



Your P.O. #  
Your C.O.C. #: N/A

**Attention:** \_\_\_\_\_  
Atlantic Industrial Services  
PO Box 185  
680 MacElmon Rd  
Debert, NS  
B0M 1G0

Report Date: 2013/09/30

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B3F9013**  
**Received: 2013/09/20, 11:37**

Sample Matrix: Water  
# Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
ABN Compounds in Water by GC/MS (1)	1	2013/09/25	2013/09/27	CAM SOP-00301	EPA 8270 (modified)
Carbonaceous BOD	1	N/A	2013/09/25	ATL SOP 00041	Based on APHA 521
Chloride	1	N/A	2013/09/30	ATL SOP 00014	Based on SM4500-C
Str. Acid Diss. Cyanide water (3)	1	N/A	2013/09/24	ATL SOP 00040	Based on EPA335.3
Chemical Oxygen Demand (COD)	1	N/A	2013/09/26	ATL SOP 00042	Based on SM5220D
Chromium (VI) in Water (1)	1	N/A	2013/09/27	CAM SOP-00438	EPA 7199
Conductance - water	1	N/A	2013/09/27	ATL SOP-00004	Based on SM2510B
TEH in Water (PIRI)	1	2013/09/23	2013/09/24	ATL SOP 00113	Based on Atl. PIRI
Fluoride	1	N/A	2013/09/23	ATL SOP 00043	Based on SM4500F-
Glycol in Water (2)	1	2013/09/23	2013/09/30		
Mercury - Total (CVAA,LL)	1	2013/09/25	2013/09/25	ATL SOP 00026	Based on EPA245.1
Metals Water Total MS (4)	1	2013/09/26	2013/09/27	ATL SOP 00058	Based on EPA6020/4
Mineral Oil and Grease - Water	1	N/A	2013/09/27	ATL SOP 00101	based on 1664A
Nitrogen Ammonia - water	1	N/A	2013/09/28	ATL SOP 00015	Based on USEPA 35
Nitrogen - Nitrate + Nitrite	1	N/A	2013/09/27	ATL SOP 00018	Based on USGS - Er
Nitrogen - Nitrite	1	N/A	2013/09/28	ATL SOP 00017	Based on SM4500-N
Nitrogen - Nitrate (as N)	1	N/A	2013/09/30	ATL SOP 00018	Based on ASTM D38
Phenols (4-AAP)	1	N/A	2013/09/23	ATL SOP 00039	Based on EPA 420.2
pH (9)	1	N/A	2013/09/27	ATL SOP 00003	Based on SM4500H-
VPH in Water (PIRI)	1	2013/09/26	2013/09/27	ATL SOP 00118	Based on Atl. PIRI
Sulphate	1	N/A	2013/09/27	ATL SOP 00023	Based on EPA 375.4
Sulphide (1)	1	N/A	2013/09/24	CAM SOP-00455	SM 4500-S G
Nitrogen TKN - water (as N)	1	N/A	2013/09/27	ATL SOP 00019	Based on USEPA 35
Total Oil and Grease - Water	1	2013/09/24	2013/09/27	ATL SOP 00101	Based on EPA1664
ModTPH (T1) Calc. for Water	1	N/A	2013/09/30	N/A	Based on Atl. PIRI
Phosphorus Total Colourimetry	1	2013/09/25	2013/09/27	ATL SOP 00057	Based on EPA385.1
Total Suspended Solids	1	N/A	2013/09/26	ATL SOP 00007	based on EPA 160.2
Volatile Organic Compounds in Water (4)	1	2013/09/23	2013/09/24	ATL SOP 00122/00133	Based on EPA624

**Remarks:**

Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.



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**CERTIFICATE OF ANALYSIS**

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

- (1) This test was performed by Maxxam Analytics Mississauga
- (2) This test was performed by Bedford to Calgary Subcontract
- (3) Strong acid dissociable cyanide value may include contribution from thiocyanate.  
New RDLs in effect due to release of NS Contaminated Sites Regulations. Reduced RDL based on MDL study performance. Low level analytical run checks being implemented.
- (4) New RDLs in effect due to release of NS Contaminated Sites Regulations. Reduced RDL based on MDL study performance. Low level analytical run checks being implemented.
- (5) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.

**Encryption Ke**

30 Sep 2013 17:37:45 -03:00

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

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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.



Maxxam Job #: B3F9013  
 Report Date: 2013/09/30

Atlantic Industrial Services

Your P.O. #: 6228

**RESULTS OF ANALYSES OF WATER**

Maxxam ID		TD3680		
Sampling Date		2013/09/19		
COC Number		N/A		
	<b>Units</b>	<b>PERMEATE SEPT 19/13</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Calculated Parameters</b>				
Nitrate (N)	mg/L	ND	0.050	3357152
<b>Inorganics</b>				
Carbonaceous BOD	mg/L	ND	5.0	3358746
Total Chemical Oxygen Demand	mg/L	5.8	5.0	3383514
Dissolved Chloride (Cl)	mg/L	50	1.0	3365365
Strong Acid Dissoc. Cyanide (CN)	mg/L	ND	0.0010	3360798
Dissolved Fluoride (F-)	mg/L	ND	0.10	3359230
Nitrate + Nitrite	mg/L	ND	0.050	3365381
Nitrite (N)	mg/L	ND	0.010	3365386
Nitrogen (Ammonia Nitrogen)	mg/L	ND	0.050	3363892
pH	pH	6.58	N/A	3365462
Phenols-4AAP	mg/L	0.0013	0.0010	3359239
Total Phosphorus	mg/L	ND	0.020	3362671
Total Suspended Solids	mg/L	ND	1.0	3361688
Dissolved Sulphate (SO4)	mg/L	ND	2.0	3365388
Sulphide	mg/L	ND	0.020	3361150
Total Kjeldahl Nitrogen	mg/L	0.21	0.10	3365282
Conductivity	uS/cm	150	1.0	3365465
<b>Subcontracted Analysis</b>				
Subcontract Parameter	N/A	ATTACHED	N/A	3359719
<b>Petroleum Hydrocarbons</b>				
Mineral Oil and Grease	mg/L	ND	5.0	3365722
Total Oil & Grease	mg/L	ND	5.0	3360743

ND = Not detected  
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**MERCURY BY COLD VAPOUR AA (WATER)**

Maxxam ID		TD3680		
Sampling Date		2013/09/19		
COC Number		N/A		
	Units	PERMEATE SEPT 19/13	RDL	QC Batch

<b>Metals</b>				
Total Mercury (Hg)	ug/L	ND	0.013	3382442

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**ELEMENTS BY ICP/MS (WATER)**

Maxxam ID		TD3680		
Sampling Date		2013/09/19		
COC Number		N/A		
	Units	PERMEATE SEPT 19/13	RDL	QC Batch

<b>Metals</b>				
Total Aluminum (Al)	ug/L	5.9	5.0	3383876
Total Antimony (Sb)	ug/L	ND	1.0	3383876
Total Arsenic (As)	ug/L	ND	1.0	3383876
Total Barium (Ba)	ug/L	5.8	1.0	3383876
Total Beryllium (Be)	ug/L	ND	1.0	3383876
Total Bismuth (Bi)	ug/L	ND	2.0	3383876
Total Boron (B)	ug/L	ND	50	3383876
Total Cadmium (Cd)	ug/L	ND	0.010	3383876
Total Calcium (Ca)	ug/L	580	100	3383876
Total Chromium (Cr)	ug/L	ND	1.0	3383876
Total Cobalt (Co)	ug/L	ND	0.40	3383876
Total Copper (Cu)	ug/L	ND	2.0	3383876
Total Iron (Fe)	ug/L	ND	50	3383876
Total Lead (Pb)	ug/L	ND	0.50	3383876
Total Lithium (Li)	ug/L	2.0	2.0	3383876
Total Magnesium (Mg)	ug/L	200	100	3383876
Total Manganese (Mn)	ug/L	ND	2.0	3383876
Total Molybdenum (Mo)	ug/L	ND	2.0	3383876
Total Nickel (Ni)	ug/L	ND	2.0	3383876
Total Potassium (K)	ug/L	120	100	3383876
Total Selenium (Se)	ug/L	ND	1.0	3383876
Total Silver (Ag)	ug/L	ND	0.10	3383876
Total Sodium (Na)	ug/L	29000	100	3383876
Total Strontium (Sr)	ug/L	18	2.0	3383876
Total Thallium (Tl)	ug/L	ND	0.10	3383876
Total Tin (Sn)	ug/L	ND	2.0	3383876
Total Titanium (Ti)	ug/L	ND	2.0	3383876
Total Uranium (U)	ug/L	ND	0.10	3383876
Total Vanadium (V)	ug/L	ND	2.0	3383876

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**ELEMENTS BY ICP/MS (WATER)**

Maxxam ID		TD3680		
Sampling Date		2013/09/19		
COC Number		N/A		
	Units	PERMEATE SEPT 19/13	RDL	QC Batch

Total Zinc (Zn)	ug/L	ND	5.0	3383876
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**ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)**

Maxxam ID		TD3680		
Sampling Date		2013/09/19		
COC Number		N/A		
	Units	PERMEATE SEPT 19/13	RDL	QC Batch

Metals				
Chromium (VI)	ug/L	0.88	0.50	3361256

N/A = Not Applicable  
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**SEMI-VOLATILE ORGANICS BY GC-MS (WATER)**

Maxxam ID		7D3680		
Sampling Date		2013/09/19		
COC Number		N/A		
	Units	PERMEATE SEPT 19/13	RDL	QC Batch
<b>Semivolatile Organics</b>				
Hexachlorobenzene	ug/L	ND	0.5	3362805
<b>Surrogate Recovery (%)</b>				
2,4,6-Tribromophenol	%	39		3362805
2-Fluorobiphenyl	%	44		3362805
2-Fluorophenol	%	17		3362805
D14-Terphenyl	%	97		3362805
O5-Nitrobenzene	%	38		3362805
O5-Phenol	%	14		3362805
ND = Not detected N/A = Not Applicable RDL = Reportable Detection Limit QC Batch = Quality Control Batch				





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**VOLATILE ORGANICS BY GC/MS (WATER)**

Maxxam ID		TD3880		
Sampling Date		2013/09/19		
COC Number		N/A		
	Units	PERMEATE SEPT 19/13	RDL	QC Batch
<b>Chlorobenzenes</b>				
1,2-Dichlorobenzene	ug/L	ND	0.50	3358817
1,4-Dichlorobenzene	ug/L	ND	1.0	3358817
<b>Volatile Organics</b>				
1,1,1-Trichloroethane	ug/L	ND	1.0	3358817
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	3358817
1,1,2-Trichloroethane	ug/L	ND	1.0	3358817
Benzene	ug/L	ND	1.0	3358817
Chloroform	ug/L	ND	1.0	3358817
Ethylbenzene	ug/L	ND	1.0	3358817
Methylene Chloride(Dichloromethane)	ug/L	ND	3.0	3358817
Toluene	ug/L	ND	1.0	3358817
Trichloroethylene	ug/L	ND	1.0	3358817
Xylene (Total)	ug/L	ND	1.0	3358817
<b>Surrogate Recovery (%)</b>				
4-Bromofluorobenzene	%	100		3358817
D4-1,2-Dichloroethane	%	102		3358817
D8-Toluene	%	100		3358817
ND = Not detected N/A = Not Applicable RDL = Reportable Detection Limit QC Batch = Quality Control Batch				



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**ATLANTIC RBGA HYDROCARBONS (WATER)**

Maxxam ID		TD3680		
Sampling Date		2013/09/19		
COC Number		N/A		
	<b>Units</b>	<b>PERMEATE SEPT 19/13</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Petroleum Hydrocarbons</b>				
Benzene	mg/L	ND	0.0010	3384157
Toluene	mg/L	ND	0.0010	3384157
Ethylbenzene	mg/L	ND	0.0010	3384157
Xylene (Total)	mg/L	ND	0.0020	3384157
C8 - C10 (less BTEX)	mg/L	ND	0.010	3384157
>C10-C16 Hydrocarbons	mg/L	ND	0.050	3358788
>C16-C21 Hydrocarbons	mg/L	ND	0.050	3358788
>C21-<C32 Hydrocarbons	mg/L	ND	0.10	3358788
Modified TPH (Tier1)	mg/L	ND	0.10	3356558
Reached Baseline at C32	mg/L	NA	N/A	3358788
Hydrocarbon Resemblance	mg/L	NA	N/A	3358788
<b>Surrogate Recovery (%)</b>				
Isobutylbenzene - Extractable	%	117		3358788
n-Dotriacontane - Extractable	%	90		3358788
Isobutylbenzene - Volatile	%	103		3384157

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 QC Batch = Quality Control Batch



Report ID: 10000000000000000000

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Package 1	11.7°C
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Each temperature is the average of up to three cooler temperatures taken at receipt

**GENERAL COMMENTS**

Sample TD3680-01: Total/Dissolved Chromium < Hexavalent Chromium: Both values fall within acceptable RPD limits for duplicates and are likely equivalent.

**Results relate only to the items tested.**



Atlantic Industrial Services  
 Attention  
 Client Project #:  
 P.O. #: 6228  
 Site Location:

Quality Assurance Report  
 Maxxam Job Number: DB3F9013

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Lin	
3358746 MBN	QC Standard	Carbonaceous BOD	2013/09/25		96	%	80 - 1	
	Spiked Blank	Carbonaceous BOD	2013/09/25		103	%	80 - 1	
	Method Blank	Carbonaceous BOD	2013/09/25	ND, RDL=5.0		mg/L		
	RPD	Carbonaceous BOD	2013/09/25	NC		%		
3358786 JRU	Matrix Spike	Isobutylbenzene - Extractable	2013/09/23		109	%	30 - 1	
		n-Dotriacontane - Extractable	2013/09/23		87	%	30 - 1	
		>C10-C16 Hydrocarbons	2013/09/23		93	%	30 - 1	
		>C16-C21 Hydrocarbons	2013/09/23		105	%	30 - 1	
	Spiked Blank	>C21-<C32 Hydrocarbons	2013/09/23		109	%	30 - 1	
		Isobutylbenzene - Extractable	2013/09/23		104	%	30 - 1	
		n-Dotriacontane - Extractable	2013/09/23		79	%	30 - 1	
		>C10-C16 Hydrocarbons	2013/09/23		83	%	30 - 1	
	Method Blank	>C16-C21 Hydrocarbons	2013/09/23		92	%	30 - 1	
		>C21-<C32 Hydrocarbons	2013/09/23		97	%	30 - 1	
		Isobutylbenzene - Extractable	2013/09/23		102	%	30 - 1	
		n-Dotriacontane - Extractable	2013/09/23		75	%	30 - 1	
	RPD	>C10-C16 Hydrocarbons	2013/09/23	ND, RDL=0.050		mg/L		
		>C16-C21 Hydrocarbons	2013/09/23	ND, RDL=0.050		mg/L		
		>C21-<C32 Hydrocarbons	2013/09/23	ND, RDL=0.10		mg/L		
		>C10-C16 Hydrocarbons	2013/09/23	NC		%		
	3358817 SHL	Matrix Spike	>C16-C21 Hydrocarbons	2013/09/23	NC		%	
			1,2-Dichlorobenzene	2013/09/23		103	%	70 - 1
			1,4-Dichlorobenzene	2013/09/23		105	%	70 - 1
			1,1,1-Trichloroethane	2013/09/23		112	%	70 - 1
1,1,2,2-Tetrachloroethane			2013/09/23		105	%	70 - 1	
1,1,2-Trichloroethane			2013/09/23		108	%	70 - 1	
4-Bromofluorobenzene			2013/09/23		98	%	70 - 1	
Benzene			2013/09/23		112	%	70 - 1	
Chloroform			2013/09/23		103	%	70 - 1	
D4-1,2-Dichloroethane			2013/09/23		100	%	70 - 1	
D8-Toluene			2013/09/23		100	%	70 - 1	
Ethylbenzene			2013/09/23		110	%	70 - 1	
Methylene Chloride(Dichloromethane)			2013/09/23		NC	%	70 - 1	
Toluene			2013/09/23		112	%	70 - 1	
Trichloroethylene			2013/09/23		109	%	70 - 1	
Spiked Blank			1,2-Dichlorobenzene	2013/09/23		107	%	70 - 1
		1,4-Dichlorobenzene	2013/09/23		110	%	70 - 1	
		1,1,1-Trichloroethane	2013/09/23		114	%	70 - 1	
		1,1,2,2-Tetrachloroethane	2013/09/23		110	%	70 - 1	
		1,1,2-Trichloroethane	2013/09/23		111	%	70 - 1	
		4-Bromofluorobenzene	2013/09/23		100	%	70 - 1	
		Benzene	2013/09/23		115	%	70 - 1	
		Chloroform	2013/09/23		105	%	70 - 1	
		D4-1,2-Dichloroethane	2013/09/23		100	%	70 - 1	
		D8-Toluene	2013/09/23		101	%	70 - 1	
		Ethylbenzene	2013/09/23		112	%	70 - 1	
		Methylene Chloride(Dichloromethane)	2013/09/23		109	%	70 - 1	
		Toluene	2013/09/23		114	%	70 - 1	
		Trichloroethylene	2013/09/23		115	%	70 - 1	
		Method Blank	1,2-Dichlorobenzene	2013/09/23	ND, RDL=0.50		ug/L	
			1,4-Dichlorobenzene	2013/09/23	ND, RDL=1.0		ug/L	
1,1,1-Trichloroethane			2013/09/23	ND, RDL=1.0		ug/L		
1,1,2,2-Tetrachloroethane	2013/09/23		ND, RDL=0.50		ug/L			
		1,1,2-Trichloroethane	2013/09/23	ND, RDL=1.0		ug/L		



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Quality Assurance Report (Continued)  
 Maxxam Job Number: DB3F9013

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC LIn
3358817 SHL	Method Blank	4-Bromofluorobenzene	2013/09/23		101	%	70 - 1
		Benzene	2013/09/23	ND, RDL=1.0		ug/L	
		Chloroform	2013/09/23	ND, RDL=1.0		ug/L	
		D4-1,2-Dichloroethane	2013/09/23		101	%	70 - 1
		D8-Toluene	2013/09/23		99	%	70 - 1
		Ethylbenzene	2013/09/23	ND, RDL=1.0		ug/L	
		Methylene Chloride(Dichloromethane)	2013/09/23	ND, RDL=3.0		ug/L	
		Toluene	2013/09/23	ND, RDL=1.0		ug/L	
		Trichloroethylene	2013/09/23	ND, RDL=1.0		ug/L	
		Xylene (Total)	2013/09/23	ND, RDL=1.0		ug/L	
	RPD	1,2-Dichlorobenzene	2013/09/23	NC		%	
		1,4-Dichlorobenzene	2013/09/23	NC		%	
		Benzene	2013/09/23	NC		%	
		Chloroform	2013/09/23	0.09		%	
		Ethylbenzene	2013/09/23	NC		%	
		Methylene Chloride(Dichloromethane)	2013/09/23	13.9		%	
		Toluene	2013/09/23	NC		%	
		Trichloroethylene	2013/09/23	NC		%	
		Xylene (Total)	2013/09/23	NC		%	
3359230 TPE	Matrix Spike	Dissolved Fluoride (F-)	2013/09/23		97	%	80 - 1
	Spiked Blank	Dissolved Fluoride (F-)	2013/09/23		97	%	80 - 1
	Method Blank	Dissolved Fluoride (F-)	2013/09/23	ND, RDL=0.10		mg/L	
	RPD	Dissolved Fluoride (F-)	2013/09/23	NC		%	
3359239 CRA	Matrix Spike	Phenols-4AAP	2013/09/23		100	%	80 - 1
	Spiked Blank	Phenols-4AAP	2013/09/23		100	%	80 - 1
	Method Blank	Phenols-4AAP	2013/09/23	ND, RDL=0.0010		mg/L	
	RPD	Phenols-4AAP	2013/09/23	NC (1)		%	
3360743 LCS	Matrix Spike	Total Oil & Grease	2013/09/27		86	%	70 - 1
	Spiked Blank	Total Oil & Grease	2013/09/27		77	%	70 - 1
	Method Blank	Total Oil & Grease	2013/09/27	ND, RDL=5.0		mg/L	
	RPD	Total Oil & Grease	2013/09/27	NC		%	
3360798 CRA	Matrix Spike	Strong Acid Dissoc. Cyanide (CN)	2013/09/24		107	%	80 - 1
	Spiked Blank	Strong Acid Dissoc. Cyanide (CN)	2013/09/24		91	%	80 - 1
	Method Blank	Strong Acid Dissoc. Cyanide (CN)	2013/09/24	ND, RDL=0.0010		mg/L	
	RPD [TD3680-20]	Strong Acid Dissoc. Cyanide (CN)	2013/09/24	NC		%	
3361150 NYS	Matrix Spike	Sulphide	2013/09/24		51 (2)	%	80 - 1
	Spiked Blank	Sulphide	2013/09/24		90	%	80 - 1
	Method Blank	Sulphide	2013/09/24	ND, RDL=0.020		mg/L	
	RPD	Sulphide	2013/09/24	NC		%	
3361256 SAC	Matrix Spike	Chromium (VI)	2013/09/27		86	%	80 - 1
	Spiked Blank	Chromium (VI)	2013/09/27		89	%	80 - 1
	Method Blank	Chromium (VI)	2013/09/27	ND, RDL=0.50		ug/L	
	RPD	Chromium (VI)	2013/09/27	NC		%	
3361888 AWM	QC Standard	Total Suspended Solids	2013/09/26		99	%	80 - 1
	Method Blank	Total Suspended Solids	2013/09/26	ND, RDL=1.0		mg/L	
	RPD	Total Suspended Solids	2013/09/26	13.6		%	
3362442 MKH	Matrix Spike	Total Mercury (Hg)	2013/09/25		101	%	80 - 1
	Spiked Blank	Total Mercury (Hg)	2013/09/25		102	%	80 - 1
	Method Blank	Total Mercury (Hg)	2013/09/25	ND, RDL=0.013		ug/L	
	RPD	Total Mercury (Hg)	2013/09/25	NC		%	
3362671 ALG	Matrix Spike	Total Phosphorus	2013/09/27		110	%	80 - 1
	Spiked Blank	Total Phosphorus	2013/09/27		102	%	80 - 1
	Method Blank	Total Phosphorus	2013/09/27	ND, RDL=0.020		mg/L	
	RPD	Total Phosphorus	2013/09/27	0.9		%	



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QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Lin	
3362805 ANL	Matrix Spike	2,4,6-Tribromophenol	2013/09/26		82	%	10 - 1	
		2-Fluorobiphenyl	2013/09/26		77	%	30 - 1	
		2-Fluorophenol	2013/09/26		39	%	10 - 1	
		D14-Terphenyl	2013/09/26		93	%	30 - 1	
		D5-Nitrobenzene	2013/09/26		70	%	30 - 1	
	Spiked Blank	D5-Phenol	2013/09/26		28	%	10 - 1	
		Hexachlorobenzene	2013/09/26		87	%	30 - 1	
		2,4,6-Tribromophenol	2013/09/26		80	%	10 - 1	
		2-Fluorobiphenyl	2013/09/26		69	%	30 - 1	
		2-Fluorophenol	2013/09/26		33	%	10 - 1	
	Method Blank	D14-Terphenyl	2013/09/26		98	%	30 - 1	
		D5-Nitrobenzene	2013/09/26		58	%	30 - 1	
		D5-Phenol	2013/09/26		24	%	10 - 1	
		Hexachlorobenzene	2013/09/26		88	%	30 - 1	
		2,4,6-Tribromophenol	2013/09/26		63	%	10 - 1	
	3363514 ZZH	Matrix Spike	Total Chemical Oxygen Demand	2013/09/26	ND, RDL=0.5		ug/L	
			QC Standard	2013/09/26		103	%	80 - 1
		Spiked Blank	Total Chemical Oxygen Demand	2013/09/26		94	%	80 - 1
			Total Chemical Oxygen Demand	2013/09/26		105	%	80 - 1
Method Blank		Total Chemical Oxygen Demand	2013/09/26	ND, RDL=5.0		mg/L		
3363676 DLB	Matrix Spike	Total Chemical Oxygen Demand	2013/09/25	NC		%		
		Total Aluminum (Al)	2013/09/26		99	%	80 - 1	
		Total Antimony (Sb)	2013/09/26		110	%	80 - 1	
		Total Arsenic (As)	2013/09/26		98	%	80 - 1	
		Total Barium (Ba)	2013/09/26		85	%	80 - 1	
		Total Beryllium (Be)	2013/09/26		97	%	80 - 1	
		Total Bismuth (Bi)	2013/09/26		101	%	80 - 1	
		Total Boron (B)	2013/09/26		98	%	80 - 1	
		Total Cadmium (Cd)	2013/09/26		94	%	80 - 1	
		Total Calcium (Ca)	2013/09/26		96	%	80 - 1	
		Total Chromium (Cr)	2013/09/26		100	%	80 - 1	
		Total Cobalt (Co)	2013/09/26		100	%	80 - 1	
		Total Copper (Cu)	2013/09/26		97	%	80 - 1	
		Total Iron (Fe)	2013/09/26		102	%	80 - 1	
		Total Lead (Pb)	2013/09/26		99	%	80 - 1	
		Total Lithium (Li)	2013/09/26		100	%	80 - 1	
		Total Magnesium (Mg)	2013/09/26		106	%	80 - 1	
		Total Manganese (Mn)	2013/09/26		98	%	80 - 1	
		Total Molybdenum (Mo)	2013/09/26		108	%	80 - 1	
		Total Nickel (Ni)	2013/09/26		97	%	80 - 1	
		Total Potassium (K)	2013/09/26		101	%	80 - 1	
		Total Selenium (Se)	2013/09/26		95	%	80 - 1	
		Total Silver (Ag)	2013/09/26		103	%	80 - 1	
		Total Sodium (Na)	2013/09/26		107	%	80 - 1	
		Total Strontium (Sr)	2013/09/26		98	%	80 - 1	
		Total Thallium (Tl)	2013/09/26		101	%	80 - 1	
		Total Tin (Sn)	2013/09/26		107	%	80 - 1	
		Total Titanium (Ti)	2013/09/26		102	%	80 - 1	
		Total Uranium (U)	2013/09/26		107	%	80 - 1	
		Total Vanadium (V)	2013/09/26		100	%	80 - 1	



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Quality Assurance Report (Continued)

Maxxam Job Number: DB3F9013

QA/QC Batch Num: Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Lin
3383676 DLB	Matrix Spike Spiked Blank	Total Zinc (Zn)	2013/09/26		86	%	80 - 1
		Total Aluminum (Al)	2013/09/26		99	%	80 - 1
	Total Antimony (Sb)	2013/09/26		112	%	80 - 1	
	Total Arsenic (As)	2013/09/26		99	%	80 - 1	
	Total Barium (Ba)	2013/09/26		97	%	80 - 1	
	Total Beryllium (Be)	2013/09/26		97	%	80 - 1	
	Total Bismuth (Bi)	2013/09/26		101	%	80 - 1	
	Total Boron (B)	2013/09/26		98	%	80 - 1	
	Total Cadmium (Cd)	2013/09/26		95	%	80 - 1	
	Total Calcium (Ca)	2013/09/26		96	%	80 - 1	
	Total Chromium (Cr)	2013/09/26		100	%	80 - 1	
	Total Cobalt (Co)	2013/09/26		100	%	80 - 1	
	Total Copper (Cu)	2013/09/26		98	%	80 - 1	
	Total Iron (Fe)	2013/09/26		103	%	80 - 1	
	Total Lead (Pb)	2013/09/26		100	%	80 - 1	
	Total Lithium (Li)	2013/09/26		98	%	80 - 1	
	Total Magnesium (Mg)	2013/09/26		106	%	80 - 1	
	Total Manganese (Mn)	2013/09/26		99	%	80 - 1	
	Total Molybdenum (Mo)	2013/09/26		107	%	80 - 1	
	Total Nickel (Ni)	2013/09/26		99	%	80 - 1	
	Total Potassium (K)	2013/09/26		102	%	80 - 1	
	Total Selenium (Se)	2013/09/26		97	%	80 - 1	
	Total Silver (Ag)	2013/09/26		102	%	80 - 1	
	Total Sodium (Na)	2013/09/26		107	%	80 - 1	
	Total Strontium (Sr)	2013/09/26		99	%	80 - 1	
	Total Thallium (Tl)	2013/09/26		101	%	80 - 1	
	Total Tin (Sn)	2013/09/26		108	%	80 - 1	
	Total Titanium (Ti)	2013/09/26		102	%	80 - 1	
	Total Uranium (U)	2013/09/26		108	%	80 - 1	
	Total Vanadium (V)	2013/09/26		102	%	80 - 1	
	Total Zinc (Zn)	2013/09/26		100	%	80 - 1	
	Method Blank	Total Aluminum (Al)	2013/09/26	ND, RDL=5.0	ug/L		
		Total Antimony (Sb)	2013/09/26	ND, RDL=1.0	ug/L		
Total Arsenic (As)		2013/09/26	ND, RDL=1.0	ug/L			
Total Barium (Ba)		2013/09/26	ND, RDL=1.0	ug/L			
Total Beryllium (Be)		2013/09/26	ND, RDL=1.0	ug/L			
Total Bismuth (Bi)		2013/09/26	ND, RDL=2.0	ug/L			
Total Boron (B)		2013/09/26	ND, RDL=50	ug/L			
Total Cadmium (Cd)		2013/09/26	ND, RDL=0.010	ug/L			
Total Calcium (Ca)		2013/09/26	ND, RDL=100	ug/L			
Total Chromium (Cr)		2013/09/26	ND, RDL=1.0	ug/L			
Total Cobalt (Co)		2013/09/26	ND, RDL=0.40	ug/L			
Total Copper (Cu)		2013/09/26	ND, RDL=2.0	ug/L			
Total Iron (Fe)		2013/09/26	ND, RDL=50	ug/L			
Total Lead (Pb)		2013/09/26	ND, RDL=0.50	ug/L			
Total Lithium (Li)		2013/09/26	ND, RDL=2.0	ug/L			
Total Magnesium (Mg)		2013/09/26	ND, RDL=100	ug/L			
Total Manganese (Mn)		2013/09/26	ND, RDL=2.0	ug/L			
Total Molybdenum (Mo)		2013/09/26	ND, RDL=2.0	ug/L			
Total Nickel (Ni)		2013/09/26	ND, RDL=2.0	ug/L			
Total Potassium (K)		2013/09/26	ND, RDL=100	ug/L			
Total Selenium (Se)		2013/09/26	ND, RDL=1.0	ug/L			
Total Silver (Ag)		2013/09/26	ND, RDL=0.10	ug/L			
Total Sodium (Na)		2013/09/26	ND, RDL=100	ug/L			
Total Strontium (Sr)		2013/09/26	ND, RDL=2.0	ug/L			



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Quality Assurance Report (Continued)

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QA/QC Batch	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Lin			
3363676 DLB	Method Blank	Total Thallium (Tl)	2013/09/26	ND, RDL=0.10		ug/L				
		Total Tin (Sn)	2013/09/26	ND, RDL=2.0		ug/L				
		Total Titanium (Ti)	2013/09/26	ND, RDL=2.0		ug/L				
		Total Uranium (U)	2013/09/26	ND, RDL=0.10		ug/L				
		Total Vanadium (V)	2013/09/26	ND, RDL=2.0		ug/L				
		Total Zinc (Zn)	2013/09/26	ND, RDL=5.0		ug/L				
		RPD	Total Copper (Cu)	2013/09/27	3.9		%			
			Total Lead (Pb)	2013/09/27	NC		%			
			3363892 ARS	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2013/09/27		95	%	80 - 1
				Spiked Blank	Nitrogen (Ammonia Nitrogen)	2013/09/26		99	%	80 - 1
Method Blank	Nitrogen (Ammonia Nitrogen)	2013/09/26	ND, RDL=0.050		mg/L					
	RPD	Nitrogen (Ammonia Nitrogen)	2013/09/27	NC		%				
3364157 ASL	Matrix Spike	Isobutylbenzene - Volatile	2013/09/27		103	%	70 - 1			
		Benzene	2013/09/27		108	%	70 - 1			
		Toluene	2013/09/27		115	%	70 - 1			
		Ethylbenzene	2013/09/27		115	%	70 - 1			
		Xylene (Total)	2013/09/27		114	%	70 - 1			
		Spiked Blank	Isobutylbenzene - Volatile	2013/09/27		103	%	70 - 1		
	Benzene		2013/09/27		106	%	70 - 1			
	Toluene		2013/09/27		113	%	70 - 1			
	Ethylbenzene		2013/09/27		113	%	70 - 1			
	Xylene (Total)		2013/09/27		113	%	70 - 1			
	Method Blank		Isobutylbenzene - Volatile	2013/09/27		99	%	70 - 1		
		Benzene	2013/09/27	ND, RDL=0.0010		mg/L				
		Toluene	2013/09/27	ND, RDL=0.0010		mg/L				
		Ethylbenzene	2013/09/27	ND, RDL=0.0010		mg/L				
		Xylene (Total)	2013/09/27	ND, RDL=0.0020		mg/L				
		C6 - C10 (less BTEX)	2013/09/27	ND, RDL=0.010		mg/L				
		RPD	Benzene	2013/09/27	NC		%			
			Toluene	2013/09/27	NC		%			
	Ethylbenzene		2013/09/27	NC		%				
	Xylene (Total)		2013/09/27	NC		%				
3365282 MCN	Matrix Spike	Total Kjeldahl Nitrogen	2013/09/27		NC	%	80 - 1			
		Spiked Blank	Total Kjeldahl Nitrogen	2013/09/27		92	%	80 - 1		
	Method Blank	Total Kjeldahl Nitrogen	2013/09/27	ND, RDL=0.10		mg/L				
		RPD	Total Kjeldahl Nitrogen	2013/09/28	2.1		%			
	3365365 ARS	Matrix Spike	Dissolved Chloride (Cl)	2013/09/30		108	%	80 - 1		
			QC Standard	Dissolved Chloride (Cl)	2013/09/30		102	%	80 - 1	
Spiked Blank		Dissolved Chloride (Cl)	2013/09/30		102	%	80 - 1			
		Method Blank	Dissolved Chloride (Cl)	2013/09/30	ND, RDL=1.0		mg/L			
RPD	Dissolved Chloride (Cl)		2013/09/30	8.0		%				
3365368 ALG	Matrix Spike	Dissolved Sulphate (SO4)	2013/09/27		NC	%	80 - 1			
		Spiked Blank	Dissolved Sulphate (SO4)	2013/09/27		101	%	80 - 1		
	Method Blank	Dissolved Sulphate (SO4)	2013/09/27	ND, RDL=2.0		mg/L				
		RPD	Dissolved Sulphate (SO4)	2013/09/27	1.4		%			
3365381 ALG	Matrix Spike	Nitrate + Nitrite	2013/09/27		94	%	80 - 1			
		Spiked Blank	Nitrate + Nitrite	2013/09/27		92	%	80 - 1		
	Method Blank	Nitrate + Nitrite	2013/09/27	ND, RDL=0.050		mg/L				
		RPD	Nitrate + Nitrite	2013/09/27	NC		%			
3365385 MCN	Matrix Spike	Nitrite (N)	2013/09/28		98	%	80 - 1			
		Spiked Blank	Nitrite (N)	2013/09/28		95	%	80 - 1		
	Method Blank	Nitrite (N)	2013/09/28	ND, RDL=0.010		mg/L				
		RPD	Nitrite (N)	2013/09/28	NC		%			
3365462 SCR	QC Standard	pH	2013/09/27		101	%	80 - 1			





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QA/QC Batch				Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Lin
Num. Inlt	QC Type	Parameter						
3365482	SCR	RPD	pH	2013/09/27	0.3		%	
3365465	SCR	Spiked Blank	Conductivity	2013/09/27		98	%	80 - 1
		Method Blank	Conductivity	2013/09/27	ND, RDL=1.0		uS/cm	
		RPD	Conductivity	2013/09/27	0.3		%	
3365722	LCS	Method Blank	Mineral Oil and Grease	2013/09/27	ND, RDL=5.0		mg/L	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.  
 Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.  
 QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.  
 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 not sufficiently significant to permit a reliable recovery calculation.  
 NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.  
 ( 1 ) The sample was decanted due to sediment.  
 ( 2 ) The recovery in the matrix spike was not calculated (NC) due to background interference.

Validation Signature Page

Maxxam Job #: B3F9013

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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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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.