/g	0.918	0.0972	0.997	0.0399	0.300	0.275		4106052
1,2,3,4,7,8-Hexa CDF **	pg/g	4.23	0.104	0.997	0.0399	0.100	0.423		4106052
1,2,3,6,7,8-Hexa CDF **	pg/g	<2.22 (1)	2.22	0.997	0.0399	0.100	0.222		4106052
2,3,4,6,7,8-Hexa CDF **	pg/g	1.61	0.0988	0.997	0.0399	0.100	0.161		4106052
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.103	0.103	0.997	0.0399	0.100	0.0103		4106052
1,2,3,4,6,7,8-Hepta CDF **	pg/g	50.5	0.136	0.997	0.0399	0.0100	0.505		4106052
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.27	0.136	0.997	0.0399	0.0100	0.0327		4106052
Octa CDF **	pg/g	104	0.115	1.99	0.0797	0.000300	0.0312		4106052
Total Tetra CDF **	pg/g	9.88	0.106	0.199	0.0399			13	4106052
Total Penta CDF **	pg/g	22.3	0.0979	0.997	0.0399			9	4106052
Total Hexa CDF **	pg/g	61.8	0.103	0.997	0.0399			9	4106052
Total Hepta CDF **	pg/g	168	0.136	0.997	0.0399			4	4106052
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<1.1 (1)	1.1	1.0	0.90	0.100	0.110		4115506
TOTAL TOXIC EQUIVALENCY	pg/g						10.2		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH351							
Sampling Date		2015/06/08 13:55							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW018-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	98							4106052
C13-1234678 HeptaCDD *	%	94							4106052
C13-1234678 HeptaCDF **	%	80							4106052
C13-123478 HexaCDD *	%	84							4106052
C13-123478 HexaCDF **	%	69							4106052
C13-1234789 HeptaCDF **	%	72							4106052
C13-123678 HexaCDD *	%	77							4106052
C13-123678 HexaCDF **	%	79							4106052
C13-12378 PentaCDD *	%	98							4106052
C13-12378 PentaCDF **	%	80							4106052
C13-123789 HexaCDF **	%	85							4106052
C13-234678 HexaCDF **	%	72							4106052
C13-23478 PentaCDF **	%	111							4106052
C13-2378 TetraCDD *	%	79							4106052
C13-2378 TetraCDF **	%	82							4106052
C13-OCDD *	%	111							4106052
Confirmation C13-2378 TetraCDF **	%	82							4115506

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**TEST SUMMARY**

**Maxxam ID:** APH343  
**Sample ID:** SBS-ROW013-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4106052	2015/07/13	2015/07/24	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4115506	N/A	2015/07/24	Vica Cioranic
Moisture	BAL	4102231	N/A	2015/07/13	Bonali Patel - inactive

**Maxxam ID:** APH344  
**Sample ID:** SBS-ROW005-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4106052	2015/07/13	2015/07/24	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4115506	N/A	2015/07/24	Vica Cioranic
Moisture	BAL	4102231	N/A	2015/07/13	Bonali Patel - inactive

**Maxxam ID:** APH345  
**Sample ID:** SBS-ROW019-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4106052	2015/07/13	2015/07/17	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4205624	N/A	2015/09/25	Leila Azzam
Moisture	BAL	4102231	N/A	2015/07/13	Bonali Patel - inactive

**Maxxam ID:** APH346  
**Sample ID:** SBS-ROW022-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4106052	2015/07/13	2015/07/17	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4115506	N/A	2015/07/21	Vica Cioranic
Moisture	BAL	4102231	N/A	2015/07/13	Bonali Patel - inactive

**Maxxam ID:** APH347  
**Sample ID:** SBS-ROW016-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4106052	2015/07/13	2015/07/17	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4115506	N/A	2015/07/21	Vica Cioranic
Moisture	BAL	4102231	N/A	2015/07/13	Bonali Patel - inactive

**Maxxam ID:** APH348  
**Sample ID:** SBS-ROW025-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4106052	2015/07/13	2015/07/17	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4115506	N/A	2015/07/21	Vica Cioranic

**TEST SUMMARY**

**Maxxam ID:** APH348  
**Sample ID:** SBS-ROW025-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4102231	N/A	2015/07/13	Bonali Patel - inactive

**Maxxam ID:** APH349  
**Sample ID:** SBS-ROW029B-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4106052	2015/07/13	2015/07/17	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4115506	N/A	2015/07/21	Vica Cioranic
Moisture	BAL	4102231	N/A	2015/07/13	Bonali Patel - inactive

**Maxxam ID:** APH350  
**Sample ID:** SBS-ROW023-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4106052	2015/07/13	2015/07/17	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4115506	N/A	2015/07/21	Vica Cioranic
Moisture	BAL	4102231	N/A	2015/07/13	Bonali Patel - inactive

**Maxxam ID:** APH350 Dup  
**Sample ID:** SBS-ROW023-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4102231	N/A	2015/07/13	Bonali Patel - inactive

**Maxxam ID:** APH351  
**Sample ID:** SBS-ROW018-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4106052	2015/07/13	2015/07/18	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4115506	N/A	2015/07/21	Vica Cioranic
Moisture	BAL	4102231	N/A	2015/07/13	Bonali Patel - inactive



### GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.7°C
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Archived portion of LCS1 analyzed  
Report revised to reflect addition of missed TCDF confirmations.

Sample APH343-01 : Archive portion analyzed

Sample APH344-01 : Archived portion analyzed

**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4102231	MYG	RPD - Sample/Sample Dup	Moisture	2015/07/13	1.3		%	20
4106052	KKS	Spiked Blank	37CL4 2378 Tetra CDD	2015/07/24		129	%	35 - 197
			C13-1234678 HeptaCDD	2015/07/24		115	%	23 - 140
			C13-1234678 HeptaCDF	2015/07/24		96	%	28 - 143
			C13-123478 HexaCDD	2015/07/24		97	%	32 - 141
			C13-123478 HexaCDF	2015/07/24		90	%	26 - 152
			C13-1234789 HeptaCDF	2015/07/24		100	%	26 - 138
			C13-123678 HexaCDD	2015/07/24		88	%	28 - 130
			C13-123678 HexaCDF	2015/07/24		95	%	26 - 123
			C13-12378 PentaCDD	2015/07/24		111	%	25 - 181
			C13-12378 PentaCDF	2015/07/24		103	%	24 - 185
			C13-123789 HexaCDF	2015/07/24		105	%	29 - 147
			C13-234678 HexaCDF	2015/07/24		90	%	28 - 136
			C13-23478 PentaCDF	2015/07/24		117	%	21 - 178
			C13-2378 TetraCDD	2015/07/24		104	%	25 - 164
			C13-2378 TetraCDF	2015/07/24		110	%	24 - 169
			C13-OCDD	2015/07/24		130	%	17 - 157
			2,3,7,8-Tetra CDD	2015/07/24		116	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/07/24		112	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/07/24		112	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/07/24		120	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/07/24		135	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/07/24		103	%	70 - 140
			Octa CDD	2015/07/24		90	%	78 - 144
			2,3,7,8-Tetra CDF	2015/07/24		117	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/07/24		119	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/07/24		108	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/07/24		116	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/07/24		108	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/07/24		116	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/07/24		107	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/07/24		116	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/07/24		117	%	78 - 138
			Octa CDF	2015/07/24		91	%	63 - 170
4106052	KKS	RPD	2,3,7,8-Tetra CDD	2015/07/16	11		%	25
			1,2,3,7,8-Penta CDD	2015/07/16	9.3		%	25
			1,2,3,4,7,8-Hexa CDD	2015/07/16	3.6		%	25
			1,2,3,6,7,8-Hexa CDD	2015/07/16	11		%	25
			1,2,3,7,8,9-Hexa CDD	2015/07/16	11		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/07/16	5.0		%	25
			Octa CDD	2015/07/16	5.7		%	25
			2,3,7,8-Tetra CDF	2015/07/16	17		%	25
			1,2,3,7,8-Penta CDF	2015/07/16	14		%	25
			2,3,4,7,8-Penta CDF	2015/07/16	13		%	25
			1,2,3,4,7,8-Hexa CDF	2015/07/16	2.6		%	25
			1,2,3,6,7,8-Hexa CDF	2015/07/16	0		%	25
			2,3,4,6,7,8-Hexa CDF	2015/07/16	7.1		%	25
			1,2,3,7,8,9-Hexa CDF	2015/07/16	4.8		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/07/16	4.4		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/07/16	1.7		%	25
			Octa CDF	2015/07/16	17		%	25
4106052	KKS	Method Blank	37CL4 2378 Tetra CDD	2015/07/17		96	%	35 - 197
			C13-1234678 HeptaCDD	2015/07/17		89	%	23 - 140
			C13-1234678 HeptaCDF	2015/07/17		75	%	28 - 143

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-123478 HexaCDD	2015/07/17		78	%	32 - 141
			C13-123478 HexaCDF	2015/07/17		63	%	26 - 152
			C13-1234789 HeptaCDF	2015/07/17		73	%	26 - 138
			C13-123678 HexaCDD	2015/07/17		76	%	28 - 130
			C13-123678 HexaCDF	2015/07/17		65	%	26 - 123
			C13-12378 PentaCDD	2015/07/17		87	%	25 - 181
			C13-12378 PentaCDF	2015/07/17		66	%	24 - 185
			C13-123789 HexaCDF	2015/07/17		81	%	29 - 147
			C13-234678 HexaCDF	2015/07/17		68	%	28 - 136
			C13-23478 PentaCDF	2015/07/17		80	%	21 - 178
			C13-2378 TetraCDD	2015/07/17		86	%	25 - 164
			C13-2378 TetraCDF	2015/07/17		82	%	24 - 169
			C13-OCDD	2015/07/17		109	%	17 - 157
			2,3,7,8-Tetra CDD	2015/07/17	<0.121, EDL=0.121		pg/g	
			1,2,3,7,8-Penta CDD	2015/07/17	<0.140, EDL=0.140		pg/g	
			1,2,3,4,7,8-Hexa CDD	2015/07/17	<0.101, EDL=0.101		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/07/17	<0.106, EDL=0.106		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/07/17	<0.103, EDL=0.103		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/07/17	<0.124, EDL=0.124		pg/g	
			Octa CDD	2015/07/17	0.382, EDL=0.112		pg/g	
			Total Tetra CDD	2015/07/17	<0.121, EDL=0.121		pg/g	
			Total Penta CDD	2015/07/17	<0.140, EDL=0.140		pg/g	
			Total Hexa CDD	2015/07/17	<0.104, EDL=0.104		pg/g	
			Total Hepta CDD	2015/07/17	<0.124, EDL=0.124		pg/g	
			2,3,7,8-Tetra CDF	2015/07/17	<0.0638, EDL=0.0638		pg/g	
			1,2,3,7,8-Penta CDF	2015/07/17	<0.114, EDL=0.114		pg/g	
			2,3,4,7,8-Penta CDF	2015/07/17	<0.112, EDL=0.112		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/07/17	<0.115, EDL=0.115		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/07/17	<0.117, EDL=0.117		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/07/17	<0.109, EDL=0.109		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/07/17	<0.113, EDL=0.113		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/07/17	<0.115, EDL=0.115		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8,9-Hepta CDF	2015/07/17	<0.115, EDL=0.115		pg/g	
			Octa CDF	2015/07/17	<0.0981, EDL=0.0981		pg/g	
			Total Tetra CDF	2015/07/17	<0.0638, EDL=0.0638		pg/g	
			Total Penta CDF	2015/07/17	<0.113, EDL=0.113		pg/g	
			Total Hexa CDF	2015/07/17	<0.113, EDL=0.113		pg/g	
			Total Hepta CDF	2015/07/17	<0.115, EDL=0.115		pg/g	
4115506	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/07/21	<0.13, EDL=0.13		pg/g	
			Confirmation C13-2378 TetraCDF	2015/07/21		90	%	40 - 135
4205624	LAZ	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/09/25	<0.12, EDL=0.12		pg/g	
			Confirmation C13-2378 TetraCDF	2015/09/25		73	%	40 - 135
4205624	LAZ	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/09/25	NC		%	100
<p>Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.</p> <p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p> <p>NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples &lt; 5x RDL).</p>								

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist



Kay Shaw, C. Chem, Sr Scientific Specialist, HRMS Services



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

---

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5G0852  
Your C.O.C. #: NA

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/08/21**  
Report #: R3636251  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5F3520**

**Received: 2015/08/04, 15:10**

Sample Matrix: Soil  
# Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2015/08/07	2015/08/12	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2015/08/13	BRL SOP-00406	EPA M8290A / M1613
Moisture	1	N/A	2015/08/05	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International. is a NELAC accredited laboratory. Certificate # CANA001. Use of the NELAC logo however does not insure that Maxxam is accredited for all of the methods indicated. This certificate shall not be reproduced except in full, without the written approval of Maxxam Analytics Inc.

Maxxam Job #: B5F3520  
Report Date: 2015/08/21

Apex Laboratories  
Client Project #: A5G0852

**RESULTS OF ANALYSES OF SOIL**

<b>Maxxam ID</b>		ASX917			
<b>Sampling Date</b>		2015/07/28 14:15			
<b>COC Number</b>		NA			
	<b>UNITS</b>	<b>COMP-AOI004-0.5</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	12	1.0	0.50	4134467
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					

Maxxam Job #: B5F3520  
Report Date: 2015/08/21

Apex Laboratories  
Client Project #: A5G0852

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ASX917							
Sampling Date		2015/07/28 14:15							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	COMP-AOI004-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	µg/g	0.856	0.104	1.00	0.0400	1.00	0.856		4144456
1,2,3,7,8-Penta CDD *	µg/g	2.49	0.108	5.00	0.0400	1.00	2.49		4144456
1,2,3,4,7,8-Hexa CDD *	µg/g	4.65	0.0981	5.00	0.0400	0.100	0.465		4144456
1,2,3,6,7,8-Hexa CDD *	µg/g	20.3	0.107	5.00	0.0400	0.100	2.03		4144456
1,2,3,7,8,9-Hexa CDD *	µg/g	12.4	0.101	5.00	0.0400	0.100	1.24		4144456
1,2,3,4,6,7,8-Hepta CDD *	µg/g	320	0.102	5.00	0.0400	0.0100	3.20		4144456
Octa CDD *	µg/g	1860	0.146	10.0	0.0800	0.000300	0.558		4144456
Total Tetra CDD *	µg/g	3.27	0.104	1.00	0.0400			6	4144456
Total Penta CDD *	µg/g	13.1	0.108	5.00	0.0400			12	4144456
Total Hexa CDD *	µg/g	98.4	0.102	5.00	0.0400			7	4144456
Total Hepta CDD *	µg/g	537	0.102	5.00	0.0400			2	4144456
2,3,7,8-Tetra CDF **	µg/g	1.80	0.101	1.00	0.0400	0.100	0.180		4144456
1,2,3,7,8-Penta CDF **	µg/g	1.28	0.106	5.00	0.0400	0.0300	0.0384		4144456
2,3,4,7,8-Penta CDF **	µg/g	1.46	0.105	5.00	0.0400	0.300	0.438		4144456
1,2,3,4,7,8-Hexa CDF **	µg/g	5.98	0.101	5.00	0.0400	0.100	0.598		4144456
1,2,3,6,7,8-Hexa CDF **	µg/g	2.81	0.103	5.00	0.0400	0.100	0.281		4144456
2,3,4,6,7,8-Hexa CDF **	µg/g	2.35	0.0968	5.00	0.0400	0.100	0.235		4144456
1,2,3,7,8,9-Hexa CDF **	µg/g	0.176	0.101	5.00	0.0400	0.100	0.0176		4144456
1,2,3,4,6,7,8-Hepta CDF **	µg/g	42.1	0.104	5.00	0.0400	0.0100	0.421		4144456
1,2,3,4,7,8,9-Hepta CDF **	µg/g	2.63	0.103	5.00	0.0400	0.0100	0.0263		4144456
Octa CDF **	µg/g	68.6	0.107	10.0	0.0800	0.000300	0.0206		4144456
Total Tetra CDF **	µg/g	10.3	0.101	1.00	0.0400			13	4144456
Total Penta CDF **	µg/g	13.0	0.105	5.00	0.0400			9	4144456
Total Hexa CDF **	µg/g	76.8	0.100	5.00	0.0400			11	4144456
Total Hepta CDF **	µg/g	109	0.104	5.00	0.0400			4	4144456
Confirmation 2,3,7,8-Tetra CDF **	µg/g	0.74	0.11	1.0	0.90	0.100	0.0740		4148993
TOTAL TOXIC EQUIVALENCY	µg/g						13.0		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	94							4144456
C13-1234678 HeptaCDD *	%	105							4144456
EDL = Estimated Detection Limit									
RDL = Reportable Detection Limit									
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,									
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.									
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds									
QC Batch = Quality Control Batch									
* CDD = Chloro Dibenzo-p-Dioxin									
** CDF = Chloro Dibenzo-p-Furan									



Maxxam Job #: B5F3520  
Report Date: 2015/08/21

Apex Laboratories  
Client Project #: A5G0852

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ASX917							
Sampling Date		2015/07/28 14:15							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	COMP-AOI004-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	101							4144456
C13-123478 HexaCDD *	%	103							4144456
C13-123478 HexaCDF **	%	101							4144456
C13-1234789 HeptaCDF **	%	98							4144456
C13-123678 HexaCDD *	%	95							4144456
C13-123678 HexaCDF **	%	109							4144456
C13-12378 PentaCDD *	%	96							4144456
C13-12378 PentaCDF **	%	85							4144456
C13-123789 HexaCDF **	%	112							4144456
C13-234678 HexaCDF **	%	104							4144456
C13-23478 PentaCDF **	%	101							4144456
C13-2378 TetraCDD *	%	93							4144456
C13-2378 TetraCDF **	%	97							4144456
C13-OCDD *	%	90							4144456
Confirmation C13-2378 TetraCDF **	%	113							4148993

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

Maxxam Job #: B5F3520  
Report Date: 2015/08/21

Apex Laboratories  
Client Project #: A5G0852

### TEST SUMMARY

**Maxxam ID:** ASX917  
**Sample ID:** COMP-AOI004-0.5  
**Matrix:** Soil

**Collected:** 2015/07/28  
**Shipped:**  
**Received:** 2015/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4144456	2015/08/07	2015/08/12	Cathy Xu
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4148993	N/A	2015/08/13	Vica Cioranic
Moisture	BAL	4134467	N/A	2015/08/05	Valentina Kaftani

Maxxam Job #: B5F3520  
Report Date: 2015/08/21

Apex Laboratories  
Client Project #: A5G0852

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.5°C
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**Results relate only to the items tested.**

Maxxam Job #: B5F3520  
Report Date: 2015/08/21

Apex Laboratories  
Client Project #: A5G0852

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4134467	BOP	RPD - Sample/Sample Dup	Moisture	2015/08/05	5.2		%	20
4144456	CXU	Matrix Spike	37CL4 2378 Tetra CDD	2015/08/12		80	%	35 - 197
			C13-1234678 HeptaCDD	2015/08/12		100	%	23 - 140
			C13-1234678 HeptaCDF	2015/08/12		96	%	28 - 143
			C13-123478 HexaCDD	2015/08/12		98	%	32 - 141
			C13-123478 HexaCDF	2015/08/12		97	%	26 - 152
			C13-1234789 HeptaCDF	2015/08/12		93	%	26 - 138
			C13-123678 HexaCDD	2015/08/12		91	%	28 - 130
			C13-123678 HexaCDF	2015/08/12		104	%	26 - 123
			C13-12378 PentaCDD	2015/08/12		97	%	25 - 181
			C13-12378 PentaCDF	2015/08/12		84	%	24 - 185
			C13-123789 HexaCDF	2015/08/12		110	%	29 - 147
			C13-234678 HexaCDF	2015/08/12		98	%	28 - 136
			C13-23478 PentaCDF	2015/08/12		102	%	21 - 178
			C13-2378 TetraCDD	2015/08/12		92	%	25 - 164
			C13-2378 TetraCDF	2015/08/12		93	%	24 - 169
			C13-OCDD	2015/08/12		92	%	17 - 157
			2,3,7,8-Tetra CDD	2015/08/12		131	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/08/12		122	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/08/12		127	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/08/12		147 (1)	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/08/12		145	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/08/12		130	%	70 - 140
			Octa CDD	2015/08/12		133	%	78 - 144
			2,3,7,8-Tetra CDF	2015/08/12		133	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/08/12		139 (1)	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/08/12		117	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/08/12		139 (1)	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/08/12		125	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/08/12		135	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/08/12		122	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/08/12		134 (1)	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/08/12		134	%	78 - 138
			Octa CDF	2015/08/12		129	%	63 - 170
4144456	CXU	MS/MSD RPD	2,3,7,8-Tetra CDD	2015/08/12	17		%	25
			1,2,3,7,8-Penta CDD	2015/08/12	17		%	25
			1,2,3,4,7,8-Hexa CDD	2015/08/12	13		%	25
			1,2,3,6,7,8-Hexa CDD	2015/08/12	21		%	25
			1,2,3,7,8,9-Hexa CDD	2015/08/12	19		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/08/12	17		%	25
			Octa CDD	2015/08/12	15		%	25
			2,3,7,8-Tetra CDF	2015/08/12	17		%	25
			1,2,3,7,8-Penta CDF	2015/08/12	16		%	25
			2,3,4,7,8-Penta CDF	2015/08/12	17		%	25
			1,2,3,4,7,8-Hexa CDF	2015/08/12	15		%	25
			1,2,3,6,7,8-Hexa CDF	2015/08/12	15		%	25
			2,3,4,6,7,8-Hexa CDF	2015/08/12	19		%	25
			1,2,3,7,8,9-Hexa CDF	2015/08/12	17		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/08/12	17		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/08/12	17		%	25
			Octa CDF	2015/08/12	21		%	25
4144456	CXU	Spiked Blank	37CL4 2378 Tetra CDD	2015/08/12		55	%	35 - 197
			C13-1234678 HeptaCDD	2015/08/12		66	%	23 - 140
			C13-1234678 HeptaCDF	2015/08/12		66	%	28 - 143

Maxxam Job #: B5F3520  
Report Date: 2015/08/21

Apex Laboratories  
Client Project #: A5G0852

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-123478 HexaCDD	2015/08/12		62	%	32 - 141
			C13-123478 HexaCDF	2015/08/12		64	%	26 - 152
			C13-1234789 HeptaCDF	2015/08/12		60	%	26 - 138
			C13-123678 HexaCDD	2015/08/12		60	%	28 - 130
			C13-123678 HexaCDF	2015/08/12		69	%	26 - 123
			C13-12378 PentaCDD	2015/08/12		57	%	25 - 181
			C13-12378 PentaCDF	2015/08/12		49	%	24 - 185
			C13-123789 HexaCDF	2015/08/12		69	%	29 - 147
			C13-234678 HexaCDF	2015/08/12		65	%	28 - 136
			C13-23478 PentaCDF	2015/08/12		59	%	21 - 178
			C13-2378 TetraCDD	2015/08/12		57	%	25 - 164
			C13-2378 TetraCDF	2015/08/12		53	%	24 - 169
			C13-OCDD	2015/08/12		61	%	17 - 157
			2,3,7,8-Tetra CDD	2015/08/12		101	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/08/12		98	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/08/12		112	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/08/12		121	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/08/12		121	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/08/12		111	%	70 - 140
			Octa CDD	2015/08/12		112	%	78 - 144
			2,3,7,8-Tetra CDF	2015/08/12		112	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/08/12		121	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/08/12		101	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/08/12		121	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/08/12		109	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/08/12		113	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/08/12		105	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/08/12		113	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/08/12		110	%	78 - 138
			Octa CDF	2015/08/12		98	%	63 - 170
4144456	CXU	Method Blank	37CL4 2378 Tetra CDD	2015/08/16		95	%	35 - 197
			C13-1234678 HeptaCDD	2015/08/16		91	%	23 - 140
			C13-1234678 HeptaCDF	2015/08/16		83	%	28 - 143
			C13-123478 HexaCDD	2015/08/16		90	%	32 - 141
			C13-123478 HexaCDF	2015/08/16		78	%	26 - 152
			C13-1234789 HeptaCDF	2015/08/16		83	%	26 - 138
			C13-123678 HexaCDD	2015/08/16		83	%	28 - 130
			C13-123678 HexaCDF	2015/08/16		87	%	26 - 123
			C13-12378 PentaCDD	2015/08/16		73	%	25 - 181
			C13-12378 PentaCDF	2015/08/16		66	%	24 - 185
			C13-123789 HexaCDF	2015/08/16		89	%	29 - 147
			C13-234678 HexaCDF	2015/08/16		84	%	28 - 136
			C13-23478 PentaCDF	2015/08/16		76	%	21 - 178
			C13-2378 TetraCDD	2015/08/16		79	%	25 - 164
			C13-2378 TetraCDF	2015/08/16		77	%	24 - 169
			C13-OCDD	2015/08/16		87	%	17 - 157
			2,3,7,8-Tetra CDD	2015/08/16	<0.135, EDL=0.135		pg/g	
			1,2,3,7,8-Penta CDD	2015/08/16	<0.0879, EDL=0.0879		pg/g	
			1,2,3,4,7,8-Hexa CDD	2015/08/16	<0.0988, EDL=0.0988		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/08/16	<0.107, EDL=0.107		pg/g	

Maxxam Job #: B5F3520  
Report Date: 2015/08/21

Apex Laboratories  
Client Project #: A5G0852

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8,9-Hexa CDD	2015/08/16	<0.102, EDL=0.102		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/08/16	<0.144, EDL=0.144		pg/g	
			Octa CDD	2015/08/16	0.121, EDL=0.115		pg/g	
			Total Tetra CDD	2015/08/16	0.734, EDL=0.135 (2)		pg/g	
			Total Penta CDD	2015/08/16	0.336, EDL=0.0879 (2)		pg/g	
			Total Hexa CDD	2015/08/16	1.78, EDL=0.103 (2)		pg/g	
			Total Hepta CDD	2015/08/16	<0.144, EDL=0.144		pg/g	
			2,3,7,8-Tetra CDF	2015/08/16	<0.0874, EDL=0.0874		pg/g	
			1,2,3,7,8-Penta CDF	2015/08/16	<0.0793, EDL=0.0793		pg/g	
			2,3,4,7,8-Penta CDF	2015/08/16	<0.0788, EDL=0.0788		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/08/16	<0.0717, EDL=0.0717		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/08/16	<0.0733, EDL=0.0733		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/08/16	<0.0687, EDL=0.0687		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/08/16	<0.0716, EDL=0.0716		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/08/16	<0.0917, EDL=0.0917		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2015/08/16	<0.0916, EDL=0.0916		pg/g	
			Octa CDF	2015/08/16	<0.0934, EDL=0.0934		pg/g	
			Total Tetra CDF	2015/08/16	<0.0874, EDL=0.0874		pg/g	
			Total Penta CDF	2015/08/16	<0.0791, EDL=0.0791		pg/g	
			Total Hexa CDF	2015/08/16	<0.0713, EDL=0.0713		pg/g	
			Total Hepta CDF	2015/08/16	<0.0916, EDL=0.0916		pg/g	
4144456	CXU	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/08/12	NC		%	25
			1,2,3,7,8-Penta CDD	2015/08/12	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/08/12	NC (2)		%	25
			1,2,3,6,7,8-Hexa CDD	2015/08/12	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2015/08/12	NC		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/08/12	NC		%	25
			Octa CDD	2015/08/12	6.7		%	25
			Total Tetra CDD	2015/08/12	NC (2)		%	25
			Total Penta CDD	2015/08/12	NC (2)		%	25
			Total Hexa CDD	2015/08/12	NC (3)		%	25

Maxxam Job #: B5F3520  
Report Date: 2015/08/21

Apex Laboratories  
Client Project #: A5G0852

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Hepta CDD	2015/08/12	32 (3)		%	25
			2,3,7,8-Tetra CDF	2015/08/12	NC (4)		%	25
			1,2,3,7,8-Penta CDF	2015/08/12	NC		%	25
			2,3,4,7,8-Penta CDF	2015/08/12	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/08/12	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2015/08/12	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/08/12	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/08/12	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/08/12	NC		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/08/12	NC		%	25
			Octa CDF	2015/08/12	NC		%	25
			Total Tetra CDF	2015/08/12	NC		%	25
			Total Penta CDF	2015/08/12	NC		%	25
			Total Hexa CDF	2015/08/12	NC		%	25
			Total Hepta CDF	2015/08/12	NC		%	25
4148993	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/08/13	<0.080, EDL=0.080		pg/g	
			Confirmation C13-2378 TetraCDF	2015/08/13		90	%	40 - 135
4148993	VCI	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/08/13	NC		%	100

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) EMPC / IAR - Peak detected meets S/N ratio but does not meet the ion abundance ratio.

(3) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

(4) RT > 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.

Maxxam Job #: B5F3520  
Report Date: 2015/08/21

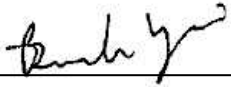
Apex Laboratories  
Client Project #: A5G0852

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist



Branko Vrzic, A.S.C.T., Senior Analyst, HRMS Services



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

---

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5I0106  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/09/30**  
Report #: R3705803  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B511779**

**Received: 2015/09/09, 14:08**

Sample Matrix: Soil  
# Samples Received: 10

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2015/09/15	2015/09/23	BRL SOP-00410	EPA 1613B m
Dioxins/Furans in Soil (1613B) (1)	9	2015/09/15	2015/09/25	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2015/09/25	BRL SOP-00406	EPA M8290A / M1613
2378TCDF Confirmation (M8290A/M1613)	9	N/A	2015/09/28	BRL SOP-00406	EPA M8290A / M1613
Moisture	10	N/A	2015/09/15	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT

Email: MDiGrazia@maxxam.ca

Phone# (905) 817-5700

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		AYJ607	AYJ608	AYJ609	AYJ610	AYJ611			
Sampling Date		2015/08/26 09:00	2015/09/01 13:15	2015/08/26 10:15	2015/09/01 15:30	2015/08/26 13:30			
COC Number		na	na	na	na	na			
	<b>UNITS</b>	<b>SBS-ROW005-2.0</b>	<b>SBS-ROW013-2.0</b>	<b>SBS-ROW014-2.0</b>	<b>SBS-ROW016-2.0</b>	<b>SBS-ROW019-1.5</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	7.6	6.2	8.1	11	5.4	1.0	0.50	4190489
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									

Maxxam ID		AYJ612	AYJ613	AYJ614	AYJ615			
Sampling Date		2015/08/26 12:15	2015/09/01 14:30	2015/08/26 14:00	2015/08/26 15:30			
COC Number		na	na	na	na			
	<b>UNITS</b>	<b>SBS-ROW022-1.5</b>	<b>SBS-ROW023-2.0</b>	<b>SBS-ROW025-1.5</b>	<b>SBS-ROW026-1.5</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	8.7	8.9	7.5	8.2	1.0	0.50	4190489
RDL = Reportable Detection Limit QC Batch = Quality Control Batch								

Maxxam ID		AYJ616			
Sampling Date		2015/08/26 14:45			
COC Number		na			
	<b>UNITS</b>	<b>SBS-ROW029B-1.5</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	9.3	1.0	0.50	4190489
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ607							
Sampling Date		2015/08/26 09:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW005-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.155	0.149	0.200	0.400	1.00	0.155		4205485
1,2,3,7,8-Penta CDD *	pg/g	1.56	0.132	1.00	0.400	1.00	1.56		4205485
1,2,3,4,7,8-Hexa CDD *	pg/g	3.89	0.111	1.00	0.400	0.100	0.389		4205485
1,2,3,6,7,8-Hexa CDD *	pg/g	14.2	0.119	1.00	0.400	0.100	1.42		4205485
1,2,3,7,8,9-Hexa CDD *	pg/g	9.58	0.119	1.00	0.400	0.100	0.958		4205485
1,2,3,4,6,7,8-Hepta CDD *	pg/g	279	0.116	1.00	0.400	0.0100	2.79		4205485
Octa CDD *	pg/g	1590	0.0923	2.00	0.800	0.000300	0.477		4205485
Total Tetra CDD *	pg/g	0.639	0.149	0.200	0.400			2	4205485
Total Penta CDD *	pg/g	8.03	0.132	1.00	0.400			11	4205485
Total Hexa CDD *	pg/g	79.7	0.118	1.00	0.400			8	4205485
Total Hepta CDD *	pg/g	517	0.116	1.00	0.400			2	4205485
2,3,7,8-Tetra CDF **	pg/g	0.897	0.111	0.200	0.400	0.100	0.0897		4205485
1,2,3,7,8-Penta CDF **	pg/g	1.06	0.102	1.00	0.400	0.0300	0.0318		4205485
2,3,4,7,8-Penta CDF **	pg/g	1.35	0.101	1.00	0.400	0.300	0.405		4205485
1,2,3,4,7,8-Hexa CDF **	pg/g	6.06	0.0969	1.00	0.400	0.100	0.606		4205485
1,2,3,6,7,8-Hexa CDF **	pg/g	3.09	0.101	1.00	0.400	0.100	0.309		4205485
2,3,4,6,7,8-Hexa CDF **	pg/g	2.03	0.0942	1.00	0.400	0.100	0.203		4205485
1,2,3,7,8,9-Hexa CDF **	pg/g	0.183	0.0999	1.00	0.400	0.100	0.0183		4205485
1,2,3,4,6,7,8-Hepta CDF **	pg/g	49.9	0.106	1.00	0.400	0.0100	0.499		4205485
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.21	0.104	1.00	0.400	0.0100	0.0321		4205485
Octa CDF **	pg/g	82.1	0.121	2.00	0.800	0.000300	0.0246		4205485
Total Tetra CDF **	pg/g	6.56	0.111	0.200	0.400			11	4205485
Total Penta CDF **	pg/g	19.1	0.101	1.00	0.400			9	4205485
Total Hexa CDF **	pg/g	95.4	0.0979	1.00	0.400			10	4205485
Total Hepta CDF **	pg/g	138	0.105	1.00	0.400			4	4205485
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.48	0.18	1.0	0.90	0.100	0.0480		4205624
TOTAL TOXIC EQUIVALENCY	pg/g						9.93		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	100							4205485
C13-1234678 HeptaCDD *	%	80							4205485
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ607							
Sampling Date		2015/08/26 09:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW005-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	81							4205485
C13-123478 HexaCDD *	%	70							4205485
C13-123478 HexaCDF **	%	74							4205485
C13-1234789 HeptaCDF **	%	73							4205485
C13-123678 HexaCDD *	%	73							4205485
C13-123678 HexaCDF **	%	73							4205485
C13-12378 PentaCDD *	%	85							4205485
C13-12378 PentaCDF **	%	77							4205485
C13-123789 HexaCDF **	%	80							4205485
C13-234678 HexaCDF **	%	66							4205485
C13-23478 PentaCDF **	%	90							4205485
C13-2378 TetraCDD *	%	71							4205485
C13-2378 TetraCDF **	%	69							4205485
C13-OCDD *	%	65							4205485
Confirmation C13-2378 TetraCDF **	%	61							4205624

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

### DIOXINS AND FURANS BY HRMS (SOIL)

Maxxam ID		AYJ608							
Sampling Date		2015/09/01 13:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW013-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.109	0.109	0.199	0.400	1.00	0.109		4205485
1,2,3,7,8-Penta CDD *	pg/g	0.671	0.102	0.997	0.400	1.00	0.671		4205485
1,2,3,4,7,8-Hexa CDD *	pg/g	2.42	0.100	0.997	0.400	0.100	0.242		4205485
1,2,3,6,7,8-Hexa CDD *	pg/g	12.0	0.107	0.997	0.400	0.100	1.20		4205485
1,2,3,7,8,9-Hexa CDD *	pg/g	6.92	0.107	0.997	0.400	0.100	0.692		4205485
1,2,3,4,6,7,8-Hepta CDD *	pg/g	248	0.102	0.997	0.400	0.0100	2.48		4205485
Octa CDD *	pg/g	1520	0.101	1.99	0.800	0.000300	0.456		4205485
Total Tetra CDD *	pg/g	<0.109	0.109	0.199	0.400			0	4205485
Total Penta CDD *	pg/g	2.29	0.102	0.997	0.400			6	4205485
Total Hexa CDD *	pg/g	59.2	0.106	0.997	0.400			7	4205485
Total Hepta CDD *	pg/g	449	0.102	0.997	0.400			2	4205485
2,3,7,8-Tetra CDF **	pg/g	0.336	0.105	0.199	0.400	0.100	0.0336		4205485
1,2,3,7,8-Penta CDF **	pg/g	1.08	0.101	0.997	0.400	0.0300	0.0324		4205485
2,3,4,7,8-Penta CDF **	pg/g	1.15	0.100	0.997	0.400	0.300	0.345		4205485
1,2,3,4,7,8-Hexa CDF **	pg/g	8.01	0.105	0.997	0.400	0.100	0.801		4205485
1,2,3,6,7,8-Hexa CDF **	pg/g	3.06	0.109	0.997	0.400	0.100	0.306		4205485
2,3,4,6,7,8-Hexa CDF **	pg/g	2.12	0.102	0.997	0.400	0.100	0.212		4205485
1,2,3,7,8,9-Hexa CDF **	pg/g	0.159	0.108	0.997	0.400	0.100	0.0159		4205485
1,2,3,4,6,7,8-Hepta CDF **	pg/g	40.3	0.107	0.997	0.400	0.0100	0.403		4205485
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.41	0.104	0.997	0.400	0.0100	0.0241		4205485
Octa CDF **	pg/g	49.6	0.101	1.99	0.800	0.000300	0.0149		4205485
Total Tetra CDF **	pg/g	2.04	0.105	0.199	0.400			7	4205485
Total Penta CDF **	pg/g	13.6	0.101	0.997	0.400			6	4205485
Total Hexa CDF **	pg/g	96.5	0.106	0.997	0.400			10	4205485
Total Hepta CDF **	pg/g	107	0.105	0.997	0.400			4	4205485
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.38	0.16	1.0	0.90	0.100	0.0380		4209016
TOTAL TOXIC EQUIVALENCY	pg/g						8.04		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	80							4205485
C13-1234678 HeptaCDD *	%	60							4205485
EDL = Estimated Detection Limit									
RDL = Reportable Detection Limit									
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,									
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.									
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds									
QC Batch = Quality Control Batch									
* CDD = Chloro Dibenzo-p-Dioxin									
** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ608							
Sampling Date		2015/09/01 13:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW013-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	63							4205485
C13-123478 HexaCDD *	%	53							4205485
C13-123478 HexaCDF **	%	56							4205485
C13-1234789 HeptaCDF **	%	53							4205485
C13-123678 HexaCDD *	%	57							4205485
C13-123678 HexaCDF **	%	60							4205485
C13-12378 PentaCDD *	%	69							4205485
C13-12378 PentaCDF **	%	64							4205485
C13-123789 HexaCDF **	%	64							4205485
C13-234678 HexaCDF **	%	49							4205485
C13-23478 PentaCDF **	%	73							4205485
C13-2378 TetraCDD *	%	56							4205485
C13-2378 TetraCDF **	%	61							4205485
C13-OCDD *	%	42							4205485
Confirmation C13-2378 TetraCDF **	%	51							4209016

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ609							
Sampling Date		2015/08/26 10:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW014-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.109	0.109	0.199	0.400	1.00	0.109		4205485
1,2,3,7,8-Penta CDD *	pg/g	0.707	0.106	0.996	0.400	1.00	0.707		4205485
1,2,3,4,7,8-Hexa CDD *	pg/g	2.50	0.0990	0.996	0.400	0.100	0.250		4205485
1,2,3,6,7,8-Hexa CDD *	pg/g	12.3	0.105	0.996	0.400	0.100	1.23		4205485
1,2,3,7,8,9-Hexa CDD *	pg/g	6.41	0.106	0.996	0.400	0.100	0.641		4205485
1,2,3,4,6,7,8-Hepta CDD *	pg/g	271	0.109	0.996	0.400	0.0100	2.71		4205485
Octa CDD *	pg/g	1730	0.118	1.99	0.800	0.000300	0.519		4205485
Total Tetra CDD *	pg/g	<0.109	0.109	0.199	0.400			0	4205485
Total Penta CDD *	pg/g	2.43	0.106	0.996	0.400			5	4205485
Total Hexa CDD *	pg/g	57.0	0.105	0.996	0.400			6	4205485
Total Hepta CDD *	pg/g	482	0.109	0.996	0.400			2	4205485
2,3,7,8-Tetra CDF **	pg/g	0.494	0.107	0.199	0.400	0.100	0.0494		4205485
1,2,3,7,8-Penta CDF **	pg/g	1.33	0.107	0.996	0.400	0.0300	0.0399		4205485
2,3,4,7,8-Penta CDF **	pg/g	1.58	0.106	0.996	0.400	0.300	0.474		4205485
1,2,3,4,7,8-Hexa CDF **	pg/g	9.42	0.103	0.996	0.400	0.100	0.942		4205485
1,2,3,6,7,8-Hexa CDF **	pg/g	3.61	0.107	0.996	0.400	0.100	0.361		4205485
2,3,4,6,7,8-Hexa CDF **	pg/g	2.13	0.100	0.996	0.400	0.100	0.213		4205485
1,2,3,7,8,9-Hexa CDF **	pg/g	0.174	0.106	0.996	0.400	0.100	0.0174		4205485
1,2,3,4,6,7,8-Hepta CDF **	pg/g	42.4	0.105	0.996	0.400	0.0100	0.424		4205485
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.35	0.102	0.996	0.400	0.0100	0.0235		4205485
Octa CDF **	pg/g	39.2	0.107	1.99	0.800	0.000300	0.0118		4205485
Total Tetra CDF **	pg/g	1.20	0.107	0.199	0.400			5	4205485
Total Penta CDF **	pg/g	13.6	0.106	0.996	0.400			7	4205485
Total Hexa CDF **	pg/g	111	0.104	0.996	0.400			10	4205485
Total Hepta CDF **	pg/g	110	0.103	0.996	0.400			4	4205485
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.24 (1)	0.24	1.0	0.90	0.100	0.0240		4209016
TOTAL TOXIC EQUIVALENCY	pg/g						8.70		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	86							4205485
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ609							
Sampling Date		2015/08/26 10:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW014-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	59							4205485
C13-1234678 HeptaCDF **	%	62							4205485
C13-123478 HexaCDD *	%	53							4205485
C13-123478 HexaCDF **	%	58							4205485
C13-1234789 HeptaCDF **	%	56							4205485
C13-123678 HexaCDD *	%	60							4205485
C13-123678 HexaCDF **	%	60							4205485
C13-12378 PentaCDD *	%	65							4205485
C13-12378 PentaCDF **	%	61							4205485
C13-123789 HexaCDF **	%	64							4205485
C13-234678 HexaCDF **	%	54							4205485
C13-23478 PentaCDF **	%	70							4205485
C13-2378 TetraCDD *	%	57							4205485
C13-2378 TetraCDF **	%	58							4205485
C13-OCDD *	%	40							4205485
Confirmation C13-2378 TetraCDF **	%	49							4209016

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ610							
Sampling Date		2015/09/01 15:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW016-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.101	0.101	0.199	0.400	1.00	0.101		4205485
1,2,3,7,8-Penta CDD *	pg/g	0.452	0.102	0.997	0.400	1.00	0.452		4205485
1,2,3,4,7,8-Hexa CDD *	pg/g	1.39	0.0965	0.997	0.400	0.100	0.139		4205485
1,2,3,6,7,8-Hexa CDD *	pg/g	5.02	0.103	0.997	0.400	0.100	0.502		4205485
1,2,3,7,8,9-Hexa CDD *	pg/g	4.10	0.103	0.997	0.400	0.100	0.410		4205485
1,2,3,4,6,7,8-Hepta CDD *	pg/g	113	0.105	0.997	0.400	0.0100	1.13		4205485
Octa CDD *	pg/g	578	0.101	1.99	0.800	0.000300	0.173		4205485
Total Tetra CDD *	pg/g	<0.101	0.101	0.199	0.400			0	4205485
Total Penta CDD *	pg/g	2.25	0.102	0.997	0.400			6	4205485
Total Hexa CDD *	pg/g	28.3	0.102	0.997	0.400			7	4205485
Total Hepta CDD *	pg/g	204	0.105	0.997	0.400			2	4205485
2,3,7,8-Tetra CDF **	pg/g	0.250	0.102	0.199	0.400	0.100	0.0250		4205485
1,2,3,7,8-Penta CDF **	pg/g	0.344	0.103	0.997	0.400	0.0300	0.0103		4205485
2,3,4,7,8-Penta CDF **	pg/g	0.642	0.102	0.997	0.400	0.300	0.193		4205485
1,2,3,4,7,8-Hexa CDF **	pg/g	2.63	0.0989	0.997	0.400	0.100	0.263		4205485
1,2,3,6,7,8-Hexa CDF **	pg/g	1.45	0.103	0.997	0.400	0.100	0.145		4205485
2,3,4,6,7,8-Hexa CDF **	pg/g	1.47	0.0962	0.997	0.400	0.100	0.147		4205485
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.102	0.102	0.997	0.400	0.100	0.0102		4205485
1,2,3,4,6,7,8-Hepta CDF **	pg/g	14.9	0.108	0.997	0.400	0.0100	0.149		4205485
1,2,3,4,7,8,9-Hepta CDF **	pg/g	0.890	0.105	0.997	0.400	0.0100	0.00890		4205485
Octa CDF **	pg/g	16.8	0.104	1.99	0.800	0.000300	0.00504		4205485
Total Tetra CDF **	pg/g	2.22	0.102	0.199	0.400			5	4205485
Total Penta CDF **	pg/g	12.3	0.103	0.997	0.400			8	4205485
Total Hexa CDF **	pg/g	42.7	0.0999	0.997	0.400			9	4205485
Total Hepta CDF **	pg/g	36.2	0.106	0.997	0.400			3	4205485
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.17	0.11	1.0	0.90	0.100	0.0170		4209016
TOTAL TOXIC EQUIVALENCY	pg/g						3.86		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	95							4205485
C13-1234678 HeptaCDD *	%	83							4205485
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ610							
Sampling Date		2015/09/01 15:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW016-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	97							4205485
C13-123478 HexaCDD *	%	71							4205485
C13-123478 HexaCDF **	%	73							4205485
C13-1234789 HeptaCDF **	%	81							4205485
C13-123678 HexaCDD *	%	77							4205485
C13-123678 HexaCDF **	%	79							4205485
C13-12378 PentaCDD *	%	85							4205485
C13-12378 PentaCDF **	%	81							4205485
C13-123789 HexaCDF **	%	84							4205485
C13-234678 HexaCDF **	%	69							4205485
C13-23478 PentaCDF **	%	97							4205485
C13-2378 TetraCDD *	%	75							4205485
C13-2378 TetraCDF **	%	82							4205485
C13-OCDD *	%	68							4205485
Confirmation C13-2378 TetraCDF **	%	70							4209016

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

\*\* CDF = Chloro Dibenzo-p-Furan

\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ611							
Sampling Date		2015/08/26 13:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW019-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.796	0.106	0.199	0.400	1.00	0.796		4205485
1,2,3,7,8-Penta CDD *	pg/g	4.13	0.102	0.996	0.400	1.00	4.13		4205485
1,2,3,4,7,8-Hexa CDD *	pg/g	12.8	0.101	0.996	0.400	0.100	1.28		4205485
1,2,3,6,7,8-Hexa CDD *	pg/g	54.8	0.107	0.996	0.400	0.100	5.48		4205485
1,2,3,7,8,9-Hexa CDD *	pg/g	31.3	0.107	0.996	0.400	0.100	3.13		4205485
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1220	0.104	0.996	0.400	0.0100	12.2		4205485
Octa CDD *	pg/g	8410 (1)	0.110	9.96	0.800	0.000300	2.52		4205485
Total Tetra CDD *	pg/g	2.98	0.106	0.199	0.400			6	4205485
Total Penta CDD *	pg/g	17.3	0.102	0.996	0.400			9	4205485
Total Hexa CDD *	pg/g	277	0.107	0.996	0.400			7	4205485
Total Hepta CDD *	pg/g	2190	0.104	0.996	0.400			2	4205485
2,3,7,8-Tetra CDF **	pg/g	2.04	0.106	0.199	0.400	0.100	0.204		4205485
1,2,3,7,8-Penta CDF **	pg/g	4.95	0.109	0.996	0.400	0.0300	0.149		4205485
2,3,4,7,8-Penta CDF **	pg/g	6.79	0.108	0.996	0.400	0.300	2.04		4205485
1,2,3,4,7,8-Hexa CDF **	pg/g	40.9	0.101	0.996	0.400	0.100	4.09		4205485
1,2,3,6,7,8-Hexa CDF **	pg/g	16.0	0.105	0.996	0.400	0.100	1.60		4205485
2,3,4,6,7,8-Hexa CDF **	pg/g	10.2	0.0979	0.996	0.400	0.100	1.02		4205485
1,2,3,7,8,9-Hexa CDF **	pg/g	0.526	0.104	0.996	0.400	0.100	0.0526		4205485
1,2,3,4,6,7,8-Hepta CDF **	pg/g	197	0.108	0.996	0.400	0.0100	1.97		4205485
1,2,3,4,7,8,9-Hepta CDF **	pg/g	10.5	0.105	0.996	0.400	0.0100	0.105		4205485
Octa CDF **	pg/g	160	0.111	1.99	0.800	0.000300	0.0480		4205485
Total Tetra CDF **	pg/g	13.4	0.106	0.199	0.400			9	4205485
Total Penta CDF **	pg/g	70.3	0.108	0.996	0.400			11	4205485
Total Hexa CDF **	pg/g	488	0.102	0.996	0.400			11	4205485
Total Hepta CDF **	pg/g	493	0.107	0.996	0.400			4	4205485
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.31	0.14	1.0	0.90	0.100	0.131		4209016
TOTAL TOXIC EQUIVALENCY	pg/g						40.7		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	75							4205485
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) From 5xdilution									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ611							
Sampling Date		2015/08/26 13:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW019-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	59							4205485
C13-1234678 HeptaCDF **	%	58							4205485
C13-123478 HexaCDD *	%	47							4205485
C13-123478 HexaCDF **	%	50							4205485
C13-1234789 HeptaCDF **	%	53							4205485
C13-123678 HexaCDD *	%	53							4205485
C13-123678 HexaCDF **	%	52							4205485
C13-12378 PentaCDD *	%	61							4205485
C13-12378 PentaCDF **	%	57							4205485
C13-123789 HexaCDF **	%	56							4205485
C13-234678 HexaCDF **	%	47							4205485
C13-23478 PentaCDF **	%	65							4205485
C13-2378 TetraCDD *	%	52							4205485
C13-2378 TetraCDF **	%	56							4205485
C13-OCDD *	%	48 (1)							4205485
Confirmation C13-2378 TetraCDF **	%	48							4209016

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) From 5xdilution

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ612							
Sampling Date		2015/08/26 12:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW022-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.193 (1)	0.193	0.200	0.400	1.00	0.193		4205485
1,2,3,7,8-Penta CDD *	pg/g	1.11	0.109	0.999	0.400	1.00	1.11		4205485
1,2,3,4,7,8-Hexa CDD *	pg/g	2.31	0.0965	0.999	0.400	0.100	0.231		4205485
1,2,3,6,7,8-Hexa CDD *	pg/g	8.10	0.103	0.999	0.400	0.100	0.810		4205485
1,2,3,7,8,9-Hexa CDD *	pg/g	6.42	0.103	0.999	0.400	0.100	0.642		4205485
1,2,3,4,6,7,8-Hepta CDD *	pg/g	174	0.102	0.999	0.400	0.0100	1.74		4205485
Octa CDD *	pg/g	1170	0.112	2.00	0.800	0.000300	0.351		4205485
Total Tetra CDD *	pg/g	1.94	0.105	0.200	0.400			5	4205485
Total Penta CDD *	pg/g	7.03	0.109	0.999	0.400			9	4205485
Total Hexa CDD *	pg/g	55.1	0.102	0.999	0.400			7	4205485
Total Hepta CDD *	pg/g	329	0.102	0.999	0.400			2	4205485
2,3,7,8-Tetra CDF **	pg/g	1.41	0.106	0.200	0.400	0.100	0.141		4205485
1,2,3,7,8-Penta CDF **	pg/g	0.648	0.101	0.999	0.400	0.0300	0.0194		4205485
2,3,4,7,8-Penta CDF **	pg/g	1.40	0.0995	0.999	0.400	0.300	0.420		4205485
1,2,3,4,7,8-Hexa CDF **	pg/g	4.10	0.108	0.999	0.400	0.100	0.410		4205485
1,2,3,6,7,8-Hexa CDF **	pg/g	2.75	0.113	0.999	0.400	0.100	0.275		4205485
2,3,4,6,7,8-Hexa CDF **	pg/g	2.68	0.105	0.999	0.400	0.100	0.268		4205485
1,2,3,7,8,9-Hexa CDF **	pg/g	0.119	0.112	0.999	0.400	0.100	0.0119		4205485
1,2,3,4,6,7,8-Hepta CDF **	pg/g	28.4	0.102	0.999	0.400	0.0100	0.284		4205485
1,2,3,4,7,8,9-Hepta CDF **	pg/g	1.83	0.0997	0.999	0.400	0.0100	0.0183		4205485
Octa CDF **	pg/g	61.6	0.113	2.00	0.800	0.000300	0.0185		4205485
Total Tetra CDF **	pg/g	12.9	0.106	0.200	0.400			11	4205485
Total Penta CDF **	pg/g	32.1	0.100	0.999	0.400			8	4205485
Total Hexa CDF **	pg/g	87.4	0.110	0.999	0.400			11	4205485
Total Hepta CDF **	pg/g	77.0	0.101	0.999	0.400			4	4205485
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.67	0.11	1.0	0.90	0.100	0.0670		4209016
TOTAL TOXIC EQUIVALENCY	pg/g						6.87		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	90							4205485
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ612							
Sampling Date		2015/08/26 12:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW022-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	87							4205485
C13-1234678 HeptaCDF **	%	88							4205485
C13-123478 HexaCDD *	%	71							4205485
C13-123478 HexaCDF **	%	74							4205485
C13-1234789 HeptaCDF **	%	77							4205485
C13-123678 HexaCDD *	%	78							4205485
C13-123678 HexaCDF **	%	77							4205485
C13-12378 PentaCDD *	%	82							4205485
C13-12378 PentaCDF **	%	80							4205485
C13-123789 HexaCDF **	%	84							4205485
C13-234678 HexaCDF **	%	72							4205485
C13-23478 PentaCDF **	%	93							4205485
C13-2378 TetraCDD *	%	73							4205485
C13-2378 TetraCDF **	%	78							4205485
C13-OCDD *	%	70							4205485
Confirmation C13-2378 TetraCDF **	%	64							4209016

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ613							
Sampling Date		2015/09/01 14:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW023-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.106	0.106	0.200	0.400	1.00	0.106		4205485
1,2,3,7,8-Penta CDD *	pg/g	0.315	0.105	0.998	0.400	1.00	0.315		4205485
1,2,3,4,7,8-Hexa CDD *	pg/g	0.741	0.102	0.998	0.400	0.100	0.0741		4205485
1,2,3,6,7,8-Hexa CDD *	pg/g	2.60	0.109	0.998	0.400	0.100	0.260		4205485
1,2,3,7,8,9-Hexa CDD *	pg/g	2.36	0.109	0.998	0.400	0.100	0.236		4205485
1,2,3,4,6,7,8-Hepta CDD *	pg/g	71.4	0.103	0.998	0.400	0.0100	0.714		4205485
Octa CDD *	pg/g	462	0.112	2.00	0.800	0.000300	0.139		4205485
Total Tetra CDD *	pg/g	0.215	0.106	0.200	0.400			1	4205485
Total Penta CDD *	pg/g	1.26	0.105	0.998	0.400			4	4205485
Total Hexa CDD *	pg/g	15.2	0.108	0.998	0.400			6	4205485
Total Hepta CDD *	pg/g	115	0.103	0.998	0.400			2	4205485
2,3,7,8-Tetra CDF **	pg/g	0.179	0.109	0.200	0.400	0.100	0.0179		4205485
1,2,3,7,8-Penta CDF **	pg/g	0.149	0.106	0.998	0.400	0.0300	0.00447		4205485
2,3,4,7,8-Penta CDF **	pg/g	0.264	0.105	0.998	0.400	0.300	0.0792		4205485
1,2,3,4,7,8-Hexa CDF **	pg/g	1.30	0.103	0.998	0.400	0.100	0.130		4205485
1,2,3,6,7,8-Hexa CDF **	pg/g	0.626	0.107	0.998	0.400	0.100	0.0626		4205485
2,3,4,6,7,8-Hexa CDF **	pg/g	0.543	0.0999	0.998	0.400	0.100	0.0543		4205485
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.106	0.106	0.998	0.400	0.100	0.0106		4205485
1,2,3,4,6,7,8-Hepta CDF **	pg/g	21.3	0.106	0.998	0.400	0.0100	0.213		4205485
1,2,3,4,7,8,9-Hepta CDF **	pg/g	1.71	0.104	0.998	0.400	0.0100	0.0171		4205485
Octa CDF **	pg/g	81.8	0.115	2.00	0.800	0.000300	0.0245		4205485
Total Tetra CDF **	pg/g	0.779	0.109	0.200	0.400			5	4205485
Total Penta CDF **	pg/g	2.94	0.105	0.998	0.400			6	4205485
Total Hexa CDF **	pg/g	23.8	0.104	0.998	0.400			9	4205485
Total Hepta CDF **	pg/g	76.9	0.105	0.998	0.400			4	4205485
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.15 (1)	0.15	1.0	0.90	0.100	0.0150		4209016
TOTAL TOXIC EQUIVALENCY	pg/g						2.45		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	96							4205485
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ613							
Sampling Date		2015/09/01 14:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW023-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	66							4205485
C13-1234678 HeptaCDF **	%	71							4205485
C13-123478 HexaCDD *	%	57							4205485
C13-123478 HexaCDF **	%	60							4205485
C13-1234789 HeptaCDF **	%	64							4205485
C13-123678 HexaCDD *	%	64							4205485
C13-123678 HexaCDF **	%	65							4205485
C13-12378 PentaCDD *	%	76							4205485
C13-12378 PentaCDF **	%	73							4205485
C13-123789 HexaCDF **	%	71							4205485
C13-234678 HexaCDF **	%	58							4205485
C13-23478 PentaCDF **	%	82							4205485
C13-2378 TetraCDD *	%	63							4205485
C13-2378 TetraCDF **	%	65							4205485
C13-OCDD *	%	52							4205485
Confirmation C13-2378 TetraCDF **	%	53							4209016

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ614							
Sampling Date		2015/08/26 14:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW025-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.253	0.103	0.200	0.400	1.00	0.253		4205485
1,2,3,7,8-Penta CDD *	pg/g	2.08	0.101	0.998	0.400	1.00	2.08		4205485
1,2,3,4,7,8-Hexa CDD *	pg/g	3.77	0.101	0.998	0.400	0.100	0.377		4205485
1,2,3,6,7,8-Hexa CDD *	pg/g	12.2	0.108	0.998	0.400	0.100	1.22		4205485
1,2,3,7,8,9-Hexa CDD *	pg/g	9.28	0.108	0.998	0.400	0.100	0.928		4205485
1,2,3,4,6,7,8-Hepta CDD *	pg/g	207	0.110	0.998	0.400	0.0100	2.07		4205485
Octa CDD *	pg/g	1250	0.102	2.00	0.800	0.000300	0.375		4205485
Total Tetra CDD *	pg/g	1.16	0.103	0.200	0.400			5	4205485
Total Penta CDD *	pg/g	8.27	0.101	0.998	0.400			11	4205485
Total Hexa CDD *	pg/g	64.9	0.107	0.998	0.400			7	4205485
Total Hepta CDD *	pg/g	384	0.110	0.998	0.400			2	4205485
2,3,7,8-Tetra CDF **	pg/g	0.846	0.102	0.200	0.400	0.100	0.0846		4205485
1,2,3,7,8-Penta CDF **	pg/g	1.21	0.104	0.998	0.400	0.0300	0.0363		4205485
2,3,4,7,8-Penta CDF **	pg/g	1.20	0.103	0.998	0.400	0.300	0.360		4205485
1,2,3,4,7,8-Hexa CDF **	pg/g	4.73	0.106	0.998	0.400	0.100	0.473		4205485
1,2,3,6,7,8-Hexa CDF **	pg/g	2.38	0.110	0.998	0.400	0.100	0.238		4205485
2,3,4,6,7,8-Hexa CDF **	pg/g	1.98	0.103	0.998	0.400	0.100	0.198		4205485
1,2,3,7,8,9-Hexa CDF **	pg/g	0.458	0.109	0.998	0.400	0.100	0.0458		4205485
1,2,3,4,6,7,8-Hepta CDF **	pg/g	34.9	0.104	0.998	0.400	0.0100	0.349		4205485
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.37	0.101	0.998	0.400	0.0100	0.0237		4205485
Octa CDF **	pg/g	58.6	0.115	2.00	0.800	0.000300	0.0176		4205485
Total Tetra CDF **	pg/g	3.99	0.102	0.200	0.400			11	4205485
Total Penta CDF **	pg/g	10.1	0.103	0.998	0.400			8	4205485
Total Hexa CDF **	pg/g	59.4	0.107	0.998	0.400			10	4205485
Total Hepta CDF **	pg/g	95.2	0.102	0.998	0.400			3	4205485
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.59	0.12	1.0	0.90	0.100	0.0590		4209016
TOTAL TOXIC EQUIVALENCY	pg/g						9.10		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	102							4205485
C13-1234678 HeptaCDD *	%	94							4205485
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ614							
Sampling Date		2015/08/26 14:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW025-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	99							4205485
C13-123478 HexaCDD *	%	76							4205485
C13-123478 HexaCDF **	%	79							4205485
C13-1234789 HeptaCDF **	%	89							4205485
C13-123678 HexaCDD *	%	83							4205485
C13-123678 HexaCDF **	%	85							4205485
C13-12378 PentaCDD *	%	94							4205485
C13-12378 PentaCDF **	%	92							4205485
C13-123789 HexaCDF **	%	92							4205485
C13-234678 HexaCDF **	%	78							4205485
C13-23478 PentaCDF **	%	108							4205485
C13-2378 TetraCDD *	%	79							4205485
C13-2378 TetraCDF **	%	84							4205485
C13-OCDD *	%	73							4205485
Confirmation C13-2378 TetraCDF **	%	67							4209016

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ615							
Sampling Date		2015/08/26 15:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW026-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.451	0.104	0.200	0.400	1.00	0.451		4205485
1,2,3,7,8-Penta CDD *	pg/g	2.69	0.102	0.998	0.400	1.00	2.69		4205485
1,2,3,4,7,8-Hexa CDD *	pg/g	5.75	0.103	0.998	0.400	0.100	0.575		4205485
1,2,3,6,7,8-Hexa CDD *	pg/g	24.9	0.110	0.998	0.400	0.100	2.49		4205485
1,2,3,7,8,9-Hexa CDD *	pg/g	15.6	0.110	0.998	0.400	0.100	1.56		4205485
1,2,3,4,6,7,8-Hepta CDD *	pg/g	460	0.101	0.998	0.400	0.0100	4.60		4205485
Octa CDD *	pg/g	2640	0.112	2.00	0.800	0.000300	0.792		4205485
Total Tetra CDD *	pg/g	3.85	0.104	0.200	0.400			7	4205485
Total Penta CDD *	pg/g	17.5	0.102	0.998	0.400			12	4205485
Total Hexa CDD *	pg/g	131	0.110	0.998	0.400			7	4205485
Total Hepta CDD *	pg/g	845	0.101	0.998	0.400			2	4205485
2,3,7,8-Tetra CDF **	pg/g	2.22	0.106	0.200	0.400	0.100	0.222		4205485
1,2,3,7,8-Penta CDF **	pg/g	2.31	0.101	0.998	0.400	0.0300	0.0693		4205485
2,3,4,7,8-Penta CDF **	pg/g	3.19	0.100	0.998	0.400	0.300	0.957		4205485
1,2,3,4,7,8-Hexa CDF **	pg/g	15.2	0.101	0.998	0.400	0.100	1.52		4205485
1,2,3,6,7,8-Hexa CDF **	pg/g	6.62	0.105	0.998	0.400	0.100	0.662		4205485
2,3,4,6,7,8-Hexa CDF **	pg/g	3.88	0.0978	0.998	0.400	0.100	0.388		4205485
1,2,3,7,8,9-Hexa CDF **	pg/g	0.229	0.104	0.998	0.400	0.100	0.0229		4205485
1,2,3,4,6,7,8-Hepta CDF **	pg/g	83.5	0.102	0.998	0.400	0.0100	0.835		4205485
1,2,3,4,7,8,9-Hepta CDF **	pg/g	4.72	0.0993	0.998	0.400	0.0100	0.0472		4205485
Octa CDF **	pg/g	89.4	0.114	2.00	0.800	0.000300	0.0268		4205485
Total Tetra CDF **	pg/g	12.6	0.106	0.200	0.400			13	4205485
Total Penta CDF **	pg/g	29.2	0.101	0.998	0.400			10	4205485
Total Hexa CDF **	pg/g	179	0.102	0.998	0.400			11	4205485
Total Hepta CDF **	pg/g	223	0.100	0.998	0.400			4	4205485
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.16	0.13	1.0	0.90	0.100	0.116		4209016
TOTAL TOXIC EQUIVALENCY	pg/g						17.8		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	103							4205485
C13-1234678 HeptaCDD *	%	86							4205485
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ615							
Sampling Date		2015/08/26 15:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW026-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	87							4205485
C13-123478 HexaCDD *	%	73							4205485
C13-123478 HexaCDF **	%	75							4205485
C13-1234789 HeptaCDF **	%	85							4205485
C13-123678 HexaCDD *	%	78							4205485
C13-123678 HexaCDF **	%	77							4205485
C13-12378 PentaCDD *	%	88							4205485
C13-12378 PentaCDF **	%	82							4205485
C13-123789 HexaCDF **	%	86							4205485
C13-234678 HexaCDF **	%	71							4205485
C13-23478 PentaCDF **	%	101							4205485
C13-2378 TetraCDD *	%	73							4205485
C13-2378 TetraCDF **	%	77							4205485
C13-OCDD *	%	72							4205485
Confirmation C13-2378 TetraCDF **	%	63							4209016

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ616							
Sampling Date		2015/08/26 14:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW029B-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.206	0.102	0.199	0.400	1.00	0.206		4205485
1,2,3,7,8-Penta CDD *	pg/g	1.57	0.103	0.997	0.400	1.00	1.57		4205485
1,2,3,4,7,8-Hexa CDD *	pg/g	3.50	0.103	0.997	0.400	0.100	0.350		4205485
1,2,3,6,7,8-Hexa CDD *	pg/g	12.1	0.110	0.997	0.400	0.100	1.21		4205485
1,2,3,7,8,9-Hexa CDD *	pg/g	9.61	0.110	0.997	0.400	0.100	0.961		4205485
1,2,3,4,6,7,8-Hepta CDD *	pg/g	300	0.105	0.997	0.400	0.0100	3.00		4205485
Octa CDD *	pg/g	2010	0.110	1.99	0.800	0.000300	0.603		4205485
Total Tetra CDD *	pg/g	1.02	0.102	0.199	0.400			5	4205485
Total Penta CDD *	pg/g	9.66	0.103	0.997	0.400			11	4205485
Total Hexa CDD *	pg/g	80.9	0.109	0.997	0.400			7	4205485
Total Hepta CDD *	pg/g	579	0.105	0.997	0.400			2	4205485
2,3,7,8-Tetra CDF **	pg/g	0.819	0.104	0.199	0.400	0.100	0.0819		4205485
1,2,3,7,8-Penta CDF **	pg/g	0.786	0.109	0.997	0.400	0.0300	0.0236		4205485
2,3,4,7,8-Penta CDF **	pg/g	1.15	0.108	0.997	0.400	0.300	0.345		4205485
1,2,3,4,7,8-Hexa CDF **	pg/g	5.56	0.101	0.997	0.400	0.100	0.556		4205485
1,2,3,6,7,8-Hexa CDF **	pg/g	2.79	0.105	0.997	0.400	0.100	0.279		4205485
2,3,4,6,7,8-Hexa CDF **	pg/g	2.28	0.0985	0.997	0.400	0.100	0.228		4205485
1,2,3,7,8,9-Hexa CDF **	pg/g	0.132	0.104	0.997	0.400	0.100	0.0132		4205485
1,2,3,4,6,7,8-Hepta CDF **	pg/g	51.4	0.107	0.997	0.400	0.0100	0.514		4205485
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.36	0.104	0.997	0.400	0.0100	0.0336		4205485
Octa CDF **	pg/g	144	0.117	1.99	0.800	0.000300	0.0432		4205485
Total Tetra CDF **	pg/g	4.84	0.104	0.199	0.400			9	4205485
Total Penta CDF **	pg/g	19.2	0.109	0.997	0.400			9	4205485
Total Hexa CDF **	pg/g	92.8	0.102	0.997	0.400			10	4205485
Total Hepta CDF **	pg/g	161	0.106	0.997	0.400			4	4205485
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.61	0.12	1.0	0.90	0.100	0.0610		4209016
TOTAL TOXIC EQUIVALENCY	pg/g						10.0		

**Surrogate Recovery (%)**

37CL4 2378 Tetra CDD *	%	88							4205485
C13-1234678 HeptaCDD *	%	62							4205485

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ616							
Sampling Date		2015/08/26 14:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW029B-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	69							4205485
C13-123478 HexaCDD *	%	58							4205485
C13-123478 HexaCDF **	%	62							4205485
C13-1234789 HeptaCDF **	%	61							4205485
C13-123678 HexaCDD *	%	63							4205485
C13-123678 HexaCDF **	%	65							4205485
C13-12378 PentaCDD *	%	75							4205485
C13-12378 PentaCDF **	%	73							4205485
C13-123789 HexaCDF **	%	70							4205485
C13-234678 HexaCDF **	%	58							4205485
C13-23478 PentaCDF **	%	86							4205485
C13-2378 TetraCDD *	%	67							4205485
C13-2378 TetraCDF **	%	71							4205485
C13-OCDD *	%	51							4205485
Confirmation C13-2378 TetraCDF **	%	60							4209016

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

\*\* CDF = Chloro Dibenzo-p-Furan

\* CDD = Chloro Dibenzo-p-Dioxin

### TEST SUMMARY

**Maxxam ID:** AYJ607  
**Sample ID:** SBS-ROW005-2.0  
**Matrix:** Soil

**Collected:** 2015/08/26  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/23	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4205624	N/A	2015/09/25	Leila Azzam
Moisture	BAL	4190489	N/A	2015/09/15	Valentina Kaftani

**Maxxam ID:** AYJ607 Dup  
**Sample ID:** SBS-ROW005-2.0  
**Matrix:** Soil

**Collected:** 2015/08/26  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/23	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4205624	N/A	2015/09/25	Leila Azzam

**Maxxam ID:** AYJ608  
**Sample ID:** SBS-ROW013-2.0  
**Matrix:** Soil

**Collected:** 2015/09/01  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/25	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4209016	N/A	2015/09/28	Leila Azzam
Moisture	BAL	4190489	N/A	2015/09/15	Valentina Kaftani

**Maxxam ID:** AYJ609  
**Sample ID:** SBS-ROW014-2.0  
**Matrix:** Soil

**Collected:** 2015/08/26  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/25	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4209016	N/A	2015/09/28	Leila Azzam
Moisture	BAL	4190489	N/A	2015/09/15	Valentina Kaftani

**Maxxam ID:** AYJ610  
**Sample ID:** SBS-ROW016-2.0  
**Matrix:** Soil

**Collected:** 2015/09/01  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/25	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4209016	N/A	2015/09/28	Leila Azzam
Moisture	BAL	4190489	N/A	2015/09/15	Valentina Kaftani

**Maxxam ID:** AYJ611  
**Sample ID:** SBS-ROW019-1.5  
**Matrix:** Soil

**Collected:** 2015/08/26  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/25	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4209016	N/A	2015/09/28	Leila Azzam
Moisture	BAL	4190489	N/A	2015/09/15	Valentina Kaftani

**TEST SUMMARY**

**Maxxam ID:** AYJ612  
**Sample ID:** SBS-ROW022-1.5  
**Matrix:** Soil

**Collected:** 2015/08/26  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/25	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4209016	N/A	2015/09/28	Leila Azzam
Moisture	BAL	4190489	N/A	2015/09/15	Valentina Kaftani

**Maxxam ID:** AYJ613  
**Sample ID:** SBS-ROW023-2.0  
**Matrix:** Soil

**Collected:** 2015/09/01  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/25	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4209016	N/A	2015/09/28	Leila Azzam
Moisture	BAL	4190489	N/A	2015/09/15	Valentina Kaftani

**Maxxam ID:** AYJ614  
**Sample ID:** SBS-ROW025-1.5  
**Matrix:** Soil

**Collected:** 2015/08/26  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/25	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4209016	N/A	2015/09/28	Leila Azzam
Moisture	BAL	4190489	N/A	2015/09/15	Valentina Kaftani

**Maxxam ID:** AYJ615  
**Sample ID:** SBS-ROW026-1.5  
**Matrix:** Soil

**Collected:** 2015/08/26  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/25	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4209016	N/A	2015/09/28	Leila Azzam
Moisture	BAL	4190489	N/A	2015/09/15	Valentina Kaftani

**Maxxam ID:** AYJ616  
**Sample ID:** SBS-ROW029B-1.5  
**Matrix:** Soil

**Collected:** 2015/08/26  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/25	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4209016	N/A	2015/09/28	Leila Azzam
Moisture	BAL	4190489	N/A	2015/09/15	Valentina Kaftani



**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.8°C
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**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4190489	NS3	RPD - Sample/Sample Dup	Moisture	2015/09/15	NC		%	20
4205485	KKS	Spiked Blank	37CL4 2378 Tetra CDD	2015/09/23		87	%	35 - 197
			C13-1234678 HeptaCDD	2015/09/23		72	%	23 - 140
			C13-1234678 HeptaCDF	2015/09/23		64	%	28 - 143
			C13-123478 HexaCDD	2015/09/23		65	%	32 - 141
			C13-123478 HexaCDF	2015/09/23		67	%	26 - 152
			C13-1234789 HeptaCDF	2015/09/23		69	%	26 - 138
			C13-123678 HexaCDD	2015/09/23		67	%	28 - 130
			C13-123678 HexaCDF	2015/09/23		69	%	26 - 123
			C13-12378 PentaCDD	2015/09/23		80	%	25 - 181
			C13-12378 PentaCDF	2015/09/23		72	%	24 - 185
			C13-123789 HexaCDF	2015/09/23		79	%	29 - 147
			C13-234678 HexaCDF	2015/09/23		61	%	28 - 136
			C13-23478 PentaCDF	2015/09/23		82	%	21 - 178
			C13-2378 TetraCDD	2015/09/23		63	%	25 - 164
			C13-2378 TetraCDF	2015/09/23		66	%	24 - 169
			C13-OCDD	2015/09/23		54	%	17 - 157
			2,3,7,8-Tetra CDD	2015/09/23		107	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/09/23		96	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/09/23		106	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/09/23		112	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/09/23		116	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/09/23		105	%	70 - 140
			Octa CDD	2015/09/23		110	%	78 - 144
			2,3,7,8-Tetra CDF	2015/09/23		111	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/09/23		112	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/09/23		95	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/09/23		114	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/09/23		111	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/09/23		116	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/09/23		105	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/09/23		122	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/09/23		111	%	78 - 138
			Octa CDF	2015/09/23		117	%	63 - 170
4205485	KKS	Method Blank	37CL4 2378 Tetra CDD	2015/09/23		87	%	35 - 197
			C13-1234678 HeptaCDD	2015/09/23		95	%	23 - 140
			C13-1234678 HeptaCDF	2015/09/23		101	%	28 - 143
			C13-123478 HexaCDD	2015/09/23		82	%	32 - 141
			C13-123478 HexaCDF	2015/09/23		86	%	26 - 152
			C13-1234789 HeptaCDF	2015/09/23		87	%	26 - 138
			C13-123678 HexaCDD	2015/09/23		88	%	28 - 130
			C13-123678 HexaCDF	2015/09/23		91	%	26 - 123
			C13-12378 PentaCDD	2015/09/23		94	%	25 - 181
			C13-12378 PentaCDF	2015/09/23		88	%	24 - 185
			C13-123789 HexaCDF	2015/09/23		97	%	29 - 147
			C13-234678 HexaCDF	2015/09/23		79	%	28 - 136
			C13-23478 PentaCDF	2015/09/23		102	%	21 - 178
			C13-2378 TetraCDD	2015/09/23		78	%	25 - 164
			C13-2378 TetraCDF	2015/09/23		83	%	24 - 169
			C13-OCDD	2015/09/23		74	%	17 - 157
			2,3,7,8-Tetra CDD	2015/09/23	<0.103, EDL=0.103		pg/g	
			1,2,3,7,8-Penta CDD	2015/09/23	<0.0836, EDL=0.0836		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/09/23	<0.103, EDL=0.103		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/09/23	<0.109, EDL=0.109		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/09/23	<0.110, EDL=0.110		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/09/23	0.200, EDL=0.0834		pg/g	
			Octa CDD	2015/09/23	1.09, EDL=0.102		pg/g	
			Total Tetra CDD	2015/09/23	<0.103, EDL=0.103		pg/g	
			Total Penta CDD	2015/09/23	<0.0836, EDL=0.0836		pg/g	
			Total Hexa CDD	2015/09/23	<0.109, EDL=0.109		pg/g	
			Total Hepta CDD	2015/09/23	0.200, EDL=0.0834		pg/g	
			2,3,7,8-Tetra CDF	2015/09/23	<0.124, EDL=0.124		pg/g	
			1,2,3,7,8-Penta CDF	2015/09/23	<0.106, EDL=0.106		pg/g	
			2,3,4,7,8-Penta CDF	2015/09/23	<0.104, EDL=0.104		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/09/23	<0.0895, EDL=0.0895		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/09/23	<0.0932, EDL=0.0932		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/09/23	<0.0871, EDL=0.0871		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/09/23	<0.0923, EDL=0.0923		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/09/23	0.460, EDL=0.0992		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2015/09/23	<0.0970, EDL=0.0970		pg/g	
			Octa CDF	2015/09/23	0.214, EDL=0.108		pg/g	
			Total Tetra CDF	2015/09/23	<0.124, EDL=0.124		pg/g	
			Total Penta CDF	2015/09/23	<0.105, EDL=0.105		pg/g	
			Total Hexa CDF	2015/09/23	0.129, EDL=0.0905		pg/g	
			Total Hepta CDF	2015/09/23	0.730, EDL=0.0981		pg/g	
4205485	KKS	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/09/23	NC (1)		%	25
			1,2,3,7,8-Penta CDD	2015/09/23	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/09/23	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2015/09/23	12		%	25
			1,2,3,7,8,9-Hexa CDD	2015/09/23	20		%	25

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,6,7,8-Hepta CDD	2015/09/23	19		%	25
			Octa CDD	2015/09/23	20		%	25
			Total Tetra CDD	2015/09/23	NC		%	25
			Total Penta CDD	2015/09/23	13		%	25
			Total Hexa CDD	2015/09/23	17		%	25
			Total Hepta CDD	2015/09/23	20		%	25
			2,3,7,8-Tetra CDF	2015/09/23	NC		%	25
			1,2,3,7,8-Penta CDF	2015/09/23	NC		%	25
			2,3,4,7,8-Penta CDF	2015/09/23	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/09/23	13		%	25
			1,2,3,6,7,8-Hexa CDF	2015/09/23	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/09/23	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/09/23	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/09/23	17		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/09/23	NC		%	25
			Octa CDF	2015/09/23	13		%	25
			Total Tetra CDF	2015/09/23	36 (2)		%	25
			Total Penta CDF	2015/09/23	6.4		%	25
			Total Hexa CDF	2015/09/23	15		%	25
			Total Hepta CDF	2015/09/23	19		%	25
4205624	LAZ	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/09/25	<0.12, EDL=0.12		pg/g	
			Confirmation C13-2378 TetraCDF	2015/09/25		73	%	40 - 135
4205624	LAZ	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/09/25	NC		%	100
4209016	LAZ	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/09/28	<0.10, EDL=0.10		pg/g	
			Confirmation C13-2378 TetraCDF	2015/09/28		64	%	40 - 135
4209016	LAZ	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/09/28	NC (1)		%	100

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

(2) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Your Project #: A5I0609  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/10/15**  
Report #: R3721857  
Version: 2 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5J7321**

**Received: 2015/09/29, 14:01**

Sample Matrix: Soil  
# Samples Received: 1

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2015/10/02	2015/10/08	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2015/10/09	BRL SOP-00406	EPA M8290A / M1613
Moisture	1	N/A	2015/09/30	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

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**RESULTS OF ANALYSES OF SOIL**

<b>Maxxam ID</b>		BBM043			
<b>Sampling Date</b>		2015/09/21 11:00			
<b>COC Number</b>		na			
	<b>UNITS</b>	<b>ISM-AOI026-0.5- AFTER ISM A51069-02</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	2.9	1.0	0.50	4211239
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BBM043							
Sampling Date		2015/09/21 11:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI026-0.5- AFTER ISM A5I069-02	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.290 (1)	0.290	0.200	0.0400	1.00	0.290		4218456
1,2,3,7,8-Penta CDD *	pg/g	1.61	0.101	1.00	0.0400	1.00	1.61		4218456
1,2,3,4,7,8-Hexa CDD *	pg/g	2.66	0.0989	1.00	0.0400	0.100	0.266		4218456
1,2,3,6,7,8-Hexa CDD *	pg/g	14.2	0.106	1.00	0.0400	0.100	1.42		4218456
1,2,3,7,8,9-Hexa CDD *	pg/g	7.29	0.102	1.00	0.0400	0.100	0.729		4218456
1,2,3,4,6,7,8-Hepta CDD *	pg/g	273	0.115	1.00	0.0400	0.0100	2.73		4218456
Octa CDD *	pg/g	1900	0.113	2.00	0.0800	0.000300	0.570		4218456
Total Tetra CDD *	pg/g	1.03	0.109	0.200	0.0400			2	4218456
Total Penta CDD *	pg/g	8.84	0.101	1.00	0.0400			7	4218456
Total Hexa CDD *	pg/g	71.2	0.103	1.00	0.0400			6	4218456
Total Hepta CDD *	pg/g	453	0.115	1.00	0.0400			2	4218456
2,3,7,8-Tetra CDF **	pg/g	1.49	0.115	0.200	0.0400	0.100	0.149		4218456
1,2,3,7,8-Penta CDF **	pg/g	1.05	0.108	1.00	0.0400	0.0300	0.0315		4218456
2,3,4,7,8-Penta CDF **	pg/g	1.15	0.106	1.00	0.0400	0.300	0.345		4218456
1,2,3,4,7,8-Hexa CDF **	pg/g	4.46	0.102	1.00	0.0400	0.100	0.446		4218456
1,2,3,6,7,8-Hexa CDF **	pg/g	2.24	0.109	1.00	0.0400	0.100	0.224		4218456
2,3,4,6,7,8-Hexa CDF **	pg/g	1.95	0.0975	1.00	0.0400	0.100	0.195		4218456
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.135 (1)	0.135	1.00	0.0400	0.100	0.0135		4218456
1,2,3,4,6,7,8-Hepta CDF **	pg/g	37.1	0.105	1.00	0.0400	0.0100	0.371		4218456
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.09	0.105	1.00	0.0400	0.0100	0.0209		4218456
Octa CDF **	pg/g	71.6	0.0970	2.00	0.0800	0.000300	0.0215		4218456
Total Tetra CDF **	pg/g	4.87	0.115	0.200	0.0400			8	4218456
Total Penta CDF **	pg/g	9.72	0.107	1.00	0.0400			7	4218456
Total Hexa CDF **	pg/g	60.2	0.103	1.00	0.0400			9	4218456
Total Hepta CDF **	pg/g	98.2	0.105	1.00	0.0400			4	4218456
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.85	0.11	1.0	0.90	0.100	0.0850		4226791
TOTAL TOXIC EQUIVALENCY	pg/g						9.37		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.



**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		BBM043							
<b>Sampling Date</b>		2015/09/21 11:00							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ISM-AOI026-0.5- AFTER ISM A5I069-02</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	106							4218456
C13-1234678 HeptaCDD *	%	104							4218456
C13-1234678 HeptaCDF **	%	84							4218456
C13-123478 HexaCDD *	%	86							4218456
C13-123478 HexaCDF **	%	86							4218456
C13-1234789 HeptaCDF **	%	88							4218456
C13-123678 HexaCDD *	%	103							4218456
C13-123678 HexaCDF **	%	93							4218456
C13-12378 PentaCDD *	%	137							4218456
C13-12378 PentaCDF **	%	126							4218456
C13-123789 HexaCDF **	%	105							4218456
C13-234678 HexaCDF **	%	86							4218456
C13-23478 PentaCDF **	%	148							4218456
C13-2378 TetraCDD *	%	101							4218456
C13-2378 TetraCDF **	%	124							4218456
C13-OCDD *	%	93							4218456
Confirmation C13-2378 TetraCDF **	%	92							4226791

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**TEST SUMMARY**

**Maxxam ID:** BBM043  
**Sample ID:** ISM-AOI026-0.5-AFTER ISM A5I069-02  
**Matrix:** Soil

**Collected:** 2015/09/21  
**Shipped:**  
**Received:** 2015/09/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4218456	2015/10/02	2015/10/08	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4226791	N/A	2015/10/09	Leila Azzam
Moisture	BAL	4211239	N/A	2015/09/30	Valentina Kaftani

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	14.9°C
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**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4211239	NS3	RPD - Sample/Sample Dup	Moisture	2015/09/30	1.5		%	20
4218456	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/10/08		107	%	35 - 197
			C13-1234678 HeptaCDD	2015/10/08		81	%	23 - 140
			C13-1234678 HeptaCDF	2015/10/08		74	%	28 - 143
			C13-123478 HexaCDD	2015/10/08		71	%	32 - 141
			C13-123478 HexaCDF	2015/10/08		70	%	26 - 152
			C13-1234789 HeptaCDF	2015/10/08		71	%	26 - 138
			C13-123678 HexaCDD	2015/10/08		90	%	28 - 130
			C13-123678 HexaCDF	2015/10/08		84	%	26 - 123
			C13-12378 PentaCDD	2015/10/08		115	%	25 - 181
			C13-12378 PentaCDF	2015/10/08		105	%	24 - 185
			C13-123789 HexaCDF	2015/10/08		90	%	29 - 147
			C13-234678 HexaCDF	2015/10/08		72	%	28 - 136
			C13-23478 PentaCDF	2015/10/08		134	%	21 - 178
			C13-2378 TetraCDD	2015/10/08		79	%	25 - 164
			C13-2378 TetraCDF	2015/10/08		93	%	24 - 169
			C13-OCDD	2015/10/08		69	%	17 - 157
			2,3,7,8-Tetra CDD	2015/10/08		110	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/10/08		95	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/10/08		102	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/10/08		101	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/10/08		108	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/10/08		89	%	70 - 140
			Octa CDD	2015/10/08		98	%	78 - 144
			2,3,7,8-Tetra CDF	2015/10/08		104	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/10/08		100	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/10/08		84	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/10/08		102	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/10/08		93	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/10/08		103	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/10/08		89	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/10/08		104	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/10/08		99	%	78 - 138
			Octa CDF	2015/10/08		96	%	63 - 170
4218456	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/10/08		107	%	35 - 197
			C13-1234678 HeptaCDD	2015/10/08		95	%	23 - 140
			C13-1234678 HeptaCDF	2015/10/08		89	%	28 - 143
			C13-123478 HexaCDD	2015/10/08		86	%	32 - 141
			C13-123478 HexaCDF	2015/10/08		80	%	26 - 152
			C13-1234789 HeptaCDF	2015/10/08		90	%	26 - 138
			C13-123678 HexaCDD	2015/10/08		107	%	28 - 130
			C13-123678 HexaCDF	2015/10/08		93	%	26 - 123
			C13-12378 PentaCDD	2015/10/08		146	%	25 - 181
			C13-12378 PentaCDF	2015/10/08		135	%	24 - 185
			C13-123789 HexaCDF	2015/10/08		107	%	29 - 147
			C13-234678 HexaCDF	2015/10/08		88	%	28 - 136
			C13-23478 PentaCDF	2015/10/08		160	%	21 - 178
			C13-2378 TetraCDD	2015/10/08		97	%	25 - 164
			C13-2378 TetraCDF	2015/10/08		119	%	24 - 169
			C13-OCDD	2015/10/08		82	%	17 - 157
			2,3,7,8-Tetra CDD	2015/10/08	<0.150, EDL=0.150		pg/g	
			1,2,3,7,8-Penta CDD	2015/10/08	<0.107, EDL=0.107		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/10/08	<0.0970, EDL=0.0970		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/10/08	<0.104, EDL=0.104		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/10/08	<0.0999, EDL=0.0999		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/10/08	0.665, EDL=0.136		pg/g	
			Octa CDD	2015/10/08	2.15, EDL=0.122		pg/g	
			Total Tetra CDD	2015/10/08	<0.150, EDL=0.150		pg/g	
			Total Penta CDD	2015/10/08	<0.107, EDL=0.107		pg/g	
			Total Hexa CDD	2015/10/08	<0.101, EDL=0.101		pg/g	
			Total Hepta CDD	2015/10/08	0.665, EDL=0.136		pg/g	
			2,3,7,8-Tetra CDF	2015/10/08	<0.120, EDL=0.120		pg/g	
			1,2,3,7,8-Penta CDF	2015/10/08	<0.111, EDL=0.111		pg/g	
			2,3,4,7,8-Penta CDF	2015/10/08	<0.109, EDL=0.109		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/10/08	<0.118, EDL=0.118		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/10/08	<0.126, EDL=0.126		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/10/08	<0.113, EDL=0.113		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/10/08	<0.119, EDL=0.119		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/10/08	<0.106, EDL=0.106		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2015/10/08	<0.105, EDL=0.105		pg/g	
			Octa CDF	2015/10/08	<0.147, EDL=0.147		pg/g	
			Total Tetra CDF	2015/10/08	<0.120, EDL=0.120		pg/g	
			Total Penta CDF	2015/10/08	<0.110, EDL=0.110		pg/g	
			Total Hexa CDF	2015/10/08	<0.119, EDL=0.119		pg/g	
			Total Hepta CDF	2015/10/08	<0.106, EDL=0.106		pg/g	
4226791	LAZ	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/10/09	<0.13, EDL=0.13		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC				Date		%		
Batch	Init	QC Type	Parameter	Analyzed	Value	Recovery	UNITS	QC Limits
			Confirmation C13-2378 TetraCDF	2015/10/09		88	%	40 - 135
<p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p>								

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Your Project #: A5I0106  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/10/23**  
Report #: R3731342  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5K5043**

**Received: 2015/10/08, 13:35**

Sample Matrix: Soil  
# Samples Received: 3

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	3	2015/10/15	2015/10/20	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	3	N/A	2015/10/20	BRL SOP-00406	EPA M8290A / M1613
Moisture	3	N/A	2015/10/09	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

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**RESULTS OF ANALYSES OF SOIL**

<b>Maxxam ID</b>		BCZ144	BCZ145	BCZ146			
<b>Sampling Date</b>		2015/08/26 15:45	2015/09/01 16:00	2015/09/01 14:15			
<b>COC Number</b>		na	na	na			
	<b>UNITS</b>	<b>SBS-ROW026-2.0</b>	<b>SBS-ROW019-2.0</b>	<b>SBS-ROW023-1.5</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	15	8.1	8.2	1.0	0.50	4224303
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BCZ144							
Sampling Date		2015/08/26 15:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW026-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.213	0.108	0.200	0.400	1.00	0.213		4235084
1,2,3,7,8-Penta CDD *	pg/g	1.11	0.101	0.999	0.400	1.00	1.11		4235084
1,2,3,4,7,8-Hexa CDD *	pg/g	2.68	0.0950	0.999	0.400	0.100	0.268		4235084
1,2,3,6,7,8-Hexa CDD *	pg/g	11.9	0.101	0.999	0.400	0.100	1.19		4235084
1,2,3,7,8,9-Hexa CDD *	pg/g	7.87	0.101	0.999	0.400	0.100	0.787		4235084
1,2,3,4,6,7,8-Hepta CDD *	pg/g	232	0.107	0.999	0.400	0.0100	2.32		4235084
Octa CDD *	pg/g	1610	0.102	2.00	0.800	0.000300	0.483		4235084
Total Tetra CDD *	pg/g	1.83	0.108	0.200	0.400			6	4235084
Total Penta CDD *	pg/g	6.98	0.101	0.999	0.400			10	4235084
Total Hexa CDD *	pg/g	60.7	0.101	0.999	0.400			7	4235084
Total Hepta CDD *	pg/g	389	0.107	0.999	0.400			2	4235084
2,3,7,8-Tetra CDF **	pg/g	0.873	0.108	0.200	0.400	0.100	0.0873		4235084
1,2,3,7,8-Penta CDF **	pg/g	1.18	0.106	0.999	0.400	0.0300	0.0354		4235084
2,3,4,7,8-Penta CDF **	pg/g	1.68	0.105	0.999	0.400	0.300	0.504		4235084
1,2,3,4,7,8-Hexa CDF **	pg/g	8.03	0.0991	0.999	0.400	0.100	0.803		4235084
1,2,3,6,7,8-Hexa CDF **	pg/g	3.44	0.103	0.999	0.400	0.100	0.344		4235084
2,3,4,6,7,8-Hexa CDF **	pg/g	1.93	0.0964	0.999	0.400	0.100	0.193		4235084
1,2,3,7,8,9-Hexa CDF **	pg/g	0.218	0.102	0.999	0.400	0.100	0.0218		4235084
1,2,3,4,6,7,8-Hepta CDF **	pg/g	44.1	0.104	0.999	0.400	0.0100	0.441		4235084
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.47	0.101	0.999	0.400	0.0100	0.0247		4235084
Octa CDF **	pg/g	43.7	0.100	2.00	0.800	0.000300	0.0131		4235084
Total Tetra CDF **	pg/g	5.34	0.108	0.200	0.400			12	4235084
Total Penta CDF **	pg/g	16.5	0.105	0.999	0.400			9	4235084
Total Hexa CDF **	pg/g	82.5	0.100	0.999	0.400			10	4235084
Total Hepta CDF **	pg/g	107	0.102	0.999	0.400			4	4235084
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.62	0.13	1.0	0.90	0.100	0.0620		4238801
TOTAL TOXIC EQUIVALENCY	pg/g						8.81		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	77							4235084
C13-1234678 HeptaCDD *	%	101							4235084
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BCZ144							
Sampling Date		2015/08/26 15:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW026-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	83							4235084
C13-123478 HexaCDD *	%	68							4235084
C13-123478 HexaCDF **	%	74							4235084
C13-1234789 HeptaCDF **	%	88							4235084
C13-123678 HexaCDD *	%	71							4235084
C13-123678 HexaCDF **	%	72							4235084
C13-12378 PentaCDD *	%	86							4235084
C13-12378 PentaCDF **	%	86							4235084
C13-123789 HexaCDF **	%	84							4235084
C13-234678 HexaCDF **	%	68							4235084
C13-23478 PentaCDF **	%	90							4235084
C13-2378 TetraCDD *	%	66							4235084
C13-2378 TetraCDF **	%	77							4235084
C13-OCDD *	%	82							4235084
Confirmation C13-2378 TetraCDF **	%	76							4238801

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BCZ145							
Sampling Date		2015/09/01 16:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW019-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.100	0.100	0.199	0.400	1.00	0.100		4235084
1,2,3,7,8-Penta CDD *	pg/g	0.749	0.103	0.995	0.400	1.00	0.749		4235084
1,2,3,4,7,8-Hexa CDD *	pg/g	2.18	0.0958	0.995	0.400	0.100	0.218		4235084
1,2,3,6,7,8-Hexa CDD *	pg/g	11.3	0.102	0.995	0.400	0.100	1.13		4235084
1,2,3,7,8,9-Hexa CDD *	pg/g	5.91	0.102	0.995	0.400	0.100	0.591		4235084
1,2,3,4,6,7,8-Hepta CDD *	pg/g	229	0.101	0.995	0.400	0.0100	2.29		4235084
Octa CDD *	pg/g	1660	0.104	1.99	0.800	0.000300	0.498		4235084
Total Tetra CDD *	pg/g	0.140	0.100	0.199	0.400			1	4235084
Total Penta CDD *	pg/g	2.52	0.103	0.995	0.400			5	4235084
Total Hexa CDD *	pg/g	50.5	0.102	0.995	0.400			7	4235084
Total Hepta CDD *	pg/g	391	0.101	0.995	0.400			2	4235084
2,3,7,8-Tetra CDF **	pg/g	0.444	0.109	0.199	0.400	0.100	0.0444		4235084
1,2,3,7,8-Penta CDF **	pg/g	1.02	0.104	0.995	0.400	0.0300	0.0306		4235084
2,3,4,7,8-Penta CDF **	pg/g	1.54	0.103	0.995	0.400	0.300	0.462		4235084
1,2,3,4,7,8-Hexa CDF **	pg/g	9.10	0.104	0.995	0.400	0.100	0.910		4235084
1,2,3,6,7,8-Hexa CDF **	pg/g	3.39	0.108	0.995	0.400	0.100	0.339		4235084
2,3,4,6,7,8-Hexa CDF **	pg/g	1.92	0.101	0.995	0.400	0.100	0.192		4235084
1,2,3,7,8,9-Hexa CDF **	pg/g	0.194	0.107	0.995	0.400	0.100	0.0194		4235084
1,2,3,4,6,7,8-Hepta CDF **	pg/g	40.2	0.106	0.995	0.400	0.0100	0.402		4235084
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.14	0.103	0.995	0.400	0.0100	0.0214		4235084
Octa CDF **	pg/g	28.4	0.101	1.99	0.800	0.000300	0.00852		4235084
Total Tetra CDF **	pg/g	2.63	0.109	0.199	0.400			7	4235084
Total Penta CDF **	pg/g	15.5	0.103	0.995	0.400			9	4235084
Total Hexa CDF **	pg/g	95.0	0.105	0.995	0.400			11	4235084
Total Hepta CDF **	pg/g	96.9	0.104	0.995	0.400			4	4235084
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.28	0.11	0.99	0.89	0.100	0.0280		4238801
TOTAL TOXIC EQUIVALENCY	pg/g						7.99		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	92							4235084
C13-1234678 HeptaCDD *	%	101							4235084
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BCZ145							
Sampling Date		2015/09/01 16:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW019-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	86							4235084
C13-123478 HexaCDD *	%	72							4235084
C13-123478 HexaCDF **	%	77							4235084
C13-1234789 HeptaCDF **	%	87							4235084
C13-123678 HexaCDD *	%	73							4235084
C13-123678 HexaCDF **	%	75							4235084
C13-12378 PentaCDD *	%	88							4235084
C13-12378 PentaCDF **	%	84							4235084
C13-123789 HexaCDF **	%	86							4235084
C13-234678 HexaCDF **	%	71							4235084
C13-23478 PentaCDF **	%	90							4235084
C13-2378 TetraCDD *	%	75							4235084
C13-2378 TetraCDF **	%	84							4235084
C13-OCDD *	%	81							4235084
Confirmation C13-2378 TetraCDF **	%	82							4238801

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BCZ146							
Sampling Date		2015/09/01 14:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW023-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.106	0.106	0.198	0.400	1.00	0.106		4235084
1,2,3,7,8-Penta CDD *	pg/g	1.02	0.104	0.992	0.400	1.00	1.02		4235084
1,2,3,4,7,8-Hexa CDD *	pg/g	2.97	0.0954	0.992	0.400	0.100	0.297		4235084
1,2,3,6,7,8-Hexa CDD *	pg/g	11.9	0.102	0.992	0.400	0.100	1.19		4235084
1,2,3,7,8,9-Hexa CDD *	pg/g	8.04	0.102	0.992	0.400	0.100	0.804		4235084
1,2,3,4,6,7,8-Hepta CDD *	pg/g	263	0.101	0.992	0.400	0.0100	2.63		4235084
Octa CDD *	pg/g	1880	0.105	1.98	0.800	0.000300	0.564		4235084
Total Tetra CDD *	pg/g	1.41	0.106	0.198	0.400			2	4235084
Total Penta CDD *	pg/g	4.41	0.104	0.992	0.400			7	4235084
Total Hexa CDD *	pg/g	57.4	0.101	0.992	0.400			7	4235084
Total Hepta CDD *	pg/g	411	0.101	0.992	0.400			2	4235084
2,3,7,8-Tetra CDF **	pg/g	0.380	0.107	0.198	0.400	0.100	0.0380		4235084
1,2,3,7,8-Penta CDF **	pg/g	0.617	0.100	0.992	0.400	0.0300	0.0185		4235084
2,3,4,7,8-Penta CDF **	pg/g	0.950	0.0992	0.992	0.400	0.300	0.285		4235084
1,2,3,4,7,8-Hexa CDF **	pg/g	6.21	0.101	0.992	0.400	0.100	0.621		4235084
1,2,3,6,7,8-Hexa CDF **	pg/g	2.62	0.105	0.992	0.400	0.100	0.262		4235084
2,3,4,6,7,8-Hexa CDF **	pg/g	1.95	0.0978	0.992	0.400	0.100	0.195		4235084
1,2,3,7,8,9-Hexa CDF **	pg/g	0.136	0.104	0.992	0.400	0.100	0.0136		4235084
1,2,3,4,6,7,8-Hepta CDF **	pg/g	101	0.102	0.992	0.400	0.0100	1.01		4235084
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.57	0.0997	0.992	0.400	0.0100	0.0657		4235084
Octa CDF **	pg/g	346	0.101	1.98	0.800	0.000300	0.104		4235084
Total Tetra CDF **	pg/g	3.72	0.107	0.198	0.400			9	4235084
Total Penta CDF **	pg/g	12.3	0.0997	0.992	0.400			9	4235084
Total Hexa CDF **	pg/g	113	0.102	0.992	0.400			11	4235084
Total Hepta CDF **	pg/g	365	0.101	0.992	0.400			4	4235084
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.18	0.18	0.99	0.89	0.100	0.0180		4238801
TOTAL TOXIC EQUIVALENCY	pg/g						9.20		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	71							4235084
C13-1234678 HeptaCDD *	%	78							4235084
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BCZ146							
Sampling Date		2015/09/01 14:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW023-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	65							4235084
C13-123478 HexaCDD *	%	54							4235084
C13-123478 HexaCDF **	%	60							4235084
C13-1234789 HeptaCDF **	%	68							4235084
C13-123678 HexaCDD *	%	55							4235084
C13-123678 HexaCDF **	%	58							4235084
C13-12378 PentaCDD *	%	67							4235084
C13-12378 PentaCDF **	%	65							4235084
C13-123789 HexaCDF **	%	65							4235084
C13-234678 HexaCDF **	%	49							4235084
C13-23478 PentaCDF **	%	64							4235084
C13-2378 TetraCDD *	%	54							4235084
C13-2378 TetraCDF **	%	58							4235084
C13-OCDD *	%	64							4235084
Confirmation C13-2378 TetraCDF **	%	59							4238801

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**TEST SUMMARY**

**Maxxam ID:** BCZ144  
**Sample ID:** SBS-ROW026-2.0  
**Matrix:** Soil

**Collected:** 2015/08/26  
**Shipped:**  
**Received:** 2015/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4235084	2015/10/15	2015/10/20	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4238801	N/A	2015/10/20	Leila Azzam
Moisture	BAL	4224303	N/A	2015/10/09	Chun Yan

**Maxxam ID:** BCZ144 Dup  
**Sample ID:** SBS-ROW026-2.0  
**Matrix:** Soil

**Collected:** 2015/08/26  
**Shipped:**  
**Received:** 2015/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4235084	2015/10/15	2015/10/20	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4238801	N/A	2015/10/20	Leila Azzam

**Maxxam ID:** BCZ145  
**Sample ID:** SBS-ROW019-2.0  
**Matrix:** Soil

**Collected:** 2015/09/01  
**Shipped:**  
**Received:** 2015/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4235084	2015/10/15	2015/10/20	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4238801	N/A	2015/10/20	Leila Azzam
Moisture	BAL	4224303	N/A	2015/10/09	Chun Yan

**Maxxam ID:** BCZ146  
**Sample ID:** SBS-ROW023-1.5  
**Matrix:** Soil

**Collected:** 2015/09/01  
**Shipped:**  
**Received:** 2015/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4235084	2015/10/15	2015/10/20	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4238801	N/A	2015/10/20	Leila Azzam
Moisture	BAL	4224303	N/A	2015/10/09	Chun Yan



**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.0°C
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**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4224303	NS3	RPD - Sample/Sample Dup	Moisture	2015/10/09	0.61		%	20
4235084	KKS	Spiked Blank	37CL4 2378 Tetra CDD	2015/10/19		85	%	35 - 197
			C13-1234678 HeptaCDD	2015/10/19		97	%	23 - 140
			C13-1234678 HeptaCDF	2015/10/19		81	%	28 - 143
			C13-123478 HexaCDD	2015/10/19		75	%	32 - 141
			C13-123478 HexaCDF	2015/10/19		77	%	26 - 152
			C13-1234789 HeptaCDF	2015/10/19		85	%	26 - 138
			C13-123678 HexaCDD	2015/10/19		75	%	28 - 130
			C13-123678 HexaCDF	2015/10/19		76	%	26 - 123
			C13-12378 PentaCDD	2015/10/19		93	%	25 - 181
			C13-12378 PentaCDF	2015/10/19		90	%	24 - 185
			C13-123789 HexaCDF	2015/10/19		88	%	29 - 147
			C13-234678 HexaCDF	2015/10/19		73	%	28 - 136
			C13-23478 PentaCDF	2015/10/19		95	%	21 - 178
			C13-2378 TetraCDD	2015/10/19		74	%	25 - 164
			C13-2378 TetraCDF	2015/10/19		85	%	24 - 169
			C13-OCDD	2015/10/19		72	%	17 - 157
			2,3,7,8-Tetra CDD	2015/10/19		100	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/10/19		88	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/10/19		103	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/10/19		98	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/10/19		114	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/10/19		83	%	70 - 140
			Octa CDD	2015/10/19		96	%	78 - 144
			2,3,7,8-Tetra CDF	2015/10/19		107	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/10/19		105	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/10/19		97	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/10/19		106	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/10/19		104	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/10/19		107	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/10/19		97	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/10/19		110	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/10/19		104	%	78 - 138
			Octa CDF	2015/10/19		102	%	63 - 170
4235084	KKS	Method Blank	37CL4 2378 Tetra CDD	2015/10/19		83	%	35 - 197
			C13-1234678 HeptaCDD	2015/10/19		92	%	23 - 140
			C13-1234678 HeptaCDF	2015/10/19		78	%	28 - 143
			C13-123478 HexaCDD	2015/10/19		70	%	32 - 141
			C13-123478 HexaCDF	2015/10/19		74	%	26 - 152
			C13-1234789 HeptaCDF	2015/10/19		81	%	26 - 138
			C13-123678 HexaCDD	2015/10/19		72	%	28 - 130
			C13-123678 HexaCDF	2015/10/19		72	%	26 - 123
			C13-12378 PentaCDD	2015/10/19		83	%	25 - 181
			C13-12378 PentaCDF	2015/10/19		84	%	24 - 185
			C13-123789 HexaCDF	2015/10/19		82	%	29 - 147
			C13-234678 HexaCDF	2015/10/19		62	%	28 - 136
			C13-23478 PentaCDF	2015/10/19		82	%	21 - 178
			C13-2378 TetraCDD	2015/10/19		67	%	25 - 164
			C13-2378 TetraCDF	2015/10/19		73	%	24 - 169
			C13-OCDD	2015/10/19		76	%	17 - 157
			2,3,7,8-Tetra CDD	2015/10/19	<0.104, EDL=0.104		pg/g	
			1,2,3,7,8-Penta CDD	2015/10/19	<0.0837, EDL=0.0837		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/10/19	<0.103, EDL=0.103		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/10/19	<0.110, EDL=0.110		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/10/19	<0.110, EDL=0.110		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/10/19	0.149, EDL=0.104		pg/g	
			Octa CDD	2015/10/19	1.42, EDL=0.107		pg/g	
			Total Tetra CDD	2015/10/19	<0.104, EDL=0.104		pg/g	
			Total Penta CDD	2015/10/19	<0.0837, EDL=0.0837		pg/g	
			Total Hexa CDD	2015/10/19	<0.109, EDL=0.109		pg/g	
			Total Hepta CDD	2015/10/19	0.293, EDL=0.104		pg/g	
			2,3,7,8-Tetra CDF	2015/10/19	<0.102, EDL=0.102		pg/g	
			1,2,3,7,8-Penta CDF	2015/10/19	<0.112, EDL=0.112		pg/g	
			2,3,4,7,8-Penta CDF	2015/10/19	<0.111, EDL=0.111		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/10/19	<0.104, EDL=0.104		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/10/19	<0.108, EDL=0.108		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/10/19	<0.101, EDL=0.101		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/10/19	<0.107, EDL=0.107		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/10/19	<0.112, EDL=0.112		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2015/10/19	<0.109, EDL=0.109		pg/g	
			Octa CDF	2015/10/19	<0.113, EDL=0.113		pg/g	
			Total Tetra CDF	2015/10/19	<0.102, EDL=0.102		pg/g	
			Total Penta CDF	2015/10/19	<0.111, EDL=0.111		pg/g	
			Total Hexa CDF	2015/10/19	<0.105, EDL=0.105		pg/g	
			Total Hepta CDF	2015/10/19	<0.110, EDL=0.110		pg/g	
4235084	KKS	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/10/20	NC		%	25
			1,2,3,7,8-Penta CDD	2015/10/20	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/10/20	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2015/10/20	4.6		%	25
			1,2,3,7,8,9-Hexa CDD	2015/10/20	6.3		%	25

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,6,7,8-Hepta CDD	2015/10/20	2.3		%	25
			Octa CDD	2015/10/20	2.8		%	25
			Total Tetra CDD	2015/10/20	9.7		%	25
			Total Penta CDD	2015/10/20	3.7		%	25
			Total Hexa CDD	2015/10/20	4.3		%	25
			Total Hepta CDD	2015/10/20	4.4		%	25
			2,3,7,8-Tetra CDF	2015/10/20	NC		%	25
			1,2,3,7,8-Penta CDF	2015/10/20	NC		%	25
			2,3,4,7,8-Penta CDF	2015/10/20	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/10/20	3.5		%	25
			1,2,3,6,7,8-Hexa CDF	2015/10/20	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/10/20	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/10/20	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/10/20	3.1		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/10/20	NC		%	25
			Octa CDF	2015/10/20	3.6		%	25
			Total Tetra CDF	2015/10/20	12		%	25
			Total Penta CDF	2015/10/20	15		%	25
			Total Hexa CDF	2015/10/20	10		%	25
			Total Hepta CDF	2015/10/20	3.6		%	25
4238801	LAZ	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/10/20	<0.10, EDL=0.10		pg/g	
			Confirmation C13-2378 TetraCDF	2015/10/20		96	%	40 - 135
4238801	LAZ	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/10/20	NC		%	100

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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Cristina Carriere, Scientific Services



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Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Your Project #: A5K0059  
Your C.O.C. #: NA

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/12/03**  
Report #: R3792706  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5M6002**

**Received: 2015/11/04, 14:05**

Sample Matrix: Soil  
# Samples Received: 5

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	2	2015/11/17	2015/11/29	BRL SOP-00410	EPA 1613B m
Dioxins/Furans in Soil (1613B) (1)	3	2015/11/17	2015/11/30	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	3	N/A	2015/11/30	BRL SOP-00406	EPA M8290A / M1613
Moisture	5	N/A	2015/11/06	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		BHC912	BHC913	BHC914	BHC915				
Sampling Date		2015/11/02 08:55	2015/11/02 09:40	2015/11/02 10:30	2015/11/02 12:15				
COC Number		NA	NA	NA	NA				
		UNITS	SS-ROW038S-0.5	SS-ROW029BS-0.5	SS-ROW010W-0.5	SS-ROW022W-0.5	RDL	MDL	QC Batch
Moisture	%	20	21	22	18	1.0	0.50	4262279	
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									

Maxxam ID		BHC916				
Sampling Date		2015/11/02 14:10				
COC Number		NA				
		UNITS	SS-ROW033W-0.5	RDL	MDL	QC Batch
Moisture	%	22	1.0	0.50	4262279	
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BHC912							
Sampling Date		2015/11/02 08:55							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW038S-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.186	0.186	2.00	0.0800	1.00	0.186		4286499
1,2,3,7,8-Penta CDD *	pg/g	0.638	0.207	10.0	0.0800	1.00	0.638		4286499
1,2,3,4,7,8-Hexa CDD *	pg/g	1.52	0.180	10.0	0.0800	0.100	0.152		4286499
1,2,3,6,7,8-Hexa CDD *	pg/g	4.90	0.193	10.0	0.0800	0.100	0.490		4286499
1,2,3,7,8,9-Hexa CDD *	pg/g	4.65	0.192	10.0	0.0800	0.100	0.465		4286499
1,2,3,4,6,7,8-Hepta CDD *	pg/g	107	0.182	10.0	0.0800	0.0100	1.07		4286499
Octa CDD *	pg/g	803	0.367	20.0	0.160	0.000300	0.241		4286499
Total Tetra CDD *	pg/g	0.253	0.186	2.00	0.0800			1	4286499
Total Penta CDD *	pg/g	1.76	0.207	10.0	0.0800			3	4286499
Total Hexa CDD *	pg/g	30.1	0.192	10.0	0.0800			7	4286499
Total Hepta CDD *	pg/g	190	0.182	10.0	0.0800			2	4286499
2,3,7,8-Tetra CDF **	pg/g	0.302	0.235	2.00	0.0800	0.100	0.0302		4286499
1,2,3,7,8-Penta CDF **	pg/g	<0.210	0.210	10.0	0.0800	0.0300	0.00630		4286499
2,3,4,7,8-Penta CDF **	pg/g	<0.261 (1)	0.261	10.0	0.0800	0.300	0.0783		4286499
1,2,3,4,7,8-Hexa CDF **	pg/g	1.80	0.215	10.0	0.0800	0.100	0.180		4286499
1,2,3,6,7,8-Hexa CDF **	pg/g	0.840	0.226	10.0	0.0800	0.100	0.0840		4286499
2,3,4,6,7,8-Hexa CDF **	pg/g	0.672	0.207	10.0	0.0800	0.100	0.0672		4286499
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.221	0.221	10.0	0.0800	0.100	0.0221		4286499
1,2,3,4,6,7,8-Hepta CDF **	pg/g	19.1	0.160	10.0	0.0800	0.0100	0.191		4286499
1,2,3,4,7,8,9-Hepta CDF **	pg/g	1.00	0.162	10.0	0.0800	0.0100	0.0100		4286499
Octa CDF **	pg/g	45.1	0.195	20.0	0.160	0.000300	0.0135		4286499
Total Tetra CDF **	pg/g	1.07	0.235	2.00	0.0800			3	4286499
Total Penta CDF **	pg/g	5.69	0.208	10.0	0.0800			5	4286499
Total Hexa CDF **	pg/g	23.7	0.217	10.0	0.0800			8	4286499
Total Hepta CDF **	pg/g	51.7	0.161	10.0	0.0800			4	4286499
TOTAL TOXIC EQUIVALENCY	pg/g						3.92		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	91							4286499
C13-1234678 HeptaCDD *	%	122							4286499
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.									



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BHC912							
Sampling Date		2015/11/02 08:55							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW038S-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	99							4286499
C13-123478 HexaCDD *	%	93							4286499
C13-123478 HexaCDF **	%	91							4286499
C13-1234789 HeptaCDF **	%	107							4286499
C13-123678 HexaCDD *	%	93							4286499
C13-123678 HexaCDF **	%	91							4286499
C13-12378 PentaCDD *	%	115							4286499
C13-12378 PentaCDF **	%	102							4286499
C13-123789 HexaCDF **	%	111							4286499
C13-234678 HexaCDF **	%	95							4286499
C13-23478 PentaCDF **	%	125							4286499
C13-2378 TetraCDD *	%	92							4286499
C13-2378 TetraCDF **	%	105							4286499
C13-OCDD *	%	99							4286499

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

### DIOXINS AND FURANS BY HRMS (SOIL)

Maxxam ID		BHC913							
Sampling Date		2015/11/02 09:40							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW029BS-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.31	0.202	2.00	0.0800	1.00	1.31		4286499
1,2,3,7,8-Penta CDD *	pg/g	4.78	0.190	10.0	0.0800	1.00	4.78		4286499
1,2,3,4,7,8-Hexa CDD *	pg/g	13.3	0.137	10.0	0.0800	0.100	1.33		4286499
1,2,3,6,7,8-Hexa CDD *	pg/g	50.3	0.146	10.0	0.0800	0.100	5.03		4286499
1,2,3,7,8,9-Hexa CDD *	pg/g	33.8	0.145	10.0	0.0800	0.100	3.38		4286499
1,2,3,4,6,7,8-Hepta CDD *	pg/g	990	0.175	10.0	0.0800	0.0100	9.90		4286499
Octa CDD *	pg/g	7820	0.247	20.0	0.160	0.000300	2.35		4286499
Total Tetra CDD *	pg/g	6.54	0.202	2.00	0.0800			7	4286499
Total Penta CDD *	pg/g	21.5	0.190	10.0	0.0800			11	4286499
Total Hexa CDD *	pg/g	242	0.146	10.0	0.0800			7	4286499
Total Hepta CDD *	pg/g	1610	0.175	10.0	0.0800			2	4286499
2,3,7,8-Tetra CDF **	pg/g	1.82	0.197	2.00	0.0800	0.100	0.182		4286499
1,2,3,7,8-Penta CDF **	pg/g	2.60	0.212	10.0	0.0800	0.0300	0.0780		4286499
2,3,4,7,8-Penta CDF **	pg/g	3.81	0.208	10.0	0.0800	0.300	1.14		4286499
1,2,3,4,7,8-Hexa CDF **	pg/g	26.3	0.159	10.0	0.0800	0.100	2.63		4286499
1,2,3,6,7,8-Hexa CDF **	pg/g	9.76	0.167	10.0	0.0800	0.100	0.976		4286499
2,3,4,6,7,8-Hexa CDF **	pg/g	7.11	0.153	10.0	0.0800	0.100	0.711		4286499
1,2,3,7,8,9-Hexa CDF **	pg/g	0.409	0.163	10.0	0.0800	0.100	0.0409		4286499
1,2,3,4,6,7,8-Hepta CDF **	pg/g	197	0.170	10.0	0.0800	0.0100	1.97		4286499
1,2,3,4,7,8,9-Hepta CDF **	pg/g	14.5	0.171	10.0	0.0800	0.0100	0.145		4286499
Octa CDF **	pg/g	467	0.246	20.0	0.160	0.000300	0.140		4286499
Total Tetra CDF **	pg/g	18.2	0.197	2.00	0.0800			13	4286499
Total Penta CDF **	pg/g	84.1	0.210	10.0	0.0800			10	4286499
Total Hexa CDF **	pg/g	281	0.160	10.0	0.0800			12	4286499
Total Hepta CDF **	pg/g	580	0.171	10.0	0.0800			4	4286499
TOTAL TOXIC EQUIVALENCY	pg/g						36.1		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	88							4286499
C13-1234678 HeptaCDD *	%	154 (1)							4286499
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) Recovery exceeds method criteria due to matrix effects									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BHC913							
Sampling Date		2015/11/02 09:40							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW029BS-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	114							4286499
C13-123478 HexaCDD *	%	102							4286499
C13-123478 HexaCDF **	%	103							4286499
C13-1234789 HeptaCDF **	%	126							4286499
C13-123678 HexaCDD *	%	107							4286499
C13-123678 HexaCDF **	%	106							4286499
C13-12378 PentaCDD *	%	126							4286499
C13-12378 PentaCDF **	%	103							4286499
C13-123789 HexaCDF **	%	122							4286499
C13-234678 HexaCDF **	%	105							4286499
C13-23478 PentaCDF **	%	148							4286499
C13-2378 TetraCDD *	%	90							4286499
C13-2378 TetraCDF **	%	103							4286499
C13-OCDD *	%	142							4286499

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BHC914							
Sampling Date		2015/11/02 10:30							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW010W-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.392	0.180	2.00	0.0800	1.00	0.392		4286499
1,2,3,7,8-Penta CDD *	pg/g	2.53	0.179	10.0	0.0800	1.00	2.53		4286499
1,2,3,4,7,8-Hexa CDD *	pg/g	6.91	0.179	10.0	0.0800	0.100	0.691		4286499
1,2,3,6,7,8-Hexa CDD *	pg/g	28.0	0.191	10.0	0.0800	0.100	2.80		4286499
1,2,3,7,8,9-Hexa CDD *	pg/g	17.2	0.190	10.0	0.0800	0.100	1.72		4286499
1,2,3,4,6,7,8-Hepta CDD *	pg/g	533	0.141	10.0	0.0800	0.0100	5.33		4286499
Octa CDD *	pg/g	3740	0.615	20.0	0.160	0.000300	1.12		4286499
Total Tetra CDD *	pg/g	4.97	0.180	2.00	0.0800			6	4286499
Total Penta CDD *	pg/g	15.5	0.179	10.0	0.0800			10	4286499
Total Hexa CDD *	pg/g	152	0.191	10.0	0.0800			7	4286499
Total Hepta CDD *	pg/g	906	0.141	10.0	0.0800			2	4286499
2,3,7,8-Tetra CDF **	pg/g	1.99	0.267	2.00	0.0800	0.100	0.199		4286499
1,2,3,7,8-Penta CDF **	pg/g	1.81	0.233	10.0	0.0800	0.0300	0.0543		4286499
2,3,4,7,8-Penta CDF **	pg/g	3.54	0.229	10.0	0.0800	0.300	1.06		4286499
1,2,3,4,7,8-Hexa CDF **	pg/g	19.1	0.170	10.0	0.0800	0.100	1.91		4286499
1,2,3,6,7,8-Hexa CDF **	pg/g	8.00	0.178	10.0	0.0800	0.100	0.800		4286499
2,3,4,6,7,8-Hexa CDF **	pg/g	6.04	0.163	10.0	0.0800	0.100	0.604		4286499
1,2,3,7,8,9-Hexa CDF **	pg/g	0.314	0.174	10.0	0.0800	0.100	0.0314		4286499
1,2,3,4,6,7,8-Hepta CDF **	pg/g	114	0.160	10.0	0.0800	0.0100	1.14		4286499
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.24	0.161	10.0	0.0800	0.0100	0.0624		4286499
Octa CDF **	pg/g	204	0.202	20.0	0.160	0.000300	0.0612		4286499
Total Tetra CDF **	pg/g	30.0	0.267	2.00	0.0800			12	4286499
Total Penta CDF **	pg/g	114	0.231	10.0	0.0800			9	4286499
Total Hexa CDF **	pg/g	227	0.171	10.0	0.0800			11	4286499
Total Hepta CDF **	pg/g	309	0.161	10.0	0.0800			4	4286499
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.18	0.11	2.0	1.8	0.100	0.118		4292733
TOTAL TOXIC EQUIVALENCY	pg/g						20.4		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	87							4286499
C13-1234678 HeptaCDD *	%	137							4286499
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BHC914							
Sampling Date		2015/11/02 10:30							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW010W-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	103							4286499
C13-123478 HexaCDD *	%	98							4286499
C13-123478 HexaCDF **	%	101							4286499
C13-1234789 HeptaCDF **	%	120							4286499
C13-123678 HexaCDD *	%	100							4286499
C13-123678 HexaCDF **	%	102							4286499
C13-12378 PentaCDD *	%	120							4286499
C13-12378 PentaCDF **	%	102							4286499
C13-123789 HexaCDF **	%	113							4286499
C13-234678 HexaCDF **	%	98							4286499
C13-23478 PentaCDF **	%	143							4286499
C13-2378 TetraCDD *	%	85							4286499
C13-2378 TetraCDF **	%	96							4286499
C13-OCDD *	%	121							4286499
Confirmation C13-2378 TetraCDF **	%	89							4292733

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BHC915							
Sampling Date		2015/11/02 12:15							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW022W-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.32	0.161	2.00	0.0800	1.00	1.32		4286499
1,2,3,7,8-Penta CDD *	pg/g	5.60	0.276	10.0	0.0800	1.00	5.60		4286499
1,2,3,4,7,8-Hexa CDD *	pg/g	21.4	0.208	10.0	0.0800	0.100	2.14		4286499
1,2,3,6,7,8-Hexa CDD *	pg/g	84.4	0.222	10.0	0.0800	0.100	8.44		4286499
1,2,3,7,8,9-Hexa CDD *	pg/g	44.6	0.221	10.0	0.0800	0.100	4.46		4286499
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1750	0.278	10.0	0.0800	0.0100	17.5		4286499
Octa CDD *	pg/g	13300 (1)	1.02	100	0.160	0.000300	3.99		4286499
Total Tetra CDD *	pg/g	9.47	0.161	2.00	0.0800			9	4286499
Total Penta CDD *	pg/g	35.6	0.276	10.0	0.0800			11	4286499
Total Hexa CDD *	pg/g	418	0.222	10.0	0.0800			7	4286499
Total Hepta CDD *	pg/g	2900	0.278	10.0	0.0800			2	4286499
2,3,7,8-Tetra CDF **	pg/g	3.10	0.245	2.00	0.0800	0.100	0.310		4286499
1,2,3,7,8-Penta CDF **	pg/g	5.24	0.204	10.0	0.0800	0.0300	0.157		4286499
2,3,4,7,8-Penta CDF **	pg/g	8.53	0.200	10.0	0.0800	0.300	2.56		4286499
1,2,3,4,7,8-Hexa CDF **	pg/g	47.7	0.197	10.0	0.0800	0.100	4.77		4286499
1,2,3,6,7,8-Hexa CDF **	pg/g	23.3	0.207	10.0	0.0800	0.100	2.33		4286499
2,3,4,6,7,8-Hexa CDF **	pg/g	15.3	0.190	10.0	0.0800	0.100	1.53		4286499
1,2,3,7,8,9-Hexa CDF **	pg/g	0.755	0.202	10.0	0.0800	0.100	0.0755		4286499
1,2,3,4,6,7,8-Hepta CDF **	pg/g	342	0.244	10.0	0.0800	0.0100	3.42		4286499
1,2,3,4,7,8,9-Hepta CDF **	pg/g	20.1	0.246	10.0	0.0800	0.0100	0.201		4286499
Octa CDF **	pg/g	920	0.241	20.0	0.160	0.000300	0.276		4286499
Total Tetra CDF **	pg/g	62.9	0.245	2.00	0.0800			14	4286499
Total Penta CDF **	pg/g	288	0.202	10.0	0.0800			10	4286499
Total Hexa CDF **	pg/g	617	0.199	10.0	0.0800			11	4286499
Total Hepta CDF **	pg/g	1010	0.245	10.0	0.0800			4	4286499
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.66	0.099	2.0	1.8	0.100	0.166		4292733
TOTAL TOXIC EQUIVALENCY	pg/g						58.9		

Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	90							4286499

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1)  
\*\* From 5X Dilution \*\*

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BHC915							
Sampling Date		2015/11/02 12:15							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW022W-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	131							4286499
C13-1234678 HeptaCDF **	%	97							4286499
C13-123478 HexaCDD *	%	91							4286499
C13-123478 HexaCDF **	%	104							4286499
C13-1234789 HeptaCDF **	%	109							4286499
C13-123678 HexaCDD *	%	97							4286499
C13-123678 HexaCDF **	%	106							4286499
C13-12378 PentaCDD *	%	117							4286499
C13-12378 PentaCDF **	%	102							4286499
C13-123789 HexaCDF **	%	107							4286499
C13-234678 HexaCDF **	%	90							4286499
C13-23478 PentaCDF **	%	158							4286499
C13-2378 TetraCDD *	%	86							4286499
C13-2378 TetraCDF **	%	93							4286499
C13-OCDD *	%	114 (1)							4286499
Confirmation C13-2378 TetraCDF **	%	86							4292733

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1)  
\*\* From 5X Dilution \*\*

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BHC916							
Sampling Date		2015/11/02 14:10							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW033W-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.15	0.203	2.00	0.0800	1.00	1.15		4286499
1,2,3,7,8-Penta CDD *	pg/g	8.08	0.197	10.0	0.0800	1.00	8.08		4286499
1,2,3,4,7,8-Hexa CDD *	pg/g	14.7	0.175	10.0	0.0800	0.100	1.47		4286499
1,2,3,6,7,8-Hexa CDD *	pg/g	58.3	0.187	10.0	0.0800	0.100	5.83		4286499
1,2,3,7,8,9-Hexa CDD *	pg/g	36.3	0.186	10.0	0.0800	0.100	3.63		4286499
1,2,3,4,6,7,8-Hepta CDD *	pg/g	999	0.157	10.0	0.0800	0.0100	9.99		4286499
Octa CDD *	pg/g	7780	0.293	20.0	0.160	0.000300	2.33		4286499
Total Tetra CDD *	pg/g	18.5	0.203	2.00	0.0800			11	4286499
Total Penta CDD *	pg/g	59.3	0.197	10.0	0.0800			12	4286499
Total Hexa CDD *	pg/g	335	0.187	10.0	0.0800			7	4286499
Total Hepta CDD *	pg/g	1720	0.157	10.0	0.0800			2	4286499
2,3,7,8-Tetra CDF **	pg/g	8.47	0.209	2.00	0.0800	0.100	0.847		4286499
1,2,3,7,8-Penta CDF **	pg/g	5.13	0.321	10.0	0.0800	0.0300	0.154		4286499
2,3,4,7,8-Penta CDF **	pg/g	16.2	0.315	10.0	0.0800	0.300	4.86		4286499
1,2,3,4,7,8-Hexa CDF **	pg/g	36.5	0.168	10.0	0.0800	0.100	3.65		4286499
1,2,3,6,7,8-Hexa CDF **	pg/g	32.0	0.176	10.0	0.0800	0.100	3.20		4286499
2,3,4,6,7,8-Hexa CDF **	pg/g	34.7	0.161	10.0	0.0800	0.100	3.47		4286499
1,2,3,7,8,9-Hexa CDF **	pg/g	0.586	0.172	10.0	0.0800	0.100	0.0586		4286499
1,2,3,4,6,7,8-Hepta CDF **	pg/g	248	0.191	10.0	0.0800	0.0100	2.48		4286499
1,2,3,4,7,8,9-Hepta CDF **	pg/g	15.1	0.192	10.0	0.0800	0.0100	0.151		4286499
Octa CDF **	pg/g	637	0.219	20.0	0.160	0.000300	0.191		4286499
Total Tetra CDF **	pg/g	373	0.209	2.00	0.0800			15	4286499
Total Penta CDF **	pg/g	1270	0.318	10.0	0.0800			11	4286499
Total Hexa CDF **	pg/g	1040	0.169	10.0	0.0800			11	4286499
Total Hepta CDF **	pg/g	763	0.191	10.0	0.0800			4	4286499
Confirmation 2,3,7,8-Tetra CDF **	pg/g	3.27	0.10	2.0	1.8	0.100	0.327		4292733
TOTAL TOXIC EQUIVALENCY	pg/g						51.0		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	95							4286499
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BHC916							
Sampling Date		2015/11/02 14:10							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW033W-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	147 (1)							4286499
C13-1234678 HeptaCDF **	%	111							4286499
C13-123478 HexaCDD *	%	102							4286499
C13-123478 HexaCDF **	%	103							4286499
C13-1234789 HeptaCDF **	%	122							4286499
C13-123678 HexaCDD *	%	100							4286499
C13-123678 HexaCDF **	%	106							4286499
C13-12378 PentaCDD *	%	122							4286499
C13-12378 PentaCDF **	%	106							4286499
C13-123789 HexaCDF **	%	120							4286499
C13-234678 HexaCDF **	%	102							4286499
C13-23478 PentaCDF **	%	147							4286499
C13-2378 TetraCDD *	%	93							4286499
C13-2378 TetraCDF **	%	104							4286499
C13-OCDD *	%	136							4286499
Confirmation C13-2378 TetraCDF **	%	98							4292733

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) Recovery exceeds method criteria due to matrix effects

**TEST SUMMARY**

**Maxxam ID:** BHC912  
**Sample ID:** SS-ROW038S-0.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4286499	2015/11/17	2015/11/29	Kay Shaw
Moisture	BAL	4262279	N/A	2015/11/06	Chun Yan

**Maxxam ID:** BHC913  
**Sample ID:** SS-ROW029BS-0.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4286499	2015/11/17	2015/11/29	Kay Shaw
Moisture	BAL	4262279	N/A	2015/11/06	Chun Yan

**Maxxam ID:** BHC913 Dup  
**Sample ID:** SS-ROW029BS-0.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4286499	2015/11/17	2015/11/30	Kay Shaw

**Maxxam ID:** BHC914  
**Sample ID:** SS-ROW010W-0.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4286499	2015/11/17	2015/11/30	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4292733	N/A	2015/11/30	Vica Cioranic
Moisture	BAL	4262279	N/A	2015/11/06	Chun Yan

**Maxxam ID:** BHC915  
**Sample ID:** SS-ROW022W-0.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4286499	2015/11/17	2015/11/30	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4292733	N/A	2015/11/30	Vica Cioranic
Moisture	BAL	4262279	N/A	2015/11/06	Chun Yan

**Maxxam ID:** BHC916  
**Sample ID:** SS-ROW033W-0.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4286499	2015/11/17	2015/11/30	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4292733	N/A	2015/11/30	Vica Cioranic
Moisture	BAL	4262279	N/A	2015/11/06	Chun Yan

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.7°C
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**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4262279	NS3	RPD - Sample/Sample Dup	Moisture	2015/11/06	1.6		%	20
4286499	KKS	Spiked Blank	37CL4 2378 Tetra CDD	2015/11/28		87	%	35 - 197
			C13-1234678 HeptaCDD	2015/11/28		68	%	23 - 140
			C13-1234678 HeptaCDF	2015/11/28		58	%	28 - 143
			C13-123478 HexaCDD	2015/11/28		64	%	32 - 141
			C13-123478 HexaCDF	2015/11/28		66	%	26 - 152
			C13-1234789 HeptaCDF	2015/11/28		63	%	26 - 138
			C13-123678 HexaCDD	2015/11/28		66	%	28 - 130
			C13-123678 HexaCDF	2015/11/28		66	%	26 - 123
			C13-12378 PentaCDD	2015/11/28		84	%	25 - 181
			C13-12378 PentaCDF	2015/11/28		76	%	24 - 185
			C13-123789 HexaCDF	2015/11/28		70	%	29 - 147
			C13-234678 HexaCDF	2015/11/28		54	%	28 - 136
			C13-23478 PentaCDF	2015/11/28		92	%	21 - 178
			C13-2378 TetraCDD	2015/11/28		75	%	25 - 164
			C13-2378 TetraCDF	2015/11/28		80	%	24 - 169
			C13-OCDD	2015/11/28		36	%	17 - 157
			2,3,7,8-Tetra CDD	2015/11/28		101	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/11/28		87	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/11/28		102	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/11/28		93	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/11/28		96	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/11/28		76	%	70 - 140
			Octa CDD	2015/11/28		95	%	78 - 144
			2,3,7,8-Tetra CDF	2015/11/28		98	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/11/28		97	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/11/28		87	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/11/28		102	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/11/28		100	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/11/28		99	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/11/28		91	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/11/28		102	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/11/28		93	%	78 - 138
			Octa CDF	2015/11/28		111	%	63 - 170
4286499	KKS	Method Blank	37CL4 2378 Tetra CDD	2015/11/29		92	%	35 - 197
			C13-1234678 HeptaCDD	2015/11/29		112	%	23 - 140
			C13-1234678 HeptaCDF	2015/11/29		92	%	28 - 143
			C13-123478 HexaCDD	2015/11/29		89	%	32 - 141
			C13-123478 HexaCDF	2015/11/29		86	%	26 - 152
			C13-1234789 HeptaCDF	2015/11/29		97	%	26 - 138
			C13-123678 HexaCDD	2015/11/29		88	%	28 - 130
			C13-123678 HexaCDF	2015/11/29		87	%	26 - 123
			C13-12378 PentaCDD	2015/11/29		122	%	25 - 181
			C13-12378 PentaCDF	2015/11/29		102	%	24 - 185
			C13-123789 HexaCDF	2015/11/29		103	%	29 - 147
			C13-234678 HexaCDF	2015/11/29		90	%	28 - 136
			C13-23478 PentaCDF	2015/11/29		127	%	21 - 178
			C13-2378 TetraCDD	2015/11/29		88	%	25 - 164
			C13-2378 TetraCDF	2015/11/29		99	%	24 - 169
			C13-OCDD	2015/11/29		83	%	17 - 157
			2,3,7,8-Tetra CDD	2015/11/29	<0.214, EDL=0.214		pg/g	
			1,2,3,7,8-Penta CDD	2015/11/29	<0.154, EDL=0.154		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/11/29	<0.190, EDL=0.190		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/11/29	<0.203, EDL=0.203		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/11/29	<0.203, EDL=0.203		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/11/29	<0.210, EDL=0.210		pg/g	
			Octa CDD	2015/11/29	0.384, EDL=0.217		pg/g	
			Total Tetra CDD	2015/11/29	<0.214, EDL=0.214		pg/g	
			Total Penta CDD	2015/11/29	<0.154, EDL=0.154		pg/g	
			Total Hexa CDD	2015/11/29	<0.203, EDL=0.203		pg/g	
			Total Hepta CDD	2015/11/29	<0.210, EDL=0.210		pg/g	
			2,3,7,8-Tetra CDF	2015/11/29	<0.128, EDL=0.128		pg/g	
			1,2,3,7,8-Penta CDF	2015/11/29	<0.149, EDL=0.149		pg/g	
			2,3,4,7,8-Penta CDF	2015/11/29	<0.146, EDL=0.146		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/11/29	<0.213, EDL=0.213		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/11/29	<0.224, EDL=0.224		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/11/29	<0.205, EDL=0.205		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/11/29	<0.219, EDL=0.219		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/11/29	0.289, EDL=0.214		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2015/11/29	<0.216, EDL=0.216		pg/g	
			Octa CDF	2015/11/29	<0.206, EDL=0.206		pg/g	
			Total Tetra CDF	2015/11/29	<0.128, EDL=0.128		pg/g	
			Total Penta CDF	2015/11/29	<0.147, EDL=0.147		pg/g	
			Total Hexa CDF	2015/11/29	<0.215, EDL=0.215		pg/g	
			Total Hepta CDF	2015/11/29	0.289, EDL=0.215		pg/g	
4286499	KKS	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/11/30	NC		%	25
			1,2,3,7,8-Penta CDD	2015/11/30	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/11/30	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2015/11/30	0.37		%	25
			1,2,3,7,8,9-Hexa CDD	2015/11/30	NC		%	25

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,6,7,8-Hepta CDD	2015/11/30	4.5		%	25
			Octa CDD	2015/11/30	4.7		%	25
			Total Tetra CDD	2015/11/30	NC		%	25
			Total Penta CDD	2015/11/30	NC		%	25
			Total Hexa CDD	2015/11/30	2.9		%	25
			Total Hepta CDD	2015/11/30	5.0		%	25
			2,3,7,8-Tetra CDF	2015/11/30	NC		%	25
			1,2,3,7,8-Penta CDF	2015/11/30	NC		%	25
			2,3,4,7,8-Penta CDF	2015/11/30	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/11/30	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2015/11/30	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/11/30	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/11/30	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/11/30	3.8		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/11/30	NC		%	25
			Octa CDF	2015/11/30	2.4		%	25
			Total Tetra CDF	2015/11/30	3.0		%	25
			Total Penta CDF	2015/11/30	2.1		%	25
			Total Hexa CDF	2015/11/30	7.4		%	25
			Total Hepta CDF	2015/11/30	5.7		%	25
4292733	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/11/30	<0.11, EDL=0.11		pg/g	
			Confirmation C13-2378 TetraCDF	2015/11/30		49	%	40 - 135
<p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p> <p>NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples &lt; 5x RDL).</p>								

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

*Ewa P.*  


\_\_\_\_\_  
Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

*Owen*  


\_\_\_\_\_  
Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

---

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5K0735  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/01/04**  
Report #: R3839192  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B501368**  
**Received: 2015/11/24, 15:15**

Sample Matrix: Water  
# Samples Received: 1

Analyses	Date		Laboratory Method	Reference
	Quantity Extracted	Date Analyzed		
Dioxins/Furans in Water (1613B) (1)	1	2015/12/04	2015/12/12 BRL SOP-00410	EPA 1613B m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.  
\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.  
(1) Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.  
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**DIOXINS AND FURANS BY HRMS (WATER)**

Maxxam ID		BKG622							
Sampling Date		2015/11/20 15:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	RINSATE-SA-3	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/L	<1.19	1.19	12.7	4.00	1.00	1.19		4305340
1,2,3,7,8-Penta CDD *	pg/L	<1.25	1.25	63.3	4.00	1.00	1.25		4305340
1,2,3,4,7,8-Hexa CDD *	pg/L	<1.01	1.01	63.3	4.00	0.100	0.101		4305340
1,2,3,6,7,8-Hexa CDD *	pg/L	<1.06	1.06	63.3	4.00	0.100	0.106		4305340
1,2,3,7,8,9-Hexa CDD *	pg/L	<0.968	0.968	63.3	4.00	0.100	0.0968		4305340
1,2,3,4,6,7,8-Hepta CDD *	pg/L	<1.28	1.28	63.3	4.00	0.0100	0.0128		4305340
Octa CDD *	pg/L	<1.61	1.61	127	8.00	0.000300	0.000483		4305340
Total Tetra CDD *	pg/L	<3.77 (1)	3.77	12.7	4.00			0	4305340
Total Penta CDD *	pg/L	<1.54 (1)	1.54	63.3	4.00			0	4305340
Total Hexa CDD *	pg/L	<3.69 (1)	3.69	63.3	4.00			0	4305340
Total Hepta CDD *	pg/L	<1.28	1.28	63.3	4.00			0	4305340
2,3,7,8-Tetra CDF **	pg/L	<1.49	1.49	12.7	4.00	0.100	0.149		4305340
1,2,3,7,8-Penta CDF **	pg/L	<1.20	1.20	63.3	4.00	0.0300	0.0360		4305340
2,3,4,7,8-Penta CDF **	pg/L	<1.18	1.18	63.3	4.00	0.300	0.354		4305340
1,2,3,4,7,8-Hexa CDF **	pg/L	<1.05	1.05	63.3	4.00	0.100	0.105		4305340
1,2,3,6,7,8-Hexa CDF **	pg/L	<1.08	1.08	63.3	4.00	0.100	0.108		4305340
2,3,4,6,7,8-Hexa CDF **	pg/L	<1.01	1.01	63.3	4.00	0.100	0.101		4305340
1,2,3,7,8,9-Hexa CDF **	pg/L	<1.05	1.05	63.3	4.00	0.100	0.105		4305340
1,2,3,4,6,7,8-Hepta CDF **	pg/L	<0.999	0.999	63.3	4.00	0.0100	0.00999		4305340
1,2,3,4,7,8,9-Hepta CDF **	pg/L	<0.979	0.979	63.3	4.00	0.0100	0.00979		4305340
Octa CDF **	pg/L	<1.22	1.22	127	8.00	0.000300	0.000366		4305340
Total Tetra CDF **	pg/L	<1.49	1.49	12.7	4.00			0	4305340
Total Penta CDF **	pg/L	<1.19	1.19	63.3	4.00			0	4305340
Total Hexa CDF **	pg/L	<1.04	1.04	63.3	4.00			0	4305340
Total Hepta CDF **	pg/L	<0.989	0.989	63.3	4.00			0	4305340
TOTAL TOXIC EQUIVALENCY	pg/L						3.74		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	61							4305340
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.									

**DIOXINS AND FURANS BY HRMS (WATER)**

Maxxam ID		BKG622							
Sampling Date		2015/11/20 15:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	RINSATE-SA-3	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	64							4305340
C13-1234678 HeptaCDF **	%	67							4305340
C13-123478 HexaCDD *	%	67							4305340
C13-123478 HexaCDF **	%	78							4305340
C13-1234789 HeptaCDF **	%	68							4305340
C13-123678 HexaCDD *	%	70							4305340
C13-123678 HexaCDF **	%	82							4305340
C13-12378 PentaCDD *	%	83							4305340
C13-12378 PentaCDF **	%	73							4305340
C13-123789 HexaCDF **	%	84							4305340
C13-234678 HexaCDF **	%	71							4305340
C13-23478 PentaCDF **	%	80							4305340
C13-2378 TetraCDD *	%	59							4305340
C13-2378 TetraCDF **	%	67							4305340
C13-OCDD *	%	68							4305340

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**TEST SUMMARY**

**Maxxam ID:** BKG622  
**Sample ID:** RINSATE-SA-3  
**Matrix:** Water

**Collected:** 2015/11/20  
**Shipped:**  
**Received:** 2015/11/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Water (1613B)	HRMS/MS	4305340	2015/12/04	2015/12/12	Owen Cosby

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.7°C
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**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4305340	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/12/10		54	%	35 - 197	
			C13-1234678 HeptaCDD	2015/12/10		44	%	23 - 140	
			C13-1234678 HeptaCDF	2015/12/10		46	%	28 - 143	
			C13-123478 HexaCDD	2015/12/10		44	%	32 - 141	
			C13-123478 HexaCDF	2015/12/10		53	%	26 - 152	
			C13-1234789 HeptaCDF	2015/12/10		46	%	28 - 143	
			C13-123678 HexaCDD	2015/12/10		52	%	28 - 130	
			C13-123678 HexaCDF	2015/12/10		49	%	26 - 123	
			C13-12378 PentaCDD	2015/12/10		50	%	25 - 181	
			C13-12378 PentaCDF	2015/12/10		45	%	24 - 185	
			C13-123789 HexaCDF	2015/12/10		66	%	28 - 136	
			C13-234678 HexaCDF	2015/12/10		42	%	29 - 147	
			C13-23478 PentaCDF	2015/12/10		50	%	21 - 178	
			C13-2378 TetraCDD	2015/12/10		43	%	24 - 164	
			C13-2378 TetraCDF	2015/12/10		43	%	24 - 169	
			C13-OCDD	2015/12/10		44	%	17 - 157	
			2,3,7,8-Tetra CDD	2015/12/10		98	%	67 - 158	
			1,2,3,7,8-Penta CDD	2015/12/10		80	%	25 - 181	
			1,2,3,4,7,8-Hexa CDD	2015/12/10		104	%	70 - 164	
			1,2,3,6,7,8-Hexa CDD	2015/12/10		110	%	76 - 134	
			1,2,3,7,8,9-Hexa CDD	2015/12/10		117	%	64 - 162	
			1,2,3,4,6,7,8-Hepta CDD	2015/12/10		99	%	70 - 140	
			Octa CDD	2015/12/10		102	%	78 - 144	
			2,3,7,8-Tetra CDF	2015/12/10		101	%	75 - 158	
			1,2,3,7,8-Penta CDF	2015/12/10		94	%	80 - 134	
			2,3,4,7,8-Penta CDF	2015/12/10		81	%	68 - 160	
			1,2,3,4,7,8-Hexa CDF	2015/12/10		102	%	72 - 134	
			1,2,3,6,7,8-Hexa CDF	2015/12/10		105	%	84 - 130	
			2,3,4,6,7,8-Hexa CDF	2015/12/10		98	%	70 - 156	
			1,2,3,7,8,9-Hexa CDF	2015/12/10		91	%	78 - 130	
			1,2,3,4,6,7,8-Hepta CDF	2015/12/10		106	%	82 - 122	
			1,2,3,4,7,8,9-Hepta CDF	2015/12/10		99	%	78 - 138	
			Octa CDF	2015/12/10		106	%	63 - 170	
4305340	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/12/10		62	%	35 - 197	
			C13-1234678 HeptaCDD	2015/12/10		51	%	23 - 140	
			C13-1234678 HeptaCDF	2015/12/10		56	%	28 - 143	
			C13-123478 HexaCDD	2015/12/10		56	%	32 - 141	
			C13-123478 HexaCDF	2015/12/10		67	%	26 - 152	
			C13-1234789 HeptaCDF	2015/12/10		52	%	28 - 143	
			C13-123678 HexaCDD	2015/12/10		63	%	28 - 130	
			C13-123678 HexaCDF	2015/12/10		66	%	26 - 123	
			C13-12378 PentaCDD	2015/12/10		70	%	25 - 181	
			C13-12378 PentaCDF	2015/12/10		62	%	24 - 185	
			C13-123789 HexaCDF	2015/12/10		77	%	28 - 136	
			C13-234678 HexaCDF	2015/12/10		58	%	29 - 147	
			C13-23478 PentaCDF	2015/12/10		70	%	21 - 178	
			C13-2378 TetraCDD	2015/12/10		57	%	24 - 164	
			C13-2378 TetraCDF	2015/12/10		65	%	24 - 169	
			C13-OCDD	2015/12/10		48	%	17 - 157	
			2,3,7,8-Tetra CDD	2015/12/10		<1.23, EDL=1.23		pg/L	
			1,2,3,7,8-Penta CDD	2015/12/10		<1.31, EDL=1.31		pg/L	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/12/10	<1.30, EDL=1.30		pg/L	
			1,2,3,6,7,8-Hexa CDD	2015/12/10	<1.36, EDL=1.36		pg/L	
			1,2,3,7,8,9-Hexa CDD	2015/12/10	<1.24, EDL=1.24		pg/L	
			1,2,3,4,6,7,8-Hepta CDD	2015/12/10	<1.24, EDL=1.24		pg/L	
			Octa CDD	2015/12/10	<1.78, EDL=1.78 (1)		pg/L	
			Total Tetra CDD	2015/12/10	<2.91, EDL=2.91 (1)		pg/L	
			Total Penta CDD	2015/12/10	<1.31, EDL=1.31		pg/L	
			Total Hexa CDD	2015/12/10	<2.76, EDL=2.76 (1)		pg/L	
			Total Hepta CDD	2015/12/10	<1.24, EDL=1.24		pg/L	
			2,3,7,8-Tetra CDF	2015/12/10	<1.14, EDL=1.14		pg/L	
			1,2,3,7,8-Penta CDF	2015/12/10	<1.32, EDL=1.32		pg/L	
			2,3,4,7,8-Penta CDF	2015/12/10	<1.28, EDL=1.28		pg/L	
			1,2,3,4,7,8-Hexa CDF	2015/12/10	<1.25, EDL=1.25		pg/L	
			1,2,3,6,7,8-Hexa CDF	2015/12/10	<1.29, EDL=1.29		pg/L	
			2,3,4,6,7,8-Hexa CDF	2015/12/10	<1.20, EDL=1.20		pg/L	
			1,2,3,7,8,9-Hexa CDF	2015/12/10	<1.25, EDL=1.25		pg/L	
			1,2,3,4,6,7,8-Hepta CDF	2015/12/10	<1.14, EDL=1.14		pg/L	
			1,2,3,4,7,8,9-Hepta CDF	2015/12/10	<1.12, EDL=1.12		pg/L	
			Octa CDF	2015/12/10	<1.32, EDL=1.32		pg/L	
			Total Tetra CDF	2015/12/10	<1.14, EDL=1.14		pg/L	
			Total Penta CDF	2015/12/10	<1.30, EDL=1.30		pg/L	
			Total Hexa CDF	2015/12/10	<1.25, EDL=1.25		pg/L	
			Total Hepta CDF	2015/12/10	<1.13, EDL=1.13		pg/L	
4305340	OBC	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/12/22	NC		%	25
			1,2,3,7,8-Penta CDD	2015/12/22	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/12/22	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2015/12/22	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2015/12/22	NC		%	25

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,6,7,8-Hepta CDD	2015/12/22	NC		%	25
			Octa CDD	2015/12/22	NC		%	25
			Total Tetra CDD	2015/12/22	NC		%	25
			Total Penta CDD	2015/12/22	NC		%	25
			Total Hexa CDD	2015/12/22	NC		%	25
			Total Hepta CDD	2015/12/22	NC		%	25
			2,3,7,8-Tetra CDF	2015/12/22	NC		%	25
			1,2,3,7,8-Penta CDF	2015/12/22	NC		%	25
			2,3,4,7,8-Penta CDF	2015/12/22	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/12/22	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2015/12/22	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/12/22	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/12/22	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/12/22	NC		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/12/22	NC		%	25
			Octa CDF	2015/12/22	NC		%	25
			Total Tetra CDF	2015/12/22	NC		%	25
			Total Penta CDF	2015/12/22	NC		%	25
			Total Hexa CDF	2015/12/22	NC		%	25
			Total Hepta CDF	2015/12/22	NC		%	25
			2,3,7,8-Tetra CDD	2015/12/22	NC		%	25
			1,2,3,7,8-Penta CDD	2015/12/22	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/12/22	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2015/12/22	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2015/12/22	NC		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/12/22	NC		%	25
			Octa CDD	2015/12/22	NC		%	25
			Total Tetra CDD	2015/12/22	NC		%	25
			Total Penta CDD	2015/12/22	NC		%	25
			Total Hexa CDD	2015/12/22	22		%	25
			Total Hepta CDD	2015/12/22	NC		%	25
			2,3,7,8-Tetra CDF	2015/12/22	NC		%	25
			1,2,3,7,8-Penta CDF	2015/12/22	NC		%	25
			2,3,4,7,8-Penta CDF	2015/12/22	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/12/22	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2015/12/22	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/12/22	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/12/22	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/12/22	NC		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/12/22	NC		%	25
			Octa CDF	2015/12/22	NC		%	25
			Total Tetra CDF	2015/12/22	NC		%	25
			Total Penta CDF	2015/12/22	NC		%	25
			Total Hexa CDF	2015/12/22	15		%	25
			Total Hepta CDF	2015/12/22	NC		%	25

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.


Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



---

Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.





Your Project #: A5K0059  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/01/13**  
Report #: R3850104  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5P4731**

**Received: 2015/12/10, 15:15**

Sample Matrix: Soil  
# Samples Received: 7

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	7	2015/12/14	2015/12/23	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	4	N/A	2015/12/24	BRL SOP-00406	EPA M8290A / M1613
2378TCDF Confirmation (M8290A/M1613)	3	N/A	2016/01/12	BRL SOP-00406	EPA M8290A / M1613
Moisture	7	N/A	2015/12/14	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT

Email: MDiGrazia@maxxam.ca

Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		BMU551	BMU552	BMU553	BMU554			
Sampling Date		2015/11/02 09:50	2015/11/02 10:40	2015/11/02 11:30	2015/11/02 12:25			
COC Number		na	na	na	na			
	UNITS	SBS-ROW029BS-1.5	SBS-ROW010W-1.5	SBS-ROW010E-0.5	SBS-ROW022W-1.5	RDL	MDL	QC Batch
Moisture	%	23	18	9.4	19	1.0	0.50	4312435
RDL = Reportable Detection Limit QC Batch = Quality Control Batch								

Maxxam ID		BMU555	BMU556	BMU557			
Sampling Date		2015/11/02 12:45	2015/11/02 12:45	2015/11/02 14:20			
COC Number		na	na	na			
	UNITS	SBS-ROW022E-0.5	SBS-ROW022E-0.5-DUP	SBS-ROW033W-1.5	RDL	MDL	QC Batch
Moisture	%	19	32	21	1.0	0.50	4312435
RDL = Reportable Detection Limit QC Batch = Quality Control Batch							

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU551							
Sampling Date		2015/11/02 09:50							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW029BS-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.304	0.106	0.200	0.0400	1.00	0.304		4321122
1,2,3,7,8-Penta CDD *	pg/g	0.271	0.0931	1.00	0.0400	1.00	0.271		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	0.608	0.103	1.00	0.0400	0.100	0.0608		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	2.37	0.108	1.00	0.0400	0.100	0.237		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	1.69	0.0988	1.00	0.0400	0.100	0.169		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	55.6	0.107	1.00	0.0400	0.0100	0.556		4321122
Octa CDD *	pg/g	365	0.0988	2.00	0.0800	0.000300	0.110		4321122
Total Tetra CDD *	pg/g	0.663	0.106	0.200	0.0400			3	4321122
Total Penta CDD *	pg/g	0.753	0.0931	1.00	0.0400			4	4321122
Total Hexa CDD *	pg/g	11.9	0.103	1.00	0.0400			6	4321122
Total Hepta CDD *	pg/g	94.8	0.107	1.00	0.0400			2	4321122
2,3,7,8-Tetra CDF **	pg/g	<0.213 (1)	0.213	0.200	0.0400	0.100	0.0213		4321122
1,2,3,7,8-Penta CDF **	pg/g	0.261	0.101	1.00	0.0400	0.0300	0.00783		4321122
2,3,4,7,8-Penta CDF **	pg/g	0.276	0.0992	1.00	0.0400	0.300	0.0828		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	1.31	0.104	1.00	0.0400	0.100	0.131		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	0.540	0.108	1.00	0.0400	0.100	0.0540		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	0.371	0.101	1.00	0.0400	0.100	0.0371		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.124	0.104	1.00	0.0400	0.100	0.0124		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	8.46	0.107	1.00	0.0400	0.0100	0.0846		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	0.797	0.106	1.00	0.0400	0.0100	0.00797		4321122
Octa CDF **	pg/g	20.9	0.105	2.00	0.0800	0.000300	0.00627		4321122
Total Tetra CDF **	pg/g	1.46	0.0998	0.200	0.0400			6	4321122
Total Penta CDF **	pg/g	4.86	0.100	1.00	0.0400			7	4321122
Total Hexa CDF **	pg/g	12.5	0.104	1.00	0.0400			9	4321122
Total Hepta CDF **	pg/g	24.6	0.107	1.00	0.0400			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.19	0.11	1.0	0.90	0.100	0.0190		4341388
TOTAL TOXIC EQUIVALENCY	pg/g						2.15		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	84							4321122
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU551							
Sampling Date		2015/11/02 09:50							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW029BS-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	78							4321122
C13-1234678 HeptaCDF **	%	78							4321122
C13-123478 HexaCDD *	%	88							4321122
C13-123478 HexaCDF **	%	93							4321122
C13-1234789 HeptaCDF **	%	74							4321122
C13-123678 HexaCDD *	%	91							4321122
C13-123678 HexaCDF **	%	92							4321122
C13-12378 PentaCDD *	%	94							4321122
C13-12378 PentaCDF **	%	73							4321122
C13-123789 HexaCDF **	%	104							4321122
C13-234678 HexaCDF **	%	87							4321122
C13-23478 PentaCDF **	%	91							4321122
C13-2378 TetraCDD *	%	82							4321122
C13-2378 TetraCDF **	%	82							4321122
C13-OCDD *	%	78							4321122
Confirmation C13-2378 TetraCDF **	%	45							4341388

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU552							
Sampling Date		2015/11/02 10:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW010W-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.0968	0.0968	0.200	0.0400	1.00	0.0968		4321122
1,2,3,7,8-Penta CDD *	pg/g	0.163	0.0996	0.999	0.0400	1.00	0.163		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	0.351	0.107	0.999	0.0400	0.100	0.0351		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	1.19	0.113	0.999	0.0400	0.100	0.119		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	0.847	0.103	0.999	0.0400	0.100	0.0847		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	27.5	0.0980	0.999	0.0400	0.0100	0.275		4321122
Octa CDD *	pg/g	157	0.0986	2.00	0.0800	0.000300	0.0471		4321122
Total Tetra CDD *	pg/g	0.245	0.0968	0.200	0.0400			1	4321122
Total Penta CDD *	pg/g	0.505	0.0996	0.999	0.0400			3	4321122
Total Hexa CDD *	pg/g	6.26	0.108	0.999	0.0400			6	4321122
Total Hepta CDD *	pg/g	46.3	0.0980	0.999	0.0400			2	4321122
2,3,7,8-Tetra CDF **	pg/g	0.210	0.0940	0.200	0.0400	0.100	0.0210		4321122
1,2,3,7,8-Penta CDF **	pg/g	0.185	0.0999	0.999	0.0400	0.0300	0.00555		4321122
2,3,4,7,8-Penta CDF **	pg/g	0.209	0.0985	0.999	0.0400	0.300	0.0627		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	0.784	0.0973	0.999	0.0400	0.100	0.0784		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	0.419	0.101	0.999	0.0400	0.100	0.0419		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	0.448	0.0940	0.999	0.0400	0.100	0.0448		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.106	0.0975	0.999	0.0400	0.100	0.0106		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	5.45	0.108	0.999	0.0400	0.0100	0.0545		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	0.393	0.106	0.999	0.0400	0.0100	0.00393		4321122
Octa CDF **	pg/g	11.1	0.110	2.00	0.0800	0.000300	0.00333		4321122
Total Tetra CDF **	pg/g	2.30	0.0940	0.200	0.0400			6	4321122
Total Penta CDF **	pg/g	7.29	0.0992	0.999	0.0400			7	4321122
Total Hexa CDF **	pg/g	10.7	0.0973	0.999	0.0400			9	4321122
Total Hepta CDF **	pg/g	14.2	0.107	0.999	0.0400			3	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.15	0.13	1.0	0.90	0.100	0.0150		4341388
TOTAL TOXIC EQUIVALENCY	pg/g						1.14		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	96							4321122
C13-1234678 HeptaCDD *	%	85							4321122
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU552							
Sampling Date		2015/11/02 10:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW010W-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	85							4321122
C13-123478 HexaCDD *	%	101							4321122
C13-123478 HexaCDF **	%	102							4321122
C13-1234789 HeptaCDF **	%	84							4321122
C13-123678 HexaCDD *	%	107							4321122
C13-123678 HexaCDF **	%	114							4321122
C13-12378 PentaCDD *	%	106							4321122
C13-12378 PentaCDF **	%	83							4321122
C13-123789 HexaCDF **	%	116							4321122
C13-234678 HexaCDF **	%	99							4321122
C13-23478 PentaCDF **	%	104							4321122
C13-2378 TetraCDD *	%	93							4321122
C13-2378 TetraCDF **	%	91							4321122
C13-OCDD *	%	84							4321122
Confirmation C13-2378 TetraCDF **	%	100							4341388

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU553							
Sampling Date		2015/11/02 11:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW010E-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.66	0.105	0.200	0.0400	1.00	1.66		4321122
1,2,3,7,8-Penta CDD *	pg/g	3.17	0.101	0.999	0.0400	1.00	3.17		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	6.84	0.0923	0.999	0.0400	0.100	0.684		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	29.8	0.0971	0.999	0.0400	0.100	2.98		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	16.3	0.0887	0.999	0.0400	0.100	1.63		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	561	0.105	0.999	0.0400	0.0100	5.61		4321122
Octa CDD *	pg/g	2580	0.0913	2.00	0.0800	0.000300	0.774		4321122
Total Tetra CDD *	pg/g	7.33	0.105	0.200	0.0400			11	4321122
Total Penta CDD *	pg/g	20.3	0.101	0.999	0.0400			12	4321122
Total Hexa CDD *	pg/g	150	0.0928	0.999	0.0400			7	4321122
Total Hepta CDD *	pg/g	974	0.105	0.999	0.0400			2	4321122
2,3,7,8-Tetra CDF **	pg/g	3.28	0.102	0.200	0.0400	0.100	0.328		4321122
1,2,3,7,8-Penta CDF **	pg/g	3.08	0.0972	0.999	0.0400	0.0300	0.0924		4321122
2,3,4,7,8-Penta CDF **	pg/g	5.85	0.0958	0.999	0.0400	0.300	1.76		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	19.9	0.0963	0.999	0.0400	0.100	1.99		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	10.7	0.0995	0.999	0.0400	0.100	1.07		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	8.94	0.0930	0.999	0.0400	0.100	0.894		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.512	0.0964	0.999	0.0400	0.100	0.0512		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	101	0.100	0.999	0.0400	0.0100	1.01		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.69	0.0990	0.999	0.0400	0.0100	0.0669		4321122
Octa CDF **	pg/g	134	0.101	2.00	0.0800	0.000300	0.0402		4321122
Total Tetra CDF **	pg/g	66.8	0.102	0.200	0.0400			17	4321122
Total Penta CDF **	pg/g	248	0.0965	0.999	0.0400			11	4321122
Total Hexa CDF **	pg/g	294	0.0962	0.999	0.0400			12	4321122
Total Hepta CDF **	pg/g	290	0.0996	0.999	0.0400			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.42	0.12	1.0	0.90	0.100	0.142		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						23.6		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	98							4321122
C13-1234678 HeptaCDD *	%	97							4321122

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU553							
Sampling Date		2015/11/02 11:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW010E-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	82							4321122
C13-123478 HexaCDD *	%	95							4321122
C13-123478 HexaCDF **	%	98							4321122
C13-1234789 HeptaCDF **	%	83							4321122
C13-123678 HexaCDD *	%	104							4321122
C13-123678 HexaCDF **	%	103							4321122
C13-12378 PentaCDD *	%	112							4321122
C13-12378 PentaCDF **	%	89							4321122
C13-123789 HexaCDF **	%	110							4321122
C13-234678 HexaCDF **	%	99							4321122
C13-23478 PentaCDF **	%	113							4321122
C13-2378 TetraCDD *	%	95							4321122
C13-2378 TetraCDF **	%	92							4321122
C13-OCDD *	%	86							4321122
Confirmation C13-2378 TetraCDF **	%	92							4330862

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU554							
Sampling Date		2015/11/02 12:25							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW022W-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.161	0.103	0.200	0.0400	1.00	0.161		4321122
1,2,3,7,8-Penta CDD *	pg/g	0.505	0.0978	1.00	0.0400	1.00	0.505		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	1.44	0.105	1.00	0.0400	0.100	0.144		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	6.35	0.110	1.00	0.0400	0.100	0.635		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	3.51	0.101	1.00	0.0400	0.100	0.351		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	154	0.0971	1.00	0.0400	0.0100	1.54		4321122
Octa CDD *	pg/g	1130	0.0936	2.00	0.0800	0.000300	0.339		4321122
Total Tetra CDD *	pg/g	1.07	0.103	0.200	0.0400			3	4321122
Total Penta CDD *	pg/g	2.70	0.0978	1.00	0.0400			7	4321122
Total Hexa CDD *	pg/g	31.5	0.106	1.00	0.0400			7	4321122
Total Hepta CDD *	pg/g	265	0.0971	1.00	0.0400			2	4321122
2,3,7,8-Tetra CDF **	pg/g	0.503	0.105	0.200	0.0400	0.100	0.0503		4321122
1,2,3,7,8-Penta CDF **	pg/g	0.471	0.105	1.00	0.0400	0.0300	0.0141		4321122
2,3,4,7,8-Penta CDF **	pg/g	0.975	0.103	1.00	0.0400	0.300	0.293		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	3.41	0.105	1.00	0.0400	0.100	0.341		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	1.85	0.108	1.00	0.0400	0.100	0.185		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	1.44	0.101	1.00	0.0400	0.100	0.144		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.105	0.105	1.00	0.0400	0.100	0.0105		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	27.6	0.109	1.00	0.0400	0.0100	0.276		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	1.83	0.107	1.00	0.0400	0.0100	0.0183		4321122
Octa CDF **	pg/g	73.3	0.107	2.00	0.0800	0.000300	0.0220		4321122
Total Tetra CDF **	pg/g	8.05	0.105	0.200	0.0400			10	4321122
Total Penta CDF **	pg/g	31.8	0.104	1.00	0.0400			10	4321122
Total Hexa CDF **	pg/g	52.4	0.105	1.00	0.0400			9	4321122
Total Hepta CDF **	pg/g	78.6	0.108	1.00	0.0400			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.21 (1)	0.21	1.0	0.90	0.100	0.0210		4341388
TOTAL TOXIC EQUIVALENCY	pg/g						5.00		

**Surrogate Recovery (%)**

37CL4 2378 Tetra CDD *	%	91							4321122
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EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU554							
Sampling Date		2015/11/02 12:25							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW022W-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	73							4321122
C13-1234678 HeptaCDF **	%	73							4321122
C13-123478 HexaCDD *	%	87							4321122
C13-123478 HexaCDF **	%	89							4321122
C13-1234789 HeptaCDF **	%	72							4321122
C13-123678 HexaCDD *	%	90							4321122
C13-123678 HexaCDF **	%	89							4321122
C13-12378 PentaCDD *	%	91							4321122
C13-12378 PentaCDF **	%	71							4321122
C13-123789 HexaCDF **	%	98							4321122
C13-234678 HexaCDF **	%	86							4321122
C13-23478 PentaCDF **	%	89							4321122
C13-2378 TetraCDD *	%	80							4321122
C13-2378 TetraCDF **	%	80							4321122
C13-OCDD *	%	74							4321122
Confirmation C13-2378 TetraCDF **	%	87							4341388

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU555							
Sampling Date		2015/11/02 12:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW022E-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.432	0.0962	0.200	0.0400	1.00	0.432		4321122
1,2,3,7,8-Penta CDD *	pg/g	4.13	0.0983	1.00	0.0400	1.00	4.13		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	14.9	0.103	1.00	0.0400	0.100	1.49		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	67.5	0.108	1.00	0.0400	0.100	6.75		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	34.9	0.0989	1.00	0.0400	0.100	3.49		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1250	0.0933	1.00	0.0400	0.0100	12.5		4321122
Octa CDD *	pg/g	3690	0.101	2.00	0.0800	0.000300	1.11		4321122
Total Tetra CDD *	pg/g	5.28	0.0962	0.200	0.0400			9	4321122
Total Penta CDD *	pg/g	21.9	0.0983	1.00	0.0400			11	4321122
Total Hexa CDD *	pg/g	310	0.104	1.00	0.0400			7	4321122
Total Hepta CDD *	pg/g	2060	0.0933	1.00	0.0400			2	4321122
2,3,7,8-Tetra CDF **	pg/g	2.34	0.101	0.200	0.0400	0.100	0.234		4321122
1,2,3,7,8-Penta CDF **	pg/g	4.69	0.0963	1.00	0.0400	0.0300	0.141		4321122
2,3,4,7,8-Penta CDF **	pg/g	7.66	0.0949	1.00	0.0400	0.300	2.30		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	39.5	0.0955	1.00	0.0400	0.100	3.95		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	17.0	0.0987	1.00	0.0400	0.100	1.70		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	11.2	0.0923	1.00	0.0400	0.100	1.12		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.560	0.0957	1.00	0.0400	0.100	0.0560		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	224	0.0987	1.00	0.0400	0.0100	2.24		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	13.6	0.0975	1.00	0.0400	0.0100	0.136		4321122
Octa CDF **	pg/g	324	0.0995	2.00	0.0800	0.000300	0.0972		4321122
Total Tetra CDF **	pg/g	38.1	0.101	0.200	0.0400			15	4321122
Total Penta CDF **	pg/g	220	0.0956	1.00	0.0400			12	4321122
Total Hexa CDF **	pg/g	459	0.0955	1.00	0.0400			11	4321122
Total Hepta CDF **	pg/g	624	0.0981	1.00	0.0400			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.42	0.11	1.0	0.90	0.100	0.142		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						41.8		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	104							4321122
C13-1234678 HeptaCDD *	%	98							4321122

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU555							
Sampling Date		2015/11/02 12:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW022E-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	80							4321122
C13-123478 HexaCDD *	%	92							4321122
C13-123478 HexaCDF **	%	96							4321122
C13-1234789 HeptaCDF **	%	82							4321122
C13-123678 HexaCDD *	%	100							4321122
C13-123678 HexaCDF **	%	108							4321122
C13-12378 PentaCDD *	%	104							4321122
C13-12378 PentaCDF **	%	78							4321122
C13-123789 HexaCDF **	%	108							4321122
C13-234678 HexaCDF **	%	93							4321122
C13-23478 PentaCDF **	%	98							4321122
C13-2378 TetraCDD *	%	88							4321122
C13-2378 TetraCDF **	%	86							4321122
C13-OCDD *	%	85							4321122
Confirmation C13-2378 TetraCDF **	%	87							4330862

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU556							
Sampling Date		2015/11/02 12:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW022E-0.5-DUP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.449	0.0998	0.200	0.0400	1.00	0.449		4321122
1,2,3,7,8-Penta CDD *	pg/g	4.62	0.102	0.999	0.0400	1.00	4.62		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	14.3	0.0996	0.999	0.0400	0.100	1.43		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	72.6	0.105	0.999	0.0400	0.100	7.26		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	35.1	0.0958	0.999	0.0400	0.100	3.51		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1600	0.103	0.999	0.0400	0.0100	16.0		4321122
Octa CDD *	pg/g	3210	0.0971	2.00	0.0799	0.000300	0.963		4321122
Total Tetra CDD *	pg/g	5.41	0.0998	0.200	0.0400			9	4321122
Total Penta CDD *	pg/g	18.1	0.102	0.999	0.0400			10	4321122
Total Hexa CDD *	pg/g	319	0.100	0.999	0.0400			7	4321122
Total Hepta CDD *	pg/g	2760	0.103	0.999	0.0400			2	4321122
2,3,7,8-Tetra CDF **	pg/g	2.68	0.100	0.200	0.0400	0.100	0.268		4321122
1,2,3,7,8-Penta CDF **	pg/g	5.02	0.0979	0.999	0.0400	0.0300	0.151		4321122
2,3,4,7,8-Penta CDF **	pg/g	8.08	0.0965	0.999	0.0400	0.300	2.42		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	41.1	0.102	0.999	0.0400	0.100	4.11		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	19.6	0.105	0.999	0.0400	0.100	1.96		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	12.7	0.0984	0.999	0.0400	0.100	1.27		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.717	0.102	0.999	0.0400	0.100	0.0717		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	218	0.105	0.999	0.0400	0.0100	2.18		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	14.3	0.104	0.999	0.0400	0.0100	0.143		4321122
Octa CDF **	pg/g	325	0.108	2.00	0.0799	0.000300	0.0975		4321122
Total Tetra CDF **	pg/g	28.7	0.100	0.200	0.0400			13	4321122
Total Penta CDF **	pg/g	199	0.0972	0.999	0.0400			10	4321122
Total Hexa CDF **	pg/g	483	0.102	0.999	0.0400			11	4321122
Total Hepta CDF **	pg/g	597	0.105	0.999	0.0400			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.35	0.11	1.0	0.90	0.100	0.135		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						46.8		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	102							4321122
C13-1234678 HeptaCDD *	%	92							4321122
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU556							
Sampling Date		2015/11/02 12:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW022E-0.5-DUP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	94							4321122
C13-123478 HexaCDD *	%	110							4321122
C13-123478 HexaCDF **	%	110							4321122
C13-1234789 HeptaCDF **	%	94							4321122
C13-123678 HexaCDD *	%	112							4321122
C13-123678 HexaCDF **	%	111							4321122
C13-12378 PentaCDD *	%	113							4321122
C13-12378 PentaCDF **	%	89							4321122
C13-123789 HexaCDF **	%	125							4321122
C13-234678 HexaCDF **	%	106							4321122
C13-23478 PentaCDF **	%	110							4321122
C13-2378 TetraCDD *	%	98							4321122
C13-2378 TetraCDF **	%	97							4321122
C13-OCDD *	%	100							4321122
Confirmation C13-2378 TetraCDF **	%	99							4330862

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU557							
Sampling Date		2015/11/02 14:20							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW033W-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.604	0.109	0.199	0.0399	1.00	0.604		4321122
1,2,3,7,8-Penta CDD *	pg/g	3.81	0.109	0.997	0.0399	1.00	3.81		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	6.10	0.0962	0.997	0.0399	0.100	0.610		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	25.5	0.101	0.997	0.0399	0.100	2.55		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	13.5	0.0925	0.997	0.0399	0.100	1.35		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	463	0.101	0.997	0.0399	0.0100	4.63		4321122
Octa CDD *	pg/g	2880	0.0999	1.99	0.0797	0.000300	0.864		4321122
Total Tetra CDD *	pg/g	12.7	0.109	0.199	0.0399			12	4321122
Total Penta CDD *	pg/g	38.4	0.109	0.997	0.0399			12	4321122
Total Hexa CDD *	pg/g	154	0.0967	0.997	0.0399			7	4321122
Total Hepta CDD *	pg/g	849	0.101	0.997	0.0399			2	4321122
2,3,7,8-Tetra CDF **	pg/g	6.32	0.109	0.199	0.0399	0.100	0.632		4321122
1,2,3,7,8-Penta CDF **	pg/g	3.17	0.140	0.997	0.0399	0.0300	0.0951		4321122
2,3,4,7,8-Penta CDF **	pg/g	12.0	0.138	0.997	0.0399	0.300	3.60		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	22.4	0.109	0.997	0.0399	0.100	2.24		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	22.3	0.113	0.997	0.0399	0.100	2.23		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	25.7	0.106	0.997	0.0399	0.100	2.57		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.278	0.110	0.997	0.0399	0.100	0.0278		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	107	0.105	0.997	0.0399	0.0100	1.07		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	8.10	0.104	0.997	0.0399	0.0100	0.0810		4321122
Octa CDF **	pg/g	202	0.102	1.99	0.0797	0.000300	0.0606		4321122
Total Tetra CDF **	pg/g	277	0.109	0.199	0.0399			16	4321122
Total Penta CDF **	pg/g	1010	0.139	0.997	0.0399			11	4321122
Total Hexa CDF **	pg/g	780	0.109	0.997	0.0399			11	4321122
Total Hepta CDF **	pg/g	304	0.104	0.997	0.0399			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.82	0.10	1.0	0.90	0.100	0.182		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						26.6		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	74							4321122
C13-1234678 HeptaCDD *	%	63							4321122
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU557							
Sampling Date		2015/11/02 14:20							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW033W-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	64							4321122
C13-123478 HexaCDD *	%	75							4321122
C13-123478 HexaCDF **	%	79							4321122
C13-1234789 HeptaCDF **	%	66							4321122
C13-123678 HexaCDD *	%	83							4321122
C13-123678 HexaCDF **	%	88							4321122
C13-12378 PentaCDD *	%	82							4321122
C13-12378 PentaCDF **	%	63							4321122
C13-123789 HexaCDF **	%	87							4321122
C13-234678 HexaCDF **	%	75							4321122
C13-23478 PentaCDF **	%	80							4321122
C13-2378 TetraCDD *	%	69							4321122
C13-2378 TetraCDF **	%	67							4321122
C13-OCDD *	%	67							4321122
Confirmation C13-2378 TetraCDF **	%	69							4330862

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin



**TEST SUMMARY**

**Maxxam ID:** BMU551  
**Sample ID:** SBS-ROW029BS-1.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/23	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4341388	N/A	2016/01/12	Vica Cioranic
Moisture	BAL	4312435	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU552  
**Sample ID:** SBS-ROW010W-1.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/23	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4341388	N/A	2016/01/12	Vica Cioranic
Moisture	BAL	4312435	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU552 Dup  
**Sample ID:** SBS-ROW010W-1.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/23	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4341388	N/A	2016/01/12	Vica Cioranic

**Maxxam ID:** BMU553  
**Sample ID:** SBS-ROW010E-0.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/23	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312435	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU554  
**Sample ID:** SBS-ROW022W-1.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/23	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4341388	N/A	2016/01/12	Vica Cioranic
Moisture	BAL	4312435	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU555  
**Sample ID:** SBS-ROW022E-0.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/23	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312435	N/A	2015/12/14	Valentina Kaftani

**TEST SUMMARY**

**Maxxam ID:** BMU556  
**Sample ID:** SBS-ROW022E-0.5-DUP  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/23	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312435	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU557  
**Sample ID:** SBS-ROW033W-1.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/23	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312435	N/A	2015/12/14	Valentina Kaftani

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.6°C
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**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4312435	VGS	RPD - Sample/Sample Dup	Moisture	2015/12/14	0.74		%	20
4321122	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/12/18		92	%	35 - 197
			C13-1234678 HeptaCDD	2015/12/18		74	%	23 - 140
			C13-1234678 HeptaCDF	2015/12/18		82	%	28 - 143
			C13-123478 HexaCDD	2015/12/18		85	%	32 - 141
			C13-123478 HexaCDF	2015/12/18		89	%	26 - 152
			C13-1234789 HeptaCDF	2015/12/18		79	%	26 - 138
			C13-123678 HexaCDD	2015/12/18		84	%	28 - 130
			C13-123678 HexaCDF	2015/12/18		89	%	26 - 123
			C13-12378 PentaCDD	2015/12/18		107	%	25 - 181
			C13-12378 PentaCDF	2015/12/18		92	%	24 - 185
			C13-123789 HexaCDF	2015/12/18		104	%	29 - 147
			C13-234678 HexaCDF	2015/12/18		91	%	28 - 136
			C13-23478 PentaCDF	2015/12/18		114	%	21 - 178
			C13-2378 TetraCDD	2015/12/18		89	%	25 - 164
			C13-2378 TetraCDF	2015/12/18		96	%	24 - 169
			C13-OCDD	2015/12/18		78	%	17 - 157
			2,3,7,8-Tetra CDD	2015/12/18		102	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/12/18		86	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/12/18		103	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/12/18		108	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/12/18		121	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/12/18		116	%	70 - 140
			Octa CDD	2015/12/18		105	%	78 - 144
			2,3,7,8-Tetra CDF	2015/12/18		99	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/12/18		96	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/12/18		85	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/12/18		105	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/12/18		100	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/12/18		114	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/12/18		88	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/12/18		113	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/12/18		103	%	78 - 138
			Octa CDF	2015/12/18		114	%	63 - 170
4321122	OBC	RPD	2,3,7,8-Tetra CDD	2015/12/18	7.5		%	25
			1,2,3,7,8-Penta CDD	2015/12/18	5.6		%	25
			1,2,3,4,7,8-Hexa CDD	2015/12/18	5.7		%	25
			1,2,3,6,7,8-Hexa CDD	2015/12/18	5.4		%	25
			1,2,3,7,8,9-Hexa CDD	2015/12/18	9.4		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/12/18	3.4		%	25
			Octa CDD	2015/12/18	3.7		%	25
			2,3,7,8-Tetra CDF	2015/12/18	4.9		%	25
			1,2,3,7,8-Penta CDF	2015/12/18	5.1		%	25
			2,3,4,7,8-Penta CDF	2015/12/18	4.6		%	25
			1,2,3,4,7,8-Hexa CDF	2015/12/18	4.7		%	25
			1,2,3,6,7,8-Hexa CDF	2015/12/18	9.5		%	25
			2,3,4,6,7,8-Hexa CDF	2015/12/18	2.6		%	25
			1,2,3,7,8,9-Hexa CDF	2015/12/18	3.4		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/12/18	8.5 (1)		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/12/18	4.7		%	25
			Octa CDF	2015/12/18	2.6		%	25
4321122	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/12/18		87	%	35 - 197
			C13-1234678 HeptaCDD	2015/12/18		77	%	23 - 140
			C13-1234678 HeptaCDF	2015/12/18		78	%	28 - 143

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-123478 HexaCDD	2015/12/18		76	%	32 - 141
			C13-123478 HexaCDF	2015/12/18		85	%	26 - 152
			C13-1234789 HeptaCDF	2015/12/18		68	%	26 - 138
			C13-123678 HexaCDD	2015/12/18		85	%	28 - 130
			C13-123678 HexaCDF	2015/12/18		89	%	26 - 123
			C13-12378 PentaCDD	2015/12/18		99	%	25 - 181
			C13-12378 PentaCDF	2015/12/18		83	%	24 - 185
			C13-123789 HexaCDF	2015/12/18		96	%	29 - 147
			C13-234678 HexaCDF	2015/12/18		85	%	28 - 136
			C13-23478 PentaCDF	2015/12/18		107	%	21 - 178
			C13-2378 TetraCDD	2015/12/18		91	%	25 - 164
			C13-2378 TetraCDF	2015/12/18		94	%	24 - 169
			C13-OCDD	2015/12/18		64	%	17 - 157
			2,3,7,8-Tetra CDD	2015/12/18	<0.103, EDL=0.103		pg/g	
			1,2,3,7,8-Penta CDD	2015/12/18	<0.0653, EDL=0.0653		pg/g	
			1,2,3,4,7,8-Hexa CDD	2015/12/18	<0.0720, EDL=0.0720		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/12/18	0.0940, EDL=0.0757		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/12/18	0.112, EDL=0.0692		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/12/18	0.156, EDL=0.0689		pg/g	
			Octa CDD	2015/12/18	0.427, EDL=0.123		pg/g	
			Total Tetra CDD	2015/12/18	<0.211, EDL=0.211 (2)		pg/g	
			Total Penta CDD	2015/12/18	<0.123, EDL=0.123 (2)		pg/g	
			Total Hexa CDD	2015/12/18	0.206, EDL=0.0724		pg/g	
			Total Hepta CDD	2015/12/18	0.256, EDL=0.0689		pg/g	
			2,3,7,8-Tetra CDF	2015/12/18	<0.0757, EDL=0.0757		pg/g	
			1,2,3,7,8-Penta CDF	2015/12/18	0.147, EDL=0.0948		pg/g	
			2,3,4,7,8-Penta CDF	2015/12/18	<0.0934, EDL=0.0934		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/12/18	0.166, EDL=0.0822		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/12/18	0.120, EDL=0.0849		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/12/18	0.112, EDL=0.0794		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/12/18	0.151, EDL=0.0823		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/12/18	0.239, EDL=0.0655		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8,9-Hepta CDF	2015/12/18	0.134, EDL=0.0648		pg/g	
			Octa CDF	2015/12/18	0.265, EDL=0.117		pg/g	
			Total Tetra CDF	2015/12/18	<0.0757, EDL=0.0757		pg/g	
			Total Penta CDF	2015/12/18	0.147, EDL=0.0941		pg/g	
			Total Hexa CDF	2015/12/18	0.549, EDL=0.0821		pg/g	
			Total Hepta CDF	2015/12/18	0.373, EDL=0.0652		pg/g	
4321122	OBC	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/12/23	NC		%	25
			1,2,3,7,8-Penta CDD	2015/12/23	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/12/23	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2015/12/23	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2015/12/23	NC		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/12/23	4.0		%	25
			Octa CDD	2015/12/23	5.4		%	25
			Total Tetra CDD	2015/12/23	NC		%	25
			Total Penta CDD	2015/12/23	NC		%	25
			Total Hexa CDD	2015/12/23	1.2		%	25
			Total Hepta CDD	2015/12/23	0.40		%	25
			2,3,7,8-Tetra CDF	2015/12/23	NC		%	25
			1,2,3,7,8-Penta CDF	2015/12/23	NC		%	25
			2,3,4,7,8-Penta CDF	2015/12/23	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/12/23	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2015/12/23	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/12/23	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/12/23	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/12/23	3.7		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/12/23	NC		%	25
			Octa CDF	2015/12/23	4.5		%	25
			Total Tetra CDF	2015/12/23	14		%	25
			Total Penta CDF	2015/12/23	5.1		%	25
			Total Hexa CDF	2015/12/23	4.9		%	25
			Total Hepta CDF	2015/12/23	6.4		%	25
4330862	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/12/24	<0.094, EDL=0.094		pg/g	
			Confirmation C13-2378 TetraCDF	2015/12/24		79	%	40 - 135
4341388	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2016/01/12	<0.087, EDL=0.087		pg/g	
			Confirmation C13-2378 TetraCDF	2016/01/12		107	%	40 - 135

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4341388	VCI	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2016/01/12	NC		%	100
<p>Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.</p> <p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p> <p>NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples &lt; 5x RDL).</p> <p>(1) Recovery meets EPA 1613B acceptance criteria</p> <p>(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.</p>								

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

*Cristina Carriere*

\_\_\_\_\_  
Cristina Carriere, Scientific Services

*CXU.*

\_\_\_\_\_  
Cathy Xu, Senior Analyst, HRMS Services, Senior Analyst, HRMS Services

*Owen Cosby*

\_\_\_\_\_  
Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.





Your Project #: A5K0831  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/01/12**  
Report #: R3847667  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5P4754**

**Received: 2015/12/10, 15:15**

Sample Matrix: Soil  
# Samples Received: 4

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	2	2015/12/14	2015/12/23	BRL SOP-00410	EPA 1613B m
Dioxins/Furans in Soil (1613B) (1)	2	2015/12/14	2015/12/24	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	4	N/A	2015/12/24	BRL SOP-00406	EPA M8290A / M1613
Moisture	4	N/A	2015/12/14	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		BMU623	BMU624	BMU625			
Sampling Date		2015/11/20 09:15	2015/11/20 10:20	2015/11/20 11:00			
COC Number		na	na	na			
	UNITS	ISM-A0I009-0.5-AFTER ISM	COMP-A0I001-0.5	ISM-A0I002-0.5-AFTER ISM	RDL	MDL	QC Batch
Moisture	%	2.5	24	2.1	1.0	0.50	4312642
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							

Maxxam ID		BMU626			
Sampling Date		2015/11/20 11:30			
COC Number		na			
	UNITS	ISM-A0I037-0.5-AFTER ISM	RDL	MDL	QC Batch
Moisture	%	2.0	1.0	0.50	4312642
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU623							
Sampling Date		2015/11/20 09:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-A01009-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.12	0.0705	0.130	0.0261	1.00	1.12		4321122
1,2,3,7,8-Penta CDD *	pg/g	0.627	0.0699	0.652	0.0261	1.00	0.627		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	1.55	0.0684	0.652	0.0261	0.100	0.155		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	5.35	0.0719	0.652	0.0261	0.100	0.535		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	3.75	0.0657	0.652	0.0261	0.100	0.375		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	124	0.0672	0.652	0.0261	0.0100	1.24		4321122
Octa CDD *	pg/g	841	0.0736	1.30	0.0522	0.000300	0.252		4321122
Total Tetra CDD *	pg/g	2.82	0.0705	0.130	0.0261			6	4321122
Total Penta CDD *	pg/g	4.06	0.0699	0.652	0.0261			11	4321122
Total Hexa CDD *	pg/g	31.1	0.0688	0.652	0.0261			7	4321122
Total Hepta CDD *	pg/g	216	0.0672	0.652	0.0261			2	4321122
2,3,7,8-Tetra CDF **	pg/g	0.612	0.0669	0.130	0.0261	0.100	0.0612		4321122
1,2,3,7,8-Penta CDF **	pg/g	0.414	0.0688	0.652	0.0261	0.0300	0.0124		4321122
2,3,4,7,8-Penta CDF **	pg/g	0.814	0.0678	0.652	0.0261	0.300	0.244		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	6.79	0.0679	0.652	0.0261	0.100	0.679		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	1.54	0.0702	0.652	0.0261	0.100	0.154		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	1.05	0.0656	0.652	0.0261	0.100	0.105		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.118	0.0680	0.652	0.0261	0.100	0.0118		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	28.8	0.0692	0.652	0.0261	0.0100	0.288		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.33	0.0684	0.652	0.0261	0.0100	0.0233		4321122
Octa CDF **	pg/g	62.2	0.0775	1.30	0.0522	0.000300	0.0187		4321122
Total Tetra CDF **	pg/g	5.27	0.0669	0.130	0.0261			16	4321122
Total Penta CDF **	pg/g	12.9	0.0683	0.652	0.0261			8	4321122
Total Hexa CDF **	pg/g	46.0	0.0679	0.652	0.0261			10	4321122
Total Hepta CDF **	pg/g	81.1	0.0688	0.652	0.0261			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.404	0.072	0.65	0.59	0.100	0.0404		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						5.88		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	85							4321122
C13-1234678 HeptaCDD *	%	73							4321122
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU623							
Sampling Date		2015/11/20 09:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-A01009-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	70							4321122
C13-123478 HexaCDD *	%	83							4321122
C13-123478 HexaCDF **	%	84							4321122
C13-1234789 HeptaCDF **	%	68							4321122
C13-123678 HexaCDD *	%	91							4321122
C13-123678 HexaCDF **	%	96							4321122
C13-12378 PentaCDD *	%	88							4321122
C13-12378 PentaCDF **	%	68							4321122
C13-123789 HexaCDF **	%	95							4321122
C13-234678 HexaCDF **	%	81							4321122
C13-23478 PentaCDF **	%	84							4321122
C13-2378 TetraCDD *	%	80							4321122
C13-2378 TetraCDF **	%	79							4321122
C13-OCDD *	%	78							4321122
Confirmation C13-2378 TetraCDF **	%	81							4330862

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

\*\* CDF = Chloro Dibenzo-p-Furan

\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU624							
Sampling Date		2015/11/20 10:20							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	COMP-A01001-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.09	0.0406	0.0777	0.0155	1.00	1.09		4321122
1,2,3,7,8-Penta CDD *	pg/g	11.8	0.0410	0.389	0.0155	1.00	11.8		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	25.5	0.0408	0.389	0.0155	0.100	2.55		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	110	0.0429	0.389	0.0155	0.100	11.0		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	63.7	0.0392	0.389	0.0155	0.100	6.37		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	992	0.0416	0.389	0.0155	0.0100	9.92		4321122
Octa CDD *	pg/g	2130 (1)	0.0428	0.777	0.0311	0.000300	0.639		4321122
Total Tetra CDD *	pg/g	11.6	0.0406	0.0777	0.0155			15	4321122
Total Penta CDD *	pg/g	44.6	0.0410	0.389	0.0155			12	4321122
Total Hexa CDD *	pg/g	451	0.0410	0.389	0.0155			7	4321122
Total Hepta CDD *	pg/g	1830	0.0416	0.389	0.0155			2	4321122
2,3,7,8-Tetra CDF **	pg/g	3.56	0.0395	0.0777	0.0155	0.100	0.356		4321122
1,2,3,7,8-Penta CDF **	pg/g	4.53	0.0411	0.389	0.0155	0.0300	0.136		4321122
2,3,4,7,8-Penta CDF **	pg/g	5.48	0.0405	0.389	0.0155	0.300	1.64		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	29.4	0.0413	0.389	0.0155	0.100	2.94		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	<15.1 (2)	15.1	0.389	0.0155	0.100	1.51		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	9.61	0.0399	0.389	0.0155	0.100	0.961		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.615	0.0414	0.389	0.0155	0.100	0.0615		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	241	0.0409	0.389	0.0155	0.0100	2.41		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	16.3	0.0404	0.389	0.0155	0.0100	0.163		4321122
Octa CDF **	pg/g	349	0.0448	0.777	0.0311	0.000300	0.105		4321122
Total Tetra CDF **	pg/g	28.8	0.0395	0.0777	0.0155			16	4321122
Total Penta CDF **	pg/g	122	0.0408	0.389	0.0155			12	4321122
Total Hexa CDF **	pg/g	402	0.0413	0.389	0.0155			12	4321122
Total Hepta CDF **	pg/g	644	0.0407	0.389	0.0155			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.43	0.049	0.25	0.23	0.100	0.143		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						53.4		

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

\* CDD = Chloro Dibenzo-p-Dioxin

\*\* CDF = Chloro Dibenzo-p-Furan

(1) EMCL - PCDD/DF analysis - Exceeds Maximum Calibration Limit

(2) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		BMU624							
<b>Sampling Date</b>		2015/11/20 10:20							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		# of	
	<b>UNITS</b>	<b>COMP-A0I001-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	103							4321122
C13-1234678 HeptaCDD *	%	78							4321122
C13-1234678 HeptaCDF **	%	73							4321122
C13-123478 HexaCDD *	%	98							4321122
C13-123478 HexaCDF **	%	90							4321122
C13-1234789 HeptaCDF **	%	72							4321122
C13-123678 HexaCDD *	%	94							4321122
C13-123678 HexaCDF **	%	92							4321122
C13-12378 PentaCDD *	%	108							4321122
C13-12378 PentaCDF **	%	84							4321122
C13-123789 HexaCDF **	%	101							4321122
C13-234678 HexaCDF **	%	91							4321122
C13-23478 PentaCDF **	%	101							4321122
C13-2378 TetraCDD *	%	98							4321122
C13-2378 TetraCDF **	%	97							4321122
C13-OCDD *	%	78							4321122
Confirmation C13-2378 TetraCDF **	%	97							4330862

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU625							
Sampling Date		2015/11/20 11:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-A01002-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.549	0.0703	0.131	0.0262	1.00	0.549		4321122
1,2,3,7,8-Penta CDD *	pg/g	2.24	0.0663	0.656	0.0262	1.00	2.24		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	4.89	0.0694	0.656	0.0262	0.100	0.489		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	20.2	0.0730	0.656	0.0262	0.100	2.02		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	12.6	0.0667	0.656	0.0262	0.100	1.26		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	322	0.0680	0.656	0.0262	0.0100	3.22		4321122
Octa CDD *	pg/g	2210	0.0674	1.31	0.0524	0.000300	0.663		4321122
Total Tetra CDD *	pg/g	6.82	0.0703	0.131	0.0262			13	4321122
Total Penta CDD *	pg/g	10.1	0.0663	0.656	0.0262			11	4321122
Total Hexa CDD *	pg/g	100	0.0698	0.656	0.0262			7	4321122
Total Hepta CDD *	pg/g	541	0.0680	0.656	0.0262			2	4321122
2,3,7,8-Tetra CDF **	pg/g	2.99	0.0762	0.131	0.0262	0.100	0.299		4321122
1,2,3,7,8-Penta CDF **	pg/g	1.29	0.0723	0.656	0.0262	0.0300	0.0387		4321122
2,3,4,7,8-Penta CDF **	pg/g	3.37	0.0713	0.656	0.0262	0.300	1.01		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	9.82	0.0687	0.656	0.0262	0.100	0.982		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	4.64	0.0710	0.656	0.0262	0.100	0.464		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	4.68	0.0664	0.656	0.0262	0.100	0.468		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.236	0.0688	0.656	0.0262	0.100	0.0236		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	157	0.0688	0.656	0.0262	0.0100	1.57		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.98	0.0680	0.656	0.0262	0.0100	0.0398		4321122
Octa CDF **	pg/g	108	0.0754	1.31	0.0524	0.000300	0.0324		4321122
Total Tetra CDF **	pg/g	23.2	0.0762	0.131	0.0262			16	4321122
Total Penta CDF **	pg/g	65.5	0.0718	0.656	0.0262			13	4321122
Total Hexa CDF **	pg/g	141	0.0687	0.656	0.0262			11	4321122
Total Hepta CDF **	pg/g	295	0.0684	0.656	0.0262			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.703	0.076	0.66	0.59	0.100	0.0703		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						15.1		
<b>Surrogate Recovery (%)</b>									
37Cl4 2378 Tetra CDD *	%	78							4321122
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU625							
Sampling Date		2015/11/20 11:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-A01002-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	72							4321122
C13-1234678 HeptaCDF **	%	60							4321122
C13-123478 HexaCDD *	%	75							4321122
C13-123478 HexaCDF **	%	73							4321122
C13-1234789 HeptaCDF **	%	59							4321122
C13-123678 HexaCDD *	%	80							4321122
C13-123678 HexaCDF **	%	82							4321122
C13-12378 PentaCDD *	%	81							4321122
C13-12378 PentaCDF **	%	61							4321122
C13-123789 HexaCDF **	%	81							4321122
C13-234678 HexaCDF **	%	68							4321122
C13-23478 PentaCDF **	%	80							4321122
C13-2378 TetraCDD *	%	72							4321122
C13-2378 TetraCDF **	%	70							4321122
C13-OCDD *	%	67							4321122
Confirmation C13-2378 TetraCDF **	%	72							4330862

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU626							
Sampling Date		2015/11/20 11:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-A01037-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	3.63	0.0653	0.128	0.0256	1.00	3.63		4321122
1,2,3,7,8-Penta CDD *	pg/g	1.95	0.0677	0.639	0.0256	1.00	1.95		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	4.54	0.0659	0.639	0.0256	0.100	0.454		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	20.6	0.0693	0.639	0.0256	0.100	2.06		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	12.1	0.0633	0.639	0.0256	0.100	1.21		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	417	0.0674	0.639	0.0256	0.0100	4.17		4321122
Octa CDD *	pg/g	2460	0.0666	1.28	0.0511	0.000300	0.738		4321122
Total Tetra CDD *	pg/g	10.1	0.0653	0.128	0.0256			13	4321122
Total Penta CDD *	pg/g	13.5	0.0677	0.639	0.0256			12	4321122
Total Hexa CDD *	pg/g	103	0.0662	0.639	0.0256			7	4321122
Total Hepta CDD *	pg/g	717	0.0674	0.639	0.0256			2	4321122
2,3,7,8-Tetra CDF **	pg/g	2.01	0.0679	0.128	0.0256	0.100	0.201		4321122
1,2,3,7,8-Penta CDF **	pg/g	1.24	0.0684	0.639	0.0256	0.0300	0.0372		4321122
2,3,4,7,8-Penta CDF **	pg/g	1.97	0.0674	0.639	0.0256	0.300	0.591		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	11.5	0.0668	0.639	0.0256	0.100	1.15		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	4.34	0.0690	0.639	0.0256	0.100	0.434		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	3.16	0.0645	0.639	0.0256	0.100	0.316		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.205	0.0669	0.639	0.0256	0.100	0.0205		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	75.7	0.0673	0.639	0.0256	0.0100	0.757		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	4.69	0.0665	0.639	0.0256	0.0100	0.0469		4321122
Octa CDF **	pg/g	145	0.0646	1.28	0.0511	0.000300	0.0435		4321122
Total Tetra CDF **	pg/g	16.2	0.0679	0.128	0.0256			16	4321122
Total Penta CDF **	pg/g	45.1	0.0679	0.639	0.0256			12	4321122
Total Hexa CDF **	pg/g	121	0.0667	0.639	0.0256			10	4321122
Total Hepta CDF **	pg/g	211	0.0669	0.639	0.0256			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.99	0.10	0.64	0.58	0.100	0.0990		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						17.7		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	61							4321122

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU626							
Sampling Date		2015/11/20 11:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-A0I037-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	51							4321122
C13-1234678 HeptaCDF **	%	50							4321122
C13-123478 HexaCDD *	%	64							4321122
C13-123478 HexaCDF **	%	62							4321122
C13-1234789 HeptaCDF **	%	50							4321122
C13-123678 HexaCDD *	%	66							4321122
C13-123678 HexaCDF **	%	64							4321122
C13-12378 PentaCDD *	%	66							4321122
C13-12378 PentaCDF **	%	50							4321122
C13-123789 HexaCDF **	%	68							4321122
C13-234678 HexaCDF **	%	59							4321122
C13-23478 PentaCDF **	%	62							4321122
C13-2378 TetraCDD *	%	58							4321122
C13-2378 TetraCDF **	%	60							4321122
C13-OCDD *	%	56							4321122
Confirmation C13-2378 TetraCDF **	%	61							4330862

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**TEST SUMMARY**

**Maxxam ID:** BMU623  
**Sample ID:** ISM-A0I009-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/11/20  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/23	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312642	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU624  
**Sample ID:** COMP-A0I001-0.5  
**Matrix:** Soil

**Collected:** 2015/11/20  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/23	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312642	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU625  
**Sample ID:** ISM-A0I002-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/11/20  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/24	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312642	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU626  
**Sample ID:** ISM-A0I037-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/11/20  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/24	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312642	N/A	2015/12/14	Valentina Kaftani

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.6°C
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**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4312642	NS3	RPD - Sample/Sample Dup	Moisture	2015/12/14	0		%	20
4321122	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/12/18		92	%	35 - 197
			C13-1234678 HeptaCDD	2015/12/18		74	%	23 - 140
			C13-1234678 HeptaCDF	2015/12/18		82	%	28 - 143
			C13-123478 HexaCDD	2015/12/18		85	%	32 - 141
			C13-123478 HexaCDF	2015/12/18		89	%	26 - 152
			C13-1234789 HeptaCDF	2015/12/18		79	%	26 - 138
			C13-123678 HexaCDD	2015/12/18		84	%	28 - 130
			C13-123678 HexaCDF	2015/12/18		89	%	26 - 123
			C13-12378 PentaCDD	2015/12/18		107	%	25 - 181
			C13-12378 PentaCDF	2015/12/18		92	%	24 - 185
			C13-123789 HexaCDF	2015/12/18		104	%	29 - 147
			C13-234678 HexaCDF	2015/12/18		91	%	28 - 136
			C13-23478 PentaCDF	2015/12/18		114	%	21 - 178
			C13-2378 TetraCDD	2015/12/18		89	%	25 - 164
			C13-2378 TetraCDF	2015/12/18		96	%	24 - 169
			C13-OCDD	2015/12/18		78	%	17 - 157
			2,3,7,8-Tetra CDD	2015/12/18		102	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/12/18		86	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/12/18		103	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/12/18		108	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/12/18		121	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/12/18		116	%	70 - 140
			Octa CDD	2015/12/18		105	%	78 - 144
			2,3,7,8-Tetra CDF	2015/12/18		99	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/12/18		96	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/12/18		85	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/12/18		105	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/12/18		100	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/12/18		114	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/12/18		88	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/12/18		113	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/12/18		103	%	78 - 138
			Octa CDF	2015/12/18		114	%	63 - 170
4321122	OBC	RPD	2,3,7,8-Tetra CDD	2015/12/18	7.5		%	25
			1,2,3,7,8-Penta CDD	2015/12/18	5.6		%	25
			1,2,3,4,7,8-Hexa CDD	2015/12/18	5.7		%	25
			1,2,3,6,7,8-Hexa CDD	2015/12/18	5.4		%	25
			1,2,3,7,8,9-Hexa CDD	2015/12/18	9.4		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/12/18	3.4		%	25
			Octa CDD	2015/12/18	3.7		%	25
			2,3,7,8-Tetra CDF	2015/12/18	4.9		%	25
			1,2,3,7,8-Penta CDF	2015/12/18	5.1		%	25
			2,3,4,7,8-Penta CDF	2015/12/18	4.6		%	25
			1,2,3,4,7,8-Hexa CDF	2015/12/18	4.7		%	25
			1,2,3,6,7,8-Hexa CDF	2015/12/18	9.5		%	25
			2,3,4,6,7,8-Hexa CDF	2015/12/18	2.6		%	25
			1,2,3,7,8,9-Hexa CDF	2015/12/18	3.4		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/12/18	8.5 (1)		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/12/18	4.7		%	25
			Octa CDF	2015/12/18	2.6		%	25
4321122	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/12/18		87	%	35 - 197
			C13-1234678 HeptaCDD	2015/12/18		77	%	23 - 140
			C13-1234678 HeptaCDF	2015/12/18		78	%	28 - 143

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-123478 HexaCDD	2015/12/18		76	%	32 - 141
			C13-123478 HexaCDF	2015/12/18		85	%	26 - 152
			C13-1234789 HeptaCDF	2015/12/18		68	%	26 - 138
			C13-123678 HexaCDD	2015/12/18		85	%	28 - 130
			C13-123678 HexaCDF	2015/12/18		89	%	26 - 123
			C13-12378 PentaCDD	2015/12/18		99	%	25 - 181
			C13-12378 PentaCDF	2015/12/18		83	%	24 - 185
			C13-123789 HexaCDF	2015/12/18		96	%	29 - 147
			C13-234678 HexaCDF	2015/12/18		85	%	28 - 136
			C13-23478 PentaCDF	2015/12/18		107	%	21 - 178
			C13-2378 TetraCDD	2015/12/18		91	%	25 - 164
			C13-2378 TetraCDF	2015/12/18		94	%	24 - 169
			C13-OCDD	2015/12/18		64	%	17 - 157
			2,3,7,8-Tetra CDD	2015/12/18	<0.103, EDL=0.103		pg/g	
			1,2,3,7,8-Penta CDD	2015/12/18	<0.0653, EDL=0.0653		pg/g	
			1,2,3,4,7,8-Hexa CDD	2015/12/18	<0.0720, EDL=0.0720		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/12/18	0.0940, EDL=0.0757		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/12/18	0.112, EDL=0.0692		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/12/18	0.156, EDL=0.0689		pg/g	
			Octa CDD	2015/12/18	0.427, EDL=0.123		pg/g	
			Total Tetra CDD	2015/12/18	<0.211, EDL=0.211 (2)		pg/g	
			Total Penta CDD	2015/12/18	<0.123, EDL=0.123 (2)		pg/g	
			Total Hexa CDD	2015/12/18	0.206, EDL=0.0724		pg/g	
			Total Hepta CDD	2015/12/18	0.256, EDL=0.0689		pg/g	
			2,3,7,8-Tetra CDF	2015/12/18	<0.0757, EDL=0.0757		pg/g	
			1,2,3,7,8-Penta CDF	2015/12/18	0.147, EDL=0.0948		pg/g	
			2,3,4,7,8-Penta CDF	2015/12/18	<0.0934, EDL=0.0934		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/12/18	0.166, EDL=0.0822		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/12/18	0.120, EDL=0.0849		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/12/18	0.112, EDL=0.0794		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/12/18	0.151, EDL=0.0823		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/12/18	0.239, EDL=0.0655		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8,9-Hepta CDF	2015/12/18	0.134, EDL=0.0648		pg/g	
			Octa CDF	2015/12/18	0.265, EDL=0.117		pg/g	
			Total Tetra CDF	2015/12/18	<0.0757, EDL=0.0757		pg/g	
			Total Penta CDF	2015/12/18	0.147, EDL=0.0941		pg/g	
			Total Hexa CDF	2015/12/18	0.549, EDL=0.0821		pg/g	
			Total Hepta CDF	2015/12/18	0.373, EDL=0.0652		pg/g	
4321122	OBC	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/12/23	NC		%	25
			1,2,3,7,8-Penta CDD	2015/12/23	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/12/23	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2015/12/23	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2015/12/23	NC		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/12/23	4.0		%	25
			Octa CDD	2015/12/23	5.4		%	25
			Total Tetra CDD	2015/12/23	NC		%	25
			Total Penta CDD	2015/12/23	NC		%	25
			Total Hexa CDD	2015/12/23	1.2		%	25
			Total Hepta CDD	2015/12/23	0.40		%	25
			2,3,7,8-Tetra CDF	2015/12/23	NC		%	25
			1,2,3,7,8-Penta CDF	2015/12/23	NC		%	25
			2,3,4,7,8-Penta CDF	2015/12/23	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/12/23	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2015/12/23	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/12/23	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/12/23	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/12/23	3.7		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/12/23	NC		%	25
			Octa CDF	2015/12/23	4.5		%	25
			Total Tetra CDF	2015/12/23	14		%	25
			Total Penta CDF	2015/12/23	5.1		%	25
			Total Hexa CDF	2015/12/23	4.9		%	25
			Total Hepta CDF	2015/12/23	6.4		%	25
4330862	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/12/24	<0.094, EDL=0.094		pg/g	
			Confirmation C13-2378 TetraCDF	2015/12/24		79	%	40 - 135

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Recovery meets EPA 1613B acceptance criteria

(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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Cristina Carriere, Scientific Services



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Cathy Xu, Senior Analyst, HRMS Services, Senior Analyst, HRMS Services



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Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.





Your Project #: A5L0163  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/01/12**  
Report #: R3847668  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5P4765**  
**Received: 2015/12/10, 15:15**

Sample Matrix: Soil  
# Samples Received: 5

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	5	2015/12/14	2015/12/24	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	5	N/A	2015/12/24	BRL SOP-00406	EPA M8290A / M1613
Moisture	5	N/A	2015/12/14	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.  
\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.  
(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.  
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**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		BMU670	BMU671	BMU672	BMU673	BMU674			
Sampling Date		2015/12/02 10:40	2015/12/02 11:00	2015/12/02 11:50	2015/12/02 12:30	2015/12/02 13:40			
COC Number		na	na	na	na	na			
	UNITS	ISM-AOI028B-0 .5-AFTER ISM	ISM-AOI034-0. 5-AFTER ISM	ISM-AOI028A-0 .5-AFTER ISM	ISM-AOI022-0. 5-AFTER ISM	ISM-AOI010-0. 5-AFTER ISM	RDL	MDL	QC Batch
Moisture	%	2.8	3.0	2.7	2.5	2.9	1.0	0.50	4312642
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU670							
Sampling Date		2015/12/02 10:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI028B-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.859	0.0703	0.132	0.0264	1.00	0.859		4321122
1,2,3,7,8-Penta CDD *	pg/g	2.32	0.0706	0.660	0.0264	1.00	2.32		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	5.24	0.0715	0.660	0.0264	0.100	0.524		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	24.6	0.0752	0.660	0.0264	0.100	2.46		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	13.6	0.0687	0.660	0.0264	0.100	1.36		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	424	0.0703	0.660	0.0264	0.0100	4.24		4321122
Octa CDD *	pg/g	2190	0.0691	1.32	0.0528	0.000300	0.657		4321122
Total Tetra CDD *	pg/g	7.19	0.0703	0.132	0.0264			15	4321122
Total Penta CDD *	pg/g	15.0	0.0706	0.660	0.0264			12	4321122
Total Hexa CDD *	pg/g	119	0.0719	0.660	0.0264			7	4321122
Total Hepta CDD *	pg/g	744	0.0703	0.660	0.0264			2	4321122
2,3,7,8-Tetra CDF **	pg/g	2.45	0.0718	0.132	0.0264	0.100	0.245		4321122
1,2,3,7,8-Penta CDF **	pg/g	1.44	0.0695	0.660	0.0264	0.0300	0.0432		4321122
2,3,4,7,8-Penta CDF **	pg/g	2.13	0.0685	0.660	0.0264	0.300	0.639		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	8.10	0.0688	0.660	0.0264	0.100	0.810		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	4.48	0.0711	0.660	0.0264	0.100	0.448		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	3.76	0.0665	0.660	0.0264	0.100	0.376		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.247	0.0689	0.660	0.0264	0.100	0.0247		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	89.4	0.0694	0.660	0.0264	0.0100	0.894		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	4.22	0.0685	0.660	0.0264	0.0100	0.0422		4321122
Octa CDF **	pg/g	168	0.0723	1.32	0.0528	0.000300	0.0504		4321122
Total Tetra CDF **	pg/g	30.7	0.0718	0.132	0.0264			15	4321122
Total Penta CDF **	pg/g	81.0	0.0690	0.660	0.0264			11	4321122
Total Hexa CDF **	pg/g	132	0.0688	0.660	0.0264			12	4321122
Total Hepta CDF **	pg/g	235	0.0690	0.660	0.0264			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.25	0.076	0.66	0.59	0.100	0.125		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						15.9		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	94							4321122
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU670							
Sampling Date		2015/12/02 10:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI028B-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	94							4321122
C13-1234678 HeptaCDF **	%	78							4321122
C13-123478 HexaCDD *	%	99							4321122
C13-123478 HexaCDF **	%	97							4321122
C13-1234789 HeptaCDF **	%	79							4321122
C13-123678 HexaCDD *	%	106							4321122
C13-123678 HexaCDF **	%	104							4321122
C13-12378 PentaCDD *	%	100							4321122
C13-12378 PentaCDF **	%	80							4321122
C13-123789 HexaCDF **	%	109							4321122
C13-234678 HexaCDF **	%	98							4321122
C13-23478 PentaCDF **	%	99							4321122
C13-2378 TetraCDD *	%	91							4321122
C13-2378 TetraCDF **	%	91							4321122
C13-OCDD *	%	90							4321122
Confirmation C13-2378 TetraCDF **	%	96							4330862

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU671							
Sampling Date		2015/12/02 11:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI034-0-5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.02	0.0705	0.130	0.0259	1.00	1.02		4321122
1,2,3,7,8-Penta CDD *	pg/g	1.58	0.0695	0.648	0.0259	1.00	1.58		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	2.67	0.0658	0.648	0.0259	0.100	0.267		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	10.6	0.0692	0.648	0.0259	0.100	1.06		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	7.63	0.0632	0.648	0.0259	0.100	0.763		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	215	0.0656	0.648	0.0259	0.0100	2.15		4321122
Octa CDD *	pg/g	1330	0.0692	1.30	0.0518	0.000300	0.399		4321122
Total Tetra CDD *	pg/g	7.58	0.0705	0.130	0.0259			13	4321122
Total Penta CDD *	pg/g	8.02	0.0695	0.648	0.0259			10	4321122
Total Hexa CDD *	pg/g	64.0	0.0661	0.648	0.0259			7	4321122
Total Hepta CDD *	pg/g	393	0.0656	0.648	0.0259			2	4321122
2,3,7,8-Tetra CDF **	pg/g	3.53	0.0689	0.130	0.0259	0.100	0.353		4321122
1,2,3,7,8-Penta CDF **	pg/g	1.04	0.0668	0.648	0.0259	0.0300	0.0312		4321122
2,3,4,7,8-Penta CDF **	pg/g	1.71	0.0659	0.648	0.0259	0.300	0.513		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	7.17	0.0665	0.648	0.0259	0.100	0.717		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	3.01	0.0688	0.648	0.0259	0.100	0.301		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	2.94	0.0643	0.648	0.0259	0.100	0.294		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.130	0.0667	0.648	0.0259	0.100	0.0130		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	40.5	0.0674	0.648	0.0259	0.0100	0.405		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.36	0.0666	0.648	0.0259	0.0100	0.0236		4321122
Octa CDF **	pg/g	62.6	0.0696	1.30	0.0518	0.000300	0.0188		4321122
Total Tetra CDF **	pg/g	23.3	0.0689	0.130	0.0259			16	4321122
Total Penta CDF **	pg/g	28.8	0.0663	0.648	0.0259			13	4321122
Total Hexa CDF **	pg/g	60.4	0.0665	0.648	0.0259			13	4321122
Total Hepta CDF **	pg/g	95.4	0.0670	0.648	0.0259			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.25	0.072	0.65	0.59	0.100	0.125		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						9.68		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	91							4321122
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU671							
Sampling Date		2015/12/02 11:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI034-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	77							4321122
C13-1234678 HeptaCDF **	%	72							4321122
C13-123478 HexaCDD *	%	95							4321122
C13-123478 HexaCDF **	%	90							4321122
C13-1234789 HeptaCDF **	%	74							4321122
C13-123678 HexaCDD *	%	105							4321122
C13-123678 HexaCDF **	%	91							4321122
C13-12378 PentaCDD *	%	96							4321122
C13-12378 PentaCDF **	%	75							4321122
C13-123789 HexaCDF **	%	103							4321122
C13-234678 HexaCDF **	%	87							4321122
C13-23478 PentaCDF **	%	96							4321122
C13-2378 TetraCDD *	%	88							4321122
C13-2378 TetraCDF **	%	83							4321122
C13-OCDD *	%	82							4321122
Confirmation C13-2378 TetraCDF **	%	99							4330862

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU672							
Sampling Date		2015/12/02 11:50							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI028A-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.382	0.107	0.195	0.0390	1.00	0.382		4321122
1,2,3,7,8-Penta CDD *	pg/g	1.27	0.102	0.975	0.0390	1.00	1.27		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	2.72	0.103	0.975	0.0390	0.100	0.272		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	10.9	0.108	0.975	0.0390	0.100	1.09		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	7.26	0.0989	0.975	0.0390	0.100	0.726		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	227	0.102	0.975	0.0390	0.0100	2.27		4321122
Octa CDD *	pg/g	1470	0.101	1.95	0.0780	0.000300	0.441		4321122
Total Tetra CDD *	pg/g	2.77	0.107	0.195	0.0390			7	4321122
Total Penta CDD *	pg/g	7.14	0.102	0.975	0.0390			10	4321122
Total Hexa CDD *	pg/g	58.2	0.103	0.975	0.0390			7	4321122
Total Hepta CDD *	pg/g	404	0.102	0.975	0.0390			2	4321122
2,3,7,8-Tetra CDF **	pg/g	1.04	0.102	0.195	0.0390	0.100	0.104		4321122
1,2,3,7,8-Penta CDF **	pg/g	0.678	0.104	0.975	0.0390	0.0300	0.0203		4321122
2,3,4,7,8-Penta CDF **	pg/g	0.899	0.103	0.975	0.0390	0.300	0.270		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	3.75	0.103	0.975	0.0390	0.100	0.375		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	1.82	0.106	0.975	0.0390	0.100	0.182		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	1.45	0.0991	0.975	0.0390	0.100	0.145		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.122	0.103	0.975	0.0390	0.100	0.0122		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	31.8	0.102	0.975	0.0390	0.0100	0.318		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	1.86	0.101	0.975	0.0390	0.0100	0.0186		4321122
Octa CDF **	pg/g	50.8	0.105	1.95	0.0780	0.000300	0.0152		4321122
Total Tetra CDF **	pg/g	7.40	0.102	0.195	0.0390			18	4321122
Total Penta CDF **	pg/g	14.6	0.104	0.975	0.0390			8	4321122
Total Hexa CDF **	pg/g	46.7	0.103	0.975	0.0390			11	4321122
Total Hepta CDF **	pg/g	82.1	0.102	0.975	0.0390			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.06	0.10	0.97	0.87	0.100	0.106		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						7.91		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	96							4321122
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU672							
Sampling Date		2015/12/02 11:50							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI028A-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	66							4321122
C13-1234678 HeptaCDF **	%	62							4321122
C13-123478 HexaCDD *	%	76							4321122
C13-123478 HexaCDF **	%	75							4321122
C13-1234789 HeptaCDF **	%	64							4321122
C13-123678 HexaCDD *	%	82							4321122
C13-123678 HexaCDF **	%	78							4321122
C13-12378 PentaCDD *	%	77							4321122
C13-12378 PentaCDF **	%	61							4321122
C13-123789 HexaCDF **	%	86							4321122
C13-234678 HexaCDF **	%	73							4321122
C13-23478 PentaCDF **	%	78							4321122
C13-2378 TetraCDD *	%	71							4321122
C13-2378 TetraCDF **	%	69							4321122
C13-OCDD *	%	69							4321122
Confirmation C13-2378 TetraCDF **	%	81							4330862

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU673							
Sampling Date		2015/12/02 12:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI022-0-5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.895	0.0687	0.125	0.0251	1.00	0.895		4321122
1,2,3,7,8-Penta CDD *	pg/g	1.01	0.0659	0.627	0.0251	1.00	1.01		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	2.33	0.0664	0.627	0.0251	0.100	0.233		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	12.4	0.0698	0.627	0.0251	0.100	1.24		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	6.39	0.0638	0.627	0.0251	0.100	0.639		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	252	0.0654	0.627	0.0251	0.0100	2.52		4321122
Octa CDD *	pg/g	1510	0.0672	1.25	0.0501	0.000300	0.453		4321122
Total Tetra CDD *	pg/g	2.55	0.0687	0.125	0.0251			7	4321122
Total Penta CDD *	pg/g	5.09	0.0659	0.627	0.0251			9	4321122
Total Hexa CDD *	pg/g	56.6	0.0668	0.627	0.0251			8	4321122
Total Hepta CDD *	pg/g	437	0.0654	0.627	0.0251			2	4321122
2,3,7,8-Tetra CDF **	pg/g	0.931	0.0686	0.125	0.0251	0.100	0.0931		4321122
1,2,3,7,8-Penta CDF **	pg/g	0.726	0.0654	0.627	0.0251	0.0300	0.0218		4321122
2,3,4,7,8-Penta CDF **	pg/g	0.956	0.0645	0.627	0.0251	0.300	0.287		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	4.94	0.0685	0.627	0.0251	0.100	0.494		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	2.20	0.0708	0.627	0.0251	0.100	0.220		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	1.55	0.0662	0.627	0.0251	0.100	0.155		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.101	0.0686	0.627	0.0251	0.100	0.0101		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	34.4	0.0690	0.627	0.0251	0.0100	0.344		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.12	0.0681	0.627	0.0251	0.0100	0.0212		4321122
Octa CDF **	pg/g	63.7	0.0637	1.25	0.0501	0.000300	0.0191		4321122
Total Tetra CDF **	pg/g	6.99	0.0686	0.125	0.0251			16	4321122
Total Penta CDF **	pg/g	19.3	0.0650	0.627	0.0251			11	4321122
Total Hexa CDF **	pg/g	58.5	0.0685	0.627	0.0251			10	4321122
Total Hepta CDF **	pg/g	91.8	0.0686	0.627	0.0251			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.863	0.068	0.63	0.57	0.100	0.0863		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						8.65		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	91							4321122
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU673							
Sampling Date		2015/12/02 12:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI022-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	75							4321122
C13-1234678 HeptaCDF **	%	72							4321122
C13-123478 HexaCDD *	%	93							4321122
C13-123478 HexaCDF **	%	88							4321122
C13-1234789 HeptaCDF **	%	74							4321122
C13-123678 HexaCDD *	%	96							4321122
C13-123678 HexaCDF **	%	88							4321122
C13-12378 PentaCDD *	%	91							4321122
C13-12378 PentaCDF **	%	72							4321122
C13-123789 HexaCDF **	%	99							4321122
C13-234678 HexaCDF **	%	86							4321122
C13-23478 PentaCDF **	%	90							4321122
C13-2378 TetraCDD *	%	79							4321122
C13-2378 TetraCDF **	%	76							4321122
C13-OCDD *	%	84							4321122
Confirmation C13-2378 TetraCDF **	%	95							4330862

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU674							
Sampling Date		2015/12/02 13:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOIO10-0-5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.359	0.0660	0.131	0.0262	1.00	0.359		4321122
1,2,3,7,8-Penta CDD *	pg/g	0.396	0.0687	0.656	0.0262	1.00	0.396		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	0.974	0.0692	0.656	0.0262	0.100	0.0974		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	4.38	0.0727	0.656	0.0262	0.100	0.438		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	2.69	0.0665	0.656	0.0262	0.100	0.269		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	142	0.0661	0.656	0.0262	0.0100	1.42		4321122
Octa CDD *	pg/g	1410	0.0679	1.31	0.0525	0.000300	0.423		4321122
Total Tetra CDD *	pg/g	1.48	0.0660	0.131	0.0262			4	4321122
Total Penta CDD *	pg/g	2.03	0.0687	0.656	0.0262			9	4321122
Total Hexa CDD *	pg/g	29.2	0.0696	0.656	0.0262			7	4321122
Total Hepta CDD *	pg/g	284	0.0661	0.656	0.0262			2	4321122
2,3,7,8-Tetra CDF **	pg/g	0.400	0.0706	0.131	0.0262	0.100	0.0400		4321122
1,2,3,7,8-Penta CDF **	pg/g	0.236	0.0681	0.656	0.0262	0.0300	0.00708		4321122
2,3,4,7,8-Penta CDF **	pg/g	0.371	0.0671	0.656	0.0262	0.300	0.111		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	1.90	0.0688	0.656	0.0262	0.100	0.190		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	0.694	0.0712	0.656	0.0262	0.100	0.0694		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	0.670	0.0665	0.656	0.0262	0.100	0.0670		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.0691	0.0690	0.656	0.0262	0.100	0.00691		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	18.1	0.0695	0.656	0.0262	0.0100	0.181		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	1.03	0.0686	0.656	0.0262	0.0100	0.0103		4321122
Octa CDF **	pg/g	42.1	0.0683	1.31	0.0525	0.000300	0.0126		4321122
Total Tetra CDF **	pg/g	3.14	0.0706	0.131	0.0262			11	4321122
Total Penta CDF **	pg/g	7.72	0.0676	0.656	0.0262			9	4321122
Total Hexa CDF **	pg/g	23.5	0.0688	0.656	0.0262			10	4321122
Total Hepta CDF **	pg/g	53.0	0.0690	0.656	0.0262			3	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.636	0.075	0.66	0.59	0.100	0.0636		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						4.12		

Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	94							4321122

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU674							
Sampling Date		2015/12/02 13:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI010-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	79							4321122
C13-1234678 HeptaCDF **	%	75							4321122
C13-123478 HexaCDD *	%	92							4321122
C13-123478 HexaCDF **	%	92							4321122
C13-1234789 HeptaCDF **	%	77							4321122
C13-123678 HexaCDD *	%	103							4321122
C13-123678 HexaCDF **	%	100							4321122
C13-12378 PentaCDD *	%	101							4321122
C13-12378 PentaCDF **	%	81							4321122
C13-123789 HexaCDF **	%	106							4321122
C13-234678 HexaCDF **	%	88							4321122
C13-23478 PentaCDF **	%	100							4321122
C13-2378 TetraCDD *	%	93							4321122
C13-2378 TetraCDF **	%	95							4321122
C13-OCDD *	%	85							4321122
Confirmation C13-2378 TetraCDF **	%	103							4330862

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**TEST SUMMARY**

**Maxxam ID:** BMU670  
**Sample ID:** ISM-AOI028B-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/12/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/24	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312642	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU671  
**Sample ID:** ISM-AOI034-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/12/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/24	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312642	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU672  
**Sample ID:** ISM-AOI028A-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/12/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/24	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312642	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU673  
**Sample ID:** ISM-AOI022-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/12/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/24	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312642	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU674  
**Sample ID:** ISM-AOI010-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/12/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/24	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312642	N/A	2015/12/14	Valentina Kaftani

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.3°C
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**Results relate only to the items tested.**

### QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4312642	NS3	RPD - Sample/Sample Dup	Moisture	2015/12/14	0		%	20
4321122	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/12/18		92	%	35 - 197
			C13-1234678 HeptaCDD	2015/12/18		74	%	23 - 140
			C13-1234678 HeptaCDF	2015/12/18		82	%	28 - 143
			C13-123478 HexaCDD	2015/12/18		85	%	32 - 141
			C13-123478 HexaCDF	2015/12/18		89	%	26 - 152
			C13-1234789 HeptaCDF	2015/12/18		79	%	26 - 138
			C13-123678 HexaCDD	2015/12/18		84	%	28 - 130
			C13-123678 HexaCDF	2015/12/18		89	%	26 - 123
			C13-12378 PentaCDD	2015/12/18		107	%	25 - 181
			C13-12378 PentaCDF	2015/12/18		92	%	24 - 185
			C13-123789 HexaCDF	2015/12/18		104	%	29 - 147
			C13-234678 HexaCDF	2015/12/18		91	%	28 - 136
			C13-23478 PentaCDF	2015/12/18		114	%	21 - 178
			C13-2378 TetraCDD	2015/12/18		89	%	25 - 164
			C13-2378 TetraCDF	2015/12/18		96	%	24 - 169
			C13-OCDD	2015/12/18		78	%	17 - 157
			2,3,7,8-Tetra CDD	2015/12/18		102	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/12/18		86	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/12/18		103	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/12/18		108	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/12/18		121	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/12/18		116	%	70 - 140
			Octa CDD	2015/12/18		105	%	78 - 144
			2,3,7,8-Tetra CDF	2015/12/18		99	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/12/18		96	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/12/18		85	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/12/18		105	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/12/18		100	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/12/18		114	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/12/18		88	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/12/18		113	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/12/18		103	%	78 - 138
			Octa CDF	2015/12/18		114	%	63 - 170
4321122	OBC	RPD	2,3,7,8-Tetra CDD	2015/12/18	7.5		%	25
			1,2,3,7,8-Penta CDD	2015/12/18	5.6		%	25
			1,2,3,4,7,8-Hexa CDD	2015/12/18	5.7		%	25
			1,2,3,6,7,8-Hexa CDD	2015/12/18	5.4		%	25
			1,2,3,7,8,9-Hexa CDD	2015/12/18	9.4		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/12/18	3.4		%	25
			Octa CDD	2015/12/18	3.7		%	25
			2,3,7,8-Tetra CDF	2015/12/18	4.9		%	25
			1,2,3,7,8-Penta CDF	2015/12/18	5.1		%	25
			2,3,4,7,8-Penta CDF	2015/12/18	4.6		%	25
			1,2,3,4,7,8-Hexa CDF	2015/12/18	4.7		%	25
			1,2,3,6,7,8-Hexa CDF	2015/12/18	9.5		%	25
			2,3,4,6,7,8-Hexa CDF	2015/12/18	2.6		%	25
			1,2,3,7,8,9-Hexa CDF	2015/12/18	3.4		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/12/18	8.5 (1)		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/12/18	4.7		%	25
			Octa CDF	2015/12/18	2.6		%	25
4321122	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/12/18		87	%	35 - 197
			C13-1234678 HeptaCDD	2015/12/18		77	%	23 - 140
			C13-1234678 HeptaCDF	2015/12/18		78	%	28 - 143

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-123478 HexaCDD	2015/12/18		76	%	32 - 141
			C13-123478 HexaCDF	2015/12/18		85	%	26 - 152
			C13-1234789 HeptaCDF	2015/12/18		68	%	26 - 138
			C13-123678 HexaCDD	2015/12/18		85	%	28 - 130
			C13-123678 HexaCDF	2015/12/18		89	%	26 - 123
			C13-12378 PentaCDD	2015/12/18		99	%	25 - 181
			C13-12378 PentaCDF	2015/12/18		83	%	24 - 185
			C13-123789 HexaCDF	2015/12/18		96	%	29 - 147
			C13-234678 HexaCDF	2015/12/18		85	%	28 - 136
			C13-23478 PentaCDF	2015/12/18		107	%	21 - 178
			C13-2378 TetraCDD	2015/12/18		91	%	25 - 164
			C13-2378 TetraCDF	2015/12/18		94	%	24 - 169
			C13-OCDD	2015/12/18		64	%	17 - 157
			2,3,7,8-Tetra CDD	2015/12/18	<0.103, EDL=0.103		pg/g	
			1,2,3,7,8-Penta CDD	2015/12/18	<0.0653, EDL=0.0653		pg/g	
			1,2,3,4,7,8-Hexa CDD	2015/12/18	<0.0720, EDL=0.0720		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/12/18	0.0940, EDL=0.0757		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/12/18	0.112, EDL=0.0692		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/12/18	0.156, EDL=0.0689		pg/g	
			Octa CDD	2015/12/18	0.427, EDL=0.123		pg/g	
			Total Tetra CDD	2015/12/18	<0.211, EDL=0.211 (2)		pg/g	
			Total Penta CDD	2015/12/18	<0.123, EDL=0.123 (2)		pg/g	
			Total Hexa CDD	2015/12/18	0.206, EDL=0.0724		pg/g	
			Total Hepta CDD	2015/12/18	0.256, EDL=0.0689		pg/g	
			2,3,7,8-Tetra CDF	2015/12/18	<0.0757, EDL=0.0757		pg/g	
			1,2,3,7,8-Penta CDF	2015/12/18	0.147, EDL=0.0948		pg/g	
			2,3,4,7,8-Penta CDF	2015/12/18	<0.0934, EDL=0.0934		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/12/18	0.166, EDL=0.0822		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/12/18	0.120, EDL=0.0849		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/12/18	0.112, EDL=0.0794		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/12/18	0.151, EDL=0.0823		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/12/18	0.239, EDL=0.0655		pg/g	



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8,9-Hepta CDF	2015/12/18	0.134, EDL=0.0648		pg/g	
			Octa CDF	2015/12/18	0.265, EDL=0.117		pg/g	
			Total Tetra CDF	2015/12/18	<0.0757, EDL=0.0757		pg/g	
			Total Penta CDF	2015/12/18	0.147, EDL=0.0941		pg/g	
			Total Hexa CDF	2015/12/18	0.549, EDL=0.0821		pg/g	
			Total Hepta CDF	2015/12/18	0.373, EDL=0.0652		pg/g	
4321122	OBC	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/12/23	NC		%	25
			1,2,3,7,8-Penta CDD	2015/12/23	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/12/23	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2015/12/23	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2015/12/23	NC		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/12/23	4.0		%	25
			Octa CDD	2015/12/23	5.4		%	25
			Total Tetra CDD	2015/12/23	NC		%	25
			Total Penta CDD	2015/12/23	NC		%	25
			Total Hexa CDD	2015/12/23	1.2		%	25
			Total Hepta CDD	2015/12/23	0.40		%	25
			2,3,7,8-Tetra CDF	2015/12/23	NC		%	25
			1,2,3,7,8-Penta CDF	2015/12/23	NC		%	25
			2,3,4,7,8-Penta CDF	2015/12/23	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/12/23	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2015/12/23	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/12/23	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/12/23	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/12/23	3.7		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/12/23	NC		%	25
			Octa CDF	2015/12/23	4.5		%	25
			Total Tetra CDF	2015/12/23	14		%	25
			Total Penta CDF	2015/12/23	5.1		%	25
			Total Hexa CDF	2015/12/23	4.9		%	25
			Total Hepta CDF	2015/12/23	6.4		%	25
4330862	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/12/24	<0.094, EDL=0.094		pg/g	
			Confirmation C13-2378 TetraCDF	2015/12/24		79	%	40 - 135

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Recovery meets EPA 1613B acceptance criteria

(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



\_\_\_\_\_  
Cristina Carriere, Scientific Services



\_\_\_\_\_  
Cathy Xu, Senior Analyst, HRMS Services, Senior Analyst, HRMS Services



\_\_\_\_\_  
Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5C0369  
Your C.O.C. #: NA

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/03/27**  
Report #: R3374684  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B546521**

**Received: 2015/03/17, 13:00**

Sample Matrix: Water  
# Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Water (1613B) (1)	1	2015/03/20	2015/03/25	BRL SOP-00410	EPA 1613B m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

U = Undetected at the limit of quantitation.

J = Estimated concentration between the EDL & RDL.

B = Blank Contamination.

Q = One or more quality control criteria failed.

E = Analyte concentration exceeds the maximum concentration level.

K = Estimated maximum possible concentration due to ion abundance ratio failure.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Mike Challis, CET, B.Sc, C.Chem, Customer Service Manager, US Air Toxics

Email: MChallis@maxxam.ca

Phone# (905)817-5790

=====  
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Maxxam Job #: B546521  
Report Date: 2015/03/27

Apex Laboratories  
Client Project #: A5C0369

**DIOXINS AND FURANS BY HRMS (WATER)**

Maxxam ID		ZX0868							
Sampling Date		2015/03/12 15:10							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	Units	RINSATE-SA	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/L	1.28 U	1.28	8.24	4.00	1.00	1.28		3959679
1,2,3,7,8-Penta CDD *	pg/L	1.11 U	1.11	41.2	4.00	1.00	1.11		3959679
1,2,3,4,7,8-Hexa CDD *	pg/L	1.17 U	1.17	41.2	4.00	0.100	0.117		3959679
1,2,3,6,7,8-Hexa CDD *	pg/L	1.19 U	1.19	41.2	4.00	0.100	0.119		3959679
1,2,3,7,8,9-Hexa CDD *	pg/L	1.10 U	1.10	41.2	4.00	0.100	0.110		3959679
1,2,3,4,6,7,8-Hepta CDD *	pg/L	1.13 U	1.13	41.2	4.00	0.0100	0.0113		3959679
Octa CDD *	pg/L	1.17 U (1)	1.17	82.4	8.00	0.000300	0.000351		3959679
Total Tetra CDD *	pg/L	4.20 U (1)	4.20	8.24	4.00				3959679
Total Penta CDD *	pg/L	2.25 U (1)	2.25	41.2	4.00				3959679
Total Hexa CDD *	pg/L	4.07 U (1)	4.07	41.2	4.00				3959679
Total Hepta CDD *	pg/L	1.13 U	1.13	41.2	4.00				3959679
2,3,7,8-Tetra CDF **	pg/L	1.17 U	1.17	8.24	4.00	0.100	0.117		3959679
1,2,3,7,8-Penta CDF **	pg/L	1.11 U	1.11	41.2	4.00	0.0300	0.0333		3959679
2,3,4,7,8-Penta CDF **	pg/L	1.09 U	1.09	41.2	4.00	0.300	0.327		3959679
1,2,3,4,7,8-Hexa CDF **	pg/L	1.06 U	1.06	41.2	4.00	0.100	0.106		3959679
1,2,3,6,7,8-Hexa CDF **	pg/L	1.07 U	1.07	41.2	4.00	0.100	0.107		3959679
2,3,4,6,7,8-Hexa CDF **	pg/L	0.999 U	0.999	41.2	4.00	0.100	0.0999		3959679
1,2,3,7,8,9-Hexa CDF **	pg/L	1.05 U	1.05	41.2	4.00	0.100	0.105		3959679
1,2,3,4,6,7,8-Hepta CDF **	pg/L	0.376 U	0.376	41.2	4.00	0.0100	0.00376		3959679
1,2,3,4,7,8,9-Hepta CDF **	pg/L	0.371 U	0.371	41.2	4.00	0.0100	0.00371		3959679
Octa CDF **	pg/L	0.598 U	0.598	82.4	8.00	0.000300	0.000179		3959679
Total Tetra CDF **	pg/L	1.17 U	1.17	8.24	4.00				3959679
Total Penta CDF **	pg/L	1.10 U	1.10	41.2	4.00				3959679
Total Hexa CDF **	pg/L	1.04 U	1.04	41.2	4.00				3959679
Total Hepta CDF **	pg/L	0.374 U	0.374	41.2	4.00				3959679
TOTAL TOXIC EQUIVALENCY	pg/L						3.65		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B546521  
Report Date: 2015/03/27

Apex Laboratories  
Client Project #: A5C0369

**DIOXINS AND FURANS BY HRMS (WATER)**

Maxxam ID		ZX0868							
Sampling Date		2015/03/12 15:10							
COC Number		NA	TOXIC EQUIVALENCY				# of		
	Units	RINSATE-SA	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	118							3959679
C13-1234678 HeptaCDD *	%	87							3959679
C13-1234678 HeptaCDF **	%	89							3959679
C13-123478 HexaCDD *	%	97							3959679
C13-123478 HexaCDF **	%	103							3959679
C13-1234789 HeptaCDF **	%	90							3959679
C13-123678 HexaCDD *	%	101							3959679
C13-123678 HexaCDF **	%	94							3959679
C13-12378 PentaCDD *	%	97							3959679
C13-12378 PentaCDF **	%	94							3959679
C13-123789 HexaCDF **	%	97							3959679
C13-234678 HexaCDF **	%	98							3959679
C13-23478 PentaCDF **	%	105							3959679
C13-2378 TetraCDD *	%	100							3959679
C13-2378 TetraCDF **	%	98							3959679
C13-OCDD *	%	88							3959679
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

Maxxam Job #: B546521  
Report Date: 2015/03/27

Apex Laboratories  
Client Project #: A5C0369

**TEST SUMMARY**

**Maxxam ID:** ZX0868  
**Sample ID:** RINSATE-SA  
**Matrix:** Water

**Collected:** 2015/03/12  
**Shipped:**  
**Received:** 2015/03/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Water (1613B)	HRMS/MS	3959679	2015/03/20	2015/03/25	Kay Shaw

Maxxam Job #: B546521  
Report Date: 2015/03/27

Apex Laboratories  
Client Project #: A5C0369

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.7°C
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**Results relate only to the items tested.**

Maxxam Job #: B546521  
Report Date: 2015/03/27

Apex Laboratories  
Client Project #: A5C0369

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits		
3959679	KKS	Spiked Blank	37CL4 2378 Tetra CDD	2015/03/25		111	%	35 - 197		
			C13-1234678 HeptaCDD	2015/03/25		85	%	23 - 140		
			C13-1234678 HeptaCDF	2015/03/25		91	%	28 - 143		
			C13-123478 HexaCDD	2015/03/25		93	%	32 - 141		
			C13-123478 HexaCDF	2015/03/25		98	%	26 - 152		
			C13-1234789 HeptaCDF	2015/03/25		86	%	28 - 143		
			C13-123678 HexaCDD	2015/03/25		101	%	28 - 130		
			C13-123678 HexaCDF	2015/03/25		94	%	26 - 123		
			C13-12378 PentaCDD	2015/03/25		84	%	25 - 181		
			C13-12378 PentaCDF	2015/03/25		86	%	24 - 185		
			C13-123789 HexaCDF	2015/03/25		95	%	28 - 136		
			C13-234678 HexaCDF	2015/03/25		99	%	29 - 147		
			C13-23478 PentaCDF	2015/03/25		94	%	21 - 178		
			C13-2378 TetraCDD	2015/03/25		89	%	24 - 164		
			C13-2378 TetraCDF	2015/03/25		89	%	24 - 169		
			C13-OCDD	2015/03/25		84	%	17 - 157		
			2,3,7,8-Tetra CDD	2015/03/25		98	%	67 - 158		
			1,2,3,7,8-Penta CDD	2015/03/25		97	%	25 - 181		
			1,2,3,4,7,8-Hexa CDD	2015/03/25		106	%	70 - 164		
			1,2,3,6,7,8-Hexa CDD	2015/03/25		101	%	76 - 134		
			1,2,3,7,8,9-Hexa CDD	2015/03/25		101	%	64 - 162		
			1,2,3,4,6,7,8-Hepta CDD	2015/03/25		100	%	70 - 140		
			Octa CDD	2015/03/25		98	%	78 - 144		
			2,3,7,8-Tetra CDF	2015/03/25		99	%	75 - 158		
			1,2,3,7,8-Penta CDF	2015/03/25		100	%	80 - 134		
			2,3,4,7,8-Penta CDF	2015/03/25		88	%	68 - 160		
			1,2,3,4,7,8-Hexa CDF	2015/03/25		105	%	72 - 134		
			1,2,3,6,7,8-Hexa CDF	2015/03/25		101	%	84 - 130		
			2,3,4,6,7,8-Hexa CDF	2015/03/25		99	%	70 - 156		
			1,2,3,7,8,9-Hexa CDF	2015/03/25		99	%	78 - 130		
			1,2,3,4,6,7,8-Hepta CDF	2015/03/25		105	%	82 - 122		
			1,2,3,4,7,8,9-Hepta CDF	2015/03/25		101	%	78 - 138		
			Octa CDF	2015/03/25		101	%	63 - 170		
3959679	KKS	Method Blank	37CL4 2378 Tetra CDD	2015/03/25		111	%	35 - 197		
			C13-1234678 HeptaCDD	2015/03/25		77	%	23 - 140		
			C13-1234678 HeptaCDF	2015/03/25		80	%	28 - 143		
			C13-123478 HexaCDD	2015/03/25		85	%	32 - 141		
			C13-123478 HexaCDF	2015/03/25		89	%	26 - 152		
			C13-1234789 HeptaCDF	2015/03/25		82	%	28 - 143		
			C13-123678 HexaCDD	2015/03/25		85	%	28 - 130		
			C13-123678 HexaCDF	2015/03/25		85	%	26 - 123		
			C13-12378 PentaCDD	2015/03/25		92	%	25 - 181		
			C13-12378 PentaCDF	2015/03/25		92	%	24 - 185		
			C13-123789 HexaCDF	2015/03/25		87	%	28 - 136		
			C13-234678 HexaCDF	2015/03/25		86	%	29 - 147		
			C13-23478 PentaCDF	2015/03/25		102	%	21 - 178		
			C13-2378 TetraCDD	2015/03/25		94	%	24 - 164		
			C13-2378 TetraCDF	2015/03/25		96	%	24 - 169		
			C13-OCDD	2015/03/25		80	%	17 - 157		
			2,3,7,8-Tetra CDD	2015/03/25			1.18 U, EDL=1.18		pg/L	
			1,2,3,7,8-Penta CDD	2015/03/25			1.19 U, EDL=1.19		pg/L	



Maxxam Job #: B546521  
Report Date: 2015/03/27

Apex Laboratories  
Client Project #: A5C0369

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/03/25	1.14 U, EDL=1.14		pg/L	
			1,2,3,6,7,8-Hexa CDD	2015/03/25	1.16 U, EDL=1.16		pg/L	
			1,2,3,7,8,9-Hexa CDD	2015/03/25	1.08 U, EDL=1.08		pg/L	
			1,2,3,4,6,7,8-Hepta CDD	2015/03/25	1.12 U, EDL=1.12		pg/L	
			Octa CDD	2015/03/25	1.56 J, EDL=1.17		pg/L	
			Total Tetra CDD	2015/03/25	4.18 U, EDL=4.18 (1)		pg/L	
			Total Penta CDD	2015/03/25	1.95 U, EDL=1.95 (1)		pg/L	
			Total Hexa CDD	2015/03/25	3.79 U, EDL=3.79 (1)		pg/L	
			Total Hepta CDD	2015/03/25	1.12 U, EDL=1.12		pg/L	
			2,3,7,8-Tetra CDF	2015/03/25	1.14 U, EDL=1.14		pg/L	
			1,2,3,7,8-Penta CDF	2015/03/25	1.27 U, EDL=1.27		pg/L	
			2,3,4,7,8-Penta CDF	2015/03/25	1.24 U, EDL=1.24		pg/L	
			1,2,3,4,7,8-Hexa CDF	2015/03/25	1.39 U, EDL=1.39		pg/L	
			1,2,3,6,7,8-Hexa CDF	2015/03/25	1.40 U, EDL=1.40		pg/L	
			2,3,4,6,7,8-Hexa CDF	2015/03/25	1.31 U, EDL=1.31		pg/L	
			1,2,3,7,8,9-Hexa CDF	2015/03/25	1.38 U, EDL=1.38		pg/L	
			1,2,3,4,6,7,8-Hepta CDF	2015/03/25	0.857 U, EDL=0.857		pg/L	
			1,2,3,4,7,8,9-Hepta CDF	2015/03/25	0.844 U, EDL=0.844		pg/L	
			Octa CDF	2015/03/25	0.978 U, EDL=0.978		pg/L	
			Total Tetra CDF	2015/03/25	1.14 U, EDL=1.14		pg/L	
			Total Penta CDF	2015/03/25	1.25 U, EDL=1.25		pg/L	
			Total Hexa CDF	2015/03/25	1.37 U, EDL=1.37		pg/L	

Maxxam Job #: B546521  
Report Date: 2015/03/27

Apex Laboratories  
Client Project #: A5C0369

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			Total Hepta CDF	2015/03/25	0.850 U, EDL=0.850		pg/L	
<p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p> <p>(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.</p>								

Maxxam Job #: B546521  
Report Date: 2015/03/27

Apex Laboratories  
Client Project #: A5C0369

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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Cathy Xu

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Your Project #: A5D0549  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/09/29**  
Report #: R3701914  
Version: 2 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B576705**

**Received: 2015/04/28, 13:25**

Sample Matrix: Soil  
# Samples Received: 15

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	5	2015/05/01	2015/05/05	BRL SOP-00410	EPA 1613B m
Dioxins/Furans in Soil (1613B) (1)	10	2015/05/01	2015/05/06	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	10	N/A	2015/05/06	BRL SOP-00406	EPA M8290A / M1613
2378TCDF Confirmation (M8290A/M1613)	4	N/A	2015/09/22	BRL SOP-00406	EPA M8290A / M1613
Moisture	15	N/A	2015/04/30	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT

Email: MDiGrazia@maxxam.ca

Phone# (905) 817-5700

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		AEK241	AEK242	AEK243	AEK244	AEK245			
Sampling Date		2015/04/16 13:45	2015/04/16 16:00	2015/04/16 14:30	2015/04/16 17:30	2015/04/16 16:45			
COC Number		na	na	na	na	na			
	UNITS	ISM-AOI007-0. 5-AFTER ISM	ISM-AOI011-0. 5-AFTER ISM	ISM-AOI031-0. 5-AFTER ISM	ISM-AOI018-0. 5-B-C-AFTER ISM	ISM-AOI018-0. 5-B-A-AFTER ISM	RDL	MDL	QC Batch
Moisture	%	3.5	<1.0	2.8	2.7	<1.0	1.0	0.50	4004368
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									

Maxxam ID		AEK246	AEK247	AEK248	AEK249	AEK250			
Sampling Date		2015/04/16 17:00	2015/04/16 13:00	2015/04/16 11:30	2015/04/16 18:00	2015/04/16 10:00			
COC Number		na	na	na	na	na			
	UNITS	ISM-AOI018-0. 5-B-B-AFTER ISM	ISM-AOI006-0. 5-AFTER ISM	ISM-AOI013-0. 5-F-AFTER ISM	ISM-AOI018-0. 5-F-AFTER ISM	ISM-AOI005-0. 5-AFTER ISM	RDL	MDL	QC Batch
Moisture	%	1.7	<1.0	2.3	<1.0	<1.0	1.0	0.50	4004368
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									

Maxxam ID		AEK251	AEK252	AEK253	AEK254	AEK255			
Sampling Date		2015/04/16 12:00	2015/04/16 17:15	2015/04/16 13:00	2015/04/16 10:30	2015/04/16 10:30			
COC Number		na	na	na	na	na			
	UNITS	ISM-AOI013-0. 5-B-AFTER ISM	SBS-AOI018-1.0	SBS-AOI006-1.0	SBS-AOI005-1.0-DUP	SBS-AOI005-1.0	RDL	MDL	QC Batch
Moisture	%	<1.0	19	20	21	20	1.0	0.50	4004368
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK241							
Sampling Date		2015/04/16 13:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI007-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.317	0.154	0.200	0.0400	1.00	0.317		4009518
1,2,3,7,8-Penta CDD *	pg/g	4.25	0.151	1.00	0.0400	1.00	4.25		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	11.7	0.145	1.00	0.0400	0.100	1.17		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	81.8	0.160	1.00	0.0400	0.100	8.18		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	35.9	0.151	1.00	0.0400	0.100	3.59		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1650	0.150	1.00	0.0400	0.0100	16.5		4009518
Octa CDD *	pg/g	11800 (1)	1.04	20.0	0.0800	0.000300	3.54		4009518
Total Tetra CDD *	pg/g	2.33	0.154	0.200	0.0400			5	4009518
Total Penta CDD *	pg/g	16.8	0.151	1.00	0.0400			11	4009518
Total Hexa CDD *	pg/g	311	0.154	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	2770	0.150	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	2.50	0.134	0.200	0.0400	0.100	0.250		4009518
1,2,3,7,8-Penta CDF **	pg/g	6.39	0.229	1.00	0.0400	0.0300	0.192		4009518
2,3,4,7,8-Penta CDF **	pg/g	10.2	0.223	1.00	0.0400	0.300	3.06		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	58.8	0.134	1.00	0.0400	0.100	5.88		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	22.3	0.139	1.00	0.0400	0.100	2.23		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	12.0	0.128	1.00	0.0400	0.100	1.20		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	1.12	0.144	1.00	0.0400	0.100	0.112		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	246	0.0996	1.00	0.0400	0.0100	2.46		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	15.2	0.104	1.00	0.0400	0.0100	0.152		4009518
Octa CDF **	pg/g	207	0.135	2.00	0.0800	0.000300	0.0621		4009518
Total Tetra CDF **	pg/g	15.5	0.134	0.200	0.0400			13	4009518
Total Penta CDF **	pg/g	142	0.226	1.00	0.0400			9	4009518
Total Hexa CDF **	pg/g	601	0.136	1.00	0.0400			11	4009518
Total Hepta CDF **	pg/g	657	0.102	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.98	0.10	1.0	0.90	0.100	0.198		4014175
TOTAL TOXIC EQUIVALENCY	pg/g						53.1		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) 10X Dilution

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AEK241							
<b>Sampling Date</b>		2015/04/16 13:45							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ISM-AOI007-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	99							4009518
C13-1234678 HeptaCDD *	%	94							4009518
C13-1234678 HeptaCDF **	%	87							4009518
C13-123478 HexaCDD *	%	82							4009518
C13-123478 HexaCDF **	%	86							4009518
C13-1234789 HeptaCDF **	%	90							4009518
C13-123678 HexaCDD *	%	81							4009518
C13-123678 HexaCDF **	%	81							4009518
C13-12378 PentaCDD *	%	94							4009518
C13-12378 PentaCDF **	%	92							4009518
C13-123789 HexaCDF **	%	93							4009518
C13-234678 HexaCDF **	%	83							4009518
C13-23478 PentaCDF **	%	103							4009518
C13-2378 TetraCDD *	%	79							4009518
C13-2378 TetraCDF **	%	84							4009518
C13-OCDD *	%	108							4009518
Confirmation C13-2378 TetraCDF **	%	85							4014175

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK242							
Sampling Date		2015/04/16 16:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI011-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.142	0.119	0.200	0.0400	1.00	0.142		4009518
1,2,3,7,8-Penta CDD *	pg/g	1.45	0.146	1.00	0.0400	1.00	1.45		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	3.17	0.136	1.00	0.0400	0.100	0.317		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	15.7	0.150	1.00	0.0400	0.100	1.57		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	9.88	0.142	1.00	0.0400	0.100	0.988		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	341	0.142	1.00	0.0400	0.0100	3.41		4009518
Octa CDD *	pg/g	1810	0.170	2.00	0.0800	0.000300	0.543		4009518
Total Tetra CDD *	pg/g	1.37	0.119	0.200	0.0400			4	4009518
Total Penta CDD *	pg/g	7.37	0.146	1.00	0.0400			9	4009518
Total Hexa CDD *	pg/g	76.8	0.144	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	549	0.142	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	0.991	0.154	0.200	0.0400	0.100	0.0991		4009518
1,2,3,7,8-Penta CDF **	pg/g	0.830	0.125	1.00	0.0400	0.0300	0.0249		4009518
2,3,4,7,8-Penta CDF **	pg/g	1.04	0.122	1.00	0.0400	0.300	0.312		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	4.95	0.127	1.00	0.0400	0.100	0.495		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	3.21	0.133	1.00	0.0400	0.100	0.321		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	2.24	0.122	1.00	0.0400	0.100	0.224		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.190 (1)	0.190	1.00	0.0400	0.100	0.0190		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	71.4	0.118	1.00	0.0400	0.0100	0.714		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	4.05	0.122	1.00	0.0400	0.0100	0.0405		4009518
Octa CDF **	pg/g	141	0.131	2.00	0.0800	0.000300	0.0423		4009518
Total Tetra CDF **	pg/g	5.74	0.154	0.200	0.0400			11	4009518
Total Penta CDF **	pg/g	14.7	0.123	1.00	0.0400			8	4009518
Total Hexa CDF **	pg/g	90.1	0.130	1.00	0.0400			9	4009518
Total Hepta CDF **	pg/g	207	0.120	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.50	0.10	1.0	0.90	0.100	0.0500		4014175
TOTAL TOXIC EQUIVALENCY	pg/g						10.7		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.



**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AEK242							
<b>Sampling Date</b>		2015/04/16 16:00							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ISM-AOI011-0. 5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	100							4009518
C13-1234678 HeptaCDD *	%	106							4009518
C13-1234678 HeptaCDF **	%	95							4009518
C13-123478 HexaCDD *	%	91							4009518
C13-123478 HexaCDF **	%	96							4009518
C13-1234789 HeptaCDF **	%	104							4009518
C13-123678 HexaCDD *	%	90							4009518
C13-123678 HexaCDF **	%	90							4009518
C13-12378 PentaCDD *	%	103							4009518
C13-12378 PentaCDF **	%	98							4009518
C13-123789 HexaCDF **	%	103							4009518
C13-234678 HexaCDF **	%	94							4009518
C13-23478 PentaCDF **	%	110							4009518
C13-2378 TetraCDD *	%	86							4009518
C13-2378 TetraCDF **	%	92							4009518
C13-OCDD *	%	113							4009518
Confirmation C13-2378 TetraCDF **	%	95							4014175

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK243							
Sampling Date		2015/04/16 14:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI031-0-5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.248	0.103	0.200	0.0400	1.00	0.248		4009518
1,2,3,7,8-Penta CDD *	pg/g	1.95	0.103	1.00	0.0400	1.00	1.95		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	4.15	0.0958	1.00	0.0400	0.100	0.415		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	18.8	0.106	1.00	0.0400	0.100	1.88		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	11.8 (1)	0.0996	1.00	0.0400	0.100	1.18		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	397	0.101	1.00	0.0400	0.0100	3.97		4009518
Octa CDD *	pg/g	2170	0.104	2.00	0.0800	0.000300	0.651		4009518
Total Tetra CDD *	pg/g	4.03	0.103	0.200	0.0400			7	4009518
Total Penta CDD *	pg/g	10.4	0.103	1.00	0.0400			11	4009518
Total Hexa CDD *	pg/g	96.1	0.102	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	661	0.101	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	1.74	0.109	0.200	0.0400	0.100	0.174		4009518
1,2,3,7,8-Penta CDF **	pg/g	0.983	0.104	1.00	0.0400	0.0300	0.0295		4009518
2,3,4,7,8-Penta CDF **	pg/g	1.39	0.101	1.00	0.0400	0.300	0.417		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	6.15 (1)	0.105	1.00	0.0400	0.100	0.615		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	3.24	0.109	1.00	0.0400	0.100	0.324		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	2.23	0.100	1.00	0.0400	0.100	0.223		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.168 (2)	0.168	1.00	0.0400	0.100	0.0168		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	65.9	0.101	1.00	0.0400	0.0100	0.659		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.40	0.105	1.00	0.0400	0.0100	0.0340		4009518
Octa CDF **	pg/g	176	0.108	2.00	0.0800	0.000300	0.0528		4009518
Total Tetra CDF **	pg/g	11.9	0.109	0.200	0.0400			13	4009518
Total Penta CDF **	pg/g	19.3	0.103	1.00	0.0400			9	4009518
Total Hexa CDF **	pg/g	83.5	0.107	1.00	0.0400			10	4009518
Total Hepta CDF **	pg/g	196	0.103	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.27	0.12	1.0	0.90	0.100	0.127		4203296
TOTAL TOXIC EQUIVALENCY	pg/g						12.8		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / Merged Peak  
(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AEK243							
<b>Sampling Date</b>		2015/04/16 14:30							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ISM-AOI031-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	97							4009518
C13-1234678 HeptaCDD *	%	97							4009518
C13-1234678 HeptaCDF **	%	95							4009518
C13-123478 HexaCDD *	%	89							4009518
C13-123478 HexaCDF **	%	94							4009518
C13-1234789 HeptaCDF **	%	94							4009518
C13-123678 HexaCDD *	%	90							4009518
C13-123678 HexaCDF **	%	91							4009518
C13-12378 PentaCDD *	%	101							4009518
C13-12378 PentaCDF **	%	96							4009518
C13-123789 HexaCDF **	%	99							4009518
C13-234678 HexaCDF **	%	91							4009518
C13-23478 PentaCDF **	%	109							4009518
C13-2378 TetraCDD *	%	78							4009518
C13-2378 TetraCDF **	%	85							4009518
C13-OCDD *	%	112							4009518
Confirmation C13-2378 TetraCDF **	%	81							4203296

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK244							
Sampling Date		2015/04/16 17:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOIO18-0. 5-B-C-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.255	0.101	0.200	0.0400	1.00	0.255		4009518
1,2,3,7,8-Penta CDD *	pg/g	2.05	0.108	1.00	0.0400	1.00	2.05		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	4.32	0.100	1.00	0.0400	0.100	0.432		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	20.1	0.110	1.00	0.0400	0.100	2.01		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	13.0 (1)	0.104	1.00	0.0400	0.100	1.30		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	390	0.101	1.00	0.0400	0.0100	3.90		4009518
Octa CDD *	pg/g	2070	0.102	2.00	0.0800	0.000300	0.621		4009518
Total Tetra CDD *	pg/g	2.76	0.101	0.200	0.0400			7	4009518
Total Penta CDD *	pg/g	12.5	0.108	1.00	0.0400			10	4009518
Total Hexa CDD *	pg/g	109	0.106	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	648	0.101	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	0.969	0.108	0.200	0.0400	0.100	0.0969		4009518
1,2,3,7,8-Penta CDF **	pg/g	1.04	0.102	1.00	0.0400	0.0300	0.0312		4009518
2,3,4,7,8-Penta CDF **	pg/g	1.31	0.0988	1.00	0.0400	0.300	0.393		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	6.73 (1)	0.103	1.00	0.0400	0.100	0.673		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	3.47	0.107	1.00	0.0400	0.100	0.347		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	2.41	0.0985	1.00	0.0400	0.100	0.241		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	0.207	0.111	1.00	0.0400	0.100	0.0207		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	66.4	0.105	1.00	0.0400	0.0100	0.664		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.96	0.109	1.00	0.0400	0.0100	0.0296		4009518
Octa CDF **	pg/g	84.6	0.108	2.00	0.0800	0.000300	0.0254		4009518
Total Tetra CDF **	pg/g	6.94	0.108	0.200	0.0400			10	4009518
Total Penta CDF **	pg/g	16.6	0.100	1.00	0.0400			8	4009518
Total Hexa CDF **	pg/g	89.5	0.105	1.00	0.0400			11	4009518
Total Hepta CDF **	pg/g	160	0.107	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.66	0.16	1.0	0.90	0.100	0.0660		4203296
TOTAL TOXIC EQUIVALENCY	pg/g						13.1		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / Merged Peak

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AEK244							
<b>Sampling Date</b>		2015/04/16 17:30							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ISM-AOI018-0. 5-B-C-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	96							4009518
C13-1234678 HeptaCDD *	%	98							4009518
C13-1234678 HeptaCDF **	%	87							4009518
C13-123478 HexaCDD *	%	82							4009518
C13-123478 HexaCDF **	%	87							4009518
C13-1234789 HeptaCDF **	%	96							4009518
C13-123678 HexaCDD *	%	84							4009518
C13-123678 HexaCDF **	%	85							4009518
C13-12378 PentaCDD *	%	98							4009518
C13-12378 PentaCDF **	%	94							4009518
C13-123789 HexaCDF **	%	94							4009518
C13-234678 HexaCDF **	%	85							4009518
C13-23478 PentaCDF **	%	106							4009518
C13-2378 TetraCDD *	%	79							4009518
C13-2378 TetraCDF **	%	88							4009518
C13-OCDD *	%	107							4009518
Confirmation C13-2378 TetraCDF **	%	79							4203296

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK245							
Sampling Date		2015/04/16 16:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI018-0. 5-B-A-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.324	0.224	0.200	0.0400	1.00	0.324		4009518
1,2,3,7,8-Penta CDD *	pg/g	2.14	0.147	1.00	0.0400	1.00	2.14		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	4.40	0.127	1.00	0.0400	0.100	0.440		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	20.2	0.140	1.00	0.0400	0.100	2.02		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	14.1	0.132	1.00	0.0400	0.100	1.41		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	379	0.120	1.00	0.0400	0.0100	3.79		4009518
Octa CDD *	pg/g	1990	0.121	2.00	0.0800	0.000300	0.597		4009518
Total Tetra CDD *	pg/g	4.54	0.224	0.200	0.0400			4	4009518
Total Penta CDD *	pg/g	14.6	0.147	1.00	0.0400			9	4009518
Total Hexa CDD *	pg/g	112	0.135	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	636	0.120	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	1.78	0.144	0.200	0.0400	0.100	0.178		4009518
1,2,3,7,8-Penta CDF **	pg/g	1.28	0.129	1.00	0.0400	0.0300	0.0384		4009518
2,3,4,7,8-Penta CDF **	pg/g	1.72	0.126	1.00	0.0400	0.300	0.516		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	8.65	0.113	1.00	0.0400	0.100	0.865		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	4.57	0.118	1.00	0.0400	0.100	0.457		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	3.17	0.108	1.00	0.0400	0.100	0.317		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	0.250	0.123	1.00	0.0400	0.100	0.0250		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	96.1	0.109	1.00	0.0400	0.0100	0.961		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.62	0.113	1.00	0.0400	0.0100	0.0362		4009518
Octa CDF **	pg/g	87.6	0.140	2.00	0.0800	0.000300	0.0263		4009518
Total Tetra CDF **	pg/g	11.7	0.144	0.200	0.0400			13	4009518
Total Penta CDF **	pg/g	24.5	0.128	1.00	0.0400			9	4009518
Total Hexa CDF **	pg/g	110	0.115	1.00	0.0400			11	4009518
Total Hepta CDF **	pg/g	213	0.111	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.84 (1)	0.84	1.0	0.90	0.100	0.0840		4014175
TOTAL TOXIC EQUIVALENCY	pg/g						14.0		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AEK245							
<b>Sampling Date</b>		2015/04/16 16:45							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ISM-AOI018-0. 5-B-A-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	81							4009518
C13-1234678 HeptaCDD *	%	92							4009518
C13-1234678 HeptaCDF **	%	81							4009518
C13-123478 HexaCDD *	%	73							4009518
C13-123478 HexaCDF **	%	78							4009518
C13-1234789 HeptaCDF **	%	86							4009518
C13-123678 HexaCDD *	%	75							4009518
C13-123678 HexaCDF **	%	75							4009518
C13-12378 PentaCDD *	%	88							4009518
C13-12378 PentaCDF **	%	83							4009518
C13-123789 HexaCDF **	%	87							4009518
C13-234678 HexaCDF **	%	76							4009518
C13-23478 PentaCDF **	%	95							4009518
C13-2378 TetraCDD *	%	70							4009518
C13-2378 TetraCDF **	%	76							4009518
C13-OCDD *	%	100							4009518
Confirmation C13-2378 TetraCDF **	%	77							4014175

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK246							
Sampling Date		2015/04/16 17:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOIO18-0. 5-B-B-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.326	0.102	0.200	0.0400	1.00	0.326		4009518
1,2,3,7,8-Penta CDD *	pg/g	2.32	0.102	1.00	0.0400	1.00	2.32		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	4.62	0.103	1.00	0.0400	0.100	0.462		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	21.4	0.113	1.00	0.0400	0.100	2.14		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	14.8 (1)	0.107	1.00	0.0400	0.100	1.48		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	444	0.108	1.00	0.0400	0.0100	4.44		4009518
Octa CDD *	pg/g	2480	0.108	2.00	0.0800	0.000300	0.744		4009518
Total Tetra CDD *	pg/g	3.97	0.102	0.200	0.0400			7	4009518
Total Penta CDD *	pg/g	13.8	0.102	1.00	0.0400			8	4009518
Total Hexa CDD *	pg/g	119	0.109	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	753	0.108	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	2.28	0.102	0.200	0.0400	0.100	0.228		4009518
1,2,3,7,8-Penta CDF **	pg/g	1.40	0.103	1.00	0.0400	0.0300	0.0420		4009518
2,3,4,7,8-Penta CDF **	pg/g	1.73	0.0996	1.00	0.0400	0.300	0.519		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	7.66 (1)	0.106	1.00	0.0400	0.100	0.766		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	3.98	0.110	1.00	0.0400	0.100	0.398		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	2.78	0.101	1.00	0.0400	0.100	0.278		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.229 (2)	0.229	1.00	0.0400	0.100	0.0229		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	73.2	0.103	1.00	0.0400	0.0100	0.732		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.39	0.107	1.00	0.0400	0.0100	0.0339		4009518
Octa CDF **	pg/g	107	0.104	2.00	0.0800	0.000300	0.0321		4009518
Total Tetra CDF **	pg/g	12.6	0.102	0.200	0.0400			12	4009518
Total Penta CDF **	pg/g	19.4	0.101	1.00	0.0400			11	4009518
Total Hexa CDF **	pg/g	96.4	0.108	1.00	0.0400			10	4009518
Total Hepta CDF **	pg/g	186	0.105	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<1.0 (3)	1.0	1.0	0.90	0.100	0.100		4203296

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / Merged Peak  
(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.  
(3) .  
RT>2 seconds - PCDD/DF analysis-Peak maxima of monitored ions exceeds 2 seconds



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK246							
Sampling Date		2015/04/16 17:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI018-0. 5-B-B-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
TOTAL TOXIC EQUIVALENCY	pg/g						14.8		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	96							4009518
C13-1234678 HeptaCDD *	%	104							4009518
C13-1234678 HeptaCDF **	%	94							4009518
C13-123478 HexaCDD *	%	88							4009518
C13-123478 HexaCDF **	%	95							4009518
C13-1234789 HeptaCDF **	%	104							4009518
C13-123678 HexaCDD *	%	90							4009518
C13-123678 HexaCDF **	%	91							4009518
C13-12378 PentaCDD *	%	102							4009518
C13-12378 PentaCDF **	%	100							4009518
C13-123789 HexaCDF **	%	101							4009518
C13-234678 HexaCDF **	%	90							4009518
C13-23478 PentaCDF **	%	106							4009518
C13-2378 TetraCDD *	%	80							4009518
C13-2378 TetraCDF **	%	88							4009518
C13-OCDD *	%	115							4009518
Confirmation C13-2378 TetraCDF **	%	86							4203296
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK247							
Sampling Date		2015/04/16 13:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI006-0-5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	10.8	0.104	0.200	0.0400	1.00	10.8		4009518
1,2,3,7,8-Penta CDD *	pg/g	4.00	0.104	1.00	0.0400	1.00	4.00		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	10.0	0.0986	1.00	0.0400	0.100	1.00		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	46.9	0.109	1.00	0.0400	0.100	4.69		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	29.1	0.102	1.00	0.0400	0.100	2.91		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	930	0.110	1.00	0.0400	0.0100	9.30		4009518
Octa CDD *	pg/g	4960 (1)	0.521	2.00	0.0800	0.000300	1.49		4009518
Total Tetra CDD *	pg/g	13.5	0.104	0.200	0.0400			5	4009518
Total Penta CDD *	pg/g	16.8	0.104	1.00	0.0400			10	4009518
Total Hexa CDD *	pg/g	214	0.105	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	1520	0.110	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	1.63	0.105	0.200	0.0400	0.100	0.163		4009518
1,2,3,7,8-Penta CDF **	pg/g	2.36	0.107	1.00	0.0400	0.0300	0.0708		4009518
2,3,4,7,8-Penta CDF **	pg/g	3.14	0.104	1.00	0.0400	0.300	0.942		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	18.1	0.106	1.00	0.0400	0.100	1.81		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	8.23	0.111	1.00	0.0400	0.100	0.823		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	5.11	0.102	1.00	0.0400	0.100	0.511		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	0.487	0.115	1.00	0.0400	0.100	0.0487		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	123	0.105	1.00	0.0400	0.0100	1.23		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.94	0.109	1.00	0.0400	0.0100	0.0694		4009518
Octa CDF **	pg/g	148	0.104	2.00	0.0800	0.000300	0.0444		4009518
Total Tetra CDF **	pg/g	9.18	0.105	0.200	0.0400			12	4009518
Total Penta CDF **	pg/g	35.6	0.106	1.00	0.0400			9	4009518
Total Hexa CDF **	pg/g	218	0.108	1.00	0.0400			11	4009518
Total Hepta CDF **	pg/g	326	0.107	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.90 (2)	0.90	1.0	0.90	0.100	0.0900		4203296

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) Results are from 5xdilution  
(2) Result are from 5X dilution  
RT>2 seconds - PCDD/DF analysis-Peak maxima of monitored ions exceeds 2 seconds  
EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK247							
Sampling Date		2015/04/16 13:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI006-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
TOTAL TOXIC EQUIVALENCY	pg/g						39.8		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	96							4009518
C13-1234678 HeptaCDD *	%	108							4009518
C13-1234678 HeptaCDF **	%	96							4009518
C13-123478 HexaCDD *	%	90							4009518
C13-123478 HexaCDF **	%	95							4009518
C13-1234789 HeptaCDF **	%	105							4009518
C13-123678 HexaCDD *	%	91							4009518
C13-123678 HexaCDF **	%	91							4009518
C13-12378 PentaCDD *	%	101							4009518
C13-12378 PentaCDF **	%	94							4009518
C13-123789 HexaCDF **	%	102							4009518
C13-234678 HexaCDF **	%	92							4009518
C13-23478 PentaCDF **	%	110							4009518
C13-2378 TetraCDD *	%	79							4009518
C13-2378 TetraCDF **	%	87							4009518
C13-OCDD *	%	111							4009518
Confirmation C13-2378 TetraCDF **	%	148 (1)							4203296
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK248							
Sampling Date		2015/04/16 11:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI013-0. 5-F-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	3.79	0.210	0.200	0.0400	1.00	3.79		4009518
1,2,3,7,8-Penta CDD *	pg/g	8.81	0.136	1.00	0.0400	1.00	8.81		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	28.2	0.135	1.00	0.0400	0.100	2.82		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	159	0.148	1.00	0.0400	0.100	15.9		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	66.4	0.140	1.00	0.0400	0.100	6.64		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	3560 (1)	1.13	10.0	0.0400	0.0100	35.6		4009518
Octa CDD *	pg/g	20400 (1)	1.12	20.0	0.0800	0.000300	6.12		4009518
Total Tetra CDD *	pg/g	8.76	0.210	0.200	0.0400			8	4009518
Total Penta CDD *	pg/g	38.4	0.136	1.00	0.0400			12	4009518
Total Hexa CDD *	pg/g	641	0.143	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	6120	1.13	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	3.77	0.125	0.200	0.0400	0.100	0.377		4009518
1,2,3,7,8-Penta CDF **	pg/g	11.0	0.165	1.00	0.0400	0.0300	0.330		4009518
2,3,4,7,8-Penta CDF **	pg/g	15.7	0.160	1.00	0.0400	0.300	4.71		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	91.6	0.130	1.00	0.0400	0.100	9.16		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	37.5	0.135	1.00	0.0400	0.100	3.75		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	23.4	0.124	1.00	0.0400	0.100	2.34		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	1.80	0.141	1.00	0.0400	0.100	0.180		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	500	0.128	1.00	0.0400	0.0100	5.00		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	29.8	0.133	1.00	0.0400	0.0100	0.298		4009518
Octa CDF **	pg/g	557	0.116	2.00	0.0800	0.000300	0.167		4009518
Total Tetra CDF **	pg/g	24.6	0.125	0.200	0.0400			11	4009518
Total Penta CDF **	pg/g	208	0.162	1.00	0.0400			11	4009518
Total Hexa CDF **	pg/g	1070	0.132	1.00	0.0400			11	4009518
Total Hepta CDF **	pg/g	1350	0.130	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	3.08	0.12	1.0	0.90	0.100	0.308		4014175
TOTAL TOXIC EQUIVALENCY	pg/g						106		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) 10X Dilution

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AEK248							
<b>Sampling Date</b>		2015/04/16 11:30							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ISM-AOI013-0. 5-F-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	83							4009518
C13-1234678 HeptaCDD *	%	89							4009518
C13-1234678 HeptaCDF **	%	83							4009518
C13-123478 HexaCDD *	%	94							4009518
C13-123478 HexaCDF **	%	91							4009518
C13-1234789 HeptaCDF **	%	80							4009518
C13-123678 HexaCDD *	%	95							4009518
C13-123678 HexaCDF **	%	85							4009518
C13-12378 PentaCDD *	%	85							4009518
C13-12378 PentaCDF **	%	79							4009518
C13-123789 HexaCDF **	%	92							4009518
C13-234678 HexaCDF **	%	88							4009518
C13-23478 PentaCDF **	%	92							4009518
C13-2378 TetraCDD *	%	72							4009518
C13-2378 TetraCDF **	%	75							4009518
C13-OCDD *	%	101							4009518
Confirmation C13-2378 TetraCDF **	%	76							4014175

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK249							
Sampling Date		2015/04/16 18:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI018-0. 5-F-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.461	0.152	0.200	0.0400	1.00	0.461		4009518
1,2,3,7,8-Penta CDD *	pg/g	2.80	0.146	1.00	0.0400	1.00	2.80		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	6.43	0.136	1.00	0.0400	0.100	0.643		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	27.8	0.150	1.00	0.0400	0.100	2.78		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	17.1	0.142	1.00	0.0400	0.100	1.71		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	553	0.192	1.00	0.0400	0.0100	5.53		4009518
Octa CDD *	pg/g	2940	0.168	2.00	0.0800	0.000300	0.882		4009518
Total Tetra CDD *	pg/g	4.43	0.152	0.200	0.0400			8	4009518
Total Penta CDD *	pg/g	15.2	0.146	1.00	0.0400			10	4009518
Total Hexa CDD *	pg/g	143	0.145	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	933	0.192	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	1.36	0.120	0.200	0.0400	0.100	0.136		4009518
1,2,3,7,8-Penta CDF **	pg/g	1.45	0.143	1.00	0.0400	0.0300	0.0435		4009518
2,3,4,7,8-Penta CDF **	pg/g	2.02	0.139	1.00	0.0400	0.300	0.606		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	9.91	0.143	1.00	0.0400	0.100	0.991		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	5.20	0.148	1.00	0.0400	0.100	0.520		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	3.48	0.136	1.00	0.0400	0.100	0.348		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	0.323	0.154	1.00	0.0400	0.100	0.0323		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	78.6	0.126	1.00	0.0400	0.0100	0.786		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	4.04	0.131	1.00	0.0400	0.0100	0.0404		4009518
Octa CDF **	pg/g	97.1	0.137	2.00	0.0800	0.000300	0.0291		4009518
Total Tetra CDF **	pg/g	13.1	0.120	0.200	0.0400			12	4009518
Total Penta CDF **	pg/g	42.7	0.141	1.00	0.0400			8	4009518
Total Hexa CDF **	pg/g	140	0.145	1.00	0.0400			10	4009518
Total Hepta CDF **	pg/g	196	0.128	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.84	0.11	1.0	0.90	0.100	0.0840		4014175
TOTAL TOXIC EQUIVALENCY	pg/g						18.3		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	82							4009518
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK249							
Sampling Date		2015/04/16 18:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI018-0. 5-F-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	88							4009518
C13-1234678 HeptaCDF **	%	85							4009518
C13-123478 HexaCDD *	%	89							4009518
C13-123478 HexaCDF **	%	89							4009518
C13-1234789 HeptaCDF **	%	85							4009518
C13-123678 HexaCDD *	%	87							4009518
C13-123678 HexaCDF **	%	86							4009518
C13-12378 PentaCDD *	%	93							4009518
C13-12378 PentaCDF **	%	87							4009518
C13-123789 HexaCDF **	%	93							4009518
C13-234678 HexaCDF **	%	87							4009518
C13-23478 PentaCDF **	%	98							4009518
C13-2378 TetraCDD *	%	72							4009518
C13-2378 TetraCDF **	%	77							4009518
C13-OCDD *	%	93							4009518
Confirmation C13-2378 TetraCDF **	%	82							4014175

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK250							
Sampling Date		2015/04/16 10:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI005-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	8.64	0.212	0.200	0.0400	1.00	8.64		4009518
1,2,3,7,8-Penta CDD *	pg/g	8.29	0.133	1.00	0.0400	1.00	8.29		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	18.1	0.132	1.00	0.0400	0.100	1.81		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	94.6	0.145	1.00	0.0400	0.100	9.46		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	55.5	0.137	1.00	0.0400	0.100	5.55		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1810	0.145	1.00	0.0400	0.0100	18.1		4009518
Octa CDD *	pg/g	9800 (1)	0.515	10.0	0.0800	0.000300	2.94		4009518
Total Tetra CDD *	pg/g	23.5	0.212	0.200	0.0400			14	4009518
Total Penta CDD *	pg/g	42.5	0.133	1.00	0.0400			11	4009518
Total Hexa CDD *	pg/g	429	0.140	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	3020	0.145	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	3.93	0.123	0.200	0.0400	0.100	0.393		4009518
1,2,3,7,8-Penta CDF **	pg/g	5.70	0.183	1.00	0.0400	0.0300	0.171		4009518
2,3,4,7,8-Penta CDF **	pg/g	9.10	0.177	1.00	0.0400	0.300	2.73		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	44.4	0.116	1.00	0.0400	0.100	4.44		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	22.0	0.121	1.00	0.0400	0.100	2.20		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	14.0	0.111	1.00	0.0400	0.100	1.40		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	0.854	0.126	1.00	0.0400	0.100	0.0854		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	249	0.116	1.00	0.0400	0.0100	2.49		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	15.3	0.121	1.00	0.0400	0.0100	0.153		4009518
Octa CDF **	pg/g	265	0.140	2.00	0.0800	0.000300	0.0795		4009518
Total Tetra CDF **	pg/g	56.2	0.123	0.200	0.0400			12	4009518
Total Penta CDF **	pg/g	150	0.180	1.00	0.0400			11	4009518
Total Hexa CDF **	pg/g	537	0.118	1.00	0.0400			11	4009518
Total Hepta CDF **	pg/g	649	0.118	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	2.28	0.099	1.0	0.90	0.100	0.228		4014175
TOTAL TOXIC EQUIVALENCY	pg/g						68.8		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) 5x dilution



**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AEK250							
<b>Sampling Date</b>		2015/04/16 10:00							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ISM-AOI005-0. 5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	97							4009518
C13-1234678 HeptaCDD *	%	97							4009518
C13-1234678 HeptaCDF **	%	89							4009518
C13-123478 HexaCDD *	%	81							4009518
C13-123478 HexaCDF **	%	84							4009518
C13-1234789 HeptaCDF **	%	92							4009518
C13-123678 HexaCDD *	%	80							4009518
C13-123678 HexaCDF **	%	80							4009518
C13-12378 PentaCDD *	%	101							4009518
C13-12378 PentaCDF **	%	97							4009518
C13-123789 HexaCDF **	%	96							4009518
C13-234678 HexaCDF **	%	84							4009518
C13-23478 PentaCDF **	%	113							4009518
C13-2378 TetraCDD *	%	77							4009518
C13-2378 TetraCDF **	%	87							4009518
C13-OCDD *	%	97							4009518
Confirmation C13-2378 TetraCDF **	%	84							4014175

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK251							
Sampling Date		2015/04/16 12:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI013-0. 5-B-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.964	0.221	0.200	0.0400	1.00	0.964		4009518
1,2,3,7,8-Penta CDD *	pg/g	6.25	0.117	1.00	0.0400	1.00	6.25		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	13.8	0.124	1.00	0.0400	0.100	1.38		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	72.0	0.137	1.00	0.0400	0.100	7.20		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	38.9	0.129	1.00	0.0400	0.100	3.89		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1450	0.160	1.00	0.0400	0.0100	14.5		4009518
Octa CDD *	pg/g	8790 (1)	0.503	10.0	0.0800	0.000300	2.64		4009518
Total Tetra CDD *	pg/g	16.5	0.221	0.200	0.0400			13	4009518
Total Penta CDD *	pg/g	38.9	0.117	1.00	0.0400			12	4009518
Total Hexa CDD *	pg/g	349	0.132	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	2480	0.160	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	5.89	0.133	0.200	0.0400	0.100	0.589		4009518
1,2,3,7,8-Penta CDF **	pg/g	5.00	0.152	1.00	0.0400	0.0300	0.150		4009518
2,3,4,7,8-Penta CDF **	pg/g	6.27	0.148	1.00	0.0400	0.300	1.88		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	31.7	0.108	1.00	0.0400	0.100	3.17		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	14.9	0.112	1.00	0.0400	0.100	1.49		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	9.39	0.103	1.00	0.0400	0.100	0.939		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	0.833	0.117	1.00	0.0400	0.100	0.0833		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	199	0.142	1.00	0.0400	0.0100	1.99		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	11.4	0.148	1.00	0.0400	0.0100	0.114		4009518
Octa CDF **	pg/g	288	0.133	2.00	0.0800	0.000300	0.0864		4009518
Total Tetra CDF **	pg/g	32.5	0.133	0.200	0.0400			14	4009518
Total Penta CDF **	pg/g	70.7	0.150	1.00	0.0400			12	4009518
Total Hexa CDF **	pg/g	374	0.110	1.00	0.0400			12	4009518
Total Hepta CDF **	pg/g	541	0.145	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	2.67	0.12	0.12	0.11	0.100	0.267		4014175
TOTAL TOXIC EQUIVALENCY	pg/g						47.0		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) 5x dilution

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AEK251							
<b>Sampling Date</b>		2015/04/16 12:00							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ISM-AOI013-0. 5-B-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	89							4009518
C13-1234678 HeptaCDD *	%	102							4009518
C13-1234678 HeptaCDF **	%	95							4009518
C13-123478 HexaCDD *	%	91							4009518
C13-123478 HexaCDF **	%	97							4009518
C13-1234789 HeptaCDF **	%	100							4009518
C13-123678 HexaCDD *	%	91							4009518
C13-123678 HexaCDF **	%	93							4009518
C13-12378 PentaCDD *	%	102							4009518
C13-12378 PentaCDF **	%	99							4009518
C13-123789 HexaCDF **	%	102							4009518
C13-234678 HexaCDF **	%	96							4009518
C13-23478 PentaCDF **	%	118							4009518
C13-2378 TetraCDD *	%	79							4009518
C13-2378 TetraCDF **	%	89							4009518
C13-OCDD *	%	116							4009518
Confirmation C13-2378 TetraCDF **	%	90							4014175

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK252							
Sampling Date		2015/04/16 17:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-AOI018-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.109	0.109	0.200	0.0400	1.00	0.109		4009518
1,2,3,7,8-Penta CDD *	pg/g	0.319	0.101	1.00	0.0400	1.00	0.319		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	0.609	0.0965	1.00	0.0400	0.100	0.0609		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	2.74	0.106	1.00	0.0400	0.100	0.274		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	2.03 (1)	0.100	1.00	0.0400	0.100	0.203		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	54.9	0.100	1.00	0.0400	0.0100	0.549		4009518
Octa CDD *	pg/g	290	0.105	2.00	0.0800	0.000300	0.0870		4009518
Total Tetra CDD *	pg/g	0.641	0.109	0.200	0.0400			3	4009518
Total Penta CDD *	pg/g	1.06	0.101	1.00	0.0400			3	4009518
Total Hexa CDD *	pg/g	14.0	0.102	1.00	0.0400			6	4009518
Total Hepta CDD *	pg/g	92.6	0.100	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	<0.668 (2)	0.668	0.200	0.0400	0.100	0.0668		4009518
1,2,3,7,8-Penta CDF **	pg/g	0.293	0.102	1.00	0.0400	0.0300	0.00879		4009518
2,3,4,7,8-Penta CDF **	pg/g	0.300	0.0995	1.00	0.0400	0.300	0.0900		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	1.16 (1)	0.0986	1.00	0.0400	0.100	0.116		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	0.607	0.103	1.00	0.0400	0.100	0.0607		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	0.440	0.0942	1.00	0.0400	0.100	0.0440		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.107	0.107	1.00	0.0400	0.100	0.0107		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	9.37	0.102	1.00	0.0400	0.0100	0.0937		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	0.466	0.106	1.00	0.0400	0.0100	0.00466		4009518
Octa CDF **	pg/g	9.09	0.103	2.00	0.0800	0.000300	0.00273		4009518
Total Tetra CDF **	pg/g	3.33	0.109	0.200	0.0400			11	4009518
Total Penta CDF **	pg/g	2.80	0.101	1.00	0.0400			6	4009518
Total Hexa CDF **	pg/g	13.3	0.100	1.00	0.0400			8	4009518
Total Hepta CDF **	pg/g	21.7	0.104	1.00	0.0400			3	4009518
TOTAL TOXIC EQUIVALENCY	pg/g						2.10		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / Merged Peak  
(2) RT > 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AEK252							
<b>Sampling Date</b>		2015/04/16 17:15							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>SBS-AOI018-1.0</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	96							4009518
C13-1234678 HeptaCDD *	%	103							4009518
C13-1234678 HeptaCDF **	%	92							4009518
C13-123478 HexaCDD *	%	88							4009518
C13-123478 HexaCDF **	%	93							4009518
C13-1234789 HeptaCDF **	%	101							4009518
C13-123678 HexaCDD *	%	89							4009518
C13-123678 HexaCDF **	%	89							4009518
C13-12378 PentaCDD *	%	104							4009518
C13-12378 PentaCDF **	%	97							4009518
C13-123789 HexaCDF **	%	100							4009518
C13-234678 HexaCDF **	%	91							4009518
C13-23478 PentaCDF **	%	109							4009518
C13-2378 TetraCDD *	%	84							4009518
C13-2378 TetraCDF **	%	92							4009518
C13-OCDD *	%	109							4009518

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK253							
Sampling Date		2015/04/16 13:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-AOI006-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	6.74	0.227	0.200	0.0400	1.00	6.74		4009518
1,2,3,7,8-Penta CDD *	pg/g	1.98	0.187	1.00	0.0400	1.00	1.98		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	5.03	0.139	1.00	0.0400	0.100	0.503		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	26.6	0.153	1.00	0.0400	0.100	2.66		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	14.1	0.144	1.00	0.0400	0.100	1.41		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	572	0.154	1.00	0.0400	0.0100	5.72		4009518
Octa CDD *	pg/g	2890	0.178	2.00	0.0800	0.000300	0.867		4009518
Total Tetra CDD *	pg/g	8.29	0.227	0.200	0.0400			4	4009518
Total Penta CDD *	pg/g	10.2	0.187	1.00	0.0400			9	4009518
Total Hexa CDD *	pg/g	122	0.147	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	936	0.154	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	1.03	0.130	0.200	0.0400	0.100	0.103		4009518
1,2,3,7,8-Penta CDF **	pg/g	1.51	0.140	1.00	0.0400	0.0300	0.0453		4009518
2,3,4,7,8-Penta CDF **	pg/g	2.21	0.136	1.00	0.0400	0.300	0.663		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	12.8	0.169	1.00	0.0400	0.100	1.28		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	5.29	0.176	1.00	0.0400	0.100	0.529		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	3.36	0.162	1.00	0.0400	0.100	0.336		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	0.329	0.183	1.00	0.0400	0.100	0.0329		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	74.6	0.106	1.00	0.0400	0.0100	0.746		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	4.32	0.110	1.00	0.0400	0.0100	0.0432		4009518
Octa CDF **	pg/g	79.1	0.116	2.00	0.0800	0.000300	0.0237		4009518
Total Tetra CDF **	pg/g	5.40	0.130	0.200	0.0400			9	4009518
Total Penta CDF **	pg/g	23.0	0.138	1.00	0.0400			9	4009518
Total Hexa CDF **	pg/g	144	0.172	1.00	0.0400			10	4009518
Total Hepta CDF **	pg/g	198	0.108	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.68	0.10	1.0	0.90	0.100	0.0680		4014175
TOTAL TOXIC EQUIVALENCY	pg/g						23.6		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	62							4009518
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK253							
Sampling Date		2015/04/16 13:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-AOI006-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	67							4009518
C13-1234678 HeptaCDF **	%	63							4009518
C13-123478 HexaCDD *	%	60							4009518
C13-123478 HexaCDF **	%	66							4009518
C13-1234789 HeptaCDF **	%	65							4009518
C13-123678 HexaCDD *	%	62							4009518
C13-123678 HexaCDF **	%	64							4009518
C13-12378 PentaCDD *	%	68							4009518
C13-12378 PentaCDF **	%	67							4009518
C13-123789 HexaCDF **	%	69							4009518
C13-234678 HexaCDF **	%	63							4009518
C13-23478 PentaCDF **	%	76							4009518
C13-2378 TetraCDD *	%	53							4009518
C13-2378 TetraCDF **	%	60							4009518
C13-OCDD *	%	71							4009518
Confirmation C13-2378 TetraCDF **	%	63							4014175

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK254							
Sampling Date		2015/04/16 10:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-AOI005-1.0-DUP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.12	0.202	0.200	0.0400	1.00	1.12		4009518
1,2,3,7,8-Penta CDD *	pg/g	7.94	0.150	1.00	0.0400	1.00	7.94		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	20.3	0.140	1.00	0.0400	0.100	2.03		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	104	0.155	1.00	0.0400	0.100	10.4		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	60.4	0.146	1.00	0.0400	0.100	6.04		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	2180 (1)	1.06	10.0	0.0400	0.0100	21.8		4009518
Octa CDD *	pg/g	11800 (1)	1.13	20.0	0.0800	0.000300	3.54		4009518
Total Tetra CDD *	pg/g	9.59	0.202	0.200	0.0400			11	4009518
Total Penta CDD *	pg/g	36.2	0.150	1.00	0.0400			11	4009518
Total Hexa CDD *	pg/g	470	0.149	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	3770	1.06	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	3.34	0.119	0.200	0.0400	0.100	0.334		4009518
1,2,3,7,8-Penta CDF **	pg/g	6.96	0.162	1.00	0.0400	0.0300	0.209		4009518
2,3,4,7,8-Penta CDF **	pg/g	10.8	0.158	1.00	0.0400	0.300	3.24		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	56.0	0.0994	1.00	0.0400	0.100	5.60		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	25.5	0.103	1.00	0.0400	0.100	2.55		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	15.3	0.0949	1.00	0.0400	0.100	1.53		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	1.14	0.107	1.00	0.0400	0.100	0.114		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	316	0.106	1.00	0.0400	0.0100	3.16		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	19.5	0.110	1.00	0.0400	0.0100	0.195		4009518
Octa CDF **	pg/g	372	0.132	2.00	0.0800	0.000300	0.112		4009518
Total Tetra CDF **	pg/g	44.0	0.119	0.200	0.0400			13	4009518
Total Penta CDF **	pg/g	147	0.160	1.00	0.0400			10	4009518
Total Hexa CDF **	pg/g	651	0.101	1.00	0.0400			12	4009518
Total Hepta CDF **	pg/g	869	0.108	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	2.65	0.11	1.0	0.90	0.100	0.265		4014175
TOTAL TOXIC EQUIVALENCY	pg/g						69.8		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) 10X Dilution



**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AEK254							
<b>Sampling Date</b>		2015/04/16 10:30							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>SBS-AOI005-1.0-DUP</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	94							4009518
C13-1234678 HeptaCDD *	%	97							4009518
C13-1234678 HeptaCDF **	%	96							4009518
C13-123478 HexaCDD *	%	85							4009518
C13-123478 HexaCDF **	%	93							4009518
C13-1234789 HeptaCDF **	%	100							4009518
C13-123678 HexaCDD *	%	86							4009518
C13-123678 HexaCDF **	%	89							4009518
C13-12378 PentaCDD *	%	108							4009518
C13-12378 PentaCDF **	%	104							4009518
C13-123789 HexaCDF **	%	102							4009518
C13-234678 HexaCDF **	%	88							4009518
C13-23478 PentaCDF **	%	113							4009518
C13-2378 TetraCDD *	%	83							4009518
C13-2378 TetraCDF **	%	92							4009518
C13-OCDD *	%	106							4009518
Confirmation C13-2378 TetraCDF **	%	89							4014175

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK255							
Sampling Date		2015/04/16 10:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-AOI005-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.845	0.234	0.200	0.0400	1.00	0.845		4009518
1,2,3,7,8-Penta CDD *	pg/g	6.98	0.198	1.00	0.0400	1.00	6.98		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	17.1	0.135	1.00	0.0400	0.100	1.71		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	93.5	0.148	1.00	0.0400	0.100	9.35		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	51.0	0.140	1.00	0.0400	0.100	5.10		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1900	0.168	1.00	0.0400	0.0100	19.0		4009518
Octa CDD *	pg/g	10800 (1)	1.16	20.0	0.0800	0.000300	3.24		4009518
Total Tetra CDD *	pg/g	7.57	0.234	0.200	0.0400			11	4009518
Total Penta CDD *	pg/g	30.8	0.198	1.00	0.0400			10	4009518
Total Hexa CDD *	pg/g	408	0.143	1.00	0.0400			6	4009518
Total Hepta CDD *	pg/g	3150	0.168	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	2.69	0.152	0.200	0.0400	0.100	0.269		4009518
1,2,3,7,8-Penta CDF **	pg/g	5.77	0.190	1.00	0.0400	0.0300	0.173		4009518
2,3,4,7,8-Penta CDF **	pg/g	8.31	0.185	1.00	0.0400	0.300	2.49		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	48.3	0.175	1.00	0.0400	0.100	4.83		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	21.4	0.182	1.00	0.0400	0.100	2.14		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	13.6	0.167	1.00	0.0400	0.100	1.36		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	0.900	0.189	1.00	0.0400	0.100	0.0900		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	288	0.120	1.00	0.0400	0.0100	2.88		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	17.6	0.125	1.00	0.0400	0.0100	0.176		4009518
Octa CDF **	pg/g	354	0.124	2.00	0.0800	0.000300	0.106		4009518
Total Tetra CDF **	pg/g	32.4	0.152	0.200	0.0400			8	4009518
Total Penta CDF **	pg/g	127	0.187	1.00	0.0400			10	4009518
Total Hexa CDF **	pg/g	579	0.178	1.00	0.0400			11	4009518
Total Hepta CDF **	pg/g	792	0.123	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.89	0.15	1.0	0.90	0.100	0.189		4014175
TOTAL TOXIC EQUIVALENCY	pg/g						60.7		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) 10X Dilution

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK255							
Sampling Date		2015/04/16 10:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-AOI005-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	83							4009518
C13-1234678 HeptaCDD *	%	89							4009518
C13-1234678 HeptaCDF **	%	82							4009518
C13-123478 HexaCDD *	%	79							4009518
C13-123478 HexaCDF **	%	84							4009518
C13-1234789 HeptaCDF **	%	86							4009518
C13-123678 HexaCDD *	%	77							4009518
C13-123678 HexaCDF **	%	80							4009518
C13-12378 PentaCDD *	%	88							4009518
C13-12378 PentaCDF **	%	85							4009518
C13-123789 HexaCDF **	%	87							4009518
C13-234678 HexaCDF **	%	80							4009518
C13-23478 PentaCDF **	%	97							4009518
C13-2378 TetraCDD *	%	70							4009518
C13-2378 TetraCDF **	%	78							4009518
C13-OCDD *	%	88							4009518
Confirmation C13-2378 TetraCDF **	%	80							4014175
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**TEST SUMMARY**

**Maxxam ID:** AEK241  
**Sample ID:** ISM-AOI007-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/06	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014175	N/A	2015/05/06	Vica Cioranic
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK242  
**Sample ID:** ISM-AOI011-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/06	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014175	N/A	2015/05/06	Vica Cioranic
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK243  
**Sample ID:** ISM-AOI031-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/05	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203296	N/A	2015/09/22	Leila Azzam
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK244  
**Sample ID:** ISM-AOI018-0.5-B-C-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/05	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203296	N/A	2015/09/22	Leila Azzam
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK245  
**Sample ID:** ISM-AOI018-0.5-B-A-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/06	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014175	N/A	2015/05/06	Vica Cioranic
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK246  
**Sample ID:** ISM-AOI018-0.5-B-B-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/05	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203296	N/A	2015/09/22	Leila Azzam

**TEST SUMMARY**

**Maxxam ID:** AEK246  
**Sample ID:** ISM-AOI018-0.5-B-B-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK246 Dup  
**Sample ID:** ISM-AOI018-0.5-B-B-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/05	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203296	N/A	2015/09/22	Leila Azzam

**Maxxam ID:** AEK247  
**Sample ID:** ISM-AOI006-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/05	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203296	N/A	2015/09/22	Leila Azzam
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK248  
**Sample ID:** ISM-AOI013-0.5-F-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/06	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014175	N/A	2015/05/06	Vica Cioranic
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK249  
**Sample ID:** ISM-AOI018-0.5-F-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/06	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014175	N/A	2015/05/06	Vica Cioranic
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK250  
**Sample ID:** ISM-AOI005-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/06	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014175	N/A	2015/05/06	Vica Cioranic
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**TEST SUMMARY**

**Maxxam ID:** AEK250 Dup  
**Sample ID:** ISM-AOI005-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK251  
**Sample ID:** ISM-AOI013-0.5-B-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/06	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014175	N/A	2015/05/06	Vica Cioranic
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK252  
**Sample ID:** SBS-AOI018-1.0  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/05	Kay Shaw
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK253  
**Sample ID:** SBS-AOI006-1.0  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/06	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014175	N/A	2015/05/06	Vica Cioranic
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK254  
**Sample ID:** SBS-AOI005-1.0-DUP  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/06	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014175	N/A	2015/05/06	Vica Cioranic
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK255  
**Sample ID:** SBS-AOI005-1.0  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/06	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014175	N/A	2015/05/06	Vica Cioranic
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.9°C
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Revised report reflects addition of missed TCDF confirmations.

**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4004368	BOP	RPD - Sample/Sample Dup	Moisture	2015/04/30	NC		%	20
4009518	KKS	Matrix Spike	37CL4 2378 Tetra CDD	2015/05/05		111	%	35 - 197
			C13-1234678 HeptaCDD	2015/05/05		107	%	23 - 140
			C13-1234678 HeptaCDF	2015/05/05		102	%	28 - 143
			C13-123478 HexaCDD	2015/05/05		100	%	32 - 141
			C13-123478 HexaCDF	2015/05/05		106	%	26 - 152
			C13-1234789 HeptaCDF	2015/05/05		107	%	26 - 138
			C13-123678 HexaCDD	2015/05/05		97	%	28 - 130
			C13-123678 HexaCDF	2015/05/05		101	%	26 - 123
			C13-12378 PentaCDD	2015/05/05		110	%	25 - 181
			C13-12378 PentaCDF	2015/05/05		104	%	24 - 185
			C13-123789 HexaCDF	2015/05/05		110	%	29 - 147
			C13-234678 HexaCDF	2015/05/05		101	%	28 - 136
			C13-23478 PentaCDF	2015/05/05		116	%	21 - 178
			C13-2378 TetraCDD	2015/05/05		90	%	25 - 164
			C13-2378 TetraCDF	2015/05/05		101	%	24 - 169
			C13-OCDD	2015/05/05		125	%	17 - 157
4009518	KKS	Matrix Spike(AEK247)	2,3,7,8-Tetra CDD	2015/05/05		NC	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/05/05		106	%	70 - 142
			1,2,3,4,7,8-Hexa CDD	2015/05/05		115	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/05/05		124	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/05/05		130	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/05/05		NC	%	70 - 140
			Octa CDD	2015/05/05		NC	%	78 - 144
			2,3,7,8-Tetra CDF	2015/05/05		113	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/05/05		115	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/05/05		102	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/05/05		115	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/05/05		120	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/05/05		117	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/05/05		115	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/05/05		NC	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/05/05		116	%	78 - 138
			Octa CDF	2015/05/05		NC	%	63 - 170
4009518	KKS	Spiked Blank	37CL4 2378 Tetra CDD	2015/05/05		102	%	35 - 197
			C13-1234678 HeptaCDD	2015/05/05		95	%	23 - 140
			C13-1234678 HeptaCDF	2015/05/05		94	%	28 - 143
			C13-123478 HexaCDD	2015/05/05		90	%	32 - 141
			C13-123478 HexaCDF	2015/05/05		95	%	26 - 152
			C13-1234789 HeptaCDF	2015/05/05		98	%	26 - 138
			C13-123678 HexaCDD	2015/05/05		91	%	28 - 130
			C13-123678 HexaCDF	2015/05/05		92	%	26 - 123
			C13-12378 PentaCDD	2015/05/05		107	%	25 - 181
			C13-12378 PentaCDF	2015/05/05		101	%	24 - 185
			C13-123789 HexaCDF	2015/05/05		103	%	29 - 147
			C13-234678 HexaCDF	2015/05/05		93	%	28 - 136
			C13-23478 PentaCDF	2015/05/05		117	%	21 - 178
			C13-2378 TetraCDD	2015/05/05		87	%	25 - 164
			C13-2378 TetraCDF	2015/05/05		96	%	24 - 169
			C13-OCDD	2015/05/05		103	%	17 - 157
			2,3,7,8-Tetra CDD	2015/05/05		120	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/05/05		99	%	70 - 142
			1,2,3,4,7,8-Hexa CDD	2015/05/05		109	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/05/05		111	%	76 - 134



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8,9-Hexa CDD	2015/05/05		125	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/05/05		109	%	70 - 140
			Octa CDD	2015/05/05		99	%	78 - 144
			2,3,7,8-Tetra CDF	2015/05/05		109	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/05/05		109	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/05/05		96	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/05/05		111	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/05/05		115	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/05/05		111	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/05/05		109	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/05/05		113	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/05/05		111	%	78 - 138
			Octa CDF	2015/05/05		101	%	63 - 170
4009518	KKS	Method Blank	37CL4 2378 Tetra CDD	2015/05/05		105	%	35 - 197
			C13-1234678 HeptaCDD	2015/05/05		97	%	23 - 140
			C13-1234678 HeptaCDF	2015/05/05		95	%	28 - 143
			C13-123478 HexaCDD	2015/05/05		92	%	32 - 141
			C13-123478 HexaCDF	2015/05/05		97	%	26 - 152
			C13-1234789 HeptaCDF	2015/05/05		99	%	26 - 138
			C13-123678 HexaCDD	2015/05/05		94	%	28 - 130
			C13-123678 HexaCDF	2015/05/05		96	%	26 - 123
			C13-12378 PentaCDD	2015/05/05		108	%	25 - 181
			C13-12378 PentaCDF	2015/05/05		105	%	24 - 185
			C13-123789 HexaCDF	2015/05/05		105	%	29 - 147
			C13-234678 HexaCDF	2015/05/05		94	%	28 - 136
			C13-23478 PentaCDF	2015/05/05		116	%	21 - 178
			C13-2378 TetraCDD	2015/05/05		89	%	25 - 164
			C13-2378 TetraCDF	2015/05/05		96	%	24 - 169
			C13-OCDD	2015/05/05		102	%	17 - 157
			2,3,7,8-Tetra CDD	2015/05/05	<0.102, EDL=0.102		pg/g	
			1,2,3,7,8-Penta CDD	2015/05/05	<0.108, EDL=0.108		pg/g	
			1,2,3,4,7,8-Hexa CDD	2015/05/05	<0.0981, EDL=0.0981		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/05/05	<0.108, EDL=0.108		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/05/05	<0.102, EDL=0.102		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/05/05	0.366, EDL=0.105		pg/g	
			Octa CDD	2015/05/05	1.32, EDL=0.106		pg/g	
			Total Tetra CDD	2015/05/05	<0.102, EDL=0.102		pg/g	
			Total Penta CDD	2015/05/05	<0.108, EDL=0.108		pg/g	
			Total Hexa CDD	2015/05/05	<0.104, EDL=0.104		pg/g	
			Total Hepta CDD	2015/05/05	0.366, EDL=0.105		pg/g	
			2,3,7,8-Tetra CDF	2015/05/05	<0.105, EDL=0.105		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8-Penta CDF	2015/05/05	<0.105, EDL=0.105		pg/g	
			2,3,4,7,8-Penta CDF	2015/05/05	<0.102, EDL=0.102		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/05/05	<0.104, EDL=0.104		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/05/05	<0.108, EDL=0.108		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/05/05	<0.0993, EDL=0.0993		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/05/05	<0.112, EDL=0.112		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/05/05	<0.108, EDL=0.108 (1)		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2015/05/05	<0.103, EDL=0.103		pg/g	
			Octa CDF	2015/05/05	0.183, EDL=0.104		pg/g	
			Total Tetra CDF	2015/05/05	<0.105, EDL=0.105		pg/g	
			Total Penta CDF	2015/05/05	<0.103, EDL=0.103		pg/g	
			Total Hexa CDF	2015/05/05	<0.106, EDL=0.106		pg/g	
			Total Hepta CDF	2015/05/05	<0.119, EDL=0.119 (1)		pg/g	
4009518	KKS	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/05/05	NC		%	25
			1,2,3,7,8-Penta CDD	2015/05/05	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/05/05	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2015/05/05	1.2		%	25
			1,2,3,7,8,9-Hexa CDD	2015/05/05	9.5 (2)		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/05/05	3.0		%	25
			Octa CDD	2015/05/05	2.8		%	25
			Total Tetra CDD	2015/05/05	1.9		%	25
			Total Penta CDD	2015/05/05	3.5		%	25
			Total Hexa CDD	2015/05/05	4.4		%	25
			Total Hepta CDD	2015/05/05	2.9		%	25
			2,3,7,8-Tetra CDF	2015/05/05	NC (3)		%	25
			1,2,3,7,8-Penta CDF	2015/05/05	NC		%	25
			2,3,4,7,8-Penta CDF	2015/05/05	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/05/05	0.75 (2)		%	25
			1,2,3,6,7,8-Hexa CDF	2015/05/05	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/05/05	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/05/05	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/05/05	1.8		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/05/05	NC		%	25
			Octa CDF	2015/05/05	2.5		%	25
			Total Tetra CDF	2015/05/05	1.3		%	25
			Total Penta CDF	2015/05/05	8.1		%	25
			Total Hexa CDF	2015/05/05	2.3		%	25
			Total Hepta CDF	2015/05/05	1.8		%	25
4014175	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/05/06	<0.11, EDL=0.11		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4203296	LAZ	Method Blank	Confirmation C13-2378 TetraCDF	2015/05/06		90	%	40 - 135
			Confirmation 2,3,7,8-Tetra CDF	2015/09/22	<0.14, EDL=0.14	pg/g		
4203296	LAZ	RPD - Sample/Sample Dup	Confirmation C13-2378 TetraCDF	2015/09/22		96	%	40 - 135
			Confirmation 2,3,7,8-Tetra CDF	2015/09/22	NC	%	100	
			Confirmation 2,3,7,8-Tetra CDF	2015/09/22	NC	%	100	

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

(2) EMPC / Merged Peak

(3) RT > 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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Cristina Carriere, Scientific Services



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Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5D0784  
Your C.O.C. #: NA

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/10/05**  
**Report #: R3710020**  
**Version: 2R**

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B577816**

**Received: 2015/04/29, 13:40**

Sample Matrix: Soil  
# Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Dioxins/Furans in Soil (1613B) (1)	5	2015/05/03	2015/05/07	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	2	N/A	2015/05/07	BRL SOP-00406	EPA M8290A / M1613
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2015/09/29	BRL SOP-00406	EPA M8290A / M1613
Moisture	5	N/A	2015/05/01	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

=====  
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Total cover pages: 1

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		AEP502	AEP503	AEP504	AEP505	AEP506			
Sampling Date		2015/04/23 15:10	2015/04/23 15:30	2015/04/23 16:00	2015/04/23 16:20	2015/04/23 16:40			
COC Number		NA	NA	NA	NA	NA			
	<b>Units</b>	<b>SS-ROW036-0.5</b>	<b>SBS-AOI032-1.0</b>	<b>SS-ROW012-0.5</b>	<b>SS-ROW014-0.5</b>	<b>SBS-AOI017-1.0</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>

Moisture	%	9.5	18	19	23	18	1.0	0.50	4005942
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RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch

Maxxam ID		AEP506			
Sampling Date		2015/04/23 16:40			
COC Number		NA			
	<b>Units</b>	<b>SBS-AOI017-1.0</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
		<b>Lab-Dup</b>			

Moisture	%	17	1.0	0.50	4005942
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RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP502							
Sampling Date		2015/04/23 15:10							
COC Number		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW036-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	0.913	0.334	0.186	0.400	1.00	0.913		4010827
1,2,3,7,8-Penta CDD	pg/g	3.88	0.460	0.929	0.400	1.00	3.88		4010827
1,2,3,4,7,8-Hexa CDD	pg/g	6.07	0.282	0.929	0.400	0.100	0.607		4010827
1,2,3,6,7,8-Hexa CDD	pg/g	14.1	0.310	0.929	0.400	0.100	1.41		4010827
1,2,3,7,8,9-Hexa CDD	pg/g	15.5	0.293	0.929	0.400	0.100	1.55		4010827
1,2,3,4,6,7,8-Hepta CDD	pg/g	363	0.236	0.929	0.400	0.0100	3.63		4010827
Octa CDD	pg/g	2520	0.247	1.86	0.800	0.000300	0.756		4010827
Total Tetra CDD	pg/g	3.90	0.334	0.186	0.400			5	4010827
Total Penta CDD	pg/g	22.2	0.460	0.929	0.400			10	4010827
Total Hexa CDD	pg/g	109	0.299	0.929	0.400			6	4010827
Total Hepta CDD	pg/g	630	0.236	0.929	0.400			2	4010827
2,3,7,8-Tetra CDF **	pg/g	<23.2 (1)	23.2	0.186	0.400	0.100	2.32		4010827
1,2,3,7,8-Penta CDF	pg/g	0.840	0.367	0.929	0.400	0.0300	0.0252		4010827
2,3,4,7,8-Penta CDF	pg/g	3.96	0.357	0.929	0.400	0.300	1.19		4010827
1,2,3,4,7,8-Hexa CDF	pg/g	5.95	0.203	0.929	0.400	0.100	0.595		4010827
1,2,3,6,7,8-Hexa CDF	pg/g	3.26	0.211	0.929	0.400	0.100	0.326		4010827
2,3,4,6,7,8-Hexa CDF	pg/g	2.46	0.194	0.929	0.400	0.100	0.246		4010827
1,2,3,7,8,9-Hexa CDF	pg/g	<0.220	0.220	0.929	0.400	0.100	0.0220		4010827
1,2,3,4,6,7,8-Hepta CDF	pg/g	61.6	0.171	0.929	0.400	0.0100	0.616		4010827
1,2,3,4,7,8,9-Hepta CDF	pg/g	5.37	0.178	0.929	0.400	0.0100	0.0537		4010827
Octa CDF	pg/g	223	0.495	1.86	0.800	0.000300	0.0669		4010827
Total Tetra CDF	pg/g	60.3	0.321	0.186	0.400			13	4010827
Total Penta CDF	pg/g	39.7	0.362	0.929	0.400			10	4010827
Total Hexa CDF	pg/g	87.2	0.206	0.929	0.400			9	4010827
Total Hepta CDF	pg/g	212	0.175	0.929	0.400			4	4010827
Confirmation 2,3,7,8-Tetra CDF	pg/g	2.11	0.099	0.93	0.84	0.100	0.211		4014081
TOTAL TOXIC EQUIVALENCY	pg/g						16.1		

RDL = Reportable Detection Limit

EDL = Estimated Detection Limit

QC Batch = Quality Control Batch

\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

(1) RT > 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP502							
Sampling Date		2015/04/23 15:10							
COC Number		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW036-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	79							4010827
C13-1234678 HeptaCDD	%	72							4010827
C13-1234678 HeptaCDF **	%	73							4010827
C13-123478 HexaCDD	%	73							4010827
C13-123478 HexaCDF	%	81							4010827
C13-1234789 HeptaCDF	%	69							4010827
C13-123678 HexaCDD	%	78							4010827
C13-123678 HexaCDF	%	83							4010827
C13-12378 PentaCDD	%	74							4010827
C13-12378 PentaCDF	%	72							4010827
C13-123789 HexaCDF	%	79							4010827
C13-234678 HexaCDF	%	77							4010827
C13-23478 PentaCDF	%	86							4010827
C13-2378 TetraCDD	%	64							4010827
C13-2378 TetraCDF	%	69							4010827
C13-OCDD	%	64							4010827
Confirmation C13-2378 TetraCDF	%	75							4014081

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds



Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP503							
Sampling Date		2015/04/23 15:30							
COC Number		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SBS-AOI032-1.0</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>
2,3,7,8-Tetra CDD *	pg/g	<0.180	0.180	0.186	0.400	1.00	0.180		4010827
1,2,3,7,8-Penta CDD	pg/g	0.851	0.201	0.928	0.400	1.00	0.851		4010827
1,2,3,4,7,8-Hexa CDD	pg/g	2.00	0.166	0.928	0.400	0.100	0.200		4010827
1,2,3,6,7,8-Hexa CDD	pg/g	6.30	0.183	0.928	0.400	0.100	0.630		4010827
1,2,3,7,8,9-Hexa CDD	pg/g	5.40	0.172	0.928	0.400	0.100	0.540		4010827
1,2,3,4,6,7,8-Hepta CDD	pg/g	169	0.326	0.928	0.400	0.0100	1.69		4010827
Octa CDD	pg/g	893	0.263	1.86	0.800	0.000300	0.268		4010827
Total Tetra CDD	pg/g	0.769	0.180	0.186	0.400			2	4010827
Total Penta CDD	pg/g	3.36	0.201	0.928	0.400			4	4010827
Total Hexa CDD	pg/g	39.1	0.176	0.928	0.400			6	4010827
Total Hepta CDD	pg/g	285	0.326	0.928	0.400			2	4010827
2,3,7,8-Tetra CDF **	pg/g	<0.371 (1)	0.371	0.186	0.400	0.100	0.0371		4010827
1,2,3,7,8-Penta CDF	pg/g	0.243	0.150	0.928	0.400	0.0300	0.00729		4010827
2,3,4,7,8-Penta CDF	pg/g	0.349	0.146	0.928	0.400	0.300	0.105		4010827
1,2,3,4,7,8-Hexa CDF	pg/g	1.77	0.146	0.928	0.400	0.100	0.177		4010827
1,2,3,6,7,8-Hexa CDF	pg/g	1.23	0.152	0.928	0.400	0.100	0.123		4010827
2,3,4,6,7,8-Hexa CDF	pg/g	1.16	0.139	0.928	0.400	0.100	0.116		4010827
1,2,3,7,8,9-Hexa CDF	pg/g	<0.158	0.158	0.928	0.400	0.100	0.0158		4010827
1,2,3,4,6,7,8-Hepta CDF	pg/g	36.9	0.111	0.928	0.400	0.0100	0.369		4010827
1,2,3,4,7,8,9-Hepta CDF	pg/g	1.61	0.115	0.928	0.400	0.0100	0.0161		4010827
Octa CDF	pg/g	105	0.0959	1.86	0.800	0.000300	0.0315		4010827
Total Tetra CDF	pg/g	4.53	0.263	0.186	0.400			5	4010827
Total Penta CDF	pg/g	12.2	0.148	0.928	0.400			7	4010827
Total Hexa CDF	pg/g	41.6	0.148	0.928	0.400			9	4010827
Total Hepta CDF	pg/g	110	0.113	0.928	0.400			4	4010827
TOTAL TOXIC EQUIVALENCY	pg/g						5.36		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD	%	71							4010827
<p>RDL = Reportable Detection Limit  EDL = Estimated Detection Limit  QC Batch = Quality Control Batch  * CDD = Chloro Dibenzo-p-Dioxin, ** CDF = Chloro Dibenzo-p-Furan  TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  (1) RT &gt; 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.</p>									

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP503							
Sampling Date		2015/04/23 15:30							
COC Number		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SBS-AOI032-1.0</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

C13-1234678 HeptaCDD *	%	70							4010827
C13-1234678 HeptaCDF **	%	74							4010827
C13-123478 HexaCDD	%	67							4010827
C13-123478 HexaCDF	%	73							4010827
C13-1234789 HeptaCDF	%	75							4010827
C13-123678 HexaCDD	%	66							4010827
C13-123678 HexaCDF	%	73							4010827
C13-12378 PentaCDD	%	70							4010827
C13-12378 PentaCDF	%	73							4010827
C13-123789 HexaCDF	%	74							4010827
C13-234678 HexaCDF	%	57							4010827
C13-23478 PentaCDF	%	75							4010827
C13-2378 TetraCDD	%	56							4010827
C13-2378 TetraCDF	%	58							4010827
C13-OCDD	%	81							4010827

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

### DIOXINS AND FURANS BY HRMS (SOIL)

Maxxam ID		AEP503							
Sampling Date		2015/04/23 15:30							
COC Number		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SBS-AOI032-1.0 Lab-Dup</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	<0.167	0.167	0.194	0.400	1.00	0.167		4010827
1,2,3,7,8-Penta CDD	pg/g	0.794	0.167	0.972	0.400	1.00	0.794		4010827
1,2,3,4,7,8-Hexa CDD	pg/g	1.97	0.180	0.972	0.400	0.100	0.197		4010827
1,2,3,6,7,8-Hexa CDD	pg/g	6.01	0.198	0.972	0.400	0.100	0.601		4010827
1,2,3,7,8,9-Hexa CDD	pg/g	4.51	0.187	0.972	0.400	0.100	0.451		4010827
1,2,3,4,6,7,8-Hepta CDD	pg/g	159	0.259	0.972	0.400	0.0100	1.59		4010827
Octa CDD	pg/g	856	0.257	1.94	0.800	0.000300	0.257		4010827
Total Tetra CDD	pg/g	0.483	0.167	0.194	0.400			2	4010827
Total Penta CDD	pg/g	2.60	0.167	0.972	0.400			3	4010827
Total Hexa CDD	pg/g	37.0	0.191	0.972	0.400			7	4010827
Total Hepta CDD	pg/g	267	0.259	0.972	0.400			2	4010827
2,3,7,8-Tetra CDF **	pg/g	<0.214	0.214	0.194	0.400	0.100	0.0214		4010827
1,2,3,7,8-Penta CDF	pg/g	0.207	0.117	0.972	0.400	0.0300	0.00621		4010827
2,3,4,7,8-Penta CDF	pg/g	0.339	0.114	0.972	0.400	0.300	0.102		4010827
1,2,3,4,7,8-Hexa CDF	pg/g	1.66	0.110	0.972	0.400	0.100	0.166		4010827
1,2,3,6,7,8-Hexa CDF	pg/g	1.17	0.115	0.972	0.400	0.100	0.117		4010827
2,3,4,6,7,8-Hexa CDF	pg/g	0.985	0.105	0.972	0.400	0.100	0.0985		4010827
1,2,3,7,8,9-Hexa CDF	pg/g	<0.119	0.119	0.972	0.400	0.100	0.0119		4010827
1,2,3,4,6,7,8-Hepta CDF	pg/g	35.0	0.0764	0.972	0.400	0.0100	0.350		4010827
1,2,3,4,7,8,9-Hepta CDF	pg/g	1.53	0.0794	0.972	0.400	0.0100	0.0153		4010827
Octa CDF	pg/g	98.1	0.192	1.94	0.800	0.000300	0.0294		4010827
Total Tetra CDF	pg/g	2.60 (f)	0.214	0.194	0.400			4	4010827
Total Penta CDF	pg/g	11.7	0.115	0.972	0.400			7	4010827
Total Hexa CDF	pg/g	40.2	0.112	0.972	0.400			9	4010827
Total Hepta CDF	pg/g	104	0.0778	0.972	0.400			4	4010827
TOTAL TOXIC EQUIVALENCY	pg/g						4.97		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD	%	73							4010827

RDL = Reportable Detection Limit  
EDL = Estimated Detection Limit  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
(1) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP503							
Sampling Date		2015/04/23 15:30							
COC Number		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SBS-AOI032-1.0 Lab-Dup</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

C13-1234678 HeptaCDD *	%	80							4010827
C13-1234678 HeptaCDF **	%	78							4010827
C13-123478 HexaCDD	%	73							4010827
C13-123478 HexaCDF	%	80							4010827
C13-1234789 HeptaCDF	%	81							4010827
C13-123678 HexaCDD	%	73							4010827
C13-123678 HexaCDF	%	78							4010827
C13-12378 PentaCDD	%	74							4010827
C13-12378 PentaCDF	%	74							4010827
C13-123789 HexaCDF	%	80							4010827
C13-234678 HexaCDF	%	60							4010827
C13-23478 PentaCDF	%	72							4010827
C13-2378 TetraCDD	%	57							4010827
C13-2378 TetraCDF	%	56							4010827
C13-OCDD	%	84							4010827

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP504							
Sampling Date		2015/04/23 16:00							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW012-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.189	0.189	0.200	0.400	1.00	0.189		4010827
1,2,3,7,8-Penta CDD	pg/g	1.25	0.159	0.999	0.400	1.00	1.25		4010827
1,2,3,4,7,8-Hexa CDD	pg/g	3.34	0.160	0.999	0.400	0.100	0.334		4010827
1,2,3,6,7,8-Hexa CDD	pg/g	16.3	0.176	0.999	0.400	0.100	1.63		4010827
1,2,3,7,8,9-Hexa CDD	pg/g	8.66	0.166	0.999	0.400	0.100	0.866		4010827
1,2,3,4,6,7,8-Hepta CDD	pg/g	345	0.141	0.999	0.400	0.0100	3.45		4010827
Octa CDD	pg/g	2160	0.122	2.00	0.800	0.000300	0.648		4010827
Total Tetra CDD	pg/g	1.16	0.189	0.200	0.400			3	4010827
Total Penta CDD	pg/g	4.94	0.159	0.999	0.400			6	4010827
Total Hexa CDD	pg/g	74.9	0.169	0.999	0.400			7	4010827
Total Hepta CDD	pg/g	601	0.141	0.999	0.400			2	4010827
2,3,7,8-Tetra CDF **	pg/g	<0.569 (1)	0.569	0.200	0.400	0.100	0.0569		4010827
1,2,3,7,8-Penta CDF	pg/g	0.609	0.203	0.999	0.400	0.0300	0.0183		4010827
2,3,4,7,8-Penta CDF	pg/g	0.862	0.197	0.999	0.400	0.300	0.259		4010827
1,2,3,4,7,8-Hexa CDF	pg/g	4.29	0.120	0.999	0.400	0.100	0.429		4010827
1,2,3,6,7,8-Hexa CDF	pg/g	2.90	0.125	0.999	0.400	0.100	0.290		4010827
2,3,4,6,7,8-Hexa CDF	pg/g	2.13	0.115	0.999	0.400	0.100	0.213		4010827
1,2,3,7,8,9-Hexa CDF	pg/g	0.157	0.130	0.999	0.400	0.100	0.0157		4010827
1,2,3,4,6,7,8-Hepta CDF	pg/g	44.1	0.0950	0.999	0.400	0.0100	0.441		4010827
1,2,3,4,7,8,9-Hepta CDF	pg/g	2.50	0.0988	0.999	0.400	0.0100	0.0250		4010827
Octa CDF	pg/g	72.6	0.150	2.00	0.800	0.000300	0.0218		4010827
Total Tetra CDF	pg/g	6.44	0.200	0.200	0.400			6	4010827
Total Penta CDF	pg/g	24.7	0.200	0.999	0.400			7	4010827
Total Hexa CDF	pg/g	85.6	0.122	0.999	0.400			10	4010827
Total Hepta CDF	pg/g	116	0.0969	0.999	0.400			4	4010827
TOTAL TOXIC EQUIVALENCY	pg/g						10.1		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD	%	80							4010827

RDL = Reportable Detection Limit  
EDL = Estimated Detection Limit  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP504							
Sampling Date		2015/04/23 16:00							
COC Number		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW012-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

C13-1234678 HeptaCDD *	%	91							4010827
C13-1234678 HeptaCDF **	%	87							4010827
C13-123478 HexaCDD	%	80							4010827
C13-123478 HexaCDF	%	87							4010827
C13-1234789 HeptaCDF	%	92							4010827
C13-123678 HexaCDD	%	79							4010827
C13-123678 HexaCDF	%	85							4010827
C13-12378 PentaCDD	%	84							4010827
C13-12378 PentaCDF	%	85							4010827
C13-123789 HexaCDF	%	87							4010827
C13-234678 HexaCDF	%	67							4010827
C13-23478 PentaCDF	%	87							4010827
C13-2378 TetraCDD	%	65							4010827
C13-2378 TetraCDF	%	65							4010827
C13-OCDD	%	99							4010827

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP505							
Sampling Date		2015/04/23 16:20							
COC Number		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW014-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	1.36	0.220	0.190	0.400	1.00	1.36		4010827
1,2,3,7,8-Penta CDD	pg/g	25.1	0.240	0.949	0.400	1.00	25.1		4010827
1,2,3,4,7,8-Hexa CDD	pg/g	88.6	0.409	0.949	0.400	0.100	8.86		4010827
1,2,3,6,7,8-Hexa CDD	pg/g	569	0.451	0.949	0.400	0.100	56.9		4010827
1,2,3,7,8,9-Hexa CDD	pg/g	208	0.425	0.949	0.400	0.100	20.8		4010827
1,2,3,4,6,7,8-Hepta CDD	pg/g	11100 (1)	1.55	19.0	0.400	0.0100	111		4010827
Octa CDD	pg/g	66200 (1)	2.13	38.0	0.800	0.000300	19.9		4010827
Total Tetra CDD	pg/g	8.54	0.220	0.190	0.400			9	4010827
Total Penta CDD	pg/g	104	0.240	0.949	0.400			12	4010827
Total Hexa CDD	pg/g	2190	0.434	0.949	0.400			7	4010827
Total Hepta CDD	pg/g	18900 (1)	1.55	19.0	0.400			2	4010827
2,3,7,8-Tetra CDF **	pg/g	12.4	0.202	0.190	0.400	0.100	1.24		4010827
1,2,3,7,8-Penta CDF	pg/g	47.7	0.301	0.949	0.400	0.0300	1.43		4010827
2,3,4,7,8-Penta CDF	pg/g	69.7	0.292	0.949	0.400	0.300	20.9		4010827
1,2,3,4,7,8-Hexa CDF	pg/g	403	0.781	0.949	0.400	0.100	40.3		4010827
1,2,3,6,7,8-Hexa CDF	pg/g	161	0.812	0.949	0.400	0.100	16.1		4010827
2,3,4,6,7,8-Hexa CDF	pg/g	88.3	0.746	0.949	0.400	0.100	8.83		4010827
1,2,3,7,8,9-Hexa CDF	pg/g	6.69	0.845	0.949	0.400	0.100	0.669		4010827
1,2,3,4,6,7,8-Hepta CDF	pg/g	1700	0.644	0.949	0.400	0.0100	17.0		4010827
1,2,3,4,7,8,9-Hepta CDF	pg/g	99.9	0.669	0.949	0.400	0.0100	0.999		4010827
Octa CDF	pg/g	1440	0.778	1.90	0.800	0.000300	0.432		4010827
Total Tetra CDF	pg/g	64.8	0.202	0.190	0.400			12	4010827
Total Penta CDF	pg/g	1100	0.297	0.949	0.400			12	4010827
Total Hexa CDF	pg/g	4700	0.794	0.949	0.400			12	4010827
Total Hepta CDF	pg/g	4370	0.656	0.949	0.400			4	4010827
Confirmation 2,3,7,8-Tetra CDF	pg/g	11.2	0.17	0.95	0.86	0.100	1.12		4014081
TOTAL TOXIC EQUIVALENCY	pg/g						352		

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like  
 Compounds  
 ( 1 ) \*\* From 20X Dilution Run \*\*

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP505							
Sampling Date		2015/04/23 16:20							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW014-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch

Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	76							4010827
C13-1234678 HeptaCDD	%	76 (1)							4010827
C13-1234678 HeptaCDF **	%	71							4010827
C13-123478 HexaCDD	%	66							4010827
C13-123478 HexaCDF	%	71							4010827
C13-1234789 HeptaCDF	%	80							4010827
C13-123678 HexaCDD	%	65							4010827
C13-123678 HexaCDF	%	69							4010827
C13-12378 PentaCDD	%	71							4010827
C13-12378 PentaCDF	%	69							4010827
C13-123789 HexaCDF	%	70							4010827
C13-234678 HexaCDF	%	53							4010827
C13-23478 PentaCDF	%	72							4010827
C13-2378 TetraCDD	%	52							4010827
C13-2378 TetraCDF	%	51							4010827
C13-OCDD	%	81 (1)							4010827
Confirmation C13-2378 TetraCDF	%	55							4014081

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 ( 1 ) \*\* From 20X Dilution Run \*\*



Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP506							
Sampling Date		2015/04/23 16:40							
COC Number		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SBS-AOI017-1.0</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	1.22	0.182	0.185	0.400	1.00	1.22		4010827
1,2,3,7,8-Penta CDD	pg/g	2.47	0.184	0.925	0.400	1.00	2.47		4010827
1,2,3,4,7,8-Hexa CDD	pg/g	3.69	0.181	0.925	0.400	0.100	0.369		4010827
1,2,3,6,7,8-Hexa CDD	pg/g	10.4	0.199	0.925	0.400	0.100	1.04		4010827
1,2,3,7,8,9-Hexa CDD	pg/g	6.93	0.188	0.925	0.400	0.100	0.693		4010827
1,2,3,4,6,7,8-Hepta CDD	pg/g	175	0.120	0.925	0.400	0.0100	1.75		4010827
Octa CDD	pg/g	863	0.422	1.85	0.800	0.000300	0.259		4010827
Total Tetra CDD	pg/g	3.34	0.182	0.185	0.400			4	4010827
Total Penta CDD	pg/g	3.72	0.184	0.925	0.400			3	4010827
Total Hexa CDD	pg/g	45.9	0.192	0.925	0.400			5	4010827
Total Hepta CDD	pg/g	292	0.120	0.925	0.400			2	4010827
2,3,7,8-Tetra CDF **	pg/g	0.898	0.177	0.185	0.400	0.100	0.0898		4010827
1,2,3,7,8-Penta CDF	pg/g	2.26	0.166	0.925	0.400	0.0300	0.0678		4010827
2,3,4,7,8-Penta CDF	pg/g	2.33	0.161	0.925	0.400	0.300	0.699		4010827
1,2,3,4,7,8-Hexa CDF	pg/g	5.52	0.130	0.925	0.400	0.100	0.552		4010827
1,2,3,6,7,8-Hexa CDF	pg/g	3.66	0.135	0.925	0.400	0.100	0.366		4010827
2,3,4,6,7,8-Hexa CDF	pg/g	3.14	0.124	0.925	0.400	0.100	0.314		4010827
1,2,3,7,8,9-Hexa CDF	pg/g	1.78	0.141	0.925	0.400	0.100	0.178		4010827
1,2,3,4,6,7,8-Hepta CDF	pg/g	25.8	0.133	0.925	0.400	0.0100	0.258		4010827
1,2,3,4,7,8,9-Hepta CDF	pg/g	3.43	0.139	0.925	0.400	0.0100	0.0343		4010827
Octa CDF	pg/g	31.0	0.177	1.85	0.800	0.000300	0.00930		4010827
Total Tetra CDF	pg/g	3.53	0.177	0.185	0.400			6	4010827
Total Penta CDF	pg/g	13.3	0.164	0.925	0.400			6	4010827
Total Hexa CDF	pg/g	53.9	0.132	0.925	0.400			10	4010827
Total Hepta CDF	pg/g	68.6	0.136	0.925	0.400			4	4010827
Confirmation 2,3,7,8-Tetra CDF	pg/g	<0.51 (1)	0.51	0.92	0.83	0.100	0.0510		4203313
TOTAL TOXIC EQUIVALENCY	pg/g						10.3		

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 (1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP506							
Sampling Date		2015/04/23 16:40							
COC Number		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SBS-AOI017-1.0</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	67							4010827
C13-1234678 HeptaCDD	%	67							4010827
C13-1234678 HeptaCDF **	%	61							4010827
C13-123478 HexaCDD	%	60							4010827
C13-123478 HexaCDF	%	63							4010827
C13-1234789 HeptaCDF	%	66							4010827
C13-123678 HexaCDD	%	61							4010827
C13-123678 HexaCDF	%	62							4010827
C13-12378 PentaCDD	%	61							4010827
C13-12378 PentaCDF	%	58							4010827
C13-123789 HexaCDF	%	66							4010827
C13-234678 HexaCDF	%	50							4010827
C13-23478 PentaCDF	%	60							4010827
C13-2378 TetraCDD	%	46							4010827
C13-2378 TetraCDF	%	45							4010827
C13-OCDD	%	67							4010827
Confirmation C13-2378 TetraCDF	%	45							4203313

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

### Test Summary

**Maxxam ID** AEP502 **Collected** 2015/04/23  
**Sample ID** SS-ROW036-0.5 **Shipped**  
**Matrix** Soil **Received** 2015/04/29

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4010827	2015/05/03	2015/05/07	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014081	N/A	2015/05/07	Vica Cioranic
Moisture	BAL	4005942	N/A	2015/05/01	Chun Yan

**Maxxam ID** AEP503 **Collected** 2015/04/23  
**Sample ID** SBS-AOI032-1.0 **Shipped**  
**Matrix** Soil **Received** 2015/04/29

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4010827	2015/05/03	2015/05/07	Kay Shaw
Moisture	BAL	4005942	N/A	2015/05/01	Chun Yan

**Maxxam ID** AEP503 Dup **Collected** 2015/04/23  
**Sample ID** SBS-AOI032-1.0 **Shipped**  
**Matrix** Soil **Received** 2015/04/29

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4010827	2015/05/03	2015/05/07	Kay Shaw

**Maxxam ID** AEP504 **Collected** 2015/04/23  
**Sample ID** SS-ROW012-0.5 **Shipped**  
**Matrix** Soil **Received** 2015/04/29

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4010827	2015/05/03	2015/05/07	Kay Shaw
Moisture	BAL	4005942	N/A	2015/05/01	Chun Yan

**Maxxam ID** AEP505 **Collected** 2015/04/23  
**Sample ID** SS-ROW014-0.5 **Shipped**  
**Matrix** Soil **Received** 2015/04/29

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4010827	2015/05/03	2015/05/07	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014081	N/A	2015/05/07	Vica Cioranic
Moisture	BAL	4005942	N/A	2015/05/01	Chun Yan

**Maxxam ID** AEP506 **Collected** 2015/04/23  
**Sample ID** SBS-AOI017-1.0 **Shipped**  
**Matrix** Soil **Received** 2015/04/29

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4010827	2015/05/03	2015/05/07	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203313	N/A	2015/09/29	Leila Azzam
Moisture	BAL	4005942	N/A	2015/05/01	Chun Yan

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

### Test Summary

**Maxxam ID** AEP506 Dup  
**Sample ID** SBS-AOI017-1.0  
**Matrix** Soil

**Collected** 2015/04/23  
**Shipped**  
**Received** 2015/04/29

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Moisture	BAL	4005942	N/A	2015/05/01	Chun Yan

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

Package 1	8.3°C
Package 2	9.2°C

Each temperature is the average of up to three cooler temperatures taken at receipt

**GENERAL COMMENTS**

Report revised to reflect addition of missed TCDF confirmations.

**Results relate only to the items tested.**

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5D0784  
P.O. #:  
Site Location:

**Quality Assurance Report**  
Maxxam Job Number: GB577816

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
4005942 BOP	RPD - Sample/Sample Dup	Moisture	2015/05/01	1.1		%	20
4010827 KKS	Spiked Blank	37CL4 2378 Tetra CDD	2015/05/06		59	%	35 - 197
		C13-1234678 HeptaCDD	2015/05/06		58	%	23 - 140
		C13-1234678 HeptaCDF	2015/05/06		58	%	28 - 143
		C13-123478 HexaCDD	2015/05/06		56	%	32 - 141
		C13-123478 HexaCDF	2015/05/06		59	%	26 - 152
		C13-1234789 HeptaCDF	2015/05/06		57	%	26 - 138
		C13-123678 HexaCDD	2015/05/06		53	%	28 - 130
		C13-123678 HexaCDF	2015/05/06		59	%	26 - 123
		C13-12378 PentaCDD	2015/05/06		56	%	25 - 181
		C13-12378 PentaCDF	2015/05/06		57	%	24 - 185
		C13-123789 HexaCDF	2015/05/06		59	%	29 - 147
		C13-234678 HexaCDF	2015/05/06		41	%	28 - 136
		C13-23478 PentaCDF	2015/05/06		53	%	21 - 178
		C13-2378 TetraCDD	2015/05/06		44	%	25 - 164
		C13-2378 TetraCDF	2015/05/06		41	%	24 - 169
		C13-OCDD	2015/05/06		62	%	17 - 157
		2,3,7,8-Tetra CDD	2015/05/06		111	%	67 - 158
		1,2,3,7,8-Penta CDD	2015/05/06		97	%	70 - 142
		1,2,3,4,7,8-Hexa CDD	2015/05/06		105	%	70 - 164
		1,2,3,6,7,8-Hexa CDD	2015/05/06		110	%	76 - 134
		1,2,3,7,8,9-Hexa CDD	2015/05/06		109	%	64 - 162
		1,2,3,4,6,7,8-Hepta CDD	2015/05/06		105	%	70 - 140
		Octa CDD	2015/05/06		102	%	78 - 144
		2,3,7,8-Tetra CDF	2015/05/06		109	%	75 - 158
		1,2,3,7,8-Penta CDF	2015/05/06		108	%	80 - 134
		2,3,4,7,8-Penta CDF	2015/05/06		95	%	68 - 160
		1,2,3,4,7,8-Hexa CDF	2015/05/06		108	%	72 - 134
		1,2,3,6,7,8-Hexa CDF	2015/05/06		112	%	84 - 130
		2,3,4,6,7,8-Hexa CDF	2015/05/06		109	%	70 - 156
		1,2,3,7,8,9-Hexa CDF	2015/05/06		105	%	78 - 130
		1,2,3,4,6,7,8-Hepta CDF	2015/05/06		112	%	82 - 122
		1,2,3,4,7,8,9-Hepta CDF	2015/05/06		110	%	78 - 138
		Octa CDF	2015/05/06		96	%	63 - 170
	Method Blank	37CL4 2378 Tetra CDD	2015/05/07		70	%	35 - 197
		C13-1234678 HeptaCDD	2015/05/07		70	%	23 - 140
		C13-1234678 HeptaCDF	2015/05/07		76	%	28 - 143
		C13-123478 HexaCDD	2015/05/07		69	%	32 - 141
		C13-123478 HexaCDF	2015/05/07		78	%	26 - 152
		C13-1234789 HeptaCDF	2015/05/07		76	%	26 - 138
		C13-123678 HexaCDD	2015/05/07		69	%	28 - 130
		C13-123678 HexaCDF	2015/05/07		79	%	26 - 123
		C13-12378 PentaCDD	2015/05/07		67	%	25 - 181
		C13-12378 PentaCDF	2015/05/07		76	%	24 - 185
		C13-123789 HexaCDF	2015/05/07		76	%	29 - 147
		C13-234678 HexaCDF	2015/05/07		48	%	28 - 136
		C13-23478 PentaCDF	2015/05/07		62	%	21 - 178
		C13-2378 TetraCDD	2015/05/07		52	%	25 - 164
		C13-2378 TetraCDF	2015/05/07		48	%	24 - 169
		C13-OCDD	2015/05/07		76	%	17 - 157
		2,3,7,8-Tetra CDD	2015/05/07	<0.164, EDL=0.164		pg/g	
		1,2,3,7,8-Penta CDD	2015/05/07	<0.148, EDL=0.148		pg/g	
		1,2,3,4,7,8-Hexa CDD	2015/05/07	<0.104, EDL=0.104		pg/g	

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5D0784  
P.O. #:  
Site Location:

Quality Assurance Report (Continued)  
Maxxam Job Number: GB577816

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
4010827	KKS	Method Blank					
		1,2,3,6,7,8-Hexa CDD	2015/05/07	<0.115, EDL=0.115		pg/g	
		1,2,3,7,8,9-Hexa CDD	2015/05/07	<0.108, EDL=0.108		pg/g	
		1,2,3,4,6,7,8-Hepta CDD	2015/05/07	0.227, EDL=0.116		pg/g	
		Octa CDD	2015/05/07	0.906, EDL=0.107		pg/g	
		Total Tetra CDD	2015/05/07	<0.164, EDL=0.164		pg/g	
		Total Penta CDD	2015/05/07	<0.148, EDL=0.148		pg/g	
		Total Hexa CDD	2015/05/07	<0.110, EDL=0.110		pg/g	
		Total Hepta CDD	2015/05/07	0.395, EDL=0.116		pg/g	
		2,3,7,8-Tetra CDF	2015/05/07	<0.141, EDL=0.141		pg/g	
		1,2,3,7,8-Penta CDF	2015/05/07	<0.155, EDL=0.155		pg/g	
		2,3,4,7,8-Penta CDF	2015/05/07	<0.151, EDL=0.151		pg/g	
		1,2,3,4,7,8-Hexa CDF	2015/05/07	<0.109, EDL=0.109		pg/g	
		1,2,3,6,7,8-Hexa CDF	2015/05/07	<0.113, EDL=0.113		pg/g	
		2,3,4,6,7,8-Hexa CDF	2015/05/07	0.106, EDL=0.104		pg/g	
		1,2,3,7,8,9-Hexa CDF	2015/05/07	0.140, EDL=0.118		pg/g	
		1,2,3,4,6,7,8-Hepta CDF	2015/05/07	<0.0975, EDL=0.0975 (1)		pg/g	
		1,2,3,4,7,8,9-Hepta CDF	2015/05/07	<0.111, EDL=0.111 (1)		pg/g	
		Octa CDF	2015/05/07	0.317, EDL=0.0986		pg/g	
		Total Tetra CDF	2015/05/07	<0.141, EDL=0.141		pg/g	
		Total Penta CDF	2015/05/07	<0.153, EDL=0.153		pg/g	
		Total Hexa CDF	2015/05/07	0.140, EDL=0.111		pg/g	
		Total Hepta CDF	2015/05/07	<0.109, EDL=0.109 (1)		pg/g	
	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/05/07	NC		%	25
		1,2,3,7,8-Penta CDD	2015/05/07	NC		%	25
		1,2,3,4,7,8-Hexa CDD	2015/05/07	NC		%	25
		1,2,3,6,7,8-Hexa CDD	2015/05/07	4.7		%	25
		1,2,3,7,8,9-Hexa CDD	2015/05/07	NC		%	25
		1,2,3,4,6,7,8-Hepta CDD	2015/05/07	5.9		%	25
		Octa CDD	2015/05/07	4.3		%	25
		Total Tetra CDD	2015/05/07	NC		%	25
		Total Penta CDD	2015/05/07	NC		%	25
		Total Hexa CDD	2015/05/07	5.7		%	25
		Total Hepta CDD	2015/05/07	6.5		%	25
		2,3,7,8-Tetra CDF	2015/05/07	NC		%	25
		1,2,3,7,8-Penta CDF	2015/05/07	NC		%	25
		2,3,4,7,8-Penta CDF	2015/05/07	NC		%	25
		1,2,3,4,7,8-Hexa CDF	2015/05/07	NC		%	25
		1,2,3,6,7,8-Hexa CDF	2015/05/07	NC		%	25
		2,3,4,6,7,8-Hexa CDF	2015/05/07	NC		%	25
		1,2,3,7,8,9-Hexa CDF	2015/05/07	NC		%	25
		1,2,3,4,6,7,8-Hepta CDF	2015/05/07	5.1		%	25
		1,2,3,4,7,8,9-Hepta CDF	2015/05/07	NC		%	25
		Octa CDF	2015/05/07	6.9		%	25
		Total Tetra CDF	2015/05/07	54 (2)		%	25
		Total Penta CDF	2015/05/07	4.2		%	25
		Total Hexa CDF	2015/05/07	3.3		%	25
		Total Hepta CDF	2015/05/07	5.8		%	25
4014081	VCI	Method Blank					
		Confirmation C13-2378 TetraCDF	2015/05/07		51	%	40 - 135
		Confirmation 2,3,7,8-Tetra CDF	2015/05/07	<0.17, EDL=0.17		pg/g	
4203313	LAZ	Method Blank					
		Confirmation C13-2378 TetraCDF	2015/09/29		92	%	40 - 135
		Confirmation 2,3,7,8-Tetra CDF	2015/09/29	<0.12, EDL=0.12		pg/g	
	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/09/29	NC		%	100

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5D0784  
P.O. #:  
Site Location:

### Quality Assurance Report (Continued)

Maxxam Job Number: GB577816

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

( 1 ) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

( 2 ) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.



**Validation Signature Page**

**Maxxam Job #: B577816**

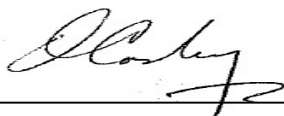
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The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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Cristina Carriere, Scientific Services



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Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5D0781  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/05/19**  
Report #: R3433850  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B583474**

**Received: 2015/05/06, 13:46**

Sample Matrix: Soil  
# Samples Received: 9

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	8	2015/05/07	2015/05/11	BRL SOP-00410	EPA 1613B m
Dioxins/Furans in Soil (1613B) (1)	1	2015/05/07	2015/05/12	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation in Soil	9	N/A	2015/05/12	BRL SOP-00406	EPA 8290A m
Moisture	9	N/A	2015/05/07	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT

Email: MDiGrazia@maxxam.ca

Phone# (905) 817-5700

=====  
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		AFP811	AFP812	AFP813	AFP814	AFP815			
Sampling Date		2015/04/23 11:25	2015/04/23 09:00	2015/04/23 14:40	2015/04/23 13:15	2015/04/23 14:15			
COC Number		na	na	na	na	na			
	Units	ISM-AOI017-0. 5-C-AFTER ISM	ISM-AOI012-0. 5-AFTER ISM	ISM-AOI029B-0 .5-AFTER ISM	ISM-AOI014-0. 5-AFTER ISM	ISM-AOI036-0. 5-AFTER ISM	RDL	MDL	QC Batch
Moisture	%	<1.0	<1.0	1.6	<1.0	<1.0	1.0	0.040	4014169
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									

Maxxam ID		AFP816	AFP817	AFP818	AFP819			
Sampling Date		2015/04/23 13:45	2015/04/23 10:50	2015/04/23 10:00	2015/04/23 10:30			
COC Number		na	na	na	na			
	Units	ISM-AOI032-0. 5-AFTER ISM	ISM-AOI017-0. 5-B-AFTER ISM	ISM-AOI015-0. 5-AFTER ISM	ISM-AOI017-0. 5-A-AFTER ISM	RDL	MDL	QC Batch
Moisture	%	1.6	<1.0	1.7	1.7	1.0	0.040	4014169
RDL = Reportable Detection Limit QC Batch = Quality Control Batch								

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP811							
Sampling Date		2015/04/23 11:25							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI017-0. 5-C-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	4.13	0.126	0.200	0.400	1.00	4.13		4017637
1,2,3,7,8-Penta CDD *	pg/g	6.84	0.152	0.999	0.400	1.00	6.84		4017637
1,2,3,4,7,8-Hexa CDD *	pg/g	15.2	0.237	0.999	0.400	0.100	1.52		4017637
1,2,3,6,7,8-Hexa CDD *	pg/g	54.9	0.251	0.999	0.400	0.100	5.49		4017637
1,2,3,7,8,9-Hexa CDD *	pg/g	36.5	0.231	0.999	0.400	0.100	3.65		4017637
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1100	0.123	0.999	0.400	0.0100	11.0		4017637
Octa CDD *	pg/g	6960 (1)	2.24	9.99	0.800	0.000300	2.09		4017637
Total Tetra CDD *	pg/g	10.3	0.126	0.200	0.400			7	4017637
Total Penta CDD *	pg/g	38.0	0.152	0.999	0.400			11	4017637
Total Hexa CDD *	pg/g	283	0.244	0.999	0.400			6	4017637
Total Hepta CDD *	pg/g	1850	0.123	0.999	0.400			2	4017637
2,3,7,8-Tetra CDF **	pg/g	2.85	0.146	0.200	0.400	0.100	0.285		4017637
1,2,3,7,8-Penta CDF **	pg/g	3.34	0.130	0.999	0.400	0.0300	0.100		4017637
2,3,4,7,8-Penta CDF **	pg/g	4.54	0.128	0.999	0.400	0.300	1.36		4017637
1,2,3,4,7,8-Hexa CDF **	pg/g	22.5	0.128	0.999	0.400	0.100	2.25		4017637
1,2,3,6,7,8-Hexa CDF **	pg/g	12.5	0.132	0.999	0.400	0.100	1.25		4017637
2,3,4,6,7,8-Hexa CDF **	pg/g	7.47	0.123	0.999	0.400	0.100	0.747		4017637
1,2,3,7,8,9-Hexa CDF **	pg/g	0.327	0.137	0.999	0.400	0.100	0.0327		4017637
1,2,3,4,6,7,8-Hepta CDF **	pg/g	187	0.153	0.999	0.400	0.0100	1.87		4017637
1,2,3,4,7,8,9-Hepta CDF **	pg/g	10.1	0.129	0.999	0.400	0.0100	0.101		4017637
Octa CDF **	pg/g	230	0.0997	2.00	0.800	0.000300	0.0690		4017637
Total Tetra CDF **	pg/g	17.2	0.146	0.200	0.400			9	4017637
Total Penta CDF **	pg/g	80.0	0.129	0.999	0.400			9	4017637
Total Hexa CDF **	pg/g	291	0.130	0.999	0.400			11	4017637
Total Hepta CDF **	pg/g	452	0.140	0.999	0.400			4	4017637
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<2.4 (2)	2.4	1.0	0.090	0.100	0.240		4021422
TOTAL TOXIC EQUIVALENCY	pg/g						42.7		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution \*\*  
(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AFP811							
<b>Sampling Date</b>		2015/04/23 11:25							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI017-0. 5-C-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	90							4017637
C13-1234678 HeptaCDD *	%	73							4017637
C13-1234678 HeptaCDF **	%	61							4017637
C13-123478 HexaCDD *	%	70							4017637
C13-123478 HexaCDF **	%	68							4017637
C13-1234789 HeptaCDF **	%	70							4017637
C13-123678 HexaCDD *	%	77							4017637
C13-123678 HexaCDF **	%	70							4017637
C13-12378 PentaCDD *	%	82							4017637
C13-12378 PentaCDF **	%	92							4017637
C13-123789 HexaCDF **	%	66							4017637
C13-234678 HexaCDF **	%	57							4017637
C13-23478 PentaCDF **	%	77							4017637
C13-2378 TetraCDD *	%	53							4017637
C13-2378 TetraCDF **	%	55							4017637
C13-OCDD *	%	81 (1)							4017637
Confirmation C13-2378 TetraCDF **	%	60							4021422

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution \*\*

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP812							
Sampling Date		2015/04/23 09:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI012-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.471 (1)	0.471	0.199	0.400	1.00	0.471		4017637
1,2,3,7,8-Penta CDD *	pg/g	2.45	0.105	0.997	0.400	1.00	2.45		4017637
1,2,3,4,7,8-Hexa CDD *	pg/g	6.27	0.159	0.997	0.400	0.100	0.627		4017637
1,2,3,6,7,8-Hexa CDD *	pg/g	24.6	0.168	0.997	0.400	0.100	2.46		4017637
1,2,3,7,8,9-Hexa CDD *	pg/g	15.1	0.155	0.997	0.400	0.100	1.51		4017637
1,2,3,4,6,7,8-Hepta CDD *	pg/g	542	0.139	0.997	0.400	0.0100	5.42		4017637
Octa CDD *	pg/g	3500	0.133	1.99	0.800	0.000300	1.05		4017637
Total Tetra CDD *	pg/g	3.61	0.238	0.199	0.400			3	4017637
Total Penta CDD *	pg/g	14.5	0.105	0.997	0.400			8	4017637
Total Hexa CDD *	pg/g	135	0.163	0.997	0.400			6	4017637
Total Hepta CDD *	pg/g	906	0.139	0.997	0.400			2	4017637
2,3,7,8-Tetra CDF **	pg/g	2.12	0.208	0.199	0.400	0.100	0.212		4017637
1,2,3,7,8-Penta CDF **	pg/g	1.88	0.175	0.997	0.400	0.0300	0.0564		4017637
2,3,4,7,8-Penta CDF **	pg/g	2.57	0.173	0.997	0.400	0.300	0.771		4017637
1,2,3,4,7,8-Hexa CDF **	pg/g	12.6	0.167	0.997	0.400	0.100	1.26		4017637
1,2,3,6,7,8-Hexa CDF **	pg/g	7.46	0.173	0.997	0.400	0.100	0.746		4017637
2,3,4,6,7,8-Hexa CDF **	pg/g	4.93	0.160	0.997	0.400	0.100	0.493		4017637
1,2,3,7,8,9-Hexa CDF **	pg/g	0.270	0.180	0.997	0.400	0.100	0.0270		4017637
1,2,3,4,6,7,8-Hepta CDF **	pg/g	101	0.222	0.997	0.400	0.0100	1.01		4017637
1,2,3,4,7,8,9-Hepta CDF **	pg/g	5.40	0.188	0.997	0.400	0.0100	0.0540		4017637
Octa CDF **	pg/g	122	0.140	1.99	0.800	0.000300	0.0366		4017637
Total Tetra CDF **	pg/g	16.1	0.208	0.199	0.400			9	4017637
Total Penta CDF **	pg/g	57.6	0.174	0.997	0.400			9	4017637
Total Hexa CDF **	pg/g	160	0.170	0.997	0.400			10	4017637
Total Hepta CDF **	pg/g	231	0.203	0.997	0.400			4	4017637
Confirmation 2,3,7,8-Tetra CDF **	pg/g	2.03	0.53	1.0	0.90	0.100	0.203		4021422
TOTAL TOXIC EQUIVALENCY	pg/g						18.6		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AFP812							
<b>Sampling Date</b>		2015/04/23 09:00							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI012-0. 5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	79							4017637
C13-1234678 HeptaCDD *	%	64							4017637
C13-1234678 HeptaCDF **	%	50							4017637
C13-123478 HexaCDD *	%	55							4017637
C13-123478 HexaCDF **	%	57							4017637
C13-1234789 HeptaCDF **	%	60							4017637
C13-123678 HexaCDD *	%	63							4017637
C13-123678 HexaCDF **	%	54							4017637
C13-12378 PentaCDD *	%	67							4017637
C13-12378 PentaCDF **	%	61							4017637
C13-123789 HexaCDF **	%	56							4017637
C13-234678 HexaCDF **	%	47							4017637
C13-23478 PentaCDF **	%	65							4017637
C13-2378 TetraCDD *	%	42							4017637
C13-2378 TetraCDF **	%	45							4017637
C13-OCDD *	%	73							4017637
Confirmation C13-2378 TetraCDF **	%	42							4021422

EDL = Estimated Detection Limit  
 RDL = Reportable Detection Limit  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin  
 \*\* CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP813							
Sampling Date		2015/04/23 14:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI029B-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.713	0.126	0.199	0.400	1.00	0.713		4017637
1,2,3,7,8-Penta CDD *	pg/g	5.24	0.136	0.995	0.400	1.00	5.24		4017637
1,2,3,4,7,8-Hexa CDD *	pg/g	10.5	0.0711	0.995	0.400	0.100	1.05		4017637
1,2,3,6,7,8-Hexa CDD *	pg/g	38.5	0.0755	0.995	0.400	0.100	3.85		4017637
1,2,3,7,8,9-Hexa CDD *	pg/g	23.8	0.0693	0.995	0.400	0.100	2.38		4017637
1,2,3,4,6,7,8-Hepta CDD *	pg/g	763	0.0744	0.995	0.400	0.0100	7.63		4017637
Octa CDD *	pg/g	5080 (1)	1.74	9.95	0.800	0.000300	1.52		4017637
Total Tetra CDD *	pg/g	10.5	0.126	0.199	0.400			10	4017637
Total Penta CDD *	pg/g	34.4	0.136	0.995	0.400			12	4017637
Total Hexa CDD *	pg/g	214	0.0731	0.995	0.400			6	4017637
Total Hepta CDD *	pg/g	1390	0.0744	0.995	0.400			2	4017637
2,3,7,8-Tetra CDF **	pg/g	2.85	0.156	0.199	0.400	0.100	0.285		4017637
1,2,3,7,8-Penta CDF **	pg/g	2.48	0.155	0.995	0.400	0.0300	0.0744		4017637
2,3,4,7,8-Penta CDF **	pg/g	3.48	0.154	0.995	0.400	0.300	1.04		4017637
1,2,3,4,7,8-Hexa CDF **	pg/g	13.7	0.115	0.995	0.400	0.100	1.37		4017637
1,2,3,6,7,8-Hexa CDF **	pg/g	7.73	0.118	0.995	0.400	0.100	0.773		4017637
2,3,4,6,7,8-Hexa CDF **	pg/g	5.96	0.110	0.995	0.400	0.100	0.596		4017637
1,2,3,7,8,9-Hexa CDF **	pg/g	0.322	0.123	0.995	0.400	0.100	0.0322		4017637
1,2,3,4,6,7,8-Hepta CDF **	pg/g	130	0.181	0.995	0.400	0.0100	1.30		4017637
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.97	0.153	0.995	0.400	0.0100	0.0697		4017637
Octa CDF **	pg/g	208	0.174	1.99	0.800	0.000300	0.0624		4017637
Total Tetra CDF **	pg/g	18.6	0.156	0.199	0.400			13	4017637
Total Penta CDF **	pg/g	57.7	0.155	0.995	0.400			12	4017637
Total Hexa CDF **	pg/g	179	0.116	0.995	0.400			11	4017637
Total Hepta CDF **	pg/g	329	0.166	0.995	0.400			4	4017637
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.79 (2)	0.79	0.99	0.89	0.100	0.0790		4021422
TOTAL TOXIC EQUIVALENCY	pg/g						27.8		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution \*\*  
(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.



Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AFP813							
<b>Sampling Date</b>		2015/04/23 14:40							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		# of	
	<b>Units</b>	<b>ISM-AOI029B-0 .5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	84							4017637
C13-1234678 HeptaCDD *	%	105							4017637
C13-1234678 HeptaCDF **	%	83							4017637
C13-123478 HexaCDD *	%	102							4017637
C13-123478 HexaCDF **	%	103							4017637
C13-1234789 HeptaCDF **	%	105							4017637
C13-123678 HexaCDD *	%	112							4017637
C13-123678 HexaCDF **	%	101							4017637
C13-12378 PentaCDD *	%	113							4017637
C13-12378 PentaCDF **	%	98							4017637
C13-123789 HexaCDF **	%	94							4017637
C13-234678 HexaCDF **	%	90							4017637
C13-23478 PentaCDF **	%	112							4017637
C13-2378 TetraCDD *	%	65							4017637
C13-2378 TetraCDF **	%	76							4017637
C13-OCDD *	%	104 (1)							4017637
Confirmation C13-2378 TetraCDF **	%	82							4021422

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution \*\*

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP814							
Sampling Date		2015/04/23 13:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI014-0-5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.589	0.194	0.199	0.400	1.00	0.589		4017637
1,2,3,7,8-Penta CDD *	pg/g	5.40	0.0869	0.995	0.400	1.00	5.40		4017637
1,2,3,4,7,8-Hexa CDD *	pg/g	14.8	0.204	0.995	0.400	0.100	1.48		4017637
1,2,3,6,7,8-Hexa CDD *	pg/g	58.0	0.216	0.995	0.400	0.100	5.80		4017637
1,2,3,7,8,9-Hexa CDD *	pg/g	31.6	0.199	0.995	0.400	0.100	3.16		4017637
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1230	0.0954	0.995	0.400	0.0100	12.3		4017637
Octa CDD *	pg/g	7750 (1)	2.06	9.95	0.800	0.000300	2.33		4017637
Total Tetra CDD *	pg/g	6.26	0.194	0.199	0.400			8	4017637
Total Penta CDD *	pg/g	29.8	0.0869	0.995	0.400			12	4017637
Total Hexa CDD *	pg/g	276	0.209	0.995	0.400			6	4017637
Total Hepta CDD *	pg/g	2180	0.0954	0.995	0.400			2	4017637
2,3,7,8-Tetra CDF **	pg/g	2.27	0.143	0.199	0.400	0.100	0.227		4017637
1,2,3,7,8-Penta CDF **	pg/g	4.33	0.146	0.995	0.400	0.0300	0.130		4017637
2,3,4,7,8-Penta CDF **	pg/g	5.93	0.144	0.995	0.400	0.300	1.78		4017637
1,2,3,4,7,8-Hexa CDF **	pg/g	32.2	0.120	0.995	0.400	0.100	3.22		4017637
1,2,3,6,7,8-Hexa CDF **	pg/g	15.7	0.124	0.995	0.400	0.100	1.57		4017637
2,3,4,6,7,8-Hexa CDF **	pg/g	9.89	0.115	0.995	0.400	0.100	0.989		4017637
1,2,3,7,8,9-Hexa CDF **	pg/g	0.608	0.129	0.995	0.400	0.100	0.0608		4017637
1,2,3,4,6,7,8-Hepta CDF **	pg/g	<205 (2)	205	0.995	0.400	0.0100	2.05		4017637
1,2,3,4,7,8,9-Hepta CDF **	pg/g	10.7	0.0683	0.995	0.400	0.0100	0.107		4017637
Octa CDF **	pg/g	219	0.101	1.99	0.800	0.000300	0.0657		4017637
Total Tetra CDF **	pg/g	17.9	0.143	0.199	0.400			12	4017637
Total Penta CDF **	pg/g	102	0.145	0.995	0.400			12	4017637
Total Hexa CDF **	pg/g	360	0.122	0.995	0.400			11	4017637
Total Hepta CDF **	pg/g	284	0.0741	0.995	0.400			3	4017637
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.76 (3)	0.76	1.0	0.90	0.100	0.0760		4021422

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution \*\*  
(2) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.  
(3) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP814							
Sampling Date		2015/04/23 13:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI014-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
TOTAL TOXIC EQUIVALENCY	pg/g						41.1		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	91							4017637
C13-1234678 HeptaCDD *	%	91							4017637
C13-1234678 HeptaCDF **	%	74							4017637
C13-123478 HexaCDD *	%	87							4017637
C13-123478 HexaCDF **	%	91							4017637
C13-1234789 HeptaCDF **	%	90							4017637
C13-123678 HexaCDD *	%	99							4017637
C13-123678 HexaCDF **	%	84							4017637
C13-12378 PentaCDD *	%	103							4017637
C13-12378 PentaCDF **	%	100							4017637
C13-123789 HexaCDF **	%	85							4017637
C13-234678 HexaCDF **	%	80							4017637
C13-23478 PentaCDF **	%	108							4017637
C13-2378 TetraCDD *	%	68							4017637
C13-2378 TetraCDF **	%	78							4017637
C13-OCDD *	%	119 (1)							4017637
Confirmation C13-2378 TetraCDF **	%	80							4021422
<p>EDL = Estimated Detection Limit  RDL = Reportable Detection Limit  TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds</p> <p>QC Batch = Quality Control Batch  * CDD = Chloro Dibenzo-p-Dioxin  ** CDF = Chloro Dibenzo-p-Furan  (1) ** From 5X Dilution **</p>									

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP815							
Sampling Date		2015/04/23 14:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI036-0- 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	7.33	0.125	0.199	0.400	1.00	7.33		4017637
1,2,3,7,8-Penta CDD *	pg/g	4.45	0.112	0.997	0.400	1.00	4.45		4017637
1,2,3,4,7,8-Hexa CDD *	pg/g	8.11	0.167	0.997	0.400	0.100	0.811		4017637
1,2,3,6,7,8-Hexa CDD *	pg/g	28.2	0.177	0.997	0.400	0.100	2.82		4017637
1,2,3,7,8,9-Hexa CDD *	pg/g	19.0	0.162	0.997	0.400	0.100	1.90		4017637
1,2,3,4,6,7,8-Hepta CDD *	pg/g	563	0.113	0.997	0.400	0.0100	5.63		4017637
Octa CDD *	pg/g	3560	0.0971	1.99	0.800	0.000300	1.07		4017637
Total Tetra CDD *	pg/g	22.1	0.125	0.199	0.400			10	4017637
Total Penta CDD *	pg/g	35.5	0.112	0.997	0.400			12	4017637
Total Hexa CDD *	pg/g	189	0.171	0.997	0.400			7	4017637
Total Hepta CDD *	pg/g	951	0.113	0.997	0.400			2	4017637
2,3,7,8-Tetra CDF **	pg/g	4.40	0.0970	0.199	0.400	0.100	0.440		4017637
1,2,3,7,8-Penta CDF **	pg/g	2.15	0.121	0.997	0.400	0.0300	0.0645		4017637
2,3,4,7,8-Penta CDF **	pg/g	3.40	0.120	0.997	0.400	0.300	1.02		4017637
1,2,3,4,7,8-Hexa CDF **	pg/g	13.8	0.115	0.997	0.400	0.100	1.38		4017637
1,2,3,6,7,8-Hexa CDF **	pg/g	7.03	0.119	0.997	0.400	0.100	0.703		4017637
2,3,4,6,7,8-Hexa CDF **	pg/g	6.01	0.111	0.997	0.400	0.100	0.601		4017637
1,2,3,7,8,9-Hexa CDF **	pg/g	0.263	0.124	0.997	0.400	0.100	0.0263		4017637
1,2,3,4,6,7,8-Hepta CDF **	pg/g	122	0.0937	0.997	0.400	0.0100	1.22		4017637
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.37	0.0791	0.997	0.400	0.0100	0.0637		4017637
Octa CDF **	pg/g	250	0.103	1.99	0.800	0.000300	0.0750		4017637
Total Tetra CDF **	pg/g	31.3	0.0970	0.199	0.400			14	4017637
Total Penta CDF **	pg/g	67.5	0.120	0.997	0.400			11	4017637
Total Hexa CDF **	pg/g	165	0.117	0.997	0.400			12	4017637
Total Hepta CDF **	pg/g	323	0.0858	0.997	0.400			4	4017637
Confirmation 2,3,7,8-Tetra CDF **	pg/g	2.24	0.20	1.0	0.90	0.100	0.224		4021422
TOTAL TOXIC EQUIVALENCY	pg/g						29.4		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	89							4017637
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP815							
Sampling Date		2015/04/23 14:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI036-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	102							4017637
C13-1234678 HeptaCDF **	%	82							4017637
C13-123478 HexaCDD *	%	103							4017637
C13-123478 HexaCDF **	%	102							4017637
C13-1234789 HeptaCDF **	%	101							4017637
C13-123678 HexaCDD *	%	117							4017637
C13-123678 HexaCDF **	%	97							4017637
C13-12378 PentaCDD *	%	119							4017637
C13-12378 PentaCDF **	%	102							4017637
C13-123789 HexaCDF **	%	97							4017637
C13-234678 HexaCDF **	%	92							4017637
C13-23478 PentaCDF **	%	114							4017637
C13-2378 TetraCDD *	%	71							4017637
C13-2378 TetraCDF **	%	80							4017637
C13-OCDD *	%	110							4017637
Confirmation C13-2378 TetraCDF **	%	88							4021422

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP816							
Sampling Date		2015/04/23 13:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI032-0- 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.599	0.144	0.200	0.400	1.00	0.599		4017637
1,2,3,7,8-Penta CDD *	pg/g	3.40	0.106	0.998	0.400	1.00	3.40		4017637
1,2,3,4,7,8-Hexa CDD *	pg/g	5.72	0.113	0.998	0.400	0.100	0.572		4017637
1,2,3,6,7,8-Hexa CDD *	pg/g	19.6	0.119	0.998	0.400	0.100	1.96		4017637
1,2,3,7,8,9-Hexa CDD *	pg/g	13.1	0.110	0.998	0.400	0.100	1.31		4017637
1,2,3,4,6,7,8-Hepta CDD *	pg/g	390	0.144	0.998	0.400	0.0100	3.90		4017637
Octa CDD *	pg/g	2470	0.108	2.00	0.800	0.000300	0.741		4017637
Total Tetra CDD *	pg/g	12.3	0.144	0.200	0.400			9	4017637
Total Penta CDD *	pg/g	28.8	0.106	0.998	0.400			11	4017637
Total Hexa CDD *	pg/g	114	0.116	0.998	0.400			6	4017637
Total Hepta CDD *	pg/g	659	0.144	0.998	0.400			2	4017637
2,3,7,8-Tetra CDF **	pg/g	2.98	0.118	0.200	0.400	0.100	0.298		4017637
1,2,3,7,8-Penta CDF **	pg/g	1.65	0.102	0.998	0.400	0.0300	0.0495		4017637
2,3,4,7,8-Penta CDF **	pg/g	2.45	0.101	0.998	0.400	0.300	0.735		4017637
1,2,3,4,7,8-Hexa CDF **	pg/g	9.61	0.0862	0.998	0.400	0.100	0.961		4017637
1,2,3,6,7,8-Hexa CDF **	pg/g	5.70	0.0891	0.998	0.400	0.100	0.570		4017637
2,3,4,6,7,8-Hexa CDF **	pg/g	5.05	0.0828	0.998	0.400	0.100	0.505		4017637
1,2,3,7,8,9-Hexa CDF **	pg/g	0.240	0.0927	0.998	0.400	0.100	0.0240		4017637
1,2,3,4,6,7,8-Hepta CDF **	pg/g	80.2	0.127	0.998	0.400	0.0100	0.802		4017637
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.88	0.107	0.998	0.400	0.0100	0.0388		4017637
Octa CDF **	pg/g	154	0.111	2.00	0.800	0.000300	0.0462		4017637
Total Tetra CDF **	pg/g	23.5	0.118	0.200	0.400			13	4017637
Total Penta CDF **	pg/g	69.3	0.102	0.998	0.400			13	4017637
Total Hexa CDF **	pg/g	125	0.0875	0.998	0.400			11	4017637
Total Hepta CDF **	pg/g	201	0.116	0.998	0.400			4	4017637
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.39	0.15	1.0	0.90	0.100	0.139		4021422
TOTAL TOXIC EQUIVALENCY	pg/g						16.4		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	102							4017637

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP816							
Sampling Date		2015/04/23 13:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI032-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	104							4017637
C13-1234678 HeptaCDF **	%	84							4017637
C13-123478 HexaCDD *	%	109							4017637
C13-123478 HexaCDF **	%	109							4017637
C13-1234789 HeptaCDF **	%	104							4017637
C13-123678 HexaCDD *	%	120							4017637
C13-123678 HexaCDF **	%	108							4017637
C13-12378 PentaCDD *	%	112							4017637
C13-12378 PentaCDF **	%	101							4017637
C13-123789 HexaCDF **	%	94							4017637
C13-234678 HexaCDF **	%	93							4017637
C13-23478 PentaCDF **	%	113							4017637
C13-2378 TetraCDD *	%	77							4017637
C13-2378 TetraCDF **	%	84							4017637
C13-OCDD *	%	110							4017637
Confirmation C13-2378 TetraCDF **	%	87							4021422

EDL = Estimated Detection Limit  
 RDL = Reportable Detection Limit  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin  
 \*\* CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP817							
Sampling Date		2015/04/23 10:50							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI017-0. 5-B-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	2.77	0.144	0.199	0.400	1.00	2.77		4017637
1,2,3,7,8-Penta CDD *	pg/g	4.39	0.107	0.996	0.400	1.00	4.39		4017637
1,2,3,4,7,8-Hexa CDD *	pg/g	11.3	0.182	0.996	0.400	0.100	1.13		4017637
1,2,3,6,7,8-Hexa CDD *	pg/g	41.3	0.193	0.996	0.400	0.100	4.13		4017637
1,2,3,7,8,9-Hexa CDD *	pg/g	23.3	0.178	0.996	0.400	0.100	2.33		4017637
1,2,3,4,6,7,8-Hepta CDD *	pg/g	836	0.212	0.996	0.400	0.0100	8.36		4017637
Octa CDD *	pg/g	5060 (1)	1.80	9.96	0.800	0.000300	1.52		4017637
Total Tetra CDD *	pg/g	6.09	0.144	0.199	0.400			4	4017637
Total Penta CDD *	pg/g	23.3	0.107	0.996	0.400			11	4017637
Total Hexa CDD *	pg/g	209	0.187	0.996	0.400			6	4017637
Total Hepta CDD *	pg/g	1410	0.212	0.996	0.400			2	4017637
2,3,7,8-Tetra CDF **	pg/g	1.89	0.130	0.199	0.400	0.100	0.189		4017637
1,2,3,7,8-Penta CDF **	pg/g	2.40	0.139	0.996	0.400	0.0300	0.0720		4017637
2,3,4,7,8-Penta CDF **	pg/g	3.14	0.138	0.996	0.400	0.300	0.942		4017637
1,2,3,4,7,8-Hexa CDF **	pg/g	16.6	0.115	0.996	0.400	0.100	1.66		4017637
1,2,3,6,7,8-Hexa CDF **	pg/g	9.41	0.119	0.996	0.400	0.100	0.941		4017637
2,3,4,6,7,8-Hexa CDF **	pg/g	6.01	0.110	0.996	0.400	0.100	0.601		4017637
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.273 (2)	0.273	0.996	0.400	0.100	0.0273		4017637
1,2,3,4,6,7,8-Hepta CDF **	pg/g	139	0.0964	0.996	0.400	0.0100	1.39		4017637
1,2,3,4,7,8,9-Hepta CDF **	pg/g	7.28	0.0814	0.996	0.400	0.0100	0.0728		4017637
Octa CDF **	pg/g	172	0.105	1.99	0.800	0.000300	0.0516		4017637
Total Tetra CDF **	pg/g	12.4	0.130	0.199	0.400			10	4017637
Total Penta CDF **	pg/g	57.2	0.138	0.996	0.400			10	4017637
Total Hexa CDF **	pg/g	214	0.117	0.996	0.400			10	4017637
Total Hepta CDF **	pg/g	329	0.0883	0.996	0.400			4	4017637
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.95	0.17	1.0	0.90	0.100	0.0950		4021422
TOTAL TOXIC EQUIVALENCY	pg/g						30.5		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution \*\*  
(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.



Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AFP817							
<b>Sampling Date</b>		2015/04/23 10:50							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI017-0. 5-B-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	89							4017637
C13-1234678 HeptaCDD *	%	98							4017637
C13-1234678 HeptaCDF **	%	81							4017637
C13-123478 HexaCDD *	%	98							4017637
C13-123478 HexaCDF **	%	100							4017637
C13-1234789 HeptaCDF **	%	97							4017637
C13-123678 HexaCDD *	%	109							4017637
C13-123678 HexaCDF **	%	93							4017637
C13-12378 PentaCDD *	%	104							4017637
C13-12378 PentaCDF **	%	91							4017637
C13-123789 HexaCDF **	%	87							4017637
C13-234678 HexaCDF **	%	86							4017637
C13-23478 PentaCDF **	%	105							4017637
C13-2378 TetraCDD *	%	73							4017637
C13-2378 TetraCDF **	%	78							4017637
C13-OCDD *	%	115 (1)							4017637
Confirmation C13-2378 TetraCDF **	%	79							4021422

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution \*\*

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP818							
Sampling Date		2015/04/23 10:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI015-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	3.37	0.241	0.199	0.400	1.00	3.37		4017637
1,2,3,7,8-Penta CDD *	pg/g	45.5	0.245	0.994	0.400	1.00	45.5		4017637
1,2,3,4,7,8-Hexa CDD *	pg/g	80.0	0.106	0.994	0.400	0.100	8.00		4017637
1,2,3,6,7,8-Hexa CDD *	pg/g	285	0.113	0.994	0.400	0.100	28.5		4017637
1,2,3,7,8,9-Hexa CDD *	pg/g	191	0.103	0.994	0.400	0.100	19.1		4017637
1,2,3,4,6,7,8-Hepta CDD *	pg/g	4080 (1)	1.19	4.97	0.400	0.0100	40.8		4017637
Octa CDD *	pg/g	19400 (1)	0.631	9.94	0.800	0.000300	5.82		4017637
Total Tetra CDD *	pg/g	28.0	0.241	0.199	0.400			10	4017637
Total Penta CDD *	pg/g	301	0.245	0.994	0.400			10	4017637
Total Hexa CDD *	pg/g	2090	0.109	0.994	0.400			7	4017637
Total Hepta CDD *	pg/g	7470 (1)	1.19	4.97	0.400			2	4017637
2,3,7,8-Tetra CDF **	pg/g	6.01	0.168	0.199	0.400	0.100	0.601		4017637
1,2,3,7,8-Penta CDF **	pg/g	14.6	0.194	0.994	0.400	0.0300	0.438		4017637
2,3,4,7,8-Penta CDF **	pg/g	14.1	0.192	0.994	0.400	0.300	4.23		4017637
1,2,3,4,7,8-Hexa CDF **	pg/g	74.0	0.201	0.994	0.400	0.100	7.40		4017637
1,2,3,6,7,8-Hexa CDF **	pg/g	83.7	0.208	0.994	0.400	0.100	8.37		4017637
2,3,4,6,7,8-Hexa CDF **	pg/g	45.9	0.193	0.994	0.400	0.100	4.59		4017637
1,2,3,7,8,9-Hexa CDF **	pg/g	1.00	0.217	0.994	0.400	0.100	0.100		4017637
1,2,3,4,6,7,8-Hepta CDF **	pg/g	584	0.132	0.994	0.400	0.0100	5.84		4017637
1,2,3,4,7,8,9-Hepta CDF **	pg/g	26.3	0.112	0.994	0.400	0.0100	0.263		4017637
Octa CDF **	pg/g	375	0.126	1.99	0.800	0.000300	0.113		4017637
Total Tetra CDF **	pg/g	43.4	0.168	0.199	0.400			14	4017637
Total Penta CDF **	pg/g	365	0.193	0.994	0.400			12	4017637
Total Hexa CDF **	pg/g	1060	0.205	0.994	0.400			11	4017637
Total Hepta CDF **	pg/g	1080	0.121	0.994	0.400			4	4017637
Confirmation 2,3,7,8-Tetra CDF **	pg/g	4.92	0.17	0.99	0.89	0.100	0.492		4021422
TOTAL TOXIC EQUIVALENCY	pg/g						183		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution \*\*

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AFP818							
<b>Sampling Date</b>		2015/04/23 10:00							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI015-0. 5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	81							4017637
C13-1234678 HeptaCDD *	%	87 (1)							4017637
C13-1234678 HeptaCDF **	%	68							4017637
C13-123478 HexaCDD *	%	84							4017637
C13-123478 HexaCDF **	%	87							4017637
C13-1234789 HeptaCDF **	%	83							4017637
C13-123678 HexaCDD *	%	99							4017637
C13-123678 HexaCDF **	%	79							4017637
C13-12378 PentaCDD *	%	95							4017637
C13-12378 PentaCDF **	%	85							4017637
C13-123789 HexaCDF **	%	79							4017637
C13-234678 HexaCDF **	%	79							4017637
C13-23478 PentaCDF **	%	99							4017637
C13-2378 TetraCDD *	%	58							4017637
C13-2378 TetraCDF **	%	67							4017637
C13-OCDD *	%	106 (1)							4017637
Confirmation C13-2378 TetraCDF **	%	74							4021422

EDL = Estimated Detection Limit  
 RDL = Reportable Detection Limit  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin  
 \*\* CDF = Chloro Dibenzo-p-Furan  
 (1) \*\* From 5X Dilution \*\*

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP819							
Sampling Date		2015/04/23 10:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI017-0. 5-A-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	3.37	0.290	0.198	0.400	1.00	3.37		4017637
1,2,3,7,8-Penta CDD *	pg/g	7.15	0.182	0.992	0.400	1.00	7.15		4017637
1,2,3,4,7,8-Hexa CDD *	pg/g	18.6	0.200	0.992	0.400	0.100	1.86		4017637
1,2,3,6,7,8-Hexa CDD *	pg/g	63.8	0.212	0.992	0.400	0.100	6.38		4017637
1,2,3,7,8,9-Hexa CDD *	pg/g	40.0	0.195	0.992	0.400	0.100	4.00		4017637
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1180	0.165	0.992	0.400	0.0100	11.8		4017637
Octa CDD *	pg/g	7020 (1)	1.61	9.92	0.800	0.000300	2.11		4017637
Total Tetra CDD *	pg/g	9.97	0.290	0.198	0.400			4	4017637
Total Penta CDD *	pg/g	34.2	0.182	0.992	0.400			10	4017637
Total Hexa CDD *	pg/g	329	0.206	0.992	0.400			7	4017637
Total Hepta CDD *	pg/g	1920	0.165	0.992	0.400			2	4017637
2,3,7,8-Tetra CDF **	pg/g	2.67	0.136	0.198	0.400	0.100	0.267		4017637
1,2,3,7,8-Penta CDF **	pg/g	3.52	0.155	0.992	0.400	0.0300	0.106		4017637
2,3,4,7,8-Penta CDF **	pg/g	4.32	0.154	0.992	0.400	0.300	1.30		4017637
1,2,3,4,7,8-Hexa CDF **	pg/g	22.9	0.132	0.992	0.400	0.100	2.29		4017637
1,2,3,6,7,8-Hexa CDF **	pg/g	14.4	0.137	0.992	0.400	0.100	1.44		4017637
2,3,4,6,7,8-Hexa CDF **	pg/g	8.15	0.127	0.992	0.400	0.100	0.815		4017637
1,2,3,7,8,9-Hexa CDF **	pg/g	0.470	0.142	0.992	0.400	0.100	0.0470		4017637
1,2,3,4,6,7,8-Hepta CDF **	pg/g	214	0.311	0.992	0.400	0.0100	2.14		4017637
1,2,3,4,7,8,9-Hepta CDF **	pg/g	13.6	0.263	0.992	0.400	0.0100	0.136		4017637
Octa CDF **	pg/g	290	0.126	1.98	0.800	0.000300	0.0870		4017637
Total Tetra CDF **	pg/g	18.0	0.136	0.198	0.400			11	4017637
Total Penta CDF **	pg/g	77.0	0.154	0.992	0.400			11	4017637
Total Hexa CDF **	pg/g	306	0.134	0.992	0.400			11	4017637
Total Hepta CDF **	pg/g	532	0.285	0.992	0.400			4	4017637
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.48	0.18	0.99	0.89	0.100	0.148		4021422
TOTAL TOXIC EQUIVALENCY	pg/g						45.2		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution Run \*\*

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AFP819							
<b>Sampling Date</b>		2015/04/23 10:30							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI017-0. 5-A-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	95							4017637
C13-1234678 HeptaCDD *	%	112							4017637
C13-1234678 HeptaCDF **	%	92							4017637
C13-123478 HexaCDD *	%	105							4017637
C13-123478 HexaCDF **	%	108							4017637
C13-1234789 HeptaCDF **	%	109							4017637
C13-123678 HexaCDD *	%	117							4017637
C13-123678 HexaCDF **	%	100							4017637
C13-12378 PentaCDD *	%	121							4017637
C13-12378 PentaCDF **	%	102							4017637
C13-123789 HexaCDF **	%	95							4017637
C13-234678 HexaCDF **	%	102							4017637
C13-23478 PentaCDF **	%	122							4017637
C13-2378 TetraCDD *	%	80							4017637
C13-2378 TetraCDF **	%	86							4017637
C13-OCDD *	%	126 (1)							4017637
Confirmation C13-2378 TetraCDF **	%	100							4021422

EDL = Estimated Detection Limit  
 RDL = Reportable Detection Limit  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin  
 \*\* CDF = Chloro Dibenzo-p-Furan  
 (1) \*\* From 5X Dilution Run \*\*

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**TEST SUMMARY**

**Maxxam ID:** AFP811  
**Sample ID:** ISM-AOI017-0.5-C-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/23  
**Shipped:**  
**Received:** 2015/05/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4017637	2015/05/07	2015/05/11	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4021422	N/A	2015/05/12	Leila Azzam
Moisture	BAL	4014169	N/A	2015/05/07	Valentina Kaftani

**Maxxam ID:** AFP811 Dup  
**Sample ID:** ISM-AOI017-0.5-C-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/23  
**Shipped:**  
**Received:** 2015/05/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4014169	N/A	2015/05/07	Valentina Kaftani

**Maxxam ID:** AFP812  
**Sample ID:** ISM-AOI012-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/23  
**Shipped:**  
**Received:** 2015/05/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4017637	2015/05/07	2015/05/11	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4021422	N/A	2015/05/12	Leila Azzam
Moisture	BAL	4014169	N/A	2015/05/07	Valentina Kaftani

**Maxxam ID:** AFP813  
**Sample ID:** ISM-AOI029B-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/23  
**Shipped:**  
**Received:** 2015/05/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4017637	2015/05/07	2015/05/11	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4021422	N/A	2015/05/12	Leila Azzam
Moisture	BAL	4014169	N/A	2015/05/07	Valentina Kaftani

**Maxxam ID:** AFP814  
**Sample ID:** ISM-AOI014-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/23  
**Shipped:**  
**Received:** 2015/05/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4017637	2015/05/07	2015/05/11	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4021422	N/A	2015/05/12	Leila Azzam
Moisture	BAL	4014169	N/A	2015/05/07	Valentina Kaftani

**Maxxam ID:** AFP815  
**Sample ID:** ISM-AOI036-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/23  
**Shipped:**  
**Received:** 2015/05/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4017637	2015/05/07	2015/05/11	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4021422	N/A	2015/05/12	Leila Azzam
Moisture	BAL	4014169	N/A	2015/05/07	Valentina Kaftani

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**TEST SUMMARY**

**Maxxam ID:** AFP816  
**Sample ID:** ISM-AOI032-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/23  
**Shipped:**  
**Received:** 2015/05/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4017637	2015/05/07	2015/05/11	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4021422	N/A	2015/05/12	Leila Azzam
Moisture	BAL	4014169	N/A	2015/05/07	Valentina Kaftani

**Maxxam ID:** AFP817  
**Sample ID:** ISM-AOI017-0.5-B-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/23  
**Shipped:**  
**Received:** 2015/05/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4017637	2015/05/07	2015/05/11	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4021422	N/A	2015/05/12	Leila Azzam
Moisture	BAL	4014169	N/A	2015/05/07	Valentina Kaftani

**Maxxam ID:** AFP818  
**Sample ID:** ISM-AOI015-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/23  
**Shipped:**  
**Received:** 2015/05/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4017637	2015/05/07	2015/05/11	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4021422	N/A	2015/05/12	Leila Azzam
Moisture	BAL	4014169	N/A	2015/05/07	Valentina Kaftani

**Maxxam ID:** AFP819  
**Sample ID:** ISM-AOI017-0.5-A-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/23  
**Shipped:**  
**Received:** 2015/05/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4017637	2015/05/07	2015/05/12	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4021422	N/A	2015/05/12	Leila Azzam
Moisture	BAL	4014169	N/A	2015/05/07	Valentina Kaftani

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

### GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.9°C
Package 2	8.4°C

### DIOXINS AND FURANS BY HRMS (SOIL)

Dioxins/Furans in Soil (1613B): \*\* From 20X Dilution Run \*\*

**Results relate only to the items tested.**



Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
4014169	BOP	RPD - Sample/Sample Dup	Moisture	2015/05/07	NC		%	20
4017637	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/05/11		86	%	35 - 197
			C13-1234678 HeptaCDD	2015/05/11		82	%	23 - 140
			C13-1234678 HeptaCDF	2015/05/11		68	%	28 - 143
			C13-123478 HexaCDD	2015/05/11		74	%	32 - 141
			C13-123478 HexaCDF	2015/05/11		74	%	26 - 152
			C13-1234789 HeptaCDF	2015/05/11		78	%	26 - 138
			C13-123678 HexaCDD	2015/05/11		85	%	28 - 130
			C13-123678 HexaCDF	2015/05/11		77	%	26 - 123
			C13-12378 PentaCDD	2015/05/11		90	%	25 - 181
			C13-12378 PentaCDF	2015/05/11		77	%	24 - 185
			C13-123789 HexaCDF	2015/05/11		74	%	29 - 147
			C13-234678 HexaCDF	2015/05/11		61	%	28 - 136
			C13-23478 PentaCDF	2015/05/11		91	%	21 - 178
			C13-2378 TetraCDD	2015/05/11		62	%	25 - 164
			C13-2378 TetraCDF	2015/05/11		68	%	24 - 169
			C13-OCDD	2015/05/11		82	%	17 - 157
			2,3,7,8-Tetra CDD	2015/05/11		115	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/05/11		100	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/05/11		114	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/05/11		97	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/05/11		125	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/05/11		107	%	70 - 140
			Octa CDD	2015/05/11		121	%	78 - 144
			2,3,7,8-Tetra CDF	2015/05/11		108	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/05/11		113	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/05/11		97	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/05/11		110	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/05/11		109	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/05/11		118	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/05/11		122	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/05/11		122	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/05/11		102	%	78 - 138
			Octa CDF	2015/05/11		116	%	63 - 170
4017637	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/05/11		81	%	35 - 197
			C13-1234678 HeptaCDD	2015/05/11		79	%	23 - 140
			C13-1234678 HeptaCDF	2015/05/11		76	%	28 - 143
			C13-123478 HexaCDD	2015/05/11		80	%	32 - 141
			C13-123478 HexaCDF	2015/05/11		79	%	26 - 152
			C13-1234789 HeptaCDF	2015/05/11		82	%	26 - 138
			C13-123678 HexaCDD	2015/05/11		87	%	28 - 130
			C13-123678 HexaCDF	2015/05/11		75	%	26 - 123
			C13-12378 PentaCDD	2015/05/11		91	%	25 - 181
			C13-12378 PentaCDF	2015/05/11		85	%	24 - 185
			C13-123789 HexaCDF	2015/05/11		78	%	29 - 147
			C13-234678 HexaCDF	2015/05/11		63	%	28 - 136
			C13-23478 PentaCDF	2015/05/11		83	%	21 - 178
			C13-2378 TetraCDD	2015/05/11		62	%	25 - 164
			C13-2378 TetraCDF	2015/05/11		66	%	24 - 169
			C13-OCDD	2015/05/11		88	%	17 - 157
			2,3,7,8-Tetra CDD	2015/05/11	<0.133, EDL=0.133		pg/g	
			1,2,3,7,8-Penta CDD	2015/05/11	<0.0927, EDL=0.0927		pg/g	

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/05/11	<0.0857, EDL=0.0857		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/05/11	<0.0909, EDL=0.0909		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/05/11	<0.0834, EDL=0.0834		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/05/11	0.127, EDL=0.0889		pg/g	
			Octa CDD	2015/05/11	0.762, EDL=0.0978		pg/g	
			Total Tetra CDD	2015/05/11	<0.370, EDL=0.370 (1)		pg/g	
			Total Penta CDD	2015/05/11	<0.217, EDL=0.217 (1)		pg/g	
			Total Hexa CDD	2015/05/11	<0.586, EDL=0.586 (1)		pg/g	
			Total Hepta CDD	2015/05/11	0.127, EDL=0.0889		pg/g	
			2,3,7,8-Tetra CDF	2015/05/11	<0.115, EDL=0.115		pg/g	
			1,2,3,7,8-Penta CDF	2015/05/11	<0.138, EDL=0.138		pg/g	
			2,3,4,7,8-Penta CDF	2015/05/11	<0.137, EDL=0.137		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/05/11	<0.0790, EDL=0.0790		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/05/11	<0.0816, EDL=0.0816		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/05/11	<0.0759, EDL=0.0759		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/05/11	0.110, EDL=0.0850		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/05/11	<0.128, EDL=0.128 (1)		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2015/05/11	<0.0659, EDL=0.0659		pg/g	
			Octa CDF	2015/05/11	<0.146, EDL=0.146 (1)		pg/g	
			Total Tetra CDF	2015/05/11	<0.115, EDL=0.115		pg/g	
			Total Penta CDF	2015/05/11	<0.138, EDL=0.138		pg/g	
			Total Hexa CDF	2015/05/11	0.110, EDL=0.0802		pg/g	
			Total Hepta CDF	2015/05/11	<0.127, EDL=0.127 (1)		pg/g	
4021422	LAZ	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/05/12	<0.18, EDL=0.18		pg/g	
			Confirmation C13-2378 TetraCDF	2015/05/12		74	%	40 - 135

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**QUALITY ASSURANCE REPORT(CONT'D)**

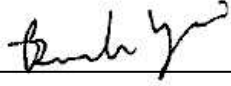
QA/QC				Date		%		
Batch	Init	QC Type	Parameter	Analyzed	Value	Recovery	Units	QC Limits
4021422	LAZ	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/05/12	8.7		%	100
<p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p> <p>NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples &lt; 5x RDL).</p> <p>(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.</p>								

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Branko Vrzic, A.S.C.T., Senior Analyst, HRMS Services



Cristina Carriere, Scientific Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5D0913  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/10/02**  
**Report #: R3707732**  
**Version: 8R**

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B585895**

**Received: 2015/05/08, 13:15**

Sample Matrix: Soil  
# Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Dioxins/Furans in Soil (1613B) (1)	9	2015/05/12	2015/05/20	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	7	N/A	2015/05/22	BRL SOP-00406	EPA M8290A / M1613
2378TCDF Confirmation (M8290A/M1613)	2	N/A	2015/09/29	BRL SOP-00406	EPA M8290A / M1613
Moisture	9	N/A	2015/05/12	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

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Total cover pages: 1

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		AGA748	AGA749	AGA750			
Sampling Date		2015/04/30 08:40	2015/04/30 09:25	2015/04/30 10:00			
COC Number		na	na	na			
	<b>Units</b>	<b>ISM-AOI020B-0.5-AFTER ISM</b>	<b>ISM-AOI021-0.5-AFTER ISM</b>	<b>ISM-AOI030-0.5-AFTER ISM</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>

Moisture	%	2.5	<1.0	<1.0	1.0	0.50	4019722
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RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch

Maxxam ID		AGA751	AGA752	AGA753			
Sampling Date		2015/04/30 10:30	2015/04/30 11:10	2015/04/30 11:40			
COC Number		na	na	na			
	<b>Units</b>	<b>ISM-AOI024-0.5-AFTER ISM</b>	<b>ISM-AOI025-0.5-AFTER ISM</b>	<b>ISM-AOI027-0.5-AFTER ISM</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>

Moisture	%	4.0	1.6	1.7	1.0	0.50	4019722
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RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch

Maxxam ID		AGA754	AGA755	AGA756	AGA756			
Sampling Date		2015/04/30 12:10	2015/04/30 12:40	2015/04/30 13:15	2015/04/30 13:15			
COC Number		na	na	na	na			
	<b>Units</b>	<b>ISM-AOI029A-0.5-AFTER ISM</b>	<b>SS-ROW030-0.5 A5D0913-15</b>	<b>SS-AOI020B-1.0 A5D0913-17</b>	<b>SS-AOI020B-1.0 A5D0913-17 Lab-Dup</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>

Moisture	%	1.8	20	17	17	1.0	0.50	4019722
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RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA748							
Sampling Date		2015/04/30 08:40							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI020B-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	1.54	0.144	0.200	0.400	1.00	1.54		4025819
1,2,3,7,8-Penta CDD	pg/g	3.26	0.178	0.999	0.400	1.00	3.26		4025819
1,2,3,4,7,8-Hexa CDD	pg/g	8.40	0.118	0.999	0.400	0.100	0.840		4025819
1,2,3,6,7,8-Hexa CDD	pg/g	33.2	0.125	0.999	0.400	0.100	3.32		4025819
1,2,3,7,8,9-Hexa CDD	pg/g	24.8	0.115	0.999	0.400	0.100	2.48		4025819
1,2,3,4,6,7,8-Hepta CDD	pg/g	734	0.102	0.999	0.400	0.0100	7.34		4025819
Octa CDD	pg/g	3800	0.132	2.00	0.800	0.000300	1.14		4025819
Total Tetra CDD	pg/g	4.14	0.144	0.200	0.400			7	4025819
Total Penta CDD	pg/g	16.0	0.178	0.999	0.400			7	4025819
Total Hexa CDD	pg/g	181	0.121	0.999	0.400			7	4025819
Total Hepta CDD	pg/g	1240	0.102	0.999	0.400			2	4025819
2,3,7,8-Tetra CDF **	pg/g	1.55	0.133	0.200	0.400	0.100	0.155		4025819
1,2,3,7,8-Penta CDF	pg/g	2.10	0.115	0.999	0.400	0.0300	0.0630		4025819
2,3,4,7,8-Penta CDF	pg/g	2.98	0.114	0.999	0.400	0.300	0.894		4025819
1,2,3,4,7,8-Hexa CDF	pg/g	16.7	0.140	0.999	0.400	0.100	1.67		4025819
1,2,3,6,7,8-Hexa CDF	pg/g	8.46	0.145	0.999	0.400	0.100	0.846		4025819
2,3,4,6,7,8-Hexa CDF	pg/g	5.52	0.135	0.999	0.400	0.100	0.552		4025819
1,2,3,7,8,9-Hexa CDF	pg/g	0.268	0.151	0.999	0.400	0.100	0.0268		4025819
1,2,3,4,6,7,8-Hepta CDF	pg/g	134	0.112	0.999	0.400	0.0100	1.34		4025819
1,2,3,4,7,8,9-Hepta CDF	pg/g	5.95	0.0945	0.999	0.400	0.0100	0.0595		4025819
Octa CDF	pg/g	187	0.137	2.00	0.800	0.000300	0.0561		4025819
Total Tetra CDF	pg/g	7.91	0.133	0.200	0.400			9	4025819
Total Penta CDF	pg/g	27.0	0.115	0.999	0.400			9	4025819
Total Hexa CDF	pg/g	175	0.142	0.999	0.400			11	4025819
Total Hepta CDF	pg/g	306	0.103	0.999	0.400			4	4025819
Confirmation 2,3,7,8-Tetra CDF	pg/g	1.34	0.079	1.0	0.90	0.100	0.134		4027724
TOTAL TOXIC EQUIVALENCY	pg/g						25.6		

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA748							
Sampling Date		2015/04/30 08:40							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI020B-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	102							4025819
C13-1234678 HeptaCDD	%	90							4025819
C13-1234678 HeptaCDF **	%	83							4025819
C13-123478 HexaCDD	%	77							4025819
C13-123478 HexaCDF	%	87							4025819
C13-1234789 HeptaCDF	%	88							4025819
C13-123678 HexaCDD	%	90							4025819
C13-123678 HexaCDF	%	79							4025819
C13-12378 PentaCDD	%	111							4025819
C13-12378 PentaCDF	%	106							4025819
C13-123789 HexaCDF	%	95							4025819
C13-234678 HexaCDF	%	79							4025819
C13-23478 PentaCDF	%	127							4025819
C13-2378 TetraCDD	%	84							4025819
C13-2378 TetraCDF	%	88							4025819
C13-OCDD	%	112							4025819
Confirmation C13-2378 TetraCDF	%	102							4027724

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds



Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA748							
Sampling Date		2015/04/30 08:40							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI020B-0.5-AFTER ISM Lab-Dup</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	1.62	0.172	0.199	0.400	1.00	1.62		4025819
1,2,3,7,8-Penta CDD	pg/g	3.48	0.179	0.997	0.400	1.00	3.48		4025819
1,2,3,4,7,8-Hexa CDD	pg/g	7.48	0.199	0.997	0.400	0.100	0.748		4025819
1,2,3,6,7,8-Hexa CDD	pg/g	34.7	0.211	0.997	0.400	0.100	3.47		4025819
1,2,3,7,8,9-Hexa CDD	pg/g	22.7	0.194	0.997	0.400	0.100	2.27		4025819
1,2,3,4,6,7,8-Hepta CDD	pg/g	766	0.0793	0.997	0.400	0.0100	7.66		4025819
Octa CDD	pg/g	4930 (1)	0.528	9.97	0.800	0.000300	1.48		4025819
Total Tetra CDD	pg/g	4.23	0.172	0.199	0.400			5	4025819
Total Penta CDD	pg/g	18.2	0.179	0.997	0.400			10	4025819
Total Hexa CDD	pg/g	183	0.204	0.997	0.400			7	4025819
Total Hepta CDD	pg/g	1330	0.0793	0.997	0.400			2	4025819
2,3,7,8-Tetra CDF **	pg/g	1.90	0.123	0.199	0.400	0.100	0.190		4025819
1,2,3,7,8-Penta CDF	pg/g	2.35	0.157	0.997	0.400	0.0300	0.0705		4025819
2,3,4,7,8-Penta CDF	pg/g	3.09	0.156	0.997	0.400	0.300	0.927		4025819
1,2,3,4,7,8-Hexa CDF	pg/g	17.7	0.138	0.997	0.400	0.100	1.77		4025819
1,2,3,6,7,8-Hexa CDF	pg/g	8.87	0.143	0.997	0.400	0.100	0.887		4025819
2,3,4,6,7,8-Hexa CDF	pg/g	6.43	0.133	0.997	0.400	0.100	0.643		4025819
1,2,3,7,8,9-Hexa CDF	pg/g	0.330	0.149	0.997	0.400	0.100	0.0330		4025819
1,2,3,4,6,7,8-Hepta CDF	pg/g	133	0.168	0.997	0.400	0.0100	1.33		4025819
1,2,3,4,7,8,9-Hepta CDF	pg/g	6.50	0.142	0.997	0.400	0.0100	0.0650		4025819
Octa CDF	pg/g	204	0.103	1.99	0.800	0.000300	0.0612		4025819
Total Tetra CDF	pg/g	9.65	0.123	0.199	0.400			12	4025819
Total Penta CDF	pg/g	30.2	0.156	0.997	0.400			9	4025819
Total Hexa CDF	pg/g	186	0.140	0.997	0.400			11	4025819
Total Hepta CDF	pg/g	311	0.154	0.997	0.400			4	4025819

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 ( 1 ) \*\* From 5X Dilution Run \*\*

Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA748							
Sampling Date		2015/04/30 08:40							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI020B-0.5-AFTER</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>
		<b>ISM Lab-Dup</b>							

Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.41	0.085	1.0	0.90	0.100	0.141		4027724
TOTAL TOXIC EQUIVALENCY	pg/g						26.7		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	92							4025819
C13-1234678 HeptaCDD	%	102							4025819
C13-1234678 HeptaCDF	%	104							4025819
C13-123478 HexaCDD	%	82							4025819
C13-123478 HexaCDF	%	84							4025819
C13-1234789 HeptaCDF	%	98							4025819
C13-123678 HexaCDD	%	91							4025819
C13-123678 HexaCDF	%	82							4025819
C13-12378 PentaCDD	%	105							4025819
C13-12378 PentaCDF	%	99							4025819
C13-123789 HexaCDF	%	93							4025819
C13-234678 HexaCDF	%	82							4025819
C13-23478 PentaCDF	%	118							4025819
C13-2378 TetraCDD	%	85							4025819
C13-2378 TetraCDF	%	89							4025819
C13-OCDD	%	77 (1)							4025819
Confirmation C13-2378 TetraCDF	%	103							4027724

RDL = Reportable Detection Limit  
EDL = Estimated Detection Limit  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
( 1 ) \*\* From 5X Dilution Run \*\*

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA749							
Sampling Date		2015/04/30 09:25							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI021-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	<0.116	0.116	0.199	0.400	1.00	0.116		4025819
1,2,3,7,8-Penta CDD	pg/g	0.478	0.0913	0.995	0.400	1.00	0.478		4025819
1,2,3,4,7,8-Hexa CDD	pg/g	1.06	0.0858	0.995	0.400	0.100	0.106		4025819
1,2,3,6,7,8-Hexa CDD	pg/g	4.00	0.0910	0.995	0.400	0.100	0.400		4025819
1,2,3,7,8,9-Hexa CDD	pg/g	3.74	0.0835	0.995	0.400	0.100	0.374		4025819
1,2,3,4,6,7,8-Hepta CDD	pg/g	115	0.0994	0.995	0.400	0.0100	1.15		4025819
Octa CDD	pg/g	946	0.167	1.99	0.800	0.000300	0.284		4025819
Total Tetra CDD	pg/g	0.159	0.116	0.199	0.400			1	4025819
Total Penta CDD	pg/g	1.60	0.0913	0.995	0.400			6	4025819
Total Hexa CDD	pg/g	21.8	0.0881	0.995	0.400			6	4025819
Total Hepta CDD	pg/g	195	0.0994	0.995	0.400			2	4025819
2,3,7,8-Tetra CDF **	pg/g	0.240	0.0972	0.199	0.400	0.100	0.0240		4025819
1,2,3,7,8-Penta CDF	pg/g	0.233	0.115	0.995	0.400	0.0300	0.00699		4025819
2,3,4,7,8-Penta CDF	pg/g	0.313	0.114	0.995	0.400	0.300	0.0939		4025819
1,2,3,4,7,8-Hexa CDF	pg/g	1.49	0.0959	0.995	0.400	0.100	0.149		4025819
1,2,3,6,7,8-Hexa CDF	pg/g	0.774	0.0991	0.995	0.400	0.100	0.0774		4025819
2,3,4,6,7,8-Hexa CDF	pg/g	0.556	0.0921	0.995	0.400	0.100	0.0556		4025819
1,2,3,7,8,9-Hexa CDF	pg/g	<0.103	0.103	0.995	0.400	0.100	0.0103		4025819
1,2,3,4,6,7,8-Hepta CDF	pg/g	17.6	0.101	0.995	0.400	0.0100	0.176		4025819
1,2,3,4,7,8,9-Hepta CDF	pg/g	0.856	0.0849	0.995	0.400	0.0100	0.00856		4025819
Octa CDF	pg/g	34.8	0.0968	1.99	0.800	0.000300	0.0104		4025819
Total Tetra CDF	pg/g	0.240	0.0972	0.199	0.400			1	4025819
Total Penta CDF	pg/g	1.69	0.115	0.995	0.400			6	4025819
Total Hexa CDF	pg/g	14.3	0.0974	0.995	0.400			8	4025819
Total Hepta CDF	pg/g	48.0	0.0921	0.995	0.400			4	4025819
Confirmation 2,3,7,8-Tetra CDF	pg/g	<0.13	0.13	0.99	0.89	0.100	0.0130		4203313
TOTAL TOXIC EQUIVALENCY	pg/g						3.51		

RDL = Reportable Detection Limit  
EDL = Estimated Detection Limit  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA749							
Sampling Date		2015/04/30 09:25							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI021-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	87							4025819
C13-1234678 HeptaCDD	%	99							4025819
C13-1234678 HeptaCDF **	%	96							4025819
C13-123478 HexaCDD	%	75							4025819
C13-123478 HexaCDF	%	69							4025819
C13-1234789 HeptaCDF	%	98							4025819
C13-123678 HexaCDD	%	84							4025819
C13-123678 HexaCDF	%	68							4025819
C13-12378 PentaCDD	%	108							4025819
C13-12378 PentaCDF	%	94							4025819
C13-123789 HexaCDF	%	92							4025819
C13-234678 HexaCDF	%	73							4025819
C13-23478 PentaCDF	%	118							4025819
C13-2378 TetraCDD	%	78							4025819
C13-2378 TetraCDF	%	84							4025819
C13-OCDD	%	133							4025819
Confirmation C13-2378 TetraCDF	%	80							4203313

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA750							
Sampling Date		2015/04/30 10:00							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI030-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	<0.625	0.625	0.200	0.400	1.00	0.625		4025819
1,2,3,7,8-Penta CDD	pg/g	1.20	0.695	0.999	0.400	1.00	1.20		4025819
1,2,3,4,7,8-Hexa CDD	pg/g	3.66	0.367	0.999	0.400	0.100	0.366		4025819
1,2,3,6,7,8-Hexa CDD	pg/g	12.5	0.390	0.999	0.400	0.100	1.25		4025819
1,2,3,7,8,9-Hexa CDD	pg/g	9.36	0.358	0.999	0.400	0.100	0.936		4025819
1,2,3,4,6,7,8-Hepta CDD	pg/g	299	0.426	0.999	0.400	0.0100	2.99		4025819
Octa CDD	pg/g	1800	1.11	2.00	0.800	0.000300	0.540		4025819
Total Tetra CDD	pg/g	<0.625	0.625	0.200	0.400			0	4025819
Total Penta CDD	pg/g	5.41	0.695	0.999	0.400			3	4025819
Total Hexa CDD	pg/g	79.5	0.377	0.999	0.400			7	4025819
Total Hepta CDD	pg/g	541	0.426	0.999	0.400			2	4025819
2,3,7,8-Tetra CDF **	pg/g	0.799	0.474	0.200	0.400	0.100	0.0799		4025819
1,2,3,7,8-Penta CDF	pg/g	<0.581	0.581	0.999	0.400	0.0300	0.0174		4025819
2,3,4,7,8-Penta CDF	pg/g	1.00	0.575	0.999	0.400	0.300	0.300		4025819
1,2,3,4,7,8-Hexa CDF	pg/g	5.19	0.432	0.999	0.400	0.100	0.519		4025819
1,2,3,6,7,8-Hexa CDF	pg/g	2.41	0.447	0.999	0.400	0.100	0.241		4025819
2,3,4,6,7,8-Hexa CDF	pg/g	2.29	0.415	0.999	0.400	0.100	0.229		4025819
1,2,3,7,8,9-Hexa CDF	pg/g	<0.465	0.465	0.999	0.400	0.100	0.0465		4025819
1,2,3,4,6,7,8-Hepta CDF	pg/g	49.0	0.286	0.999	0.400	0.0100	0.490		4025819
1,2,3,4,7,8,9-Hepta CDF	pg/g	2.21	0.242	0.999	0.400	0.0100	0.0221		4025819
Octa CDF	pg/g	72.3	0.297	2.00	0.800	0.000300	0.0217		4025819
Total Tetra CDF	pg/g	1.69	0.474	0.200	0.400			2	4025819
Total Penta CDF	pg/g	8.14	0.578	0.999	0.400			4	4025819
Total Hexa CDF	pg/g	61.2	0.439	0.999	0.400			7	4025819
Total Hepta CDF	pg/g	121	0.262	0.999	0.400			4	4025819
Confirmation 2,3,7,8-Tetra CDF	pg/g	0.45	0.11	1.0	0.90	0.100	0.0450		4203313
TOTAL TOXIC EQUIVALENCY	pg/g						9.84		

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA750							
Sampling Date		2015/04/30 10:00							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI030-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	86							4025819
C13-1234678 HeptaCDD	%	122							4025819
C13-1234678 HeptaCDF **	%	128							4025819
C13-123478 HexaCDD	%	108							4025819
C13-123478 HexaCDF	%	110							4025819
C13-1234789 HeptaCDF	%	119							4025819
C13-123678 HexaCDD	%	127							4025819
C13-123678 HexaCDF	%	135 (1)							4025819
C13-12378 PentaCDD	%	95							4025819
C13-12378 PentaCDF	%	93							4025819
C13-123789 HexaCDF	%	108							4025819
C13-234678 HexaCDF	%	111							4025819
C13-23478 PentaCDF	%	97							4025819
C13-2378 TetraCDD	%	78							4025819
C13-2378 TetraCDF	%	83							4025819
C13-OCDD	%	126							4025819
Confirmation C13-2378 TetraCDF	%	80							4203313

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like  
 Compounds  
 ( 1 ) Recovery exceeds method criteria.  
 Minimal impact on data

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA751							
Sampling Date		2015/04/30 10:30							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI024-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	0.501	0.103	0.198	0.400	1.00	0.501		4025819
1,2,3,7,8-Penta CDD	pg/g	2.09	0.105	0.992	0.400	1.00	2.09		4025819
1,2,3,4,7,8-Hexa CDD	pg/g	4.18	0.100	0.992	0.400	0.100	0.418		4025819
1,2,3,6,7,8-Hexa CDD	pg/g	16.7	0.106	0.992	0.400	0.100	1.67		4025819
1,2,3,7,8,9-Hexa CDD	pg/g	13.7	0.0978	0.992	0.400	0.100	1.37		4025819
1,2,3,4,6,7,8-Hepta CDD	pg/g	397	0.106	0.992	0.400	0.0100	3.97		4025819
Octa CDD	pg/g	2600	0.101	1.98	0.800	0.000300	0.780		4025819
Total Tetra CDD	pg/g	2.15	0.103	0.198	0.400			4	4025819
Total Penta CDD	pg/g	12.7	0.105	0.992	0.400			10	4025819
Total Hexa CDD	pg/g	90.6	0.103	0.992	0.400			5	4025819
Total Hepta CDD	pg/g	680	0.106	0.992	0.400			2	4025819
2,3,7,8-Tetra CDF **	pg/g	2.40	0.103	0.198	0.400	0.100	0.240		4025819
1,2,3,7,8-Penta CDF	pg/g	1.53	0.101	0.992	0.400	0.0300	0.0459		4025819
2,3,4,7,8-Penta CDF	pg/g	3.21	0.0997	0.992	0.400	0.300	0.963		4025819
1,2,3,4,7,8-Hexa CDF	pg/g	8.03	0.102	0.992	0.400	0.100	0.803		4025819
1,2,3,6,7,8-Hexa CDF	pg/g	7.22	0.105	0.992	0.400	0.100	0.722		4025819
2,3,4,6,7,8-Hexa CDF	pg/g	7.04	0.0976	0.992	0.400	0.100	0.704		4025819
1,2,3,7,8,9-Hexa CDF	pg/g	0.208	0.109	0.992	0.400	0.100	0.0208		4025819
1,2,3,4,6,7,8-Hepta CDF	pg/g	81.4	0.109	0.992	0.400	0.0100	0.814		4025819
1,2,3,4,7,8,9-Hepta CDF	pg/g	4.04	0.0917	0.992	0.400	0.0100	0.0404		4025819
Octa CDF	pg/g	138	0.108	1.98	0.800	0.000300	0.0414		4025819
Total Tetra CDF	pg/g	41.4	0.103	0.198	0.400			10	4025819
Total Penta CDF	pg/g	91.2	0.100	0.992	0.400			7	4025819
Total Hexa CDF	pg/g	161	0.103	0.992	0.400			10	4025819
Total Hepta CDF	pg/g	212	0.0994	0.992	0.400			4	4025819
Confirmation 2,3,7,8-Tetra CDF	pg/g	1.93	0.044	0.99	0.89	0.100	0.193		4027724
TOTAL TOXIC EQUIVALENCY	pg/g						15.1		

RDL = Reportable Detection Limit  
EDL = Estimated Detection Limit  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA751							
Sampling Date		2015/04/30 10:30							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI024-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	87							4025819
C13-1234678 HeptaCDD	%	84							4025819
C13-1234678 HeptaCDF **	%	85							4025819
C13-123478 HexaCDD	%	78							4025819
C13-123478 HexaCDF	%	77							4025819
C13-1234789 HeptaCDF	%	78							4025819
C13-123678 HexaCDD	%	85							4025819
C13-123678 HexaCDF	%	76							4025819
C13-12378 PentaCDD	%	104							4025819
C13-12378 PentaCDF	%	93							4025819
C13-123789 HexaCDF	%	87							4025819
C13-234678 HexaCDF	%	71							4025819
C13-23478 PentaCDF	%	114							4025819
C13-2378 TetraCDD	%	77							4025819
C13-2378 TetraCDF	%	83							4025819
C13-OCDD	%	90							4025819
Confirmation C13-2378 TetraCDF	%	95							4027724

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds



Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA752							
Sampling Date		2015/04/30 11:10							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI025-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	0.695	0.170	0.200	0.400	1.00	0.695		4025819
1,2,3,7,8-Penta CDD	pg/g	2.86	0.117	0.998	0.400	1.00	2.86		4025819
1,2,3,4,7,8-Hexa CDD	pg/g	5.87	0.161	0.998	0.400	0.100	0.587		4025819
1,2,3,6,7,8-Hexa CDD	pg/g	23.3	0.171	0.998	0.400	0.100	2.33		4025819
1,2,3,7,8,9-Hexa CDD	pg/g	20.7	0.157	0.998	0.400	0.100	2.07		4025819
1,2,3,4,6,7,8-Hepta CDD	pg/g	454	0.0915	0.998	0.400	0.0100	4.54		4025819
Octa CDD	pg/g	2740	0.0985	2.00	0.800	0.000300	0.822		4025819
Total Tetra CDD	pg/g	2.98	0.170	0.200	0.400			5	4025819
Total Penta CDD	pg/g	16.2	0.117	0.998	0.400			11	4025819
Total Hexa CDD	pg/g	132	0.165	0.998	0.400			7	4025819
Total Hepta CDD	pg/g	764	0.0915	0.998	0.400			2	4025819
2,3,7,8-Tetra CDF **	pg/g	2.16	0.102	0.200	0.400	0.100	0.216		4025819
1,2,3,7,8-Penta CDF	pg/g	1.56	0.0892	0.998	0.400	0.0300	0.0468		4025819
2,3,4,7,8-Penta CDF	pg/g	2.05	0.0882	0.998	0.400	0.300	0.615		4025819
1,2,3,4,7,8-Hexa CDF	pg/g	8.34	0.124	0.998	0.400	0.100	0.834		4025819
1,2,3,6,7,8-Hexa CDF	pg/g	5.35	0.128	0.998	0.400	0.100	0.535		4025819
2,3,4,6,7,8-Hexa CDF	pg/g	3.69	0.119	0.998	0.400	0.100	0.369		4025819
1,2,3,7,8,9-Hexa CDF	pg/g	0.234	0.134	0.998	0.400	0.100	0.0234		4025819
1,2,3,4,6,7,8-Hepta CDF	pg/g	80.6	0.123	0.998	0.400	0.0100	0.806		4025819
1,2,3,4,7,8,9-Hepta CDF	pg/g	3.96	0.104	0.998	0.400	0.0100	0.0396		4025819
Octa CDF	pg/g	122	0.110	2.00	0.800	0.000300	0.0366		4025819
Total Tetra CDF	pg/g	9.35	0.102	0.200	0.400			11	4025819
Total Penta CDF	pg/g	22.4	0.0887	0.998	0.400			11	4025819
Total Hexa CDF	pg/g	101	0.126	0.998	0.400			11	4025819
Total Hepta CDF	pg/g	193	0.112	0.998	0.400			4	4025819
Confirmation 2,3,7,8-Tetra CDF	pg/g	1.44	0.044	1.0	0.90	0.100	0.144		4027724
TOTAL TOXIC EQUIVALENCY	pg/g						17.4		

RDL = Reportable Detection Limit  
EDL = Estimated Detection Limit  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA752							
Sampling Date		2015/04/30 11:10							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI025-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	87							4025819
C13-1234678 HeptaCDD	%	78							4025819
C13-1234678 HeptaCDF **	%	73							4025819
C13-123478 HexaCDD	%	73							4025819
C13-123478 HexaCDF	%	72							4025819
C13-1234789 HeptaCDF	%	76							4025819
C13-123678 HexaCDD	%	77							4025819
C13-123678 HexaCDF	%	67							4025819
C13-12378 PentaCDD	%	108							4025819
C13-12378 PentaCDF	%	96							4025819
C13-123789 HexaCDF	%	88							4025819
C13-234678 HexaCDF	%	69							4025819
C13-23478 PentaCDF	%	121							4025819
C13-2378 TetraCDD	%	82							4025819
C13-2378 TetraCDF	%	84							4025819
C13-OCDD	%	88							4025819
Confirmation C13-2378 TetraCDF	%	95							4027724

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA753							
Sampling Date		2015/04/30 11:40							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI027-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	0.488	0.103	0.200	0.400	1.00	0.488		4025819
1,2,3,7,8-Penta CDD	pg/g	1.58	0.102	0.999	0.400	1.00	1.58		4025819
1,2,3,4,7,8-Hexa CDD	pg/g	3.40	0.107	0.999	0.400	0.100	0.340		4025819
1,2,3,6,7,8-Hexa CDD	pg/g	13.8	0.113	0.999	0.400	0.100	1.38		4025819
1,2,3,7,8,9-Hexa CDD	pg/g	11.8	0.104	0.999	0.400	0.100	1.18		4025819
1,2,3,4,6,7,8-Hepta CDD	pg/g	309	0.107	0.999	0.400	0.0100	3.09		4025819
Octa CDD	pg/g	2050	0.105	2.00	0.800	0.000300	0.615		4025819
Total Tetra CDD	pg/g	1.16	0.103	0.200	0.400			3	4025819
Total Penta CDD	pg/g	8.27	0.102	0.999	0.400			9	4025819
Total Hexa CDD	pg/g	76.8	0.110	0.999	0.400			7	4025819
Total Hepta CDD	pg/g	523	0.107	0.999	0.400			2	4025819
2,3,7,8-Tetra CDF **	pg/g	0.903	0.107	0.200	0.400	0.100	0.0903		4025819
1,2,3,7,8-Penta CDF	pg/g	0.763	0.104	0.999	0.400	0.0300	0.0229		4025819
2,3,4,7,8-Penta CDF	pg/g	1.03	0.103	0.999	0.400	0.300	0.309		4025819
1,2,3,4,7,8-Hexa CDF	pg/g	5.40	0.103	0.999	0.400	0.100	0.540		4025819
1,2,3,6,7,8-Hexa CDF	pg/g	2.60	0.106	0.999	0.400	0.100	0.260		4025819
2,3,4,6,7,8-Hexa CDF	pg/g	2.20	0.0988	0.999	0.400	0.100	0.220		4025819
1,2,3,7,8,9-Hexa CDF	pg/g	0.137	0.111	0.999	0.400	0.100	0.0137		4025819
1,2,3,4,6,7,8-Hepta CDF	pg/g	49.1	0.112	0.999	0.400	0.0100	0.491		4025819
1,2,3,4,7,8,9-Hepta CDF	pg/g	2.48	0.0944	0.999	0.400	0.0100	0.0248		4025819
Octa CDF	pg/g	73.9	0.112	2.00	0.800	0.000300	0.0222		4025819
Total Tetra CDF	pg/g	4.10	0.107	0.200	0.400			11	4025819
Total Penta CDF	pg/g	8.30	0.103	0.999	0.400			8	4025819
Total Hexa CDF	pg/g	54.6	0.104	0.999	0.400			9	4025819
Total Hepta CDF	pg/g	116	0.102	0.999	0.400			4	4025819
Confirmation 2,3,7,8-Tetra CDF	pg/g	0.640	0.036	1.0	0.90	0.100	0.0640		4027724
TOTAL TOXIC EQUIVALENCY	pg/g						10.6		

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA753							
Sampling Date		2015/04/30 11:40							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI027-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	95							4025819
C13-1234678 HeptaCDD	%	99							4025819
C13-1234678 HeptaCDF **	%	99							4025819
C13-123478 HexaCDD	%	83							4025819
C13-123478 HexaCDF	%	83							4025819
C13-1234789 HeptaCDF	%	96							4025819
C13-123678 HexaCDD	%	92							4025819
C13-123678 HexaCDF	%	77							4025819
C13-12378 PentaCDD	%	111							4025819
C13-12378 PentaCDF	%	109							4025819
C13-123789 HexaCDF	%	97							4025819
C13-234678 HexaCDF	%	80							4025819
C13-23478 PentaCDF	%	126							4025819
C13-2378 TetraCDD	%	85							4025819
C13-2378 TetraCDF	%	93							4025819
C13-OCDD	%	128							4025819
Confirmation C13-2378 TetraCDF	%	100							4027724

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA754							
Sampling Date		2015/04/30 12:10							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI029A-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	0.359	0.150	0.199	0.400	1.00	0.359		4025819
1,2,3,7,8-Penta CDD	pg/g	2.79	0.0937	0.997	0.400	1.00	2.79		4025819
1,2,3,4,7,8-Hexa CDD	pg/g	5.21	0.102	0.997	0.400	0.100	0.521		4025819
1,2,3,6,7,8-Hexa CDD	pg/g	23.0	0.108	0.997	0.400	0.100	2.30		4025819
1,2,3,7,8,9-Hexa CDD	pg/g	23.1	0.0990	0.997	0.400	0.100	2.31		4025819
1,2,3,4,6,7,8-Hepta CDD	pg/g	475	0.209	0.997	0.400	0.0100	4.75		4025819
Octa CDD	pg/g	3050	0.135	1.99	0.800	0.000300	0.915		4025819
Total Tetra CDD	pg/g	1.66	0.150	0.199	0.400			5	4025819
Total Penta CDD	pg/g	7.82	0.0937	0.997	0.400			9	4025819
Total Hexa CDD	pg/g	97.5	0.104	0.997	0.400			7	4025819
Total Hepta CDD	pg/g	678	0.209	0.997	0.400			2	4025819
2,3,7,8-Tetra CDF **	pg/g	1.35	0.106	0.199	0.400	0.100	0.135		4025819
1,2,3,7,8-Penta CDF	pg/g	1.55	0.0879	0.997	0.400	0.0300	0.0465		4025819
2,3,4,7,8-Penta CDF	pg/g	1.96	0.0869	0.997	0.400	0.300	0.588		4025819
1,2,3,4,7,8-Hexa CDF	pg/g	8.26	0.148	0.997	0.400	0.100	0.826		4025819
1,2,3,6,7,8-Hexa CDF	pg/g	4.00	0.152	0.997	0.400	0.100	0.400		4025819
2,3,4,6,7,8-Hexa CDF	pg/g	3.35	0.142	0.997	0.400	0.100	0.335		4025819
1,2,3,7,8,9-Hexa CDF	pg/g	0.249	0.159	0.997	0.400	0.100	0.0249		4025819
1,2,3,4,6,7,8-Hepta CDF	pg/g	73.0	0.0855	0.997	0.400	0.0100	0.730		4025819
1,2,3,4,7,8,9-Hepta CDF	pg/g	4.09	0.0722	0.997	0.400	0.0100	0.0409		4025819
Octa CDF	pg/g	75.4	0.130	1.99	0.800	0.000300	0.0226		4025819
Total Tetra CDF	pg/g	3.82	0.106	0.199	0.400			7	4025819
Total Penta CDF	pg/g	9.05	0.0874	0.997	0.400			9	4025819
Total Hexa CDF	pg/g	49.0	0.150	0.997	0.400			9	4025819
Total Hepta CDF	pg/g	152	0.0783	0.997	0.400			4	4025819
Confirmation 2,3,7,8-Tetra CDF	pg/g	1.14	0.044	1.0	0.90	0.100	0.114		4027724
TOTAL TOXIC EQUIVALENCY	pg/g						17.1		

RDL = Reportable Detection Limit  
EDL = Estimated Detection Limit  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA754							
Sampling Date		2015/04/30 12:10							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI029A-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	86							4025819
C13-1234678 HeptaCDD	%	76							4025819
C13-1234678 HeptaCDF **	%	37							4025819
C13-123478 HexaCDD	%	59							4025819
C13-123478 HexaCDF	%	30							4025819
C13-1234789 HeptaCDF	%	71							4025819
C13-123678 HexaCDD	%	73							4025819
C13-123678 HexaCDF	%	35							4025819
C13-12378 PentaCDD	%	109							4025819
C13-12378 PentaCDF	%	98							4025819
C13-123789 HexaCDF	%	92							4025819
C13-234678 HexaCDF	%	64							4025819
C13-23478 PentaCDF	%	93							4025819
C13-2378 TetraCDD	%	80							4025819
C13-2378 TetraCDF	%	85							4025819
C13-OCDD	%	102							4025819
Confirmation C13-2378 TetraCDF	%	97							4027724

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA755							
Sampling Date		2015/04/30 12:40							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW030-0.5 A5D0913-15</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	0.296	0.0337	0.0665	0.400	1.00	0.296		4025819
1,2,3,7,8-Penta CDD	pg/g	2.78	0.0333	0.333	0.400	1.00	2.78		4025819
1,2,3,4,7,8-Hexa CDD	pg/g	6.25	0.0340	0.333	0.400	0.100	0.625		4025819
1,2,3,6,7,8-Hexa CDD	pg/g	21.4	0.0360	0.333	0.400	0.100	2.14		4025819
1,2,3,7,8,9-Hexa CDD	pg/g	20.9	0.0331	0.333	0.400	0.100	2.09		4025819
1,2,3,4,6,7,8-Hepta CDD	pg/g	430	0.0340	0.333	0.400	0.0100	4.30		4025819
Octa CDD	pg/g	976	0.0340	0.665	0.800	0.000300	0.293		4025819
Total Tetra CDD	pg/g	2.40	0.0337	0.0665	0.400			10	4025819
Total Penta CDD	pg/g	13.8	0.0333	0.333	0.400			12	4025819
Total Hexa CDD	pg/g	122	0.0349	0.333	0.400			7	4025819
Total Hepta CDD	pg/g	702	0.0340	0.333	0.400			2	4025819
2,3,7,8-Tetra CDF **	pg/g	0.710	0.0339	0.0665	0.400	0.100	0.0710		4025819
1,2,3,7,8-Penta CDF	pg/g	1.24	0.0333	0.333	0.400	0.0300	0.0372		4025819
2,3,4,7,8-Penta CDF	pg/g	1.47	0.0329	0.333	0.400	0.300	0.441		4025819
1,2,3,4,7,8-Hexa CDF	pg/g	8.45	0.0335	0.333	0.400	0.100	0.845		4025819
1,2,3,6,7,8-Hexa CDF	pg/g	4.38	0.0346	0.333	0.400	0.100	0.438		4025819
2,3,4,6,7,8-Hexa CDF	pg/g	2.71	0.0322	0.333	0.400	0.100	0.271		4025819
1,2,3,7,8,9-Hexa CDF	pg/g	0.151	0.0360	0.333	0.400	0.100	0.0151		4025819
1,2,3,4,6,7,8-Hepta CDF	pg/g	70.2	0.0362	0.333	0.400	0.0100	0.702		4025819
1,2,3,4,7,8,9-Hepta CDF	pg/g	3.52	0.0306	0.333	0.400	0.0100	0.0352		4025819
Octa CDF	pg/g	85.7	0.0328	0.665	0.800	0.000300	0.0257		4025819
Total Tetra CDF	pg/g	4.79	0.0339	0.0665	0.400			12	4025819
Total Penta CDF	pg/g	15.0	0.0331	0.333	0.400			11	4025819
Total Hexa CDF	pg/g	96.8	0.0340	0.333	0.400			11	4025819
Total Hepta CDF	pg/g	182	0.0331	0.333	0.400			4	4025819
Confirmation 2,3,7,8-Tetra CDF	pg/g	0.495	0.0095	0.33	0.30	0.100	0.0495		4027724
TOTAL TOXIC EQUIVALENCY	pg/g						15.4		

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA755							
Sampling Date		2015/04/30 12:40							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW030-0.5 A5D0913-15</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	97							4025819
C13-1234678 HeptaCDD	%	117							4025819
C13-1234678 HeptaCDF **	%	101							4025819
C13-123478 HexaCDD	%	71							4025819
C13-123478 HexaCDF	%	75							4025819
C13-1234789 HeptaCDF	%	98							4025819
C13-123678 HexaCDD	%	82							4025819
C13-123678 HexaCDF	%	71							4025819
C13-12378 PentaCDD	%	104							4025819
C13-12378 PentaCDF	%	97							4025819
C13-123789 HexaCDF	%	92							4025819
C13-234678 HexaCDF	%	69							4025819
C13-23478 PentaCDF	%	112							4025819
C13-2378 TetraCDD	%	83							4025819
C13-2378 TetraCDF	%	95							4025819
C13-OCDD	%	156							4025819
Confirmation C13-2378 TetraCDF	%	100							4027724

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds



Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA756							
Sampling Date		2015/04/30 13:15							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-AOI020B-1.0 A5D0913-17</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	0.272	0.0358	0.0666	0.400	1.00	0.272		4025819
1,2,3,7,8-Penta CDD	pg/g	0.496	0.0364	0.333	0.400	1.00	0.496		4025819
1,2,3,4,7,8-Hexa CDD	pg/g	1.12	0.0323	0.333	0.400	0.100	0.112		4025819
1,2,3,6,7,8-Hexa CDD	pg/g	4.93	0.0343	0.333	0.400	0.100	0.493		4025819
1,2,3,7,8,9-Hexa CDD	pg/g	4.65	0.0315	0.333	0.400	0.100	0.465		4025819
1,2,3,4,6,7,8-Hepta CDD	pg/g	119	0.0334	0.333	0.400	0.0100	1.19		4025819
Octa CDD	pg/g	745	0.0334	0.666	0.800	0.000300	0.224		4025819
Total Tetra CDD	pg/g	0.569	0.0358	0.0666	0.400			3	4025819
Total Penta CDD	pg/g	1.47	0.0364	0.333	0.400			7	4025819
Total Hexa CDD	pg/g	21.6	0.0332	0.333	0.400			7	4025819
Total Hepta CDD	pg/g	173	0.0334	0.333	0.400			2	4025819
2,3,7,8-Tetra CDF **	pg/g	0.358	0.0365	0.0666	0.400	0.100	0.0358		4025819
1,2,3,7,8-Penta CDF	pg/g	0.377	0.0363	0.333	0.400	0.0300	0.0113		4025819
2,3,4,7,8-Penta CDF	pg/g	0.554	0.0359	0.333	0.400	0.300	0.166		4025819
1,2,3,4,7,8-Hexa CDF	pg/g	2.41	0.0322	0.333	0.400	0.100	0.241		4025819
1,2,3,6,7,8-Hexa CDF	pg/g	1.23	0.0333	0.333	0.400	0.100	0.123		4025819
2,3,4,6,7,8-Hexa CDF	pg/g	0.920	0.0309	0.333	0.400	0.100	0.0920		4025819
1,2,3,7,8,9-Hexa CDF	pg/g	0.0560	0.0346	0.333	0.400	0.100	0.00560		4025819
1,2,3,4,6,7,8-Hepta CDF	pg/g	23.3	0.0378	0.333	0.400	0.0100	0.233		4025819
1,2,3,4,7,8,9-Hepta CDF	pg/g	0.907	0.0319	0.333	0.400	0.0100	0.00907		4025819
Octa CDF	pg/g	33.8	0.0333	0.666	0.800	0.000300	0.0101		4025819
Total Tetra CDF	pg/g	1.67	0.0365	0.0666	0.400			11	4025819
Total Penta CDF	pg/g	3.22	0.0361	0.333	0.400			7	4025819
Total Hexa CDF	pg/g	15.6	0.0327	0.333	0.400			10	4025819
Total Hepta CDF	pg/g	47.8	0.0346	0.333	0.400			4	4025819
Confirmation 2,3,7,8-Tetra CDF	pg/g	0.320	0.0096	0.33	0.30	0.100	0.0320		4027724
TOTAL TOXIC EQUIVALENCY	pg/g						4.18		

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA756							
Sampling Date		2015/04/30 13:15							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-AOI020B-1.0 A5D0913-17</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	91							4025819
C13-1234678 HeptaCDD	%	86							4025819
C13-1234678 HeptaCDF **	%	49							4025819
C13-123478 HexaCDD	%	58							4025819
C13-123478 HexaCDF	%	31							4025819
C13-1234789 HeptaCDF	%	81							4025819
C13-123678 HexaCDD	%	70							4025819
C13-123678 HexaCDF	%	34							4025819
C13-12378 PentaCDD	%	103							4025819
C13-12378 PentaCDF	%	93							4025819
C13-123789 HexaCDF	%	88							4025819
C13-234678 HexaCDF	%	65							4025819
C13-23478 PentaCDF	%	92							4025819
C13-2378 TetraCDD	%	76							4025819
C13-2378 TetraCDF	%	87							4025819
C13-OCDD	%	122							4025819
Confirmation C13-2378 TetraCDF	%	94							4027724

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

### Test Summary

**Maxxam ID** AGA748  
**Sample ID** ISM-AOI020B-0.5-AFTER ISM  
**Matrix** Soil

**Collected** 2015/04/30  
**Shipped**  
**Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4025819	2015/05/12	2015/05/20	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4027724	N/A	2015/05/22	Leila Azzam
Moisture	BAL	4019722	N/A	2015/05/12	Valentina Kaftani

**Maxxam ID** AGA748 Dup  
**Sample ID** ISM-AOI020B-0.5-AFTER ISM  
**Matrix** Soil

**Collected** 2015/04/30  
**Shipped**  
**Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4025819	2015/05/12	2015/05/20	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4027724	N/A	2015/05/22	Leila Azzam

**Maxxam ID** AGA749  
**Sample ID** ISM-AOI021-0.5-AFTER ISM  
**Matrix** Soil

**Collected** 2015/04/30  
**Shipped**  
**Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4025819	2015/05/12	2015/05/20	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203313	N/A	2015/09/29	Leila Azzam
Moisture	BAL	4019722	N/A	2015/05/12	Valentina Kaftani

**Maxxam ID** AGA750  
**Sample ID** ISM-AOI030-0.5-AFTER ISM  
**Matrix** Soil

**Collected** 2015/04/30  
**Shipped**  
**Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4025819	2015/05/12	2015/05/20	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203313	N/A	2015/09/29	Leila Azzam
Moisture	BAL	4019722	N/A	2015/05/12	Valentina Kaftani

**Maxxam ID** AGA751  
**Sample ID** ISM-AOI024-0.5-AFTER ISM  
**Matrix** Soil

**Collected** 2015/04/30  
**Shipped**  
**Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4025819	2015/05/12	2015/05/20	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4027724	N/A	2015/05/22	Leila Azzam
Moisture	BAL	4019722	N/A	2015/05/12	Valentina Kaftani

**Maxxam ID** AGA752  
**Sample ID** ISM-AOI025-0.5-AFTER ISM  
**Matrix** Soil

**Collected** 2015/04/30  
**Shipped**  
**Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4025819	2015/05/12	2015/05/20	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4027724	N/A	2015/05/22	Leila Azzam
Moisture	BAL	4019722	N/A	2015/05/12	Valentina Kaftani

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

### Test Summary

**Maxxam ID** AGA753  
**Sample ID** ISM-AOI027-0.5-AFTER ISM  
**Matrix** Soil

**Collected** 2015/04/30  
**Shipped**  
**Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4025819	2015/05/12	2015/05/20	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4027724	N/A	2015/05/22	Leila Azzam
Moisture	BAL	4019722	N/A	2015/05/12	Valentina Kaftani

**Maxxam ID** AGA754  
**Sample ID** ISM-AOI029A-0.5-AFTER ISM  
**Matrix** Soil

**Collected** 2015/04/30  
**Shipped**  
**Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4025819	2015/05/12	2015/05/20	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4027724	N/A	2015/05/22	Leila Azzam
Moisture	BAL	4019722	N/A	2015/05/12	Valentina Kaftani

**Maxxam ID** AGA755  
**Sample ID** SS-ROW030-0.5 A5D0913-15  
**Matrix** Soil

**Collected** 2015/04/30  
**Shipped**  
**Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4025819	2015/05/12	2015/05/20	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4027724	N/A	2015/05/22	Leila Azzam
Moisture	BAL	4019722	N/A	2015/05/12	Valentina Kaftani

**Maxxam ID** AGA756  
**Sample ID** SS-AOI020B-1.0 A5D0913-17  
**Matrix** Soil

**Collected** 2015/04/30  
**Shipped**  
**Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4025819	2015/05/12	2015/05/20	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4027724	N/A	2015/05/22	Leila Azzam
Moisture	BAL	4019722	N/A	2015/05/12	Valentina Kaftani

**Maxxam ID** AGA756 Dup  
**Sample ID** SS-AOI020B-1.0 A5D0913-17  
**Matrix** Soil

**Collected** 2015/04/30  
**Shipped**  
**Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Moisture	BAL	4019722	N/A	2015/05/12	Valentina Kaftani

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

Package 1	7.7°C
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Each temperature is the average of up to three cooler temperatures taken at receipt

**GENERAL COMMENTS**

Report revised to reflect change of sample ID for sample AGA756.  
Report revised to reflect addition of missed TCDF confirmations.

**Results relate only to the items tested.**

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5D0913  
P.O. #:  
Site Location:

**Quality Assurance Report**  
Maxxam Job Number: GB585895

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
4019722 BOP	RPD - Sample/Sample Dup	Moisture	2015/05/12	1.2		%	20
4025819 OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/05/19		90	%	35 - 197
		C13-1234678 HeptaCDD	2015/05/19		78	%	23 - 140
		C13-1234678 HeptaCDF	2015/05/19		73	%	28 - 143
		C13-123478 HexaCDD	2015/05/19		76	%	32 - 141
		C13-123478 HexaCDF	2015/05/19		74	%	26 - 152
		C13-1234789 HeptaCDF	2015/05/19		81	%	26 - 138
		C13-123678 HexaCDD	2015/05/19		84	%	28 - 130
		C13-123678 HexaCDF	2015/05/19		70	%	26 - 123
		C13-12378 PentaCDD	2015/05/19		113	%	25 - 181
		C13-12378 PentaCDF	2015/05/19		103	%	24 - 185
		C13-123789 HexaCDF	2015/05/19		90	%	29 - 147
		C13-234678 HexaCDF	2015/05/19		74	%	28 - 136
		C13-23478 PentaCDF	2015/05/19		121	%	21 - 178
		C13-2378 TetraCDD	2015/05/19		79	%	25 - 164
		C13-2378 TetraCDF	2015/05/19		84	%	24 - 169
		C13-OCDD	2015/05/19		83	%	17 - 157
		2,3,7,8-Tetra CDD	2015/05/19		112	%	67 - 158
		1,2,3,7,8-Penta CDD	2015/05/19		92	%	25 - 181
		1,2,3,4,7,8-Hexa CDD	2015/05/19		106	%	70 - 164
		1,2,3,6,7,8-Hexa CDD	2015/05/19		101	%	76 - 134
		1,2,3,7,8,9-Hexa CDD	2015/05/19		141	%	64 - 162
		1,2,3,4,6,7,8-Hepta CDD	2015/05/19		101	%	70 - 140
		Octa CDD	2015/05/19		110	%	78 - 144
		2,3,7,8-Tetra CDF	2015/05/19		101	%	75 - 158
		1,2,3,7,8-Penta CDF	2015/05/19		95	%	80 - 134
		2,3,4,7,8-Penta CDF	2015/05/19		88	%	68 - 160
		1,2,3,4,7,8-Hexa CDF	2015/05/19		101	%	72 - 134
		1,2,3,6,7,8-Hexa CDF	2015/05/19		110	%	84 - 130
		2,3,4,6,7,8-Hexa CDF	2015/05/19		105	%	70 - 156
		1,2,3,7,8,9-Hexa CDF	2015/05/19		106	%	78 - 130
		1,2,3,4,6,7,8-Hepta CDF	2015/05/19		122	%	82 - 122
		1,2,3,4,7,8,9-Hepta CDF	2015/05/19		96	%	78 - 138
		Octa CDF	2015/05/19		106	%	63 - 170
	Method Blank	37CL4 2378 Tetra CDD	2015/05/20		89	%	35 - 197
		C13-1234678 HeptaCDD	2015/05/20		85	%	23 - 140
		C13-1234678 HeptaCDF	2015/05/20		74	%	28 - 143
		C13-123478 HexaCDD	2015/05/20		75	%	32 - 141
		C13-123478 HexaCDF	2015/05/20		71	%	26 - 152
		C13-1234789 HeptaCDF	2015/05/20		80	%	26 - 138
		C13-123678 HexaCDD	2015/05/20		83	%	28 - 130
		C13-123678 HexaCDF	2015/05/20		74	%	26 - 123
		C13-12378 PentaCDD	2015/05/20		108	%	25 - 181
		C13-12378 PentaCDF	2015/05/20		97	%	24 - 185
		C13-123789 HexaCDF	2015/05/20		90	%	29 - 147
		C13-234678 HexaCDF	2015/05/20		72	%	28 - 136
		C13-23478 PentaCDF	2015/05/20		121	%	21 - 178
		C13-2378 TetraCDD	2015/05/20		74	%	25 - 164
		C13-2378 TetraCDF	2015/05/20		83	%	24 - 169
		C13-OCDD	2015/05/20		83	%	17 - 157
		2,3,7,8-Tetra CDD	2015/05/20	<0.0878, EDL=0.0878		pg/g	
		1,2,3,7,8-Penta CDD	2015/05/20	<0.0884, EDL=0.0884		pg/g	
		1,2,3,4,7,8-Hexa CDD	2015/05/20	<0.0749, EDL=0.0749		pg/g	

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5D0913  
P.O. #:  
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: GB585895

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits	
4025819 OBC	Method Blank	1,2,3,6,7,8-Hexa CDD	2015/05/20	<0.0795, EDL=0.0795		pg/g		
		1,2,3,7,8,9-Hexa CDD	2015/05/20	<0.0730, EDL=0.0730		pg/g		
		1,2,3,4,6,7,8-Hepta CDD	2015/05/20	<0.0711, EDL=0.0711		pg/g		
		Octa CDD	2015/05/20	0.161, EDL=0.106		pg/g		
		Total Tetra CDD	2015/05/20	<0.138, EDL=0.138 (1)		pg/g		
		Total Penta CDD	2015/05/20	<0.110, EDL=0.110 (1)		pg/g		
		Total Hexa CDD	2015/05/20	<0.235, EDL=0.235 (1)		pg/g		
		Total Hepta CDD	2015/05/20	<0.0711, EDL=0.0711		pg/g		
		2,3,7,8-Tetra CDF	2015/05/20	<0.0572, EDL=0.0572		pg/g		
		1,2,3,7,8-Penta CDF	2015/05/20	<0.0590, EDL=0.0590		pg/g		
		2,3,4,7,8-Penta CDF	2015/05/20	<0.0584, EDL=0.0584		pg/g		
		1,2,3,4,7,8-Hexa CDF	2015/05/20	<0.122, EDL=0.122		pg/g		
		1,2,3,6,7,8-Hexa CDF	2015/05/20	<0.126, EDL=0.126		pg/g		
		2,3,4,6,7,8-Hexa CDF	2015/05/20	<0.117, EDL=0.117		pg/g		
		1,2,3,7,8,9-Hexa CDF	2015/05/20	<0.131, EDL=0.131		pg/g		
		1,2,3,4,6,7,8-Hepta CDF	2015/05/20	<0.0860, EDL=0.0860		pg/g		
		1,2,3,4,7,8,9-Hepta CDF	2015/05/20	<0.0726, EDL=0.0726		pg/g		
		Octa CDF	2015/05/20	<0.110, EDL=0.110		pg/g		
		Total Tetra CDF	2015/05/20	<0.0652, EDL=0.0652 (1)		pg/g		
		Total Penta CDF	2015/05/20	<0.0587, EDL=0.0587		pg/g		
		Total Hexa CDF	2015/05/20	<0.124, EDL=0.124		pg/g		
		Total Hepta CDF	2015/05/20	<0.0788, EDL=0.0788		pg/g		
		RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/05/20	5.3		%	25
			1,2,3,7,8-Penta CDD	2015/05/20	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/05/20	12		%	25
			1,2,3,6,7,8-Hexa CDD	2015/05/20	4.5		%	25
			1,2,3,7,8,9-Hexa CDD	2015/05/20	9.0		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/05/20	4.4		%	25
	Octa CDD		2015/05/20	26 (2)		%	25	
	Total Tetra CDD		2015/05/20	2.0		%	25	
	Total Penta CDD		2015/05/20	13		%	25	
	Total Hexa CDD		2015/05/20	0.98		%	25	
	Total Hepta CDD		2015/05/20	6.9		%	25	
	2,3,7,8-Tetra CDF		2015/05/20	20		%	25	
	1,2,3,7,8-Penta CDF		2015/05/20	NC		%	25	
	2,3,4,7,8-Penta CDF		2015/05/20	NC		%	25	
	1,2,3,4,7,8-Hexa CDF		2015/05/20	5.6		%	25	
	1,2,3,6,7,8-Hexa CDF		2015/05/20	4.7		%	25	
	2,3,4,6,7,8-Hexa CDF		2015/05/20	15		%	25	
	1,2,3,7,8,9-Hexa CDF		2015/05/20	NC		%	25	
	1,2,3,4,6,7,8-Hepta CDF		2015/05/20	0.48		%	25	
	1,2,3,4,7,8,9-Hepta CDF		2015/05/20	8.8		%	25	
	Octa CDF	2015/05/20	8.3		%	25		
	Total Tetra CDF	2015/05/20	20		%	25		
	Total Penta CDF	2015/05/20	11		%	25		
	Total Hexa CDF	2015/05/20	6.1		%	25		
	Total Hepta CDF	2015/05/20	1.6		%	25		
	4027724 LAZ	Method Blank	Confirmation C13-2378 TetraCDF	2015/05/22		110	%	40 - 135
Confirmation 2,3,7,8-Tetra CDF			2015/05/22	<0.045, EDL=0.045		pg/g		
4203313 LAZ	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/05/22	NC		%	100	
		Confirmation C13-2378 TetraCDF	2015/09/29		92	%	40 - 135	

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5D0913  
P.O. #:  
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: GB585895

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
4203313 LAZ	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/09/29	<0.12, EDL=0.12		pg/g	
	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/09/29	NC		%	100

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

( 1 ) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

( 2 ) \*\* From 5X Dilution Run \*\*

Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.



**Validation Signature Page**

**Maxxam Job #: B585895**

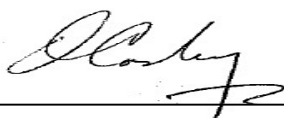
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The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



---

Brad Newman, Scientific Specialist



---

Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5E0255  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/10/02**  
**Report #: R3707753**  
**Version: 2R**

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B592755**

**Received: 2015/05/19, 12:30**

Sample Matrix: Soil  
# Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Dioxins/Furans in Soil (1613B) (1)	3	2015/05/25	2015/05/28	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2015/05/28	BRL SOP-00406	EPA M8290A / M1613
2378TCDF Confirmation (M8290A/M1613)	2	N/A	2015/09/29	BRL SOP-00406	EPA M8290A / M1613
Moisture	2	N/A	2015/05/22	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

=====  
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Total cover pages: 1

Maxxam Job #: B592755  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5E0255

**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		AHH743	AHH744			
Sampling Date		2015/05/07 14:05	2015/05/07 14:30			
COC Number		na	na			
	<b>Units</b>	<b>SS-ROW004-0.5</b>	<b>SS-ROW008-0.5</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	4.9	18	1.0	0.50	4034073
RDL = Reportable Detection Limit QC Batch = Quality Control Batch						

Maxxam Job #: B592755  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5E0255

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AHH743							
Sampling Date		2015/05/07 14:05							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW004-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>
2,3,7,8-Tetra CDD *	pg/g	0.111	0.0953	0.997	0.400	1.00	0.111		4040184
1,2,3,7,8-Penta CDD	pg/g	0.259	0.128	4.98	0.400	1.00	0.259		4040184
1,2,3,4,7,8-Hexa CDD	pg/g	0.391	0.109	4.98	0.400	0.100	0.0391		4040184
1,2,3,6,7,8-Hexa CDD	pg/g	1.09	0.115	4.98	0.400	0.100	0.109		4040184
1,2,3,7,8,9-Hexa CDD	pg/g	0.876	0.113	4.98	0.400	0.100	0.0876		4040184
1,2,3,4,6,7,8-Hepta CDD	pg/g	21.2	0.0917	4.98	0.400	0.0100	0.212		4040184
Octa CDD	pg/g	122	0.152	9.97	0.800	0.000300	0.0366		4040184
Total Tetra CDD	pg/g	0.263	0.0953	0.997	0.400			2	4040184
Total Penta CDD	pg/g	0.636	0.128	4.98	0.400			2	4040184
Total Hexa CDD	pg/g	6.79	0.114	4.98	0.400			6	4040184
Total Hepta CDD	pg/g	36.9	0.0917	4.98	0.400			2	4040184
2,3,7,8-Tetra CDF **	pg/g	0.164	0.106	0.997	0.400	0.100	0.0164		4040184
1,2,3,7,8-Penta CDF	pg/g	<0.100	0.100	4.98	0.400	0.0300	0.00300		4040184
2,3,4,7,8-Penta CDF	pg/g	0.148	0.0984	4.98	0.400	0.300	0.0444		4040184
1,2,3,4,7,8-Hexa CDF	pg/g	0.517	0.0941	4.98	0.400	0.100	0.0517		4040184
1,2,3,6,7,8-Hexa CDF	pg/g	0.378	0.0994	4.98	0.400	0.100	0.0378		4040184
2,3,4,6,7,8-Hexa CDF	pg/g	0.301	0.0894	4.98	0.400	0.100	0.0301		4040184
1,2,3,7,8,9-Hexa CDF	pg/g	0.143	0.0949	4.98	0.400	0.100	0.0143		4040184
1,2,3,4,6,7,8-Hepta CDF	pg/g	6.66	0.0756	4.98	0.400	0.0100	0.0666		4040184
1,2,3,4,7,8,9-Hepta CDF	pg/g	0.303	0.0759	4.98	0.400	0.0100	0.00303		4040184
Octa CDF	pg/g	8.05	0.153	9.97	0.800	0.000300	0.00242		4040184
Total Tetra CDF	pg/g	0.792	0.106	0.997	0.400			4	4040184
Total Penta CDF	pg/g	3.07	0.0994	4.98	0.400			5	4040184
Total Hexa CDF	pg/g	9.45	0.0943	4.98	0.400			8	4040184
Total Hepta CDF	pg/g	14.3	0.0758	4.98	0.400			3	4040184
Confirmation 2,3,7,8-Tetra CDF	pg/g	<0.38	0.38	1.0	0.90	0.100	0.0380		4203313
TOTAL TOXIC EQUIVALENCY	pg/g						1.15		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD	%	81							4040184

RDL = Reportable Detection Limit  
EDL = Estimated Detection Limit  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B592755  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5E0255

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AHH743							
Sampling Date		2015/05/07 14:05							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW004-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

C13-1234678 HeptaCDD *	%	78							4040184
C13-1234678 HeptaCDF **	%	79							4040184
C13-123478 HexaCDD	%	79							4040184
C13-123478 HexaCDF	%	86							4040184
C13-1234789 HeptaCDF	%	79							4040184
C13-123678 HexaCDD	%	91							4040184
C13-123678 HexaCDF	%	84							4040184
C13-12378 PentaCDD	%	87							4040184
C13-12378 PentaCDF	%	87							4040184
C13-123789 HexaCDF	%	84							4040184
C13-234678 HexaCDF	%	68							4040184
C13-23478 PentaCDF	%	88							4040184
C13-2378 TetraCDD	%	69							4040184
C13-2378 TetraCDF	%	71							4040184
C13-OCDD	%	79							4040184
Confirmation C13-2378 TetraCDF	%	71							4203313

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B592755  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5E0255

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AHH744							
Sampling Date		2015/05/07 14:30							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW008-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	0.283	0.187	0.996	0.400	1.00	0.283		4040184
1,2,3,7,8-Penta CDD	pg/g	1.65	0.104	4.98	0.400	1.00	1.65		4040184
1,2,3,4,7,8-Hexa CDD	pg/g	3.80	0.123	4.98	0.400	0.100	0.380		4040184
1,2,3,6,7,8-Hexa CDD	pg/g	14.3	0.130	4.98	0.400	0.100	1.43		4040184
1,2,3,7,8,9-Hexa CDD	pg/g	9.15	0.127	4.98	0.400	0.100	0.915		4040184
1,2,3,4,6,7,8-Hepta CDD	pg/g	344	0.0849	4.98	0.400	0.0100	3.44		4040184
Octa CDD	pg/g	1980	0.451	9.96	0.800	0.000300	0.594		4040184
Total Tetra CDD	pg/g	1.52	0.187	0.996	0.400			3	4040184
Total Penta CDD	pg/g	9.11	0.104	4.98	0.400			11	4040184
Total Hexa CDD	pg/g	80.2	0.128	4.98	0.400			7	4040184
Total Hepta CDD	pg/g	577	0.0849	4.98	0.400			2	4040184
2,3,7,8-Tetra CDF **	pg/g	0.727	0.0900	0.996	0.400	0.100	0.0727		4040184
1,2,3,7,8-Penta CDF	pg/g	0.763	0.106	4.98	0.400	0.0300	0.0229		4040184
2,3,4,7,8-Penta CDF	pg/g	1.01	0.104	4.98	0.400	0.300	0.303		4040184
1,2,3,4,7,8-Hexa CDF	pg/g	4.74	0.165	4.98	0.400	0.100	0.474		4040184
1,2,3,6,7,8-Hexa CDF	pg/g	3.12	0.175	4.98	0.400	0.100	0.312		4040184
2,3,4,6,7,8-Hexa CDF	pg/g	2.16	0.157	4.98	0.400	0.100	0.216		4040184
1,2,3,7,8,9-Hexa CDF	pg/g	0.184	0.167	4.98	0.400	0.100	0.0184		4040184
1,2,3,4,6,7,8-Hepta CDF	pg/g	57.4	0.0937	4.98	0.400	0.0100	0.574		4040184
1,2,3,4,7,8,9-Hepta CDF	pg/g	3.06	0.0941	4.98	0.400	0.0100	0.0306		4040184
Octa CDF	pg/g	117	0.120	9.96	0.800	0.000300	0.0351		4040184
Total Tetra CDF	pg/g	6.64	0.0900	0.996	0.400			9	4040184
Total Penta CDF	pg/g	29.8	0.105	4.98	0.400			9	4040184
Total Hexa CDF	pg/g	94.4	0.166	4.98	0.400			9	4040184
Total Hepta CDF	pg/g	159	0.0939	4.98	0.400			4	4040184
Confirmation 2,3,7,8-Tetra CDF	pg/g	<0.32 (1)	0.32	1.0	0.90	0.100	0.0320		4203313
TOTAL TOXIC EQUIVALENCY	pg/g						10.7		

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 ( 1 ) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B592755  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5E0255

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AHH744							
Sampling Date		2015/05/07 14:30							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW008-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	91							4040184
C13-1234678 HeptaCDD	%	85							4040184
C13-1234678 HeptaCDF **	%	83							4040184
C13-123478 HexaCDD	%	84							4040184
C13-123478 HexaCDF	%	90							4040184
C13-1234789 HeptaCDF	%	84							4040184
C13-123678 HexaCDD	%	96							4040184
C13-123678 HexaCDF	%	85							4040184
C13-12378 PentaCDD	%	90							4040184
C13-12378 PentaCDF	%	90							4040184
C13-123789 HexaCDF	%	88							4040184
C13-234678 HexaCDF	%	78							4040184
C13-23478 PentaCDF	%	94							4040184
C13-2378 TetraCDD	%	75							4040184
C13-2378 TetraCDF	%	78							4040184
C13-OCDD	%	95							4040184
Confirmation C13-2378 TetraCDF	%	73							4203313

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B592755  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5E0255

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AHH745							
Sampling Date		2015/05/07 15:25							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI016-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	0.485	0.122	0.997	0.400	1.00	0.485		4040184
1,2,3,7,8-Penta CDD	pg/g	5.87	0.236	4.98	0.400	1.00	5.87		4040184
1,2,3,4,7,8-Hexa CDD	pg/g	13.1	0.150	4.98	0.400	0.100	1.31		4040184
1,2,3,6,7,8-Hexa CDD	pg/g	46.7	0.159	4.98	0.400	0.100	4.67		4040184
1,2,3,7,8,9-Hexa CDD	pg/g	30.5	0.155	4.98	0.400	0.100	3.05		4040184
1,2,3,4,6,7,8-Hepta CDD	pg/g	972	0.110	4.98	0.400	0.0100	9.72		4040184
Octa CDD	pg/g	5390 (1)	1.84	49.8	0.800	0.000300	1.62		4040184
Total Tetra CDD	pg/g	7.40	0.122	0.997	0.400			9	4040184
Total Penta CDD	pg/g	35.6	0.236	4.98	0.400			12	4040184
Total Hexa CDD	pg/g	262	0.156	4.98	0.400			7	4040184
Total Hepta CDD	pg/g	1700	0.110	4.98	0.400			2	4040184
2,3,7,8-Tetra CDF **	pg/g	3.27	0.138	0.997	0.400	0.100	0.327		4040184
1,2,3,7,8-Penta CDF	pg/g	3.56	0.106	4.98	0.400	0.0300	0.107		4040184
2,3,4,7,8-Penta CDF	pg/g	5.06	0.104	4.98	0.400	0.300	1.52		4040184
1,2,3,4,7,8-Hexa CDF	pg/g	24.0	0.110	4.98	0.400	0.100	2.40		4040184
1,2,3,6,7,8-Hexa CDF	pg/g	11.8	0.117	4.98	0.400	0.100	1.18		4040184
2,3,4,6,7,8-Hexa CDF	pg/g	7.48	0.105	4.98	0.400	0.100	0.748		4040184
1,2,3,7,8,9-Hexa CDF	pg/g	0.462	0.111	4.98	0.400	0.100	0.0462		4040184
1,2,3,4,6,7,8-Hepta CDF	pg/g	142	0.132	4.98	0.400	0.0100	1.42		4040184
1,2,3,4,7,8,9-Hepta CDF	pg/g	8.19	0.133	4.98	0.400	0.0100	0.0819		4040184
Octa CDF	pg/g	166	0.149	9.97	0.800	0.000300	0.0498		4040184
Total Tetra CDF	pg/g	23.8	0.138	0.997	0.400			12	4040184
Total Penta CDF	pg/g	118	0.105	4.98	0.400			12	4040184
Total Hexa CDF	pg/g	311	0.111	4.98	0.400			13	4040184
Total Hepta CDF	pg/g	362	0.132	4.98	0.400			4	4040184
Confirmation 2,3,7,8-Tetra CDF	pg/g	1.61	0.11	1.0	0.90	0.100	0.161		4041388
TOTAL TOXIC EQUIVALENCY	pg/g						34.4		

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 ( 1 ) \*\* From 5X Dilution \*\*



Maxxam Job #: B592755  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5E0255

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AHH745							
Sampling Date		2015/05/07 15:25							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI016-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	85							4040184
C13-1234678 HeptaCDD	%	67							4040184
C13-1234678 HeptaCDF **	%	65							4040184
C13-123478 HexaCDD	%	63							4040184
C13-123478 HexaCDF	%	69							4040184
C13-1234789 HeptaCDF	%	64							4040184
C13-123678 HexaCDD	%	75							4040184
C13-123678 HexaCDF	%	68							4040184
C13-12378 PentaCDD	%	73							4040184
C13-12378 PentaCDF	%	71							4040184
C13-123789 HexaCDF	%	68							4040184
C13-234678 HexaCDF	%	55							4040184
C13-23478 PentaCDF	%	72							4040184
C13-2378 TetraCDD	%	61							4040184
C13-2378 TetraCDF	%	61							4040184
C13-OCDD	%	65 (1)							4040184
Confirmation C13-2378 TetraCDF	%	54							4041388

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like  
 Compounds  
 ( 1 ) \*\* From 5X Dilution \*\*

Maxxam Job #: B592755  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5E0255

**Test Summary**

**Maxxam ID** AHH743  
**Sample ID** SS-ROW004-0.5  
**Matrix** Soil

**Collected** 2015/05/07  
**Shipped**  
**Received** 2015/05/19

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4040184	2015/05/25	2015/05/28	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203313	N/A	2015/09/29	Leila Azzam
Moisture	BAL	4034073	N/A	2015/05/22	Chun Yan

**Maxxam ID** AHH744  
**Sample ID** SS-ROW008-0.5  
**Matrix** Soil

**Collected** 2015/05/07  
**Shipped**  
**Received** 2015/05/19

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4040184	2015/05/25	2015/05/28	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203313	N/A	2015/09/29	Leila Azzam
Moisture	BAL	4034073	N/A	2015/05/22	Chun Yan

**Maxxam ID** AHH745  
**Sample ID** ISM-AOI016-0.5-AFTER ISM  
**Matrix** Soil

**Collected** 2015/05/07  
**Shipped**  
**Received** 2015/05/19

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4040184	2015/05/25	2015/05/28	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4041388	N/A	2015/05/28	Cathy Xu

Maxxam Job #: B592755  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5E0255

Package 1	5.5°C
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Each temperature is the average of up to three cooler temperatures taken at receipt

**GENERAL COMMENTS**

Report revised to reflect addition of missed TCDF confirmations.

**Results relate only to the items tested.**

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5E0255  
P.O. #:  
Site Location:

**Quality Assurance Report**  
Maxxam Job Number: GB592755

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
4034073 BOP	RPD - Sample/Sample Dup	Moisture	2015/05/22	3.8		%	20
4040184 KKS	Spiked Blank	37CL4 2378 Tetra CDD	2015/05/28		76	%	35 - 197
		C13-1234678 HeptaCDD	2015/05/28		75	%	23 - 140
		C13-1234678 HeptaCDF	2015/05/28		75	%	28 - 143
		C13-123478 HexaCDD	2015/05/28		74	%	32 - 141
		C13-123478 HexaCDF	2015/05/28		77	%	26 - 152
		C13-1234789 HeptaCDF	2015/05/28		73	%	26 - 138
		C13-123678 HexaCDD	2015/05/28		85	%	28 - 130
		C13-123678 HexaCDF	2015/05/28		76	%	26 - 123
		C13-12378 PentaCDD	2015/05/28		82	%	25 - 181
		C13-12378 PentaCDF	2015/05/28		80	%	24 - 185
		C13-123789 HexaCDF	2015/05/28		75	%	29 - 147
		C13-234678 HexaCDF	2015/05/28		64	%	28 - 136
		C13-23478 PentaCDF	2015/05/28		80	%	21 - 178
		C13-2378 TetraCDD	2015/05/28		62	%	25 - 164
		C13-2378 TetraCDF	2015/05/28		64	%	24 - 169
		C13-OCDD	2015/05/28		79	%	17 - 157
		2,3,7,8-Tetra CDD	2015/05/28		110	%	67 - 158
		1,2,3,7,8-Penta CDD	2015/05/28		103	%	70 - 142
		1,2,3,4,7,8-Hexa CDD	2015/05/28		113	%	70 - 164
		1,2,3,6,7,8-Hexa CDD	2015/05/28		95	%	76 - 134
		1,2,3,7,8,9-Hexa CDD	2015/05/28		106	%	64 - 162
		1,2,3,4,6,7,8-Hepta CDD	2015/05/28		107	%	70 - 140
		Octa CDD	2015/05/28		109	%	78 - 144
		2,3,7,8-Tetra CDF	2015/05/28		107	%	75 - 158
		1,2,3,7,8-Penta CDF	2015/05/28		104	%	80 - 134
		2,3,4,7,8-Penta CDF	2015/05/28		96	%	68 - 160
		1,2,3,4,7,8-Hexa CDF	2015/05/28		105	%	72 - 134
		1,2,3,6,7,8-Hexa CDF	2015/05/28		105	%	84 - 130
		2,3,4,6,7,8-Hexa CDF	2015/05/28		107	%	70 - 156
		1,2,3,7,8,9-Hexa CDF	2015/05/28		104	%	78 - 130
		1,2,3,4,6,7,8-Hepta CDF	2015/05/28		108	%	82 - 122
		1,2,3,4,7,8,9-Hepta CDF	2015/05/28		107	%	78 - 138
		Octa CDF	2015/05/28		99	%	63 - 170
	Method Blank	37CL4 2378 Tetra CDD	2015/05/28		83	%	35 - 197
		C13-1234678 HeptaCDD	2015/05/28		79	%	23 - 140
		C13-1234678 HeptaCDF	2015/05/28		80	%	28 - 143
		C13-123478 HexaCDD	2015/05/28		79	%	32 - 141
		C13-123478 HexaCDF	2015/05/28		84	%	26 - 152
		C13-1234789 HeptaCDF	2015/05/28		79	%	26 - 138
		C13-123678 HexaCDD	2015/05/28		93	%	28 - 130
		C13-123678 HexaCDF	2015/05/28		79	%	26 - 123
		C13-12378 PentaCDD	2015/05/28		91	%	25 - 181
		C13-12378 PentaCDF	2015/05/28		87	%	24 - 185
		C13-123789 HexaCDF	2015/05/28		83	%	29 - 147
		C13-234678 HexaCDF	2015/05/28		71	%	28 - 136
		C13-23478 PentaCDF	2015/05/28		91	%	21 - 178
		C13-2378 TetraCDD	2015/05/28		71	%	25 - 164
		C13-2378 TetraCDF	2015/05/28		72	%	24 - 169
		C13-OCDD	2015/05/28		81	%	17 - 157
		2,3,7,8-Tetra CDD	2015/05/28	<0.0865, EDL=0.0865		pg/g	
		1,2,3,7,8-Penta CDD	2015/05/28	<0.0803, EDL=0.0803		pg/g	
		1,2,3,4,7,8-Hexa CDD	2015/05/28	<0.0791, EDL=0.0791		pg/g	

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5E0255  
P.O. #:  
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: GB592755

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
4040184 KKS	Method Blank	1,2,3,6,7,8-Hexa CDD	2015/05/28	<0.0836, EDL=0.0836		pg/g	
		1,2,3,7,8,9-Hexa CDD	2015/05/28	<0.0819, EDL=0.0819		pg/g	
		1,2,3,4,6,7,8-Hepta CDD	2015/05/28	0.490, EDL=0.128		pg/g	
		Octa CDD	2015/05/28	2.93, EDL=0.118		pg/g	
		Total Tetra CDD	2015/05/28	<0.0865, EDL=0.0865		pg/g	
		Total Penta CDD	2015/05/28	<0.0803, EDL=0.0803		pg/g	
		Total Hexa CDD	2015/05/28	0.148, EDL=0.0824		pg/g	
		Total Hepta CDD	2015/05/28	1.19, EDL=0.128		pg/g	
		2,3,7,8-Tetra CDF	2015/05/28	<0.103, EDL=0.103		pg/g	
		1,2,3,7,8-Penta CDF	2015/05/28	<0.0943, EDL=0.0943		pg/g	
		2,3,4,7,8-Penta CDF	2015/05/28	<0.0923, EDL=0.0923		pg/g	
		1,2,3,4,7,8-Hexa CDF	2015/05/28	<0.0786, EDL=0.0786		pg/g	
		1,2,3,6,7,8-Hexa CDF	2015/05/28	<0.0831, EDL=0.0831		pg/g	
		2,3,4,6,7,8-Hexa CDF	2015/05/28	<0.0747, EDL=0.0747		pg/g	
		1,2,3,7,8,9-Hexa CDF	2015/05/28	0.0980, EDL=0.0794		pg/g	
		1,2,3,4,6,7,8-Hepta CDF	2015/05/28	<0.144, EDL=0.144 (1)		pg/g	
		1,2,3,4,7,8,9-Hepta CDF	2015/05/28	<0.0937, EDL=0.0937		pg/g	
		Octa CDF	2015/05/28	0.391, EDL=0.0990		pg/g	
		Total Tetra CDF	2015/05/28	<0.103, EDL=0.103		pg/g	
		Total Penta CDF	2015/05/28	<0.0933, EDL=0.0933		pg/g	
		Total Hexa CDF	2015/05/28	0.0980, EDL=0.0789		pg/g	
		Total Hepta CDF	2015/05/28	0.124, EDL=0.0935		pg/g	
		4041388 CXU	Method Blank	Confirmation C13-2378 TetraCDF	2015/05/28		79
		Confirmation 2,3,7,8-Tetra CDF	2015/05/28	<0.11, EDL=0.11		pg/g	
4203313 LAZ	Method Blank	Confirmation C13-2378 TetraCDF	2015/09/29		92	%	40 - 135
		Confirmation 2,3,7,8-Tetra CDF	2015/09/29	<0.12, EDL=0.12		pg/g	
	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/09/29	NC		%	100

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

( 1 ) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

**Validation Signature Page**

**Maxxam Job #: B592755**

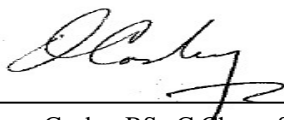
---

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



---

Brad Newman, Scientific Specialist



---

Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5D0784  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/10/02**  
**Report #: R3707744**  
**Version: 2R**

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B594651**  
**Received: 2015/05/21, 14:25**

Sample Matrix: Soil  
# Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Dioxins/Furans in Soil (1613B) (1)	2	2015/05/25	2015/05/28	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2015/05/28	BRL SOP-00406	EPA M8290A / M1613
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2015/09/29	BRL SOP-00406	EPA M8290A / M1613
Moisture	2	N/A	2015/05/22	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.  
\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Total cover pages: 1

Maxxam Job #: B594651  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0784

**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		AHQ997	AHQ998			
Sampling Date		2015/04/23 15:20	2015/04/23 16:30			
COC Number		na	na			
	<b>Units</b>	<b>SS-ROW036-1.0</b>	<b>SS-ROW014-1.0</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	19	19	1.0	0.50	4034073
RDL = Reportable Detection Limit QC Batch = Quality Control Batch						



Maxxam Job #: B594651  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AHQ997							
Sampling Date		2015/04/23 15:20							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW036-1.0</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	<0.114	0.114	0.200	0.400	1.00	0.114		4045436
1,2,3,7,8-Penta CDD	pg/g	0.183	0.114	0.999	0.400	1.00	0.183		4045436
1,2,3,4,7,8-Hexa CDD	pg/g	0.266	0.154	0.999	0.400	0.100	0.0266		4045436
1,2,3,6,7,8-Hexa CDD	pg/g	0.539	0.164	0.999	0.400	0.100	0.0539		4045436
1,2,3,7,8,9-Hexa CDD	pg/g	0.555	0.158	0.999	0.400	0.100	0.0555		4045436
1,2,3,4,6,7,8-Hepta CDD	pg/g	13.0	0.102	0.999	0.400	0.0100	0.130		4045436
Octa CDD	pg/g	99.2	0.263	2.00	0.800	0.000300	0.0298		4045436
Total Tetra CDD	pg/g	0.944	0.114	0.200	0.400			3	4045436
Total Penta CDD	pg/g	0.796	0.114	0.999	0.400			3	4045436
Total Hexa CDD	pg/g	4.13	0.160	0.999	0.400			5	4045436
Total Hepta CDD	pg/g	24.1	0.102	0.999	0.400			2	4045436
2,3,7,8-Tetra CDF **	pg/g	0.527	0.169	0.200	0.400	0.100	0.0527		4045436
1,2,3,7,8-Penta CDF	pg/g	<0.146	0.146	0.999	0.400	0.0300	0.00438		4045436
2,3,4,7,8-Penta CDF	pg/g	0.205	0.142	0.999	0.400	0.300	0.0615		4045436
1,2,3,4,7,8-Hexa CDF	pg/g	0.447	0.0978	0.999	0.400	0.100	0.0447		4045436
1,2,3,6,7,8-Hexa CDF	pg/g	0.261	0.104	0.999	0.400	0.100	0.0261		4045436
2,3,4,6,7,8-Hexa CDF	pg/g	0.270	0.0934	0.999	0.400	0.100	0.0270		4045436
1,2,3,7,8,9-Hexa CDF	pg/g	<0.0983	0.0983	0.999	0.400	0.100	0.00983		4045436
1,2,3,4,6,7,8-Hepta CDF	pg/g	2.78	0.0982	0.999	0.400	0.0100	0.0278		4045436
1,2,3,4,7,8,9-Hepta CDF	pg/g	0.214	0.0981	0.999	0.400	0.0100	0.00214		4045436
Octa CDF	pg/g	7.13	0.162	2.00	0.800	0.000300	0.00214		4045436
Total Tetra CDF	pg/g	3.68	0.169	0.200	0.400			8	4045436
Total Penta CDF	pg/g	3.47	0.144	0.999	0.400			5	4045436
Total Hexa CDF	pg/g	5.30	0.0983	0.999	0.400			7	4045436
Total Hepta CDF	pg/g	7.55	0.0981	0.999	0.400			3	4045436
Confirmation 2,3,7,8-Tetra CDF	pg/g	<0.24	0.24	1.0	0.90	0.100	0.0240		4203313
TOTAL TOXIC EQUIVALENCY	pg/g						0.822		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD	%	77							4045436

RDL = Reportable Detection Limit  
EDL = Estimated Detection Limit  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B594651  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AHQ997							
Sampling Date		2015/04/23 15:20							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW036-1.0</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

C13-1234678 HeptaCDD *	%	62							4045436
C13-1234678 HeptaCDF **	%	63							4045436
C13-123478 HexaCDD	%	61							4045436
C13-123478 HexaCDF	%	68							4045436
C13-1234789 HeptaCDF	%	64							4045436
C13-123678 HexaCDD	%	71							4045436
C13-123678 HexaCDF	%	67							4045436
C13-12378 PentaCDD	%	68							4045436
C13-12378 PentaCDF	%	67							4045436
C13-123789 HexaCDF	%	65							4045436
C13-234678 HexaCDF	%	53							4045436
C13-23478 PentaCDF	%	67							4045436
C13-2378 TetraCDD	%	54							4045436
C13-2378 TetraCDF	%	54							4045436
C13-OCDD	%	69							4045436
Confirmation C13-2378 TetraCDF	%	54							4203313

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B594651  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AHQ998							
Sampling Date		2015/04/23 16:30							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW014-1.0</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	<0.217	0.217	0.200	0.400	1.00	0.217		4045436
1,2,3,7,8-Penta CDD	pg/g	4.54	0.152	0.998	0.400	1.00	4.54		4045436
1,2,3,4,7,8-Hexa CDD	pg/g	17.7	0.169	0.998	0.400	0.100	1.77		4045436
1,2,3,6,7,8-Hexa CDD	pg/g	98.9	0.181	0.998	0.400	0.100	9.89		4045436
1,2,3,7,8,9-Hexa CDD	pg/g	42.4	0.174	0.998	0.400	0.100	4.24		4045436
1,2,3,4,6,7,8-Hepta CDD	pg/g	2400 (1)	1.00	9.98	0.400	0.0100	24.0		4045436
Octa CDD	pg/g	15300 (1)	4.41	20.0	0.800	0.000300	4.59		4045436
Total Tetra CDD	pg/g	1.64	0.217	0.200	0.400			2	4045436
Total Penta CDD	pg/g	20.0	0.152	0.998	0.400			10	4045436
Total Hexa CDD	pg/g	418	0.177	0.998	0.400			7	4045436
Total Hepta CDD	pg/g	4080 (1)	1.00	9.98	0.400			2	4045436
2,3,7,8-Tetra CDF **	pg/g	2.42	0.102	0.200	0.400	0.100	0.242		4045436
1,2,3,7,8-Penta CDF	pg/g	8.48	0.124	0.998	0.400	0.0300	0.254		4045436
2,3,4,7,8-Penta CDF	pg/g	12.7	0.121	0.998	0.400	0.300	3.81		4045436
1,2,3,4,7,8-Hexa CDF	pg/g	80.7	0.170	0.998	0.400	0.100	8.07		4045436
1,2,3,6,7,8-Hexa CDF	pg/g	32.1	0.182	0.998	0.400	0.100	3.21		4045436
2,3,4,6,7,8-Hexa CDF	pg/g	17.8	0.163	0.998	0.400	0.100	1.78		4045436
1,2,3,7,8,9-Hexa CDF	pg/g	1.30	0.171	0.998	0.400	0.100	0.130		4045436
1,2,3,4,6,7,8-Hepta CDF	pg/g	358	0.166	0.998	0.400	0.0100	3.58		4045436
1,2,3,4,7,8,9-Hepta CDF	pg/g	19.1	0.166	0.998	0.400	0.0100	0.191		4045436
Octa CDF	pg/g	262	0.125	2.00	0.800	0.000300	0.0786		4045436
Total Tetra CDF	pg/g	18.7	0.102	0.200	0.400			10	4045436
Total Penta CDF	pg/g	241	0.122	0.998	0.400			11	4045436
Total Hexa CDF	pg/g	915	0.171	0.998	0.400			12	4045436
Total Hepta CDF	pg/g	897	0.166	0.998	0.400			4	4045436
Confirmation 2,3,7,8-Tetra CDF	pg/g	1.97	0.15	1.0	0.90	0.100	0.197		4041388
TOTAL TOXIC EQUIVALENCY	pg/g						70.5		

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 ( 1 ) \*\* From 10X Dilution \*\*

Maxxam Job #: B594651  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AHQ998							
Sampling Date		2015/04/23 16:30							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW014-1.0</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	79							4045436
C13-1234678 HeptaCDD	%	64 (1)							4045436
C13-1234678 HeptaCDF **	%	65							4045436
C13-123478 HexaCDD	%	62							4045436
C13-123478 HexaCDF	%	68							4045436
C13-1234789 HeptaCDF	%	64							4045436
C13-123678 HexaCDD	%	73							4045436
C13-123678 HexaCDF	%	64							4045436
C13-12378 PentaCDD	%	73							4045436
C13-12378 PentaCDF	%	70							4045436
C13-123789 HexaCDF	%	65							4045436
C13-234678 HexaCDF	%	56							4045436
C13-23478 PentaCDF	%	73							4045436
C13-2378 TetraCDD	%	57							4045436
C13-2378 TetraCDF	%	62							4045436
C13-OCDD	%	74 (1)							4045436
Confirmation C13-2378 TetraCDF	%	54							4041388

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 ( 1 ) \*\* From 10X Dilution \*\*

Maxxam Job #: B594651  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0784

### Test Summary

**Maxxam ID** AHQ997  
**Sample ID** SS-ROW036-1.0  
**Matrix** Soil

**Collected** 2015/04/23  
**Shipped**  
**Received** 2015/05/21

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4045436	2015/05/25	2015/05/28	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203313	N/A	2015/09/29	Leila Azzam
Moisture	BAL	4034073	N/A	2015/05/22	Chun Yan

**Maxxam ID** AHQ998  
**Sample ID** SS-ROW014-1.0  
**Matrix** Soil

**Collected** 2015/04/23  
**Shipped**  
**Received** 2015/05/21

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4045436	2015/05/25	2015/05/28	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4041388	N/A	2015/05/28	Cathy Xu
Moisture	BAL	4034073	N/A	2015/05/22	Chun Yan

Maxxam Job #: B594651  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0784

Package 1	5.5°C
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Each temperature is the average of up to three cooler temperatures taken at receipt

**GENERAL COMMENTS**

Report revised to reflect addition of missed TCDF confirmations.

**Results relate only to the items tested.**

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5D0784  
P.O. #:  
Site Location:

**Quality Assurance Report**  
Maxxam Job Number: GB594651

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
4034073 BOP	RPD - Sample/Sample Dup	Moisture	2015/05/22	3.8		%	20
4041388 CXU	Method Blank	Confirmation C13-2378 TetraCDF	2015/05/28		79	%	40 - 135
		Confirmation 2,3,7,8-Tetra CDF	2015/05/28	<0.11, EDL=0.11		pg/g	
4045436 KKS	Spiked Blank	37CL4 2378 Tetra CDD	2015/05/28		75	%	35 - 197
		C13-1234678 HeptaCDD	2015/05/28		75	%	23 - 140
		C13-1234678 HeptaCDF	2015/05/28		76	%	28 - 143
		C13-123478 HexaCDD	2015/05/28		75	%	32 - 141
		C13-123478 HexaCDF	2015/05/28		78	%	26 - 152
		C13-1234789 HeptaCDF	2015/05/28		74	%	26 - 138
		C13-123678 HexaCDD	2015/05/28		85	%	28 - 130
		C13-123678 HexaCDF	2015/05/28		76	%	26 - 123
		C13-12378 PentaCDD	2015/05/28		82	%	25 - 181
		C13-12378 PentaCDF	2015/05/28		81	%	24 - 185
		C13-123789 HexaCDF	2015/05/28		76	%	29 - 147
		C13-234678 HexaCDF	2015/05/28		65	%	28 - 136
		C13-23478 PentaCDF	2015/05/28		81	%	21 - 178
		C13-2378 TetraCDD	2015/05/28		62	%	25 - 164
		C13-2378 TetraCDF	2015/05/28		64	%	24 - 169
		C13-OCDD	2015/05/28		79	%	17 - 157
		2,3,7,8-Tetra CDD	2015/05/28		113	%	67 - 158
		1,2,3,7,8-Penta CDD	2015/05/28		107	%	70 - 142
		1,2,3,4,7,8-Hexa CDD	2015/05/28		115	%	70 - 164
		1,2,3,6,7,8-Hexa CDD	2015/05/28		98	%	76 - 134
		1,2,3,7,8,9-Hexa CDD	2015/05/28		107	%	64 - 162
		1,2,3,4,6,7,8-Hepta CDD	2015/05/28		107	%	70 - 140
		Octa CDD	2015/05/28		110	%	78 - 144
		2,3,7,8-Tetra CDF	2015/05/28		110	%	75 - 158
		1,2,3,7,8-Penta CDF	2015/05/28		107	%	80 - 134
		2,3,4,7,8-Penta CDF	2015/05/28		99	%	68 - 160
		1,2,3,4,7,8-Hexa CDF	2015/05/28		106	%	72 - 134
		1,2,3,6,7,8-Hexa CDF	2015/05/28		108	%	84 - 130
		2,3,4,6,7,8-Hexa CDF	2015/05/28		109	%	70 - 156
		1,2,3,7,8,9-Hexa CDF	2015/05/28		105	%	78 - 130
		1,2,3,4,6,7,8-Hepta CDF	2015/05/28		108	%	82 - 122
		1,2,3,4,7,8,9-Hepta CDF	2015/05/28		107	%	78 - 138
		Octa CDF	2015/05/28		101	%	63 - 170
	Method Blank	37CL4 2378 Tetra CDD	2015/05/28		82	%	35 - 197
		C13-1234678 HeptaCDD	2015/05/28		79	%	23 - 140
		C13-1234678 HeptaCDF	2015/05/28		80	%	28 - 143
		C13-123478 HexaCDD	2015/05/28		79	%	32 - 141
		C13-123478 HexaCDF	2015/05/28		84	%	26 - 152
		C13-1234789 HeptaCDF	2015/05/28		80	%	26 - 138
		C13-123678 HexaCDD	2015/05/28		93	%	28 - 130
		C13-123678 HexaCDF	2015/05/28		79	%	26 - 123
		C13-12378 PentaCDD	2015/05/28		92	%	25 - 181
		C13-12378 PentaCDF	2015/05/28		88	%	24 - 185
		C13-123789 HexaCDF	2015/05/28		84	%	29 - 147
		C13-234678 HexaCDF	2015/05/28		71	%	28 - 136
		C13-23478 PentaCDF	2015/05/28		92	%	21 - 178
		C13-2378 TetraCDD	2015/05/28		72	%	25 - 164
		C13-2378 TetraCDF	2015/05/28		72	%	24 - 169
		C13-OCDD	2015/05/28		82	%	17 - 157
		2,3,7,8-Tetra CDD	2015/05/28	<0.0882, EDL=0.0882		pg/g	

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5D0784  
P.O. #:  
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: GB594651

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
4045436 KKS	Method Blank	1,2,3,7,8-Penta CDD	2015/05/28	<0.0827, EDL=0.0827		pg/g	
		1,2,3,4,7,8-Hexa CDD	2015/05/28	<0.0809, EDL=0.0809		pg/g	
		1,2,3,6,7,8-Hexa CDD	2015/05/28	<0.0865, EDL=0.0865		pg/g	
		1,2,3,7,8,9-Hexa CDD	2015/05/28	<0.0833, EDL=0.0833		pg/g	
		1,2,3,4,6,7,8-Hepta CDD	2015/05/28	0.490, EDL=0.128		pg/g	
		Octa CDD	2015/05/28	2.96, EDL=0.118		pg/g	
		Total Tetra CDD	2015/05/28	<0.0882, EDL=0.0882		pg/g	
		Total Penta CDD	2015/05/28	<0.0827, EDL=0.0827		pg/g	
		Total Hexa CDD	2015/05/28	0.152, EDL=0.0844		pg/g	
		Total Hepta CDD	2015/05/28	1.20, EDL=0.128		pg/g	
		2,3,7,8-Tetra CDF	2015/05/28	<0.107, EDL=0.107		pg/g	
		1,2,3,7,8-Penta CDF	2015/05/28	<0.0968, EDL=0.0968		pg/g	
		2,3,4,7,8-Penta CDF	2015/05/28	<0.0945, EDL=0.0945		pg/g	
		1,2,3,4,7,8-Hexa CDF	2015/05/28	<0.0799, EDL=0.0799		pg/g	
		1,2,3,6,7,8-Hexa CDF	2015/05/28	<0.0853, EDL=0.0853		pg/g	
		2,3,4,6,7,8-Hexa CDF	2015/05/28	<0.0763, EDL=0.0763		pg/g	
		1,2,3,7,8,9-Hexa CDF	2015/05/28	0.0991, EDL=0.0803		pg/g	
		1,2,3,4,6,7,8-Hepta CDF	2015/05/28	<0.146, EDL=0.146 (1)		pg/g	
		1,2,3,4,7,8,9-Hepta CDF	2015/05/28	<0.0941, EDL=0.0941		pg/g	
		Octa CDF	2015/05/28	0.398, EDL=0.101		pg/g	
		Total Tetra CDF	2015/05/28	<0.107, EDL=0.107		pg/g	
		Total Penta CDF	2015/05/28	<0.0956, EDL=0.0956		pg/g	
		Total Hexa CDF	2015/05/28	0.0991, EDL=0.0803		pg/g	
Total Hepta CDF	2015/05/28	0.124, EDL=0.0942		pg/g			
4203313 LAZ	Method Blank	Confirmation C13-2378 TetraCDF	2015/09/29		92	%	40 - 135
		Confirmation 2,3,7,8-Tetra CDF	2015/09/29	<0.12, EDL=0.12		pg/g	
	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/09/29	NC		%	100

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

( 1 ) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.



**Validation Signature Page**

**Maxxam Job #: B594651**

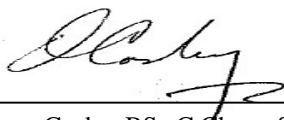
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The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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Brad Newman, Scientific Specialist



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Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

# DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 9003.01.39 | JANUARY 22, 2016 | PORT OF RIDGEFIELD

Maul Foster & Alongi, Inc. (MFA) conducted an independent review of the quality of analytical results for the Port of Ridgefield Off-Property Remedial Investigation. The samples were collected during multiple sampling events conducted in 2015 and 2016.

Maxxam and Apex Laboratories (Apex) performed the analyses. Maxxam report numbers B546521, B576705, B583474, B585895, B5C4634, B5F3520, B5A5395, B5A4222, B5B1038, B594651, B592755, B5B3319, B5D4823, B5C7784, B5B5514, B5I1779, B5K5043, B5M6002, B5J7321, B5P4765, B5P4731, B5P4754, B501368, and B577816 were reviewed as well as Apex report numbers A5D0781, A5G0852, A5D0549, A5I0106, A5K0059, A5I0609, A5D0913, A5D0913 Amended, A5D0784 Amended, A5E0713, A5E0255, A5F0658, A5F0015, A5F0363, A5K0831, A5L0163, and A5D0784. Incremental sampling methodology (ISM) samples were processed by Apex. Maxxam conducted the dibenzo-p-dioxins and dibenzofurans (dioxins/furans) analysis and Apex performed total organic carbon (TOC) analyses. The analyses performed and samples analyzed are listed below.

Analysis	Reference
Dioxins/Furans	USEPA Method 1613B modified
2,3,7,8- TCDF Confirmation*	USEPA Method 8290A modified
TOC	PSEP/SM 5310B

PSEP = Puget Sound Estuary Protocols.

SM = Standard Methods for the Examination of Water and Wastewater.

USEPA = U.S. Environmental Protection Agency.

\*Positive identification of 2,3,7,8-TCDF cannot be achieved using typical USEPA Method 1613B columns; therefore, any detections are confirmed and quantified using USEPA Method 8290A.

Report	Sample ID
B546521	RNSATE-SA
B576705/A5D0549	ISM-AOI007-0.5
B576705/A5D0549	ISM-AOI011-0.5
B576705/A5D0549	ISM-AOI031-0.5
B576705/A5D0549	ISM-AOI018-0.5-B-A
B576705/A5D0549	ISM-AOI018-0.5-B-B
B576705/A5D0549	ISM-AOI018-0.5-B-C
B576705/A5D0549	ISM-AOI006-0.5
B576705/A5D0549	ISM-AOI013-0.5-F
B576705/A5D0549	ISM-AOI018-0.5-F
B576705/A5D0549	ISM-AOI005-0.5
B576705/A5D0549	ISM-AOI013-0.5-B
B576705/A5D0549	SBS-AOI018-1.0
B576705/A5D0549	SBS-AOI006-1.0
B576705/A5D0549	SBS-AOI005-1.0-Dup
B576705/A5D0549	SBS-AOI005-1.0
B577816/A5D0784	SS-ROW036-0.5

Report	Sample ID
B577816/A5D0784	SBS-AOI032-1.0
B577816/A5D0784	SS-ROW012-0.5
B577816/A5D0784	SS-ROW014-0.5
B577816/A5D0784	SBS-AOI017-1.0
B583474/A5D0781	ISM-AOI017-0.5-A
B583474/A5D0781	ISM-AOI017-0.5-B
B583474/A5D0781	ISM-AOI017-0.5-C
B583474/A5D0781	ISM-AOI012-0.5
B583474/A5D0781	ISM-AOI029B-0.5
B583474/A5D0781	ISM-AOI014-0.5
B583474/A5D0781	ISM-AOI036-0.5
B583474/A5D0781	ISM-AOI032-0.5
B583474/A5D0781	ISM-AOI015-0.5
B585895/A5D0913	ISM-AOI020B-0.5
B585895/A5D0913	ISM-AOI021-0.5
B585895/A5D0913	ISM-AOI030-0.5
B585895/A5D0913	ISM-AOI024-0.5
B585895/A5D0913	ISM-AOI025-0.5
B585895/A5D0913	ISM-AOI027-0.5
B585895/A5D0913	ISM-AOI029A-0.5
B585895/A5D0913	SS-ROW030-0.5
B585895/A5D0913	SS-AOI020B-1.0
B592755/A5E0255	SS-ROW004-0.5
B592755/A5E0255	SS-ROW008-0.5
B592755/A5E0255	ISM-AOI016-0.5
A5D0913 Amended	SS-ROW030-1.0
B5B1038	SS-ROW030-1.0
B5A4222/A5E0713	ISM-AOI008-0.5
B5A4222/A5E0713	ISM-AOI030-0.5
B5A4222/A5E0713	SS-ROW026-0.5
B5B3319/A5F0015	ISM-AOI038-0.5
B5B3319/A5F0015	ISM-AOI039-0.5
B5B5514/A5F0363	SS-ROW013-0.5
B5B5514/A5F0363	SS-ROW005-0.5
B5B5514/A5F0363	SS-ROW019-0.5
B5B5514/A5F0363	SS-ROW022-0.5
B5B5514/A5F0363	SS-ROW016-0.5
B5B5514/A5F0363	SS-ROW025-0.5
B5B5514/A5F0363	SS-ROW029B-0.5
B5B5514/A5F0363	SS-ROW023-0.5
B5B5514/A5F0363	SS-ROW018-0.5
B5D4823/A5F0363	SBS-ROW013-1.0
B5D4823/A5F0363	SBS-ROW005-1.0
B5D4823/A5F0363	SBS-ROW022-1.0
B5D4823/A5F0363	SBS-ROW016-1.0
B5D4823/A5F0363	SBS-ROW025-1.0
B5D4823/A5F0363	SBS-ROW029B-1.0
B5D4823/A5F0363	SBS-ROW029B-1.0
B5D4823/A5F0363	SBS-ROW023-1.0
B5D4823/A5F0363	SBS-ROW018-1.0
B594651	SS-ROW036-1.0
B594651	SS-ROW014-1.0
A5D0784 Amended	SS-ROW036-1.0
A5D0784 Amended	SS-ROW014-1.0
A5F0658/B5C4634	ISM-AOI019-0.5

Report	Sample ID
B5C7784/A5E0713	SBS-ROW026-1.0
B5F3520/A5G0852	Comp-AOI4-0.5
B5I1779/A5I0106	SBS-ROW005-2.0
B5I1779/A5I0106	SBS-ROW013-2.0
B5I1779/A5I0106	SBS-ROW014-2.0
B5I1779/A5I0106	SBS-ROW016-2.0
B5I1779/A5I0106	SBS-ROW019-1.5
B5I1779/A5I0106	SBS-ROW022-1.5
B5I1779/A5I0106	SBS-ROW023-2.0
B5I1779/A5I0106	SBS-ROW025-1.5
B5I1779/A5I0106	SBS-ROW026-1.5
B5I1779/A5I0106	SBS-ROW029B-1.5
B5J7321/A5I0609	ISM-AOI026-0.5
B5K5043	SBS-ROW026-2.0
B5K5043	SBS-ROW019-2.0
B5K5043	SBS-ROW023-1.5
B5M6002/A5K0059	SS-ROW038S-0.5
B5M6002/A5K0059	SS-ROW029BS-0.5
B5M6002/A5K0059	SS-ROW010W-0.5
B5M6002/A5K0059	SS-ROW022W-0.5
B5M6002/A5K0059	SS-ROW033W-0.5
A5L0163/B5P4765	ISM-AOI034-0.5
A5L0163/B5P4765	ISM-AOI028B-0.5
A5L0163/B5P4765	ISM-AOI028A-0.5
A5L0163/B5P4765	ISM-AOI022-0.5
A5L0163/B5P4765	ISM-AOI010-0.5
A5K0831/B5P7454	ISM-AOI037-0.5
A5K0831/B5P7454	ISM-AOI009-0.5
A5K0831/B5P7454	ISM-AOI002-0.5
A5K0831/B5P7454	COMP-AOI001-0.5
B5O1368	RINSATE-SA-3
B5P4731	SBS-ROW029BS-1.5
B5P4731	SBS-ROW010W-1.5
B5P4731	SS-ROW010E-0.5
B5P4731	SBS-ROW022W-1.5
B5P4731	SS-ROW022E-0.5
B5P4731	SS-ROW022E-0.5-DUP
B5P4731	SS-ROW033W-1.5

## DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of USEPA procedures (USEPA, 2010, 2011) and appropriate laboratory and method-specific guidelines (Apex 2015; Maxxam, 2015; USEPA, 1986).

USEPA Method 1613B and 8290A detections between the method reporting limit (MRL) and the estimated detection limit (EDL) were qualified as estimates (J) by the reviewer.

Selected USEPA Method 1613B results were slightly outside required retention times used for positive analyte identification. Results that exceeded retention times were qualified by the laboratory as not detected at or above the EDL, with an elevated detection limit assigned.

Selected USEPA Method 1613B results flagged by the laboratory were assigned a “U” (non-detect) qualifier because of diphenylether interference. The qualifications resulted in an elevated EDL.

Positive identification of 2,3,7,8-TCDF cannot be achieved using typical USEPA Method 1613B columns; therefore, any detections are confirmed and quantified using USEPA Method 8290A. Selected 2,3,7,8-TCDF confirmation results were subject to diphenylether interference and the laboratory indicated that the results are “non-detect” with an elevated detection limit. The associated 1613B 2,3,7,8-TCDF result was also qualified “U” as non-detect in these cases.

USEPA Method 1613B detected results that were below the MRL and reported as an estimated maximum potential concentration (EMPC) were assigned a “U” (non-detect) qualifier by the laboratory at the reported EMPC value. The qualifications resulted in elevated EDLs. Results above the MRL reported by the laboratory as EMPCs were assigned a “U” qualifier by reviewer (non-detect) at the EMPC value as listed below:

Report	Sample	Reason	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
B576705	ISM-AOI031-0.5	EMPC	1,2,3,7,8,9-Hexa CDD	11.8	11.8 U
B576705	ISM-AOI031-0.5	EMPC	1,2,3,4,7,8-Hexa CDF	6.15	6.15 U
B576705	ISM-AOI018-0.5-B-C	EMPC	1,2,3,7,8,9-Hexa CDD	13.0	13.0 U
B576705	ISM-AOI018-0.5-B-C	EMPC	1,2,3,4,7,8-Hexa CDF	6.73	6.73 U
B576705	ISM-AOI018-0.5-B-B	EMPC	1,2,3,7,8,9-Hexa CDD	14.8	14.8 U
B576705	ISM-AOI018-0.5-B-B	EMPC	1,2,3,4,7,8-Hexa CDF	7.66	7.66 U
B576705	SBS-AOI018-1.0	EMPC	1,2,3,7,8,9-Hexa CDD	2.03	2.03 U
B576705	SBS-AOI018-1.0	EMPC	1,2,3,4,7,8-Hexa CDF	1.16	1.16 U
B5D4823	SBS-ROW016-1.0	EMPC	1,2,3,7,8-Penta CDD	4.90	4.90 U
B5D4823	SBS-ROW005-1.0	EMPC	2,3,7,8-Tetra CDF (Confirmation)	1.60	1.60 U

pg/g = picograms per gram.

In report B5P4754, the USEPA Method 1613B Octa CDD result for COMP-AOI001-0.5 was reported at above the reporting limit at 2,130 pg/g. The result was qualified “J” as estimated as follows:

Report	Sample	Reason	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
B5P4754	COMP-AOI001-0.5	Result exceeds calibration range	Octa CDD	2130	2130 J

The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

## HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

### Holding Times

Extractions and analyses were performed within the recommended holding time criteria. Archived samples were frozen at -18 degrees Celsius in order to extend holding times.

### Preservation and Sample Storage

The samples were preserved and stored appropriately.

## BLANKS

### Method Blanks

Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch. Where an analyte was detected in a sample and in the associated method blank, the sample result was qualified if the sample concentration was less than five times the method blank concentration. MRLs/EDLs were elevated to the concentration detected in the samples, qualified “U,” and assigned as the sample result. The following results were qualified:

Sample ID	Analyte	Blank Result (pg/g)	Original Result (pg/g)	Qualified Result (pg/g)
SS-ROW008-0.5	1,2,3,7,8,9-Hexa CDF	0.0980	0.184 J	0.184 UJ
SS-ROW004-0.5	1,2,3,7,8,9-Hexa CDF	0.0980	0.143	0.143 U
ISM-AOI039-0.5	1,2,3,7,8,9-Hexa CDF	0.152	0.231	0.231 U
ISM-AOI038-0.5	1,2,3,7,8,9-Hexa CDF	0.152	0.283	0.283 U
SS-ROW036-1.0	1,2,3,7,8,9-Hexa CDF	0.0991	0.0983 J	0.0983 UJ

### Trip Blanks

Trip blanks were not required for this sampling event.

## Equipment Rinsate Blanks

Three equipment rinsate blanks (RINSATE-SA, RINSATE-SA-2 and RINSATE-SA-3) were collected during the sampling events. All rinsate blank results were non-detect; therefore, no sample results were qualified.

## LABELED ANALOG STANDARD RECOVERY RESULTS

All USEPA Method 1613B and 8290A samples were spiked with C13 labeled analog standards (surrogates) to evaluate and document data quality.

The laboratory appropriately documented and qualified surrogate outliers. Associated batch quality assurance and quality control for samples with surrogate outliers were within acceptance limits. Results were not qualified based on minor outliers. All remaining surrogate recoveries were within acceptance limits.

## MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike/matrix spike duplicate (MS/MSD) results are used to evaluate laboratory precision and accuracy. MS/MSD samples were extracted and analyzed as sample volume allowed. Minor MS/MSD recovery exceedances were not qualified by the reviewer when the relative percent differences (RPDs) met acceptance criteria and other batch quality control met acceptance criteria.

All recoveries were within acceptance limits for percent recovery and RPDs.

## LABORATORY DUPLICATE RESULTS

Duplicate results are used to evaluate laboratory precision. All duplicate samples were extracted and analyzed at the required frequency.

Maxxam noted various duplicate results that marginally exceeded RPD acceptance limits due to sample heterogeneity or other factors. No actions were taken by the reviewer, as all associated samples exhibited labeled analogue results within acceptance criteria.

Some TOC duplicate RPDs slightly exceeded acceptance criteria. No qualifications were made.

All other RPDs were within acceptance limits.

## LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

A laboratory control sample/laboratory control sample duplicate (LCS/LCSD) (sometimes called a spiked blank) is spiked with target analytes to provide information on laboratory precision and accuracy. The LCS/LCSD samples were extracted and analyzed at the required frequency.

Maxxam noted LCS percent recoveries slightly outside acceptance criteria. No actions were taken by the reviewer, as all associated samples exhibited labeled analogue recoveries within acceptance criteria demonstrating precision and accuracy on a sample-specific basis.

All other LCS/LCSD analytes were within acceptance limits for percent recovery.

## FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. Multiple field duplicate pairs were submitted for analysis (SBS-AOI005-1.0/ SBS-AOI005-1.0-Dup, ISM-AOI030-0.5 / ISM-AOI030-0.5-Dup, SS-ROW022E-0.5 / SS-ROW022E-0.5-Dup). MFA uses acceptance criteria of 100 percent RPD for results that are less than five times the MRL, or 50 percent RPD for results that are greater than five times the MRL. Non-detect data are not used in the evaluation of field duplicate results. All analytes were within the acceptance criteria.

## ISM REPLICATE EVALUATION

Triplicate composite samples were collected and submitted to Maxxam. There were multiple ISM replicate sets, including samples ISM-AOI018-0.5-B-A, ISM-AOI018-0.5-B-B, and ISM-AOI018-0.5-B-C, as well as samples ISM-AOI017-0.5-A, ISM-AOI017-0.5-B, and ISM-AOI017-0.5-C. All ISM replicate samples sets were submitted for dioxin/furan and TOC analysis. The relative standard deviations (RSDs) of the replicate sets of dioxin/furan congener results were calculated.

RSDs range from 3.49 percent to 39.46 percent for dioxin/furan congeners, and the calculated mammal toxicity equivalency quotient RSD ranged from 7 to 20 percent. Associated results were qualified as estimated (J) if the RSD exceeded 35 percent. ISM replicate results were qualified as estimates when a RSDs exceeded 35 percent. A summary of exceedances and qualifications is shown below:

Sample ID	Analyte	Percent RSD	Original Result (pg/g)	Qualified Result (pg/g)
ISM-AOI018-0.5-B-A	2,3,7,8-TCDF	39.46	1.78	1.78 J
ISM-AOI018-0.5-B-B	2,3,7,8-TCDF	39.46	2.28	2.28 J
ISM-AOI018-0.5-B-C	2,3,7,8-TCDF	39.46	0.969	0.969 J

## REPORTING LIMITS

Maxxam and Apex used routine MRLs and EDLs for non-detect results. MRLs and EDLs were adjusted for samples requiring dilutions because of high analyte concentrations, matrix interferences, or ratio criteria exceedances (resulting in EMPCs).

## DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies. None were found.



## REFERENCES

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- Apex. 2014. Quality systems manual. Apex Laboratories, LLC, Tigard, Oregon. March 1.
- Maxxam. 2015. QA/QC Interpretation Guide. Maxxam Analytics. Mississauga, Ontario.
- USEPA. 1986. Test methods for evaluating solid waste: physical/chemical methods. EPA-530/SW-846 Update V. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. September (revision 1, July 2014).
- USEPA. 2010. USEPA contract laboratory program national functional guidelines for inorganic superfund data review. EPA 540/R-10/011. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. January.
- USEPA. 2011. USEPA contract laboratory program national functional guidelines for chlorinated dibenzo-p-dioxins (CDDs) and chlorinated dibenzofurans (CDFs) data review. EPA-540-R-11-016. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. September.

# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Tuesday, January 26, 2016

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: POR OPP / 9003.01.39

Enclosed are the results of analyses for work order A5L0948, which was received by the laboratory on 12/23/2015 at 3:30:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

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Apex Laboratories



Philip Nerenberg, Lab Director

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
01/26/16 16:33

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI035-0.5-As Received	A5L0948-01	Soil	12/23/15 11:30	12/23/15 15:30
ISM-AOI035-0.5-After ISM	A5L0948-02	Soil	12/23/15 11:30	12/23/15 15:30

Apex Laboratories



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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 01/26/16 16:33

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI035-0.5-After ISM (A5L0948-02)</b>			<b>Matrix: Soil</b>					
Batch: 6010067								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	01/06/16 12:50	PSEP/SM 5310B MOD	

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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 01/26/16 16:33

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI035-0.5-As Received (A5L0948-01)</b>			<b>Matrix: Soil</b>		<b>Batch: 6010074</b>			
% Solids	77.2	---	1.00	% by Weight	1	01/07/16 07:33	EPA 8000C	
<b>ISM-AOI035-0.5-After ISM (A5L0948-02)</b>			<b>Matrix: Soil</b>		<b>Batch: 6010074</b>			
% Solids	98.0	---	1.00	% by Weight	1	01/07/16 07:33	EPA 8000C	

Apex Laboratories



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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher


**Reported:**  
 01/26/16 16:33

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6010067 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (6010067-BLK1)</b>						Prepared: 01/05/16 16:10 Analyzed: 01/06/16 12:50						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (6010067-BS1)</b>						Prepared: 01/05/16 16:10 Analyzed: 01/06/16 12:50						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9300	---		mg/kg	1	10000	---	93	85-115%	---	---	
<b>Duplicate (6010067-DUP1)</b>						Prepared: 01/05/16 16:10 Analyzed: 01/06/16 12:50						
<b>QC Source Sample: ISM-AOI035-0.5-After ISM (A5L0948-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	18000	---	200	mg/kg	1	---	17000	---	---	6	20%	

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Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 01/26/16 16:33

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6010074 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (6010074-DUP1)</b>						Prepared: 01/06/16 09:16 Analyzed: 01/07/16 07:33						
QC Source Sample: Other (A6A0022-01)												
EPA 8000C												
% Solids	84.6	---	1.00	% by Weight	1	---	84.4	---	---	0.2	10%	
<b>Duplicate (6010074-DUP2)</b>						Prepared: 01/06/16 09:16 Analyzed: 01/07/16 07:33						
QC Source Sample: Other (A6A0041-05)												
EPA 8000C												
% Solids	75.3	---	1.00	% by Weight	1	---	74.7	---	---	0.8	10%	
<b>Duplicate (6010074-DUP3)</b>						Prepared: 01/06/16 14:23 Analyzed: 01/07/16 07:33						
QC Source Sample: Other (A6A0052-18)												
EPA 8000C												
% Solids	64.5	---	1.00	% by Weight	1	---	64.4	---	---	0.1	10%	
<b>Duplicate (6010074-DUP4)</b>						Prepared: 01/06/16 17:58 Analyzed: 01/07/16 07:33						
QC Source Sample: Other (A6A0078-05)												
EPA 8000C												
% Solids	81.7	---	1.00	% by Weight	1	---	81.8	---	---	0.1	10%	
<b>Duplicate (6010074-DUP5)</b>						Prepared: 01/06/16 17:58 Analyzed: 01/07/16 07:33						
QC Source Sample: Other (A6A0084-03)												
EPA 8000C												
% Solids	74.1	---	1.00	% by Weight	1	---	74.0	---	---	0.08	10%	



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 01/26/16 16:33

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 6010067</b>							
A5L0948-02	Soil	PSEP/SM 5310B MOD	12/23/15 11:30	01/05/16 16:10	5g/5g	5g/5g	NA

### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 6010074</b>							
A5L0948-01	Soil	EPA 8000C	12/23/15 11:30	01/06/16 09:17	1N/A/1N/A	1N/A/1N/A	NA
A5L0948-02	Soil	EPA 8000C	12/23/15 11:30	01/06/16 09:17	1N/A/1N/A	1N/A/1N/A	NA

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
01/26/16 16:33

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- QC
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).







Your Project #: A5L0948  
Your C.O.C. #: NA

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/01/20**  
Report #: R3857479  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B603252**

**Received: 2016/01/07, 15:45**

Sample Matrix: Soil  
# Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2016/01/11	2016/01/18	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2016/01/18	BRL SOP-00406	EPA M8290A / M1613
Moisture	1	N/A	2016/01/08	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**RESULTS OF ANALYSES OF SOIL**

<b>Maxxam ID</b>		BPW012			
<b>Sampling Date</b>		2015/12/23 11:30			
<b>COC Number</b>		NA			
	<b>UNITS</b>	<b>ISM-AOI035-0- 5-AFTER ISM</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	2.0	1.0	0.50	4339193
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BPW012							
Sampling Date		2015/12/23 11:30							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI035-0-5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.20	0.0314	0.0649	0.400	1.00	1.20		4348884
1,2,3,7,8-Penta CDD *	pg/g	5.80	0.0293	0.324	0.400	1.00	5.80		4348884
1,2,3,4,7,8-Hexa CDD *	pg/g	8.75	0.0279	0.324	0.400	0.100	0.875		4348884
1,2,3,6,7,8-Hexa CDD *	pg/g	25.9	0.0294	0.324	0.400	0.100	2.59		4348884
1,2,3,7,8,9-Hexa CDD *	pg/g	26.1	0.0269	0.324	0.400	0.100	2.61		4348884
1,2,3,4,6,7,8-Hepta CDD *	pg/g	430	0.0284	0.324	0.400	0.0100	4.30		4348884
Octa CDD *	pg/g	1050	0.0301	0.649	0.800	0.000300	0.315		4348884
Total Tetra CDD *	pg/g	4.76	0.0314	0.0649	0.400			9	4348884
Total Penta CDD *	pg/g	41.5	0.0293	0.324	0.400			12	4348884
Total Hexa CDD *	pg/g	141	0.0281	0.324	0.400			7	4348884
Total Hepta CDD *	pg/g	692	0.0284	0.324	0.400			2	4348884
2,3,7,8-Tetra CDF **	pg/g	18.0	0.0419	0.0649	0.400	0.100	1.80		4348884
1,2,3,7,8-Penta CDF **	pg/g	14.7	0.0339	0.324	0.400	0.0300	0.441		4348884
2,3,4,7,8-Penta CDF **	pg/g	26.4	0.0334	0.324	0.400	0.300	7.92		4348884
1,2,3,4,7,8-Hexa CDF **	pg/g	81.1	0.0580	0.324	0.400	0.100	8.11		4348884
1,2,3,6,7,8-Hexa CDF **	pg/g	37.0	0.0599	0.324	0.400	0.100	3.70		4348884
2,3,4,6,7,8-Hexa CDF **	pg/g	55.7	0.0560	0.324	0.400	0.100	5.57		4348884
1,2,3,7,8,9-Hexa CDF **	pg/g	1.75	0.0581	0.324	0.400	0.100	0.175		4348884
1,2,3,4,6,7,8-Hepta CDF **	pg/g	342	0.0304	0.324	0.400	0.0100	3.42		4348884
1,2,3,4,7,8,9-Hepta CDF **	pg/g	19.0	0.0300	0.324	0.400	0.0100	0.190		4348884
Octa CDF **	pg/g	476	0.0346	0.649	0.800	0.000300	0.143		4348884
Total Tetra CDF **	pg/g	64.2	0.0419	0.0649	0.400			15	4348884
Total Penta CDF **	pg/g	160	0.0337	0.324	0.400			16	4348884
Total Hexa CDF **	pg/g	272	0.0580	0.324	0.400			14	4348884
Total Hepta CDF **	pg/g	639	0.0302	0.324	0.400			4	4348884
Confirmation 2,3,7,8-Tetra CDF **	pg/g	10.8	0.072	0.32	0.29	0.100	1.08		4349614
TOTAL TOXIC EQUIVALENCY	pg/g						48.4		

**Surrogate Recovery (%)**

37CL4 2378 Tetra CDD *	%	99							4348884
------------------------	---	----	--	--	--	--	--	--	---------

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

\* CDD = Chloro Dibenzo-p-Dioxin

\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BPW012							
Sampling Date		2015/12/23 11:30							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI035-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	79							4348884
C13-1234678 HeptaCDF **	%	47							4348884
C13-123478 HexaCDD *	%	90							4348884
C13-123478 HexaCDF **	%	43							4348884
C13-1234789 HeptaCDF **	%	66							4348884
C13-123678 HexaCDD *	%	101							4348884
C13-123678 HexaCDF **	%	51							4348884
C13-12378 PentaCDD *	%	92							4348884
C13-12378 PentaCDF **	%	73							4348884
C13-123789 HexaCDF **	%	105							4348884
C13-234678 HexaCDF **	%	84							4348884
C13-23478 PentaCDF **	%	81							4348884
C13-2378 TetraCDD *	%	101							4348884
C13-2378 TetraCDF **	%	40							4348884
C13-OCDD *	%	88							4348884
Confirmation C13-2378 TetraCDF **	%	52							4349614

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**TEST SUMMARY**

**Maxxam ID:** BPW012  
**Sample ID:** ISM-AOI035-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/12/23  
**Shipped:**  
**Received:** 2016/01/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4348884	2016/01/11	2016/01/18	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4349614	N/A	2016/01/18	Leila Azzam
Moisture	BAL	4339193	N/A	2016/01/08	Chun Yan

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.1°C
-----------	-------

**Results relate only to the items tested.**



**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4339193	NS3	RPD - Sample/Sample Dup	Moisture	2016/01/08	2.6		%	20
4348884	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2016/01/17		83	%	35 - 197
			C13-1234678 HeptaCDD	2016/01/17		74	%	23 - 140
			C13-1234678 HeptaCDF	2016/01/17		73	%	28 - 143
			C13-123478 HexaCDD	2016/01/17		96	%	32 - 141
			C13-123478 HexaCDF	2016/01/17		94	%	26 - 152
			C13-1234789 HeptaCDF	2016/01/17		66	%	26 - 138
			C13-123678 HexaCDD	2016/01/17		106	%	28 - 130
			C13-123678 HexaCDF	2016/01/17		95	%	26 - 123
			C13-12378 PentaCDD	2016/01/17		86	%	25 - 181
			C13-12378 PentaCDF	2016/01/17		69	%	24 - 185
			C13-123789 HexaCDF	2016/01/17		98	%	29 - 147
			C13-234678 HexaCDF	2016/01/17		85	%	28 - 136
			C13-23478 PentaCDF	2016/01/17		79	%	21 - 178
			C13-2378 TetraCDD	2016/01/17		87	%	25 - 164
			C13-2378 TetraCDF	2016/01/17		76	%	24 - 169
			C13-OCDD	2016/01/17		76	%	17 - 157
			2,3,7,8-Tetra CDD	2016/01/17		98	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/01/17		85	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/01/17		100	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/01/17		97	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/01/17		98	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/01/17		98	%	70 - 140
			Octa CDD	2016/01/17		102	%	78 - 144
			2,3,7,8-Tetra CDF	2016/01/17		98	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/01/17		89	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/01/17		84	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/01/17		101	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/01/17		96	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/01/17		114	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/01/17		83	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/01/17		104	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/01/17		99	%	78 - 138
			Octa CDF	2016/01/17		97	%	63 - 170
4348884	OBC	Method Blank	37CL4 2378 Tetra CDD	2016/01/17		89	%	35 - 197
			C13-1234678 HeptaCDD	2016/01/17		69	%	23 - 140
			C13-1234678 HeptaCDF	2016/01/17		69	%	28 - 143
			C13-123478 HexaCDD	2016/01/17		87	%	32 - 141
			C13-123478 HexaCDF	2016/01/17		87	%	26 - 152
			C13-1234789 HeptaCDF	2016/01/17		61	%	26 - 138
			C13-123678 HexaCDD	2016/01/17		96	%	28 - 130
			C13-123678 HexaCDF	2016/01/17		94	%	26 - 123
			C13-12378 PentaCDD	2016/01/17		79	%	25 - 181
			C13-12378 PentaCDF	2016/01/17		63	%	24 - 185
			C13-123789 HexaCDF	2016/01/17		90	%	29 - 147
			C13-234678 HexaCDF	2016/01/17		81	%	28 - 136
			C13-23478 PentaCDF	2016/01/17		77	%	21 - 178
			C13-2378 TetraCDD	2016/01/17		81	%	25 - 164
			C13-2378 TetraCDF	2016/01/17		72	%	24 - 169
			C13-OCDD	2016/01/17		68	%	17 - 157
			2,3,7,8-Tetra CDD	2016/01/17	<0.0556, EDL=0.0556		pg/g	
			1,2,3,7,8-Penta CDD	2016/01/17	<0.112, EDL=0.112		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDD	2016/01/17	<0.0921, EDL=0.0921		pg/g	
			1,2,3,6,7,8-Hexa CDD	2016/01/17	<0.0968, EDL=0.0968		pg/g	
			1,2,3,7,8,9-Hexa CDD	2016/01/17	<0.0885, EDL=0.0885		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2016/01/17	0.213, EDL=0.0612		pg/g	
			Octa CDD	2016/01/17	0.728, EDL=0.139		pg/g	
			Total Tetra CDD	2016/01/17	<0.177, EDL=0.177 (1)		pg/g	
			Total Penta CDD	2016/01/17	<0.112, EDL=0.112		pg/g	
			Total Hexa CDD	2016/01/17	<0.237, EDL=0.237 (1)		pg/g	
			Total Hepta CDD	2016/01/17	0.213, EDL=0.0612		pg/g	
			2,3,7,8-Tetra CDF	2016/01/17	<0.0653, EDL=0.0653		pg/g	
			1,2,3,7,8-Penta CDF	2016/01/17	<0.0703, EDL=0.0703		pg/g	
			2,3,4,7,8-Penta CDF	2016/01/17	<0.0693, EDL=0.0693		pg/g	
			1,2,3,4,7,8-Hexa CDF	2016/01/17	<0.0571, EDL=0.0571		pg/g	
			1,2,3,6,7,8-Hexa CDF	2016/01/17	<0.0590, EDL=0.0590		pg/g	
			2,3,4,6,7,8-Hexa CDF	2016/01/17	<0.0552, EDL=0.0552		pg/g	
			1,2,3,7,8,9-Hexa CDF	2016/01/17	0.0987, EDL=0.0572		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2016/01/17	<0.0874, EDL=0.0874		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2016/01/17	<0.0864, EDL=0.0864		pg/g	
			Octa CDF	2016/01/17	0.135, EDL=0.101		pg/g	
			Total Tetra CDF	2016/01/17	<0.0653, EDL=0.0653		pg/g	
			Total Penta CDF	2016/01/17	<0.0698, EDL=0.0698		pg/g	
			Total Hexa CDF	2016/01/17	0.0987, EDL=0.0571		pg/g	
			Total Hepta CDF	2016/01/17	<0.0869, EDL=0.0869		pg/g	
4349614	LAZ	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2016/01/18	<0.085, EDL=0.085		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC				Date		%		
Batch	Init	QC Type	Parameter	Analyzed	Value	Recovery	UNITS	QC Limits
			Confirmation C13-2378 TetraCDF	2016/01/18		120	%	40 - 135
<p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p> <p>(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.</p>								

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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Cristina Carriere, Scientific Services



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Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Friday, March 11, 2016

Madi Novak  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

Enclosed are the results of analyses for work order A6B0380, which was received by the laboratory on 2/10/2016 at 12:08:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



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Philip Nerenberg, Lab Director

Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

Reported:  
03/11/16 13:07

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-A0I003-0.5-As Received	A6B0380-01	Soil	02/09/16 11:30	02/10/16 12:08
ISM-A0I003-0.5-After ISM	A6B0380-02	Soil	02/09/16 11:30	02/10/16 12:08

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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 03/11/16 13:07

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-A01003-0.5-After ISM (A6B0380-02)</b>			<b>Matrix: Soil</b>					
Batch: 6020472								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	02/18/16 13:45	PSEP/SM 5310B MOD	

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 03/11/16 13:07

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-A0I003-0.5-As Received (A6B0380-01)</b>			<b>Matrix: Soil</b>		<b>Batch: 6020385</b>			
% Solids	77.4	---	1.00	% by Weight	1	02/15/16 07:51	EPA 8000C	
<b>ISM-A0I003-0.5-After ISM (A6B0380-02)</b>			<b>Matrix: Soil</b>		<b>Batch: 6020453</b>			
% Solids	94.6	---	1.00	% by Weight	1	02/17/16 09:26	EPA 8000C	

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Philip Nerenberg, Lab Director



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 03/11/16 13:07

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6020472 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (6020472-BLK1)</b>						Prepared: 02/16/16 16:35 Analyzed: 02/18/16 13:45						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (6020472-BS1)</b>						Prepared: 02/16/16 16:35 Analyzed: 02/18/16 13:45						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	8800	---		mg/kg	1	10000	---	88	85-115%	---	---	
<b>Duplicate (6020472-DUP1)</b>						Prepared: 02/16/16 16:35 Analyzed: 02/18/16 13:45						
<b>QC Source Sample: ISM-A01003-0.5-After ISM (A6B0380-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	16000	---	200	mg/kg	1	---	17000	---	---	11	20%	

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2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

Reported:  
03/11/16 13:07

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6020385 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (6020385-DUP1)</b>						Prepared: 02/12/16 14:02 Analyzed: 02/15/16 07:51						
QC Source Sample: Other (A6B0382-08)												
EPA 8000C												
% Solids	68.0	---	1.00	% by Weight	1	---	68.5	---	---	0.6	10%	
<b>Duplicate (6020385-DUP2)</b>						Prepared: 02/12/16 14:02 Analyzed: 02/15/16 07:51						
QC Source Sample: Other (A6B0402-10)												
EPA 8000C												
% Solids	76.5	---	1.00	% by Weight	1	---	78.0	---	---	2	10%	
<b>Duplicate (6020385-DUP3)</b>						Prepared: 02/12/16 14:02 Analyzed: 02/15/16 07:51						
QC Source Sample: Other (A6B0420-02)												
EPA 8000C												
% Solids	67.4	---	1.00	% by Weight	1	---	67.3	---	---	0.07	10%	
<b>Duplicate (6020385-DUP4)</b>						Prepared: 02/12/16 14:02 Analyzed: 02/15/16 07:51						
QC Source Sample: Other (A6B0420-10)												
EPA 8000C												
% Solids	78.9	---	1.00	% by Weight	1	---	78.7	---	---	0.2	10%	
<b>Duplicate (6020385-DUP5)</b>						Prepared: 02/12/16 18:59 Analyzed: 02/15/16 07:51						
QC Source Sample: Other (A6B0436-01)												
EPA 8000C												
% Solids	80.2	---	1.00	% by Weight	1	---	78.4	---	---	2	10%	
<b>Duplicate (6020385-DUP6)</b>						Prepared: 02/12/16 18:59 Analyzed: 02/15/16 07:51						
QC Source Sample: Other (A6B0443-03)												
EPA 8000C												
% Solids	76.5	---	1.00	% by Weight	1	---	76.4	---	---	0.2	10%	
<b>Batch 6020453 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (6020453-DUP1)</b>						Prepared: 02/16/16 09:36 Analyzed: 02/17/16 09:26						
QC Source Sample: Other (A6B0478-04)												
EPA 8000C												

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Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

Reported:  
 03/11/16 13:07

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6020453 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (6020453-DUP1)</b>						Prepared: 02/16/16 09:36 Analyzed: 02/17/16 09:26						
QC Source Sample: Other (A6B0478-04)												
% Solids	89.0	---	1.00	% by Weight	1	---	90.4	---	---	2	10%	
<b>Duplicate (6020453-DUP2)</b>						Prepared: 02/16/16 09:36 Analyzed: 02/17/16 09:26						
QC Source Sample: Other (A6B0486-02)												
EPA 8000C												
% Solids	79.9	---	1.00	% by Weight	1	---	80.0	---	---	0.03	10%	
<b>Duplicate (6020453-DUP3)</b>						Prepared: 02/16/16 09:36 Analyzed: 02/17/16 09:26						
QC Source Sample: Other (A6B0494-04)												
EPA 8000C												
% Solids	88.3	---	1.00	% by Weight	1	---	87.3	---	---	1	10%	
<b>Duplicate (6020453-DUP4)</b>						Prepared: 02/16/16 14:24 Analyzed: 02/17/16 09:26						
QC Source Sample: Other (A6B0513-06)												
EPA 8000C												
% Solids	71.4	---	1.00	% by Weight	1	---	71.5	---	---	0.2	10%	
<b>Duplicate (6020453-DUP5)</b>						Prepared: 02/16/16 18:17 Analyzed: 02/17/16 09:26						
QC Source Sample: Other (A6B0449-15)												
EPA 8000C												
% Solids	75.6	---	1.00	% by Weight	1	---	75.5	---	---	0.03	10%	
<b>Duplicate (6020453-DUP6)</b>						Prepared: 02/16/16 18:18 Analyzed: 02/17/16 09:26						
QC Source Sample: Other (A6B0523-03)												
EPA 8000C												
% Solids	77.7	---	1.00	% by Weight	1	---	79.0	---	---	2	10%	
<b>Duplicate (6020453-DUP7)</b>						Prepared: 02/16/16 19:40 Analyzed: 02/17/16 09:26						
QC Source Sample: Other (A6B0535-02)												
EPA 8000C												
% Solids	73.8	---	1.00	% by Weight	1	---	73.4	---	---	0.5	10%	
<b>Duplicate (6020453-DUP8)</b>						Prepared: 02/16/16 19:40 Analyzed: 02/17/16 09:26						
QC Source Sample: Other (A6B0539-02)												

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Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak


**Reported:**  
 03/11/16 13:07

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6020453 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (6020453-DUP8)</b>						Prepared: 02/16/16 19:40 Analyzed: 02/17/16 09:26						
QC Source Sample: Other (A6B0539-02)												
EPA 8000C												
% Solids	83.6	---	1.00	% by Weight	1	---	84.0	---	---	0.4	10%	

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Philip Nerenberg, Lab Director

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 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 03/11/16 13:07

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 6020472</b>							
A6B0380-02	Soil	PSEP/SM 5310B MOD	02/09/16 11:30	02/16/16 16:35	5g/5g	5g/5g	NA

### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 6020385</b>							
A6B0380-01	Soil	EPA 8000C	02/09/16 11:30	02/12/16 18:59	1N/A/1N/A	1N/A/1N/A	NA
<b>Batch: 6020453</b>							
A6B0380-02	Soil	EPA 8000C	02/09/16 11:30	02/16/16 14:25	1N/A/1N/A	1N/A/1N/A	NA



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Madi Novak


**Reported:**  
03/11/16 13:07

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



Maul Foster & Alongi, INC.  
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Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

Reported:  
03/11/16 13:07

Lab # AL6B0386 of 1  
COC

### CHAIN OF CUSTODY

### APEX LABS

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <u>MFA</u>		Project Name: <u>Port of Ridgefield</u>		Project # <u>9003.01.39</u>	
Address: <u>2001 NW 19th Ave STE 200</u>		Phone: <u>503 501 5209</u>		Email: <u>paul.wiescher@maulfooster.com</u>	
Project Mgr: <u>M. Novak</u>		Fax:			
ANALYSIS REQUEST					
Site Location: <u>OR</u>	Other: <u>WA</u>	LAB ID #	DATE	TIME	MATRIX
SAMPLE ID					
<u>ISM-A01003-0.5</u>		<u>2-9-16</u>	<u>11:30</u>	<u>50</u>	<u>1</u>
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
ANALYSIS REQUEST AT, SB, AS, BA, BE, CA Cd, Cr, Cu, Co, Ni, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, TL, V, Zn TOTAL DISS TC/P 1200-Z 1200-COLS 1200-Z ISM Processing Dosing USEMA 1613 TOE USEP/ISM					
Normal Turn Around Time (TAT) = 7-10 Business Days			YES <input checked="" type="radio"/> NO <input type="radio"/> TAT Requested (circle) 1 Day 2 Day 3 Day 4 DAY 5 DAY Other:		
SPECIAL INSTRUCTIONS: <u>ISM processing</u>			RECEIVED BY: <u>[Signature]</u> Date: <u>2/10/16</u>		
RECEIVED BY: <u>[Signature]</u> Date: <u>2-9-16</u>			RECEIVED BY: <u>[Signature]</u> Date: _____		
Printed Name: <u>Paul Wiescher</u>			Printed Name: _____		
Time: _____			Time: _____		
Company: <u>MFA</u>			Company: <u>Apex Labs</u>		

*Philip Nerenberg*



Your Project #: A6B0380  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/03/05**  
Report #: R3917970  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B632779**

**Received: 2016/02/17, 15:50**

Sample Matrix: Soil  
# Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2016/02/28	2016/03/03	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2016/03/04	BRL SOP-00406	EPA M8290A / M1613
Moisture	1	N/A	2016/02/18	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**RESULTS OF ANALYSES OF SOIL**

<b>Maxxam ID</b>		BW1140			
<b>Sampling Date</b>		2016/02/09 11:30			
<b>COC Number</b>		na			
	<b>UNITS</b>	<b>ISM-A01003-0.5-AFTER ISM</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	6.0	1.0	0.50	4386140
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BW1140							
Sampling Date		2016/02/09 11:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-A01003- 0.5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	3.71	0.0398	0.0690	0.400	1.00	3.71		4403298
1,2,3,7,8-Penta CDD *	pg/g	2.00	0.0366	0.345	0.400	1.00	2.00		4403298
1,2,3,4,7,8-Hexa CDD *	pg/g	4.83	0.0339	0.345	0.400	0.100	0.483		4403298
1,2,3,6,7,8-Hexa CDD *	pg/g	16.1	0.0353	0.345	0.400	0.100	1.61		4403298
1,2,3,7,8,9-Hexa CDD *	pg/g	13.0	0.0349	0.345	0.400	0.100	1.30		4403298
1,2,3,4,6,7,8-Hepta CDD *	pg/g	334	0.0416	0.345	0.400	0.0100	3.34		4403298
Octa CDD *	pg/g	1760	0.0187	0.690	0.800	0.000300	0.528		4403298
Total Tetra CDD *	pg/g	5.63	0.0398	0.345	0.400			8	4403298
Total Penta CDD *	pg/g	10.3	0.0366	0.345	0.400			11	4403298
Total Hexa CDD *	pg/g	90.0	0.0350	0.345	0.400			7	4403298
Total Hepta CDD *	pg/g	569	0.0416	0.345	0.400			2	4403298
2,3,7,8-Tetra CDF **	pg/g	1.33	0.0313	0.0690	0.400	0.100	0.133		4403298
1,2,3,7,8-Penta CDF **	pg/g	0.847	0.0337	0.345	0.400	0.0300	0.0254		4403298
2,3,4,7,8-Penta CDF **	pg/g	1.64	0.0327	0.345	0.400	0.300	0.492		4403298
1,2,3,4,7,8-Hexa CDF **	pg/g	6.75	0.0434	0.345	0.400	0.100	0.675		4403298
1,2,3,6,7,8-Hexa CDF **	pg/g	3.36	0.0449	0.345	0.400	0.100	0.336		4403298
2,3,4,6,7,8-Hexa CDF **	pg/g	2.65	0.0418	0.345	0.400	0.100	0.265		4403298
1,2,3,7,8,9-Hexa CDF **	pg/g	0.135	0.0443	0.345	0.400	0.100	0.0135		4403298
1,2,3,4,6,7,8-Hepta CDF **	pg/g	48.4	0.0373	0.345	0.400	0.0100	0.484		4403298
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.73	0.0380	0.345	0.400	0.0100	0.0273		4403298
Octa CDF **	pg/g	66.3	0.0540	0.690	0.800	0.000300	0.0199		4403298
Total Tetra CDF **	pg/g	6.44	0.0313	0.345	0.400			13	4403298
Total Penta CDF **	pg/g	23.5	0.0332	0.345	0.400			12	4403298
Total Hexa CDF **	pg/g	88.6	0.0436	0.345	0.400			11	4403298
Total Hepta CDF **	pg/g	121	0.0377	0.345	0.400			4	4403298
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.823	0.036	0.35	0.32	0.100	0.0823		4405533
TOTAL TOXIC EQUIVALENCY	pg/g						15.4		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	108							4403298
C13-1234678 HeptaCDD *	%	96							4403298
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BW1140							
Sampling Date		2016/02/09 11:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-A01003- 0.5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	97							4403298
C13-123478 HexaCDD *	%	83							4403298
C13-123478 HexaCDF **	%	87							4403298
C13-1234789 HeptaCDF **	%	100							4403298
C13-123678 HexaCDD *	%	104							4403298
C13-123678 HexaCDF **	%	102							4403298
C13-12378 PentaCDD *	%	116							4403298
C13-12378 PentaCDF **	%	130							4403298
C13-123789 HexaCDF **	%	112							4403298
C13-234678 HexaCDF **	%	86							4403298
C13-23478 PentaCDF **	%	95							4403298
C13-2378 TetraCDD *	%	99							4403298
C13-2378 TetraCDF **	%	106							4403298
C13-OCDD *	%	112							4403298
Confirmation C13-2378 TetraCDF **	%	104							4405533

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**TEST SUMMARY**

**Maxxam ID:** BWI140  
**Sample ID:** ISM-A0I003-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2016/02/09  
**Shipped:**  
**Received:** 2016/02/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4403298	2016/02/28	2016/03/03	Cuong Duc Do
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4405533	N/A	2016/03/04	Vica Cioranic
Moisture	BAL	4386140	N/A	2016/02/18	Valentina Kaftani

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.4°C
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**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4386140	SB1	RPD - Sample/Sample Dup	Moisture	2016/02/18	2.6		%	20
4403298	CD	Spiked Blank	37CL4 2378 Tetra CDD	2016/03/03		97	%	35 - 197
			C13-1234678 HeptaCDD	2016/03/03		80	%	23 - 140
			C13-1234678 HeptaCDF	2016/03/03		84	%	28 - 143
			C13-123478 HexaCDD	2016/03/03		74	%	32 - 141
			C13-123478 HexaCDF	2016/03/03		76	%	26 - 152
			C13-1234789 HeptaCDF	2016/03/03		84	%	26 - 138
			C13-123678 HexaCDD	2016/03/03		95	%	28 - 130
			C13-123678 HexaCDF	2016/03/03		91	%	26 - 123
			C13-12378 PentaCDD	2016/03/03		102	%	25 - 181
			C13-12378 PentaCDF	2016/03/03		117	%	24 - 185
			C13-123789 HexaCDF	2016/03/03		105	%	29 - 147
			C13-234678 HexaCDF	2016/03/03		82	%	28 - 136
			C13-23478 PentaCDF	2016/03/03		84	%	21 - 178
			C13-2378 TetraCDD	2016/03/03		86	%	25 - 164
			C13-2378 TetraCDF	2016/03/03		95	%	24 - 169
			C13-OCDD	2016/03/03		78	%	17 - 157
			2,3,7,8-Tetra CDD	2016/03/03		94	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/03/03		92	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/03/03		92	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/03/03		93	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/03/03		102	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/03/03		95	%	70 - 140
			Octa CDD	2016/03/03		102	%	78 - 144
			2,3,7,8-Tetra CDF	2016/03/03		98	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/03/03		92	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/03/03		97	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/03/03		96	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/03/03		95	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/03/03		91	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/03/03		98	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/03/03		105	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/03/03		98	%	78 - 138
			Octa CDF	2016/03/03		95	%	63 - 170
4403298	CD	RPD	2,3,7,8-Tetra CDD	2016/03/03	1.1		%	25
			1,2,3,7,8-Penta CDD	2016/03/03	6.7		%	25
			1,2,3,4,7,8-Hexa CDD	2016/03/03	3.2		%	25
			1,2,3,6,7,8-Hexa CDD	2016/03/03	1.1		%	25
			1,2,3,7,8,9-Hexa CDD	2016/03/03	15		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/03/03	13		%	25
			Octa CDD	2016/03/03	17		%	25
			2,3,7,8-Tetra CDF	2016/03/03	1.0		%	25
			1,2,3,7,8-Penta CDF	2016/03/03	2.2		%	25
			2,3,4,7,8-Penta CDF	2016/03/03	4.2		%	25
			1,2,3,4,7,8-Hexa CDF	2016/03/03	0		%	25
			1,2,3,6,7,8-Hexa CDF	2016/03/03	6.5		%	25
			2,3,4,6,7,8-Hexa CDF	2016/03/03	1.1		%	25
			1,2,3,7,8,9-Hexa CDF	2016/03/03	6.3		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/03/03	0.96		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/03/03	7.4		%	25
			Octa CDF	2016/03/03	17		%	25
4403298	CD	Method Blank	37CL4 2378 Tetra CDD	2016/03/03		104	%	35 - 197
			C13-1234678 HeptaCDD	2016/03/03		90	%	23 - 140
			C13-1234678 HeptaCDF	2016/03/03		96	%	28 - 143

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-123478 HexaCDD	2016/03/03		86	%	32 - 141
			C13-123478 HexaCDF	2016/03/03		80	%	26 - 152
			C13-1234789 HeptaCDF	2016/03/03		99	%	26 - 138
			C13-123678 HexaCDD	2016/03/03		106	%	28 - 130
			C13-123678 HexaCDF	2016/03/03		99	%	26 - 123
			C13-12378 PentaCDD	2016/03/03		112	%	25 - 181
			C13-12378 PentaCDF	2016/03/03		126	%	24 - 185
			C13-123789 HexaCDF	2016/03/03		117	%	29 - 147
			C13-234678 HexaCDF	2016/03/03		91	%	28 - 136
			C13-23478 PentaCDF	2016/03/03		93	%	21 - 178
			C13-2378 TetraCDD	2016/03/03		92	%	25 - 164
			C13-2378 TetraCDF	2016/03/03		106	%	24 - 169
			C13-OCDD	2016/03/03		85	%	17 - 157
			2,3,7,8-Tetra CDD	2016/03/03	<0.110, EDL=0.110		pg/g	
			1,2,3,7,8-Penta CDD	2016/03/03	<0.0907, EDL=0.0907		pg/g	
			1,2,3,4,7,8-Hexa CDD	2016/03/03	<0.113, EDL=0.113		pg/g	
			1,2,3,6,7,8-Hexa CDD	2016/03/03	<0.118, EDL=0.118		pg/g	
			1,2,3,7,8,9-Hexa CDD	2016/03/03	<0.116, EDL=0.116		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2016/03/03	<0.113, EDL=0.113		pg/g	
			Octa CDD	2016/03/03	0.270, EDL=0.102		pg/g	
			Total Tetra CDD	2016/03/03	<0.110, EDL=0.110		pg/g	
			Total Penta CDD	2016/03/03	<0.0907, EDL=0.0907		pg/g	
			Total Hexa CDD	2016/03/03	<0.117, EDL=0.117		pg/g	
			Total Hepta CDD	2016/03/03	<0.113, EDL=0.113		pg/g	
			2,3,7,8-Tetra CDF	2016/03/03	<0.0503, EDL=0.0503		pg/g	
			1,2,3,7,8-Penta CDF	2016/03/03	<0.120, EDL=0.120		pg/g	
			2,3,4,7,8-Penta CDF	2016/03/03	<0.116, EDL=0.116		pg/g	
			1,2,3,4,7,8-Hexa CDF	2016/03/03	<0.134, EDL=0.134		pg/g	
			1,2,3,6,7,8-Hexa CDF	2016/03/03	<0.139, EDL=0.139		pg/g	
			2,3,4,6,7,8-Hexa CDF	2016/03/03	<0.129, EDL=0.129		pg/g	
			1,2,3,7,8,9-Hexa CDF	2016/03/03	<0.137, EDL=0.137		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2016/03/03	<0.0825, EDL=0.0825		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8,9-Hepta CDF	2016/03/03	<0.0842, EDL=0.0842		pg/g	
			Octa CDF	2016/03/03	<0.110, EDL=0.110		pg/g	
			Total Tetra CDF	2016/03/03	<0.0503, EDL=0.0503		pg/g	
			Total Penta CDF	2016/03/03	<0.118, EDL=0.118		pg/g	
			Total Hexa CDF	2016/03/03	<0.135, EDL=0.135		pg/g	
			Total Hepta CDF	2016/03/03	<0.0834, EDL=0.0834		pg/g	
4405533	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2016/03/04	<0.098, EDL=0.098		pg/g	
			Confirmation C13-2378 TetraCDF	2016/03/04		79	%	40 - 135

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.



**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

# DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 9003.01.39 | MARCH 18, 2016 | PORT OF RIDGEFIELD

Maul Foster & Alongi, Inc. (MFA) conducted an independent review of the quality of additional analytical results for the Port of Ridgefield Off-Property Remedial Investigation. The samples were collected during multiple sampling events conducted in 2015 and 2016.

Maxxam and Apex Laboratories (Apex) performed the analyses. Maxxam report numbers B603252 and B632779 were reviewed as well as Apex report numbers A5L0948 and A6B0380. Incremental sampling methodology (ISM) samples were processed by Apex. Maxxam conducted the dibenzo-p-dioxins and dibenzofurans (dioxins/furans) analysis and Apex performed total organic carbon (TOC) analyses. The analyses performed and samples analyzed are listed below.

Analysis	Reference
Dioxins/Furans	USEPA Method 1613B modified
2,3,7,8- TCDF Confirmation*	USEPA Method 8290A modified
TOC	PSEP/SM 5310B

PSEP = Puget Sound Estuary Protocols.

SM = Standard Methods for the Examination of Water and Wastewater.

USEPA = U.S. Environmental Protection Agency.

\*Positive identification of 2,3,7,8-TCDF cannot be achieved using typical USEPA Method 1613B columns; therefore, any detections are confirmed and quantified using USEPA Method 8290A.

Report	Sample ID
A5L0948/B603252	ISM-AOI035-0.5
A6B0380/B632779	ISM-AOI003-0.5

## DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of USEPA procedures (USEPA, 2010, 2011) and appropriate laboratory and method-specific guidelines (Apex 2015; Maxxam, 2015; USEPA, 1986).

USEPA Method 1613B and 8290A detections between the method reporting limit (MRL) and the estimated detection limit (EDL) were qualified as estimates (J) by the reviewer.

The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

## HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

### Holding Times

Extractions and analyses were performed within the recommended holding time criteria. Archived samples were frozen at -18 degrees Celsius in order to extend holding times.

### Preservation and Sample Storage

The samples were preserved and stored appropriately.

## BLANKS

### Method Blanks

Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch. All method blanks met acceptance criteria.

### Trip Blanks

Trip blanks were not required for this sampling event.

## LABELED ANALOG STANDARD RECOVERY RESULTS

All USEPA Method 1613B and 8290A samples were spiked with C13 labeled analog standards (surrogates) to evaluate and document data quality.

The laboratory appropriately documented and qualified surrogate outliers. All surrogate recoveries were within acceptance limits.

## LABORATORY DUPLICATE RESULTS

Duplicate results are used to evaluate laboratory precision. All duplicate samples were extracted and analyzed at the required frequency.

All RPDs were within acceptance limits.

## LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

A laboratory control sample/laboratory control sample duplicate (LCS/LCSD) (sometimes called a spiked blank) is spiked with target analytes to provide information on laboratory precision and accuracy. The LCS/LCSD samples were extracted and analyzed at the required frequency.

All LCS/LCSD analytes were within acceptance limits for percent recovery.

## REPORTING LIMITS

Maxxam and Apex used routine MRLs and EDLs for non-detect results. MRLs and EDLs were adjusted for samples requiring dilutions because of high analyte concentrations, matrix interferences, or ratio criteria exceedances (resulting in EMPCs).

## DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies. None were found.

## REFERENCES

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- Apex. 2014. Quality systems manual. Apex Laboratories, LLC, Tigard, Oregon. March 1.
- Maxxam. 2015. QA/QC Interpretation Guide. Maxxam Analytics. Mississauga, Ontario.
- USEPA. 1986. Test methods for evaluating solid waste: physical/chemical methods. EPA-530/SW-846 Update V. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. September (revision 1, July 2014).
- USEPA. 2010. USEPA contract laboratory program national functional guidelines for inorganic superfund data review. EPA 540/R-10/011. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. January.
- USEPA. 2011. USEPA contract laboratory program national functional guidelines for chlorinated dibenzo-p-dioxins (CDDs) and chlorinated dibenzofurans (CDFs) data review. EPA-540-R-11-016. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. September.