BRITISH COLUMBIA

September 29, 2014

File: PE-6858

Doug Hill
Director, Mining Operations

Re: Myra Creek and Buttle Lake Water Quality of September 6, 2014 compared to Drinking Water and Aquatic Life Guidelines

A spill of 16 cubic metres of acidic wash water containing residue of aluminum sulphate and 2,2'-iminodiethanol occurred at the NVI-Myra Falls mine on September 5, 2014. Ministry of Environment staff collected water quality samples from Myra Creek and Buttle Lake on September 6, 2014 to determine potential impacts on aquatic life and human health. In addition to surface water grabs, samples were collected at specific depths at the mouth of Myra Creek and in Buttle Lake up to 200 metres from the mouth to target any plume associated with the spill. The collection of samples from within the plume can help determine "worst case" scenario, but don't actually represent water quality throughout the entire water column.

The parameters analysed include pH, conductivity, turbidity, total organic carbon, dissolved organic carbon, hardness, alkalinity, general ions, and total and dissolved metals. Results were compared to the BC water quality guidelines for aquatic life and drinking water, as well as to the 2013 Annual Environmental and Reclamation Report submitted by the mine as part of their operating permit requirements.

Water samples were collected from the following sites and depths:

- Source material (wash water)
- TP4 Myra Creek at Pumphouse (creek sample)
- Myra Creek below waterfall (creek sample)
- Myra Creek at Buttle Lake, 35 metres downstream from waterfall (lake samples, 0.5 and 3.0 metres deep)
- Three sites in Buttle Lake 200 metres down flow from Myra Creek outlet (lake samples, 0.5, 5.0 and 10.0 metres deep)

Results showed that there were no exceedances of the drinking water guidelines at any receiving environment sites for any of the parameters sampled.

In the source material, pH was 3.93, well below the aquatic life guideline of 6.5 to 9.0. Dissolved aluminum was 363 mg/L, well above the acute aquatic life guideline of 0.1 mg/L.

Ministry of Environment
Mining Operations
Environmental Protection Division
Mailing Address:
2080A Labieux Road
Nanaimo BC V9T 6J9
Telephone: 250 751-3100
Facsimile: 250 751-3103
Website: www.gov.bc.ca/env

Sulphate was 2,080 mg/L, 16 times higher than the chronic aquatic life guideline of 128 mg/L. Note that chronic effects are based on long term exposure and thus chronic guidelines do not apply to a one-time sample result, but require a mean of a minimum of five evenly-spaced samples collected in 30 days.

In the receiving environment, most parameters met provincial guidelines for the protection of aquatic life.

Sulphate exceeded the chronic aquatic life guideline value at TP4 (174 mg/L, 1.4x the guideline) and Myra Creek at Buttle Lake at 3.0 metres depth (149 mg/L, 1.2x the guideline), and remained below the guideline at all other sites and depths. A proper comparison to the chronic guideline cannot be made without further sampling, as noted above.

Copper and zinc exceeded the acute aquatic life guidelines at TP4 (11.3 µg/L and 140 µg/L, 3.8x and 4.2x the guideline, respectively) and Myra Creek at Buttle Lake at 3.0 metres depth (9.1 µg/L and 136 µg/L, 3.0x and 4.1x the guideline, respectively); however, concentrations were similar to those measured before the spill and are therefore believed to be unrelated. Further evidence for this is the fact that these metals, as well as hardness, were lower in the source material than at these receiving environment sites. Silver was also slightly above the acute aquatic life guideline at TP4 (0.132 µg/L, 1.3x the guideline); this parameter was not measured at this site prior to the spill, but the guideline exceedance is also believed to be unrelated to the spill.

At the three sites in Buttle Lake 200 metres down flow from Myra Creek, results were similar to typical conditions, as compared with the 2013 results measured monthly at the nearest regular lake monitoring site.

Based on the relatively small volume of material spilled, the short duration of the spill, and the significant dilution provided by Buttle Lake, there are no concerns for human health. Some parameters were elevated above aquatic life guidelines, but concentrations were similar to conditions prior to the spill.

Nicole Obee

Nicole Obee, R.P. Bio.
Environmental Impact Assessment Biologist
Ministry of Environment, Mining Operations

Depth	Temp	SpC	DO	pH
0.6	21.99	81	9.37	6.68
1.0	19.98	195	9.70	6.97
2.0	16.62	341	9.79	6.99
3.0	15.35	413	10.06	7.06
4.0	15.23	416	10.14	7.10
5.0	15.26	415	10.12	7.13
6.0	15.24	416	10.10	7.14
7.0	15.25	419	10.11	7.18
8.0	15.24	417	10.11	7.19
	Bottom @ 8.4 m			
Min	15.23	81	9.37	6.68
Max	21.99	419	10.14	7.19
Ave	16.68	346	9.94	7.05

Jager, Brenda CSNR:EX

From: Environmental Emergencies Spill Reports ENV:EX
Sent: Saturday, September 6, 2014 12:37 AM
To: Pridham, Dave ENV:EX
Subject: FW: DGIR 141821 - VIR - ACIDIC WASH WATER (CODE 2)

From: SGPEP.ECC1@gov.bc.ca[SMTP:SGPEP.ECC1@GOV.BC.CA]
Sent: Saturday, September 06, 2014 12:37:05 AM
To: Environmental Emergencies Spill Reports ENV:EX
Subject: DGIR 141821 - VIR - ACIDIC WASH WATER (CODE 2)
Auto forwarded by a Rule

DGIR 141821
PEP Task Number: 152629

Incident Date: 2014-09-05 12:00
Incident Time: 2014-09-05 12:00
Report Date: 2014-09-05
Report Time: 23:39

Spiller: NYRSTAR MYRA FALLS

Caller 1 / Agency:
IVOR MCWILLIAMS / NYRSTAR MYRA FALLS - Residence: s.22 - Business: 250-287-9271 EXT 3316

Caller 2 / Agency:
/ - : - :

Location: MYRA FALLS MINE SITE, STRATHCONA
Area: CAMPBELL RIVER
PEP Region: VIR
MOE Region: Vancouver Island Region

Affected Env: Creek/Stream
Spill Type: Equipment Failure
Sector: Industrial
Jurisdictions:
1: Federal
2: Provincial

Material: ACIDIC WASH WATER (CODE 2) 16,000 LITERS

Details:
Large totes used to hold cement catalytic were full of water. The totes were dumped in an open ditch which travels to a open drain in a ground

sump. The level controller did not activate the sump pump and the water overflowed and went to Myra Creek.

Response:
Samples were taken of the wash water and the creek and sent to Maxxum Labs for analysis. Caller estimates the ph to be around 4.

Notifications:
23:45 Paged MOE RO Dave Pridham
23:48 Briefed MOE RO Dave Pridham - Code 1 Fed/Prov
00:01 Faxed MOE Nanaimo / HQ
00:03 Emailed Mines

Report Compiled By: MERRICK Operations 5 ECC - 2014-09-05 23:39

Environmental Emergency Response Officer:
Date:
Notification Coding: Code 1 / Code 2
MOE Response: Exercise / Potential / No Field Response / Field Response / IMT Activation
Notes:

Jager, Brenda CSNR:EX

From: Environmental Emergencies Spill Reports ENV:EX
Sent: Saturday, September 6, 2014 12:21 AM
To: Pridham, Dave ENV:EX
Subject: FW: DGIR 141821 - VIR - ACIDIC WASH WATER

From: SGPEP.ECC1@gov.bc.ca[SMTP:SGPEP.ECC1@GOV.BC.CA]
Sent: Saturday, September 06, 2014 12:21:05 AM
To: Environmental Emergencies Spill Reports ENV:EX
Subject: DGIR 141821 - VIR - ACIDIC WASH WATER
Auto forwarded by a Rule

DGIR 141821
PEP Task Number: 152629

Incident Date: 2014-09-05 12:00
Incident Time: 2014-09-05 12:00
Report Date: 2014-09-05
Report Time: 23:39

Spiller: NYRSTAR MYRA FALLS

Caller 1 / Agency:
IVOR MCWILLIAMS / NYRSTAR MYRA FALLS - Residence s.22 Business:
250-287-9271 EXT 3316

Caller 2 / Agency:
/ - : - :

Location: MYRA FALLS MINE SITE, STRATHCONA
Area: CAMPBELL RIVER
PEP Region: VIR
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Affected Env: Creek/Stream
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1: Federal
2: Provincial

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Report Compiled By: MERRICK Operations 5 ECC - 2014-09-05 23:39

Environmental Emergency Response Officer:
Date:
Notification Coding: Code 1 / Code 2
MOE Response: Exercise / Potential / No Field Response / Field Response / IMT Activation
Notes:

Jager, Brenda CSNR:EX

From: Environmental Emergencies Spill Reports ENV:EX
Sent: Saturday, September 6, 2014 7:10 PM
To: Pridham, Dave ENV:EX
Subject: FW: DGIR 141821 UPDATE 10 - VIR

From: SGPEP.ECC1@gov.bc.ca[SMTP:SGPEP.ECC1@GOV.BC.CA]
Sent: Saturday, September 06, 2014 7:10:05 PM
To: Environmental Emergencies Spill Reports ENV:EX
Subject: DGIR 141821 UPDATE 10 - VIR
Auto forwarded by a Rule

PEP Task Number: 152629

Incident Date: 2014-09-05
Incident Time: 23:39
Location: MYRA FALLS MINE SITE, STRATHCONA
Area: CAMPBELL RIVER
PEP Region: VIR
MOE Region: Vancouver Island Region

Caller / Agency:
DAVE PRIDHAM BY EMAIL / MOE RO

Details:
Update #10 DGIR 141821

RO Pridham was contacted by John Knapp, Nyrstar Mine Manager @ 17:30-hrs. Mr. Knapp has confirmed the following details pertaining to the release of 16,000 liters of acidic wash water into the receiving environment at Nyrstar Mine, flowing into Myra Creek and subsequently flowing into Buttle Lake.

• Confirmed that there were 16x 1000 liter totes which had held Meyco SA-160, a product used in the cement process. Sometime within 2-4 years ago, these totes were filled with surface water (source not known), following being emptied. These water filled totes were then utilized as a make shift retaining wall on the mine site.

• It was recently decided to remove and empty these totes utilizing the on-site waste water treatment system to process the acidic wash water contained inside the totes.

• Once removed and re-located, the tank control valves were opened allowing the waste water to enter a sump system which in turn would direct the waste water into their treatment facility. It was found that there was a sump pump control circuit failure in the system which subsequently allowed the sump pump system to overflow. It was also noted that this control circuit failure didn't allow the pump to go into alarm mode. The

pump control switch was found in the ‘auto’ mode, but was not functioning. This system failure is what caused the overflow release of the waste water.

• It is reported that there was only a small amount of residual product inside the tanks prior to being filled with surface water.

• Preventative measures have been put in place to allow easier monitoring of tank levels in the event of a sudden rain event. A mine employee will be posted at the tote location to monitor tank levels in the likelihood of a rain event. System repairs are underway.

• Samples taken at the mine site are being stored at their on-site lab and will be shipped to Maxxam Labs for analysis Monday AM. Site environmental staff will also be conducting water sample testing Monday AM.

• Mr. Knapp will be meeting with the Provincial sampling team members this evening.

Report Compiled By: DAVID Operations 1 ECC - 2014-09-06 18:49
DGIR 141821 UPDATE 10 - Subject: INLAND UPDATE

Notifications:
18:50 faxed MOE Nanaimo, MOE HQ, MCTS
18:52 emailed Code 2 Dist List, Mines Emergencies, COS NIZ

Environmental Emergency Response Officer:
Date:
Notification Coding: Code 1 / Code 2
MOE Response: Exercise / Potential / No Field Response / Field Response / IMT Activation
Notes:

Jager, Brenda CSNR:EX

From: Environmental Emergencies Spill Reports ENV:EX
Sent: Saturday, September 6, 2014 11:42 PM
To: Pridham, Dave ENV:EX
Subject: FW: DGIR 141821 UPDATE 11 - VIR

From: SGPEP.ECC1@gov.bc.ca[SMTP:SGPEP.ECC1@GOV.BC.CA]
Sent: Saturday, September 06, 2014 11:42:04 PM
To: Environmental Emergencies Spill Reports ENV:EX
Subject: DGIR 141821 UPDATE 11 - VIR
Auto forwarded by a Rule

PEP Task Number: 152629

Incident Date: 2014-09-05
Incident Time: 23:39
Location: MYRA FALLS MINE SITE, STRATHCONA
Area: CAMPBELL RIVER
PEP Region: VIR
MOE Region: Vancouver Island Region

Caller / Agency:
ALEX GRANT / MOE RO - Cellular: s.17

Details:
Advised the sampling team is returning from site. They were out on the lake checking quality of water in creek and lake. They will send samples for analysis first thing tomorrow. Preliminary pH values met water quality guidelines for aquatic health which is the primary concern. MOE RO Dave Pridham aware.

Report Compiled By: DAVID Operations 1 ECC - 2014-09-06 22:47
DGIR 141821 UPDATE 11 - Subject: INLAND UPDATE

Notifications:
23:03 Faxed MOE Nanaimo, MOE HQ, MCTS
23:05 Emailed Code 2 Dist List, Mines Emergencies, COS NIZ

Environmental Emergency Response Officer:
Date:
Notification Coding: Code 1 / Code 2
MOE Response: Exercise / Potential / No Field Response / Field Response / IMT Activation
Notes:

Jager, Brenda CSNR:EX

From: Environmental Emergencies Spill Reports ENV:EX
Sent: Sunday, September 7, 2014 5:26 PM
To: Pridham, Dave ENV:EX
Subject: FW: DGIR 141821 UPDATE 12 - VIR

From: SGPEP.ECC1@gov.bc.ca[SMTP:SGPEP.ECC1@GOV.BC.CA]
Sent: Sunday, September 07, 2014 5:26:04 PM
To: Environmental Emergencies Spill Reports ENV:EX
Subject: DGIR 141821 UPDATE 12 - VIR
Auto forwarded by a Rule

PEP Task Number: 152629

Incident Date: 2014-09-05
Incident Time: 23:39
Location: MYRA FALLS MINE SITE, STRATHCONA
Area: CAMPBELL RIVER
PEP Region: VIR
MOE Region: Vancouver Island Region

Caller / Agency:
DAVE PRIDHAM (VIA EMAIL) / MOE

Details:
Due to the incident circumstances regarding the spill at the Nyrstar Mine site, this DGIR can now be downgraded to a Code 1.

Report Compiled By: DAWN Operations 1 ECC - 2014-09-07 16:43
DGIR 141821 UPDATE 12 - Subject: INLAND UPDATE

Notifications:
16:53 briefed MOE HQ D'Arcy Sego
16:54 briefed PDM Ralph Mohrmann
16:56 briefed MOH Duty Officer, Katja
16:58 left message on cell EPC Howie Siemen
17:00 paged EC
17:12 EPC Howie Siemen confirmed receipt of downgrade notification
17:13 briefed Melanie/EC
17:15 faxed MOE Nanaimo, MOE HQ, MCTS
17:17 emailed Code 2 Dist, Mines Emerg. COS NIZ

Environmental Emergency Response Officer:
Date:
Notification Coding: Code 1 / Code 2
MOE Response: Exercise / Potential / No Field Response / Field Response /

IMT Activation
Notes:

Jager, Brenda CSNR:EX

From: Environmental Emergencies Spill Reports ENV:EX
Sent: Saturday, September 6, 2014 1:09 AM
To: Pridham, Dave ENV:EX
Subject: FW: DGIR 141821 UPDATE 1 - VIR

From: SGPEP.ECC1@gov.bc.ca[SMTP:SGPEP.ECC1@GOV.BC.CA]
Sent: Saturday, September 06, 2014 1:09:05 AM
To: Environmental Emergencies Spill Reports ENV:EX
Subject: DGIR 141821 UPDATE 1 - VIR
Auto forwarded by a Rule

PEP Task Number: 152629

Incident Date: 2014-09-05
Incident Time: 23:39
Location: MYRA FALLS MINE SITE, STRATHCONA
Area: CAMPBELL RIVER
PEP Region: VIR
MOE Region: Vancouver Island Region

Caller / Agency:
DAVE PRIDHAM / MOE RO

Details:
Advised that he has talked with Dennis Redford and he agrees that the incident should be upgraded to code 2 due to the volume, the risk to the Campbell River watershed and heightened media interest.

Report Compiled By: MARIE Marie Bauder - 2014-09-06 00:09
DGIR 141821 UPDATE 1 - Subject: INLAND UPDATE

Notifications:
0016 called MOE HQ D'Arcy Sego on cell left message
0017 called MOE HQ D'Arcy Sego at res. left message.
0020 briefed Ron Duty RM, asked that the EPC be notified. (unless the situation warrants, he can get further updates on his email)
0025 briefed Ralph Mohrmann Duty Mgr. (email notifications will be fine unless situation deteriorates)
0028 paged EC
0031 called EPC Howie Siemen on cell, said to contact assistant Kathy Squires
0032 called Kathy Squires on cell, went straight to voice mail, no message left.
0033 briefed MOH Duty Officer, Katja
0039 briefed EPC Howie Siemen, (no need for verbal notification unless the situation deteriorates)
0044 faxed MOE Nanaimo, MOE HQ, MCTS
0045 emailed Code 2 dissemination, mines emergencies.

Environmental Emergency Response Officer:
Date:
Notification Coding: Code 1 / Code 2
MOE Response: Exercise / Potential / No Field Response / Field Response /
IMT Activation
Notes:

Jager, Brenda CSNR:EX

From: Environmental Emergencies Spill Reports ENV:EX
Sent: Saturday, September 6, 2014 3:48 AM
To: Pridham, Dave ENV:EX
Subject: FW: DGIR 141821 UPDATE 2 - VIR

From: SGPEP.ECC1@gov.bc.ca[SMTP:SGPEP.ECC1@GOV.BC.CA]
Sent: Saturday, September 06, 2014 3:48:05 AM
To: Environmental Emergencies Spill Reports ENV:EX
Subject: DGIR 141821 UPDATE 2 - VIR
Auto forwarded by a Rule

PEP Task Number: 152629

Incident Date: 2014-09-05
Incident Time: 23:39
Location: MYRA FALLS MINE SITE, STRATHCONA
Area: CAMPBELL RIVER
PEP Region: VIR
MOE Region: Vancouver Island Region

Caller / Agency:
DAVE PRIDHAM (BY EMAIL) / MOE RO

Details:
Update #2 DGIR 141821 (Please include CO Office if not already informed)

RO Pridham contacted Ivor McWilliams, Environmental Manager at Nyrstar Mine. Mr. McWilliams confirms the following:

• 16,000 litres of acidic wash water has entered Myra Creek and subsequently entered into Buttle Lake due to a failed level control switch in their system.
• Initial testing at the point of entry into Myra creek and residue in the totes has indicated a PH of 3.5-4.0
• Spill took place around 12:00 hrs Friday Sept 5th
• The mine has not initiated their spill notification procedure to his knowledge.
• Product name is Mayco SA-160
• Company personnel have sampled the wash water and Myra Creek and have submitted samples to Maxxam Labs for analysis. No fish mortality noted.

RO Pridham notified and briefed the following:

• Contacted VIHA Emergency Management Director Sue Monroe. Mrs. Monroe will advise VIMHO Dr. Paul Hasselback.
• Contacted Don Cadden, BC Parks Regional Director, West Coast Region.
• Contacted City of Campbell River Fire Dispatch answering for City

Water Quality Dept. Dispatcher will contact ASAP.
• Direct contact with VIMHO Dr. Paul Hasselback.
• Contacted CANUTEC (CANUTEC advises that the product is suspected to be Meyco SA-160). Requesting confirmation and MSDS.
• Attempted to contact Nyrstar Mine directly- no contact.
• Attempted to contact Nyrstar Environmental Manager- no contact.
• Contacted Hubert Bunce, EP A/Mining Operations Director regarding water quality monitoring, compliance, etc.

Request for task value $100.00

Report Compiled By: MARIE Marie Bauder - 2014-09-06 03:37
DGIR 141821 UPDATE 2 - Subject: INLAND UPDATE

Notifications:
0338 faxed MOE Nanaimo, MOE HQ, MCTS
0338 emailed Code 2 dissemination, mines emergencies.COS NIZ

Environmental Emergency Response Officer:
Date:
Notification Coding: Code 1 / Code 2
MOE Response: Exercise / Potential / No Field Response / Field Response / IMT Activation
Notes:

Jager, Brenda CSNR:EX

From: Environmental Emergencies Spill Reports ENV:EX
Sent: Saturday, September 6, 2014 6:58 AM
To: Grant, Alex J ENV:EX
Subject: FW: DGIR 141821 UPDATE 3 - VIR

From: SGPEP.ECC1@gov.bc.ca[SMTP:SGPEP.ECC1@GOV.BC.CA]
Sent: Saturday, September 06, 2014 6:58:05 AM
To: Environmental Emergencies Spill Reports ENV:EX
Subject: DGIR 141821 UPDATE 3 - VIR
Auto forwarded by a Rule

PEP Task Number: 152629

Incident Date: 2014-09-05
Incident Time: 23:39
Location: MYRA FALLS MINE SITE, STRATHCONA
Area: CAMPBELL RIVER
PEP Region: VIR
MOE Region: Vancouver Island Region

Caller / Agency:
KJ SADLER / EC - Business: 604-290-2006

Details:
Requesting contact with MOE EERO.

Report Compiled By: DAWN Operations 2 ECC - 2014-09-06 06:30 DGIR 141821 UPDATE 3 - Subject: INLAND UPDATE

Notifications:
06:38 paged Van Isl MOE EERO
06:40 briefed MOE EERO Dave Pridham
06:41 faxed MOE Nanaimo, MOE HQ, MCTS
06:42 emailed Code 2 Dist List, Mines Emergencies, COS NIZ

Environmental Emergency Response Officer:
Date:
Notification Coding: Code 1 / Code 2
MOE Response: Exercise / Potential / No Field Response / Field Response / IMT Activation
Notes:

Jager, Brenda CSNR:EX

From: Environmental Emergencies Spill Reports ENV:EX
Sent: Saturday, September 6, 2014 9:36 AM
To: Pridham, Dave ENV:EX
Subject: FW: DGIR 141821 UPDATE 4 - VIR

From: SGPEP.ECC1@gov.bc.ca[SMTP:SGPEP.ECC1@GOV.BC.CA]
Sent: Saturday, September 06, 2014 9:36:06 AM
To: Environmental Emergencies Spill Reports ENV:EX
Subject: DGIR 141821 UPDATE 4 - VIR
Auto forwarded by a Rule

PEP Task Number: 152629

Incident Date: 2014-09-05
Incident Time: 23:39
Location: MYRA FALLS MINE SITE, STRATHCONA
Area: CAMPBELL RIVER
PEP Region: VIR
MOE Region: Vancouver Island Region

Caller / Agency:
ALEX GRANT / MOE

Details:
Requested contact with local COS.

Report Compiled By: DAWN Operations 1 ECC - 2014-09-06 09:20
DGIR 141821 UPDATE 4 - Subject: INLAND UPDATE

Notifications:
09:20 patched to CO Gord Gudbranson
09:24 faxed MOE Nanaimo, MOE HQ, MCTS
09:25 emailed Code 2 Dist List, Mines Emergencies, COS NIZ

Environmental Emergency Response Officer:
Date:
Notification Coding: Code 1 / Code 2
MOE Response: Exercise / Potential / No Field Response / Field Response /
IMT Activation
Notes:

Jager, Brenda CSNR:EX

From: Environmental Emergencies Spill Reports ENV:EX
Sent: Saturday, September 6, 2014 10:08 AM
To: Pridham, Dave ENV:EX
Subject: FW: DGIR 141821 UPDATE 5 - VIR

From: SGPEP.ECC1@gov.bc.ca[SMTP:SGPEP.ECC1@GOV.BC.CA]
Sent: Saturday, September 06, 2014 10:08:06 AM
To: Environmental Emergencies Spill Reports ENV:EX
Subject: DGIR 141821 UPDATE 5 - VIR
Auto forwarded by a Rule

PEP Task Number: 152629

Incident Date: 2014-09-05
Incident Time: 23:39
Location: MYRA FALLS MINE SITE, STRATHCONA
Area: CAMPBELL RIVER
PEP Region: VIR
MOE Region: Vancouver Island Region

Caller / Agency:
DAVE PRIDHAM (VIA EMAIL) / MOE

Details:
Update #5 for DGIR 141821

RO Pridham advises the following:

• Provincial sampling team has been assembled and will be on scene at Nyrstar Mine-Buttle Lake area @ 14:00-hrs today.
• EERO Grant will be accompanying Provincial Sampling team to site.
• EERO Grant has updated David Crebo, Communications Director, Environment Communications Office.
• EERO Grant has updated CO's office.
• EERO Pridham has contacted Ivor McWilliams, Environmental Manager, Nyrstar Mine requesting an email copy of MSDS as soon as possible.
• EERO Pridham has updated K.J. Sadler, Environment Canada Enforcement Officer.

Report Compiled By: DAWN Operations 1 ECC - 2014-09-06 10:00
DGIR 141821 UPDATE 5 - Subject: INLAND UPDATE

Notifications:
10:01 faxed MOE Nanaimo/HQ/MCTS
10:02 emailed Code 2 Dist List, Mines Emerg. COS NIZ

Environmental Emergency Response Officer:
Date:
Notification Coding: Code 1 / Code 2
MOE Response: Exercise / Potential / No Field Response / Field Response /
IMT Activation
Notes:

Jager, Brenda CSNR:EX

From: Environmental Emergencies Spill Reports ENV:EX
Sent: Saturday, September 6, 2014 11:12 AM
To: Pridham, Dave ENV:EX
Subject: FW: DGIR 141821 UPDATE 6 - VIR

From: SGPEP.ECC1@gov.bc.ca[SMTP:SGPEP.ECC1@GOV.BC.CA]
Sent: Saturday, September 06, 2014 11:12:06 AM
To: Environmental Emergencies Spill Reports ENV:EX
Subject: DGIR 141821 UPDATE 6 - VIR
Auto forwarded by a Rule

PEP Task Number: 152629

Incident Date: 2014-09-05
Incident Time: 23:39
Location: MYRA FALLS MINE SITE, STRATHCONA
Area: CAMPBELL RIVER
PEP Region: VIR
MOE Region: Vancouver Island Region

Caller / Agency:
KATJA MAGARIN / MOH DO - Cellular: s.17

Details:
Advised she would like to conected MOE with the First Nation Health Authority for the water testing results.

Report Compiled By: IAN Operations 4 ECC - 2014-09-06 10:41
DGIR 141821 UPDATE 6 - Subject: INLAND UPDATE

Notifications:
10:44 paged duty MOE RO David Pridham
10:46 briefed MOE RO David Pridham
10:47 faxed MOE Nanaimo/HQ/MCTS
10:48 emailed Code 2 Dist List, AANDC DO, Mines Emerg. COS NIZ

Environmental Emergency Response Officer:
Date:
Notification Coding: Code 1 / Code 2
MOE Response: Exercise / Potential / No Field Response / Field Response / IMT Activation
Notes:

Jager, Brenda CSNR:EX

From: Environmental Emergencies Spill Reports ENV:EX
Sent: Saturday, September 6, 2014 12:00 PM
To: Pridham, Dave ENV:EX
Subject: FW: DGIR 141821 UPDATE 7 - VIR

From: SGPEP.ECC1@gov.bc.ca[SMTP:SGPEP.ECC1@GOV.BC.CA]
Sent: Saturday, September 06, 2014 12:00:05 PM
To: Environmental Emergencies Spill Reports ENV:EX
Subject: DGIR 141821 UPDATE 7 - VIR
Auto forwarded by a Rule

PEP Task Number: 152629

Incident Date: 2014-09-05
Incident Time: 23:39
Location: MYRA FALLS MINE SITE, STRATHCONA
Area: CAMPBELL RIVER
PEP Region: VIR
MOE Region: Vancouver Island Region

Caller / Agency:
RON EWANYSHYN / EMBC DRM

Details:
Requesting contact with MOE EERO Dave Pridham.

Report Compiled By: DAWN Operations 1 ECC - 2014-09-06 11:41
DGIR 141821 UPDATE 7 - Subject: INLAND UPDATE

Notifications:
11:42 patched to MOE EERO Dave Pridham
11:43 faxed MOE Nanaimo, MOE HQ, MCTS
11:44 emailed Code 2 Dist List, Mines Emergencies, COS NIZ

Environmental Emergency Response Officer:
Date:
Notification Coding: Code 1 / Code 2
MOE Response: Exercise / Potential / No Field Response / Field Response /
IMT Activation
Notes:

Jager, Brenda CSNR:EX

From: Environmental Emergencies Spill Reports ENV:EX
Sent: Saturday, September 6, 2014 12:48 PM
To: Pridham, Dave ENV:EX
Subject: FW: DGIR 141821 UPDATE 8 - VIR

From: SGPEP.ECC1@gov.bc.ca[SMTP:SGPEP.ECC1@GOV.BC.CA]
Sent: Saturday, September 06, 2014 12:48:05 PM
To: Environmental Emergencies Spill Reports ENV:EX
Subject: DGIR 141821 UPDATE 8 - VIR
Auto forwarded by a Rule

PEP Task Number: 152629

Incident Date: 2014-09-05
Incident Time: 23:39
Location: MYRA FALLS MINE SITE, STRATHCONA
Area: CAMPBELL RIVER
PEP Region: VIR
MOE Region: Vancouver Island Region

Caller / Agency:
RON EWANYSHYN / EMBC

Details:
Advised he has just spoken with the MOE RO and this will remain code 2 at this time, no new information is available at this time. Requesting phone patch to Strathcona Regional District EPC.

Report Compiled By: IAN Operations 4 ECC - 2014-09-06 11:51
DGIR 141821 UPDATE 8 - Subject: INLAND UPDATE

Notifications:
11:56 patched EMBC RDM Ron Ewanyshyn through to Strathcona RD EPC Howie Siemens - has sent the information to the Strathcona RD water monitoring group - RDM Ron Ewanyshyn offered EMBC support and requested the regional district maintain communication with all stakeholders and address any media attention as well as consider where to direct phone calls from the public if they start to pick up (Strathcona drinking water monitoring contact is aware this spill).
12:04 paged MOE RO David Pridham
12:07 briefed MOE RO David Pridham
12:09 faxed MOE Nanaimo, MOE HQ, MCTS
12:10 emailed Code 2 Dist List, Mines Emergencies, COS NIZ

Environmental Emergency Response Officer:
Date:
Notification Coding: Code 1 / Code 2

MOE Response: Exercise / Potential / No Field Response / Field Response /
IMT Activation
Notes:

Jager, Brenda CSNR:EX

From: Environmental Emergencies Spill Reports ENV:EX
Sent: Saturday, September 6, 2014 3:44 PM
To: Pridham, Dave ENV:EX
Subject: FW: DGIR 141821 UPDATE 9 - VIR

From: SGPEP.ECC1@gov.bc.ca[SMTP:SGPEP.ECC1@GOV.BC.CA]
Sent: Saturday, September 06, 2014 3:44:05 PM
To: Environmental Emergencies Spill Reports ENV:EX
Subject: DGIR 141821 UPDATE 9 - VIR
Auto forwarded by a Rule

PEP Task Number: 152629

Incident Date: 2014-09-05
Incident Time: 23:39
Location: MYRA FALLS MINE SITE, STRATHCONA
Area: CAMPBELL RIVER
PEP Region: VIR
MOE Region: Vancouver Island Region

Caller / Agency:
DAVE PRIDHAM (VIA EMAIL) / MOE

Details:
Update #9 DGIR 141821

RO Pridham advises the following as of 14:30-hrs:

• Provincial water sampling team is on route to Nyrstar Mine/Buttle Lake area. Sampling team has been in contact with Environment Canada Enforcement Officer, K.J. Sadler.
• MOH Officer Dr. Paul Hasselback has initiated a MOH information system for addressing public health concerns- contact information has been forwarded to D'Arcy Sego for review.
• Briefed ECC Regional Director Ron Ewanyskyn. ECC ready to support MOE as needed.
• Briefed MOH DO Katja Magarin. DO Magarin requested that we add two local First Nations Health Authority contacts (Linda Pillsworth & Peter Mazey) to the contact stream to share water sampling results. DO Magarin also advises that the local First Nation communities will be initiating their own water sampling teams and will share findings with MOE.
• Briefed City of Campbell River Emergency Coordinator Howie Siemens. Directed Mr. Siemens to MOH Officer Dr. Hasselback to address regional health concerns from incident.
• Ongoing contact with Nyrstar Mine, Environmental Manager Ivor McWilliams for updates, contacts, follow-up.

• Received MSDS information from Nyrstar Mine. Product involved confirmed to be Meyco SA-160 (residue).

Task increase request to $2000.00

Report Compiled By: DAWN Operations 1 ECC - 2014-09-06 15:35
DGIR 141821 UPDATE 9 - Subject: INLAND UPDATE

Notifications:
15:36 faxed MOE Nanaimo, MOE HQ, MCTS
15:38 emailed Code 2 Dist List, Mines Emergencies, COS NIZ

Environmental Emergency Response Officer:
Date:
Notification Coding: Code 1 / Code 2
MOE Response: Exercise / Potential / No Field Response / Field Response / IMT Activation
Notes:

BC MINISTRY OF ENVIRONMENT
ATTN: Deborah Epps
Section Head, Provincial Water Quality
2080A Labieux Road
Nanaimo BC V9T 6J9

Date Received: 07-SEP-14
Report Date: 10-SEP-14 17:52 (MT)
Version: FINAL

Client Phone: 604-793-8770

Certificate of Analysis

Lab Work Order #: L1514217

Project P.O. #: NOT SUBMITTED
Job Reference: SITE 1 ~ 200M FROM MYRA FALLS
C of C Numbers: 50212392
Legal Site Desc:

Dean Watt
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID: L1514217-1 Description: WATER Sampled Date: 06-SEP-14 Sampled Time: 18:20 Client ID: SITE 1 ~ 200M FROM MYRA FALLS 0.5M	Sample ID: L1514217-2 Description: WATER Sampled Date: 06-SEP-14 Sampled Time: 18:23 Client ID: SITE 1 ~ 200M FROM MYRA FALLS 5.0M	Sample ID: L1514217-3 Description: WATER Sampled Date: 06-SEP-14 Sampled Time: 18:26 Client ID: SITE 1 ~ 200M FROM MYRA FALLS 10.0M		
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	29.4	30.5	33.2		
	pH (pH)	7.82	7.78	7.76		
	Turbidity (NTU)	0.24	0.19	0.17		
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	25.4	25.2	25.2		
	Sulfate (SO4) (mg/L)	6.14	6.33	11.1		
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.78	1.04	0.77		
	Total Organic Carbon (mg/L)	0.70	0.75	0.68		
Total Metals	Aluminum (Al)-Total (ug/L)	11.9	12.1	15.7		
	Antimony (Sb)-Total (ug/L)	<0.10	<0.10	0.11		
	Arsenic (As)-Total (ug/L)	0.22	0.22	0.22		
	Barium (Ba)-Total (ug/L)	4.71	4.74	5.64		
	Beryllium (Be)-Total (ug/L)	<0.10	<0.10	<0.10		
	Bismuth (Bi)-Total (ug/L)	<0.50	<0.50	<0.50		
	Boron (B)-Total (ug/L)	<10	<10	<10		
	Cadmium (Cd)-Total (ug/L)	0.017	0.019	0.037		
	Calcium (Ca)-Total (ug/L)	10900	10600	12200		
	Chromium (Cr)-Total (ug/L)	<0.10	<0.10	<0.10		
	Cobalt (Co)-Total (ug/L)	<0.10	<0.10	<0.10		
	Copper (Cu)-Total (ug/L)	0.67	0.62	0.97		
	Iron (Fe)-Total (ug/L)	<10	<10	13		
	Lead (Pb)-Total (ug/L)	<0.050	<0.050	<0.050		
	Lithium (Li)-Total (ug/L)	<0.50	<0.50	<0.50		
	Magnesium (Mg)-Total (ug/L)	910	860	990		
	Manganese (Mn)-Total (ug/L)	1.67	2.27	6.50		
	Mercury (Hg)-Total (ug/L)	<0.010	<0.010	<0.010		
	Molybdenum (Mo)-Total (ug/L)	0.284	0.295	0.454		
	Nickel (Ni)-Total (ug/L)	<0.50	<0.50	<0.50		
	Phosphorus (P)-Total (ug/L)	<50	<50	<50		
	Potassium (K)-Total (ug/L)	160	150	230		
	Selenium (Se)-Total (ug/L)	0.12	0.12	0.15		
	Silicon (Si)-Total (ug/L)	1290	1250	1290		
	Silver (Ag)-Total (ug/L)	<0.010	<0.010	<0.010		
	Sodium (Na)-Total (ug/L)	1030	1050	1490		
	Strontium (Sr)-Total (ug/L)	16.5	16.9	21.1		
	Sulfur (S)-Total (ug/L)	2350	2310	3950		
	Thallium (Tl)-Total (ug/L)	<0.010	<0.010	<0.010		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1514217-1	L1514217-2	L1514217-3		
	Description	WATER	WATER	WATER		
	Sampled Date	06-SEP-14	06-SEP-14	06-SEP-14		
	Sampled Time	18:20	18:23	18:26		
	Client ID	SITE 1 ~ 200M FROM MYRA FALLS 0.5M	SITE 1 ~ 200M FROM MYRA FALLS 5.0M	SITE 1 ~ 200M FROM MYRA FALLS 10.0M		
Grouping	**Analyte**					
WATER						
Total Metals	Tin (Sn)-Total (ug/L)	0.14	<0.10	<0.10		
	Titanium (Ti)-Total (ug/L)	<10	<10	<10		
	Uranium (U)-Total (ug/L)	0.011	0.011	0.012		
	Vanadium (V)-Total (ug/L)	<1.0	<1.0	<1.0		
	Zinc (Zn)-Total (ug/L)	4.6	5.5	9.1		
Dissolved Metals	Dissolved Mercury Filtration Location	LAB	LAB	LAB		
	Dissolved Metals Filtration Location	LAB	LAB	LAB		
	Aluminum (Al)-Dissolved (ug/L)	9.0	9.0	11.6		
	Antimony (Sb)-Dissolved (ug/L)	<0.10	<0.10	0.10		
	Arsenic (As)-Dissolved (ug/L)	0.19	0.20	0.20		
	Barium (Ba)-Dissolved (ug/L)	4.68	4.52	5.43		
	Beryllium (Be)-Dissolved (ug/L)	<0.10	<0.10	<0.10		
	Bismuth (Bi)-Dissolved (ug/L)	<0.50	<0.50	<0.50		
	Boron (B)-Dissolved (ug/L)	<10	<10	<10		
	Cadmium (Cd)-Dissolved (ug/L)	0.016	0.016	0.026		
	Calcium (Ca)-Dissolved (ug/L)	10400	10800	11800		
	Chromium (Cr)-Dissolved (ug/L)	<0.10	<0.10	<0.10		
	Cobalt (Co)-Dissolved (ug/L)	<0.10	<0.10	<0.10		
	Copper (Cu)-Dissolved (ug/L)	0.91	0.48	0.60		
	Iron (Fe)-Dissolved (ug/L)	<10	<10	<10		
	Lead (Pb)-Dissolved (ug/L)	<0.050	<0.050	<0.050		
	Lithium (Li)-Dissolved (ug/L)	<0.50	<0.50	<0.50		
	Magnesium (Mg)-Dissolved (ug/L)	840	890	940		
	Manganese (Mn)-Dissolved (ug/L)	0.110	0.067	0.321		
	Mercury (Hg)-Dissolved (ug/L)	<0.010	<0.010	<0.010		
	Molybdenum (Mo)-Dissolved (ug/L)	0.282	0.265	0.450		
	Nickel (Ni)-Dissolved (ug/L)	<0.50	<0.50	<0.50		
	Phosphorus (P)-Dissolved (ug/L)	<50	<50	<50		
	Potassium (K)-Dissolved (ug/L)	150	150	200		
	Selenium (Se)-Dissolved (ug/L)	0.12	0.12	0.15		
	Silicon (Si)-Dissolved (ug/L)	1200	1250	1220		
	Silver (Ag)-Dissolved (ug/L)	<0.010	<0.010	<0.010		
	Sodium (Na)-Dissolved (ug/L)	1010	1060	1470		
	Strontium (Sr)-Dissolved (ug/L)	16.0	16.4	20.6		
	Sulfur (S)-Dissolved (ug/L)	2290	2380	3780		
	Thallium (Tl)-Dissolved (ug/L)	<0.010	<0.010	<0.010		
	Tin (Sn)-Dissolved (ug/L)	0.50 DTC	<0.10	<0.10		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1514217-1	L1514217-2	L1514217-3		
	Description	WATER	WATER	WATER		
	Sampled Date	06-SEP-14	06-SEP-14	06-SEP-14		
	Sampled Time	18:20	18:23	18:26		
	Client ID	SITE 1 ~ 200M FROM MYRA FALLS 0.5M	SITE 1 ~ 200M FROM MYRA FALLS 5.0M	SITE 1 ~ 200M FROM MYRA FALLS 10.0M		
Grouping	**Analyte**					
WATER						
Dissolved Metals	Titanium (Ti)-Dissolved (ug/L)	<10	<10	<10		
	Uranium (U)-Dissolved (ug/L)	<0.010	0.010	0.011		
	Vanadium (V)-Dissolved (ug/L)	<1.0	<1.0	<1.0		
	Zinc (Zn)-Dissolved (ug/L)	<6.0 DLB	<6.0 DLB	<8.0 DLB		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Zinc (Zn)-Dissolved	MB-LOR	L1514217-1, -2, -3
Matrix Spike	Sulfate (SO4)	MS-B	L1514217-1, -2, -3
Matrix Spike	Total Organic Carbon	MS-B	L1514217-1, -2, -3
Matrix Spike	Dissolved Organic Carbon	MS-B	L1514217-1, -2, -3

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLB	Detection Limit was raised due to detection of analyte at comparable level in Method Blank.
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-DIS-LOW-CVAFS-VA	Water	Dissolved Mercury in Water by CVAFS(Low)	EPA SW-846 3005A & EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

HG-TOT-LOW-CVAFS-VA	Water	Total Mercury in Water by CVAFS(Low)	EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

MET-DIS-LOW-ICP-VA	Water	Dissolved Metals in Water by ICPOES	EPA 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

Reference Information

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

MET-TOT-LOW-ICP-VA Water Total Metals in Water by ICPOES EPA 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H "pH Value"

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

S-DIS-ICP-VA Water Dissolved Sulfur in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

S-TOT-ICP-VA Water Total Sulfur in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

SO4-TUR-VA Water Sulfate(SO4) by Turbidity APHA 4500-SO4 E. SULFATE

This analysis is carried out using procedures adapted from APHA Method 4500-SO4 "Sulfate". Sulfate is determined using the turbidimetric method.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 "Turbidity"

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

50212392

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1514217 Report Date: 10-SEP-14

Client: BC MINISTRY OF ENVIRONMENT
Section Head, Provincial Water Quality 2080A Labieux Road
Nanaimo BC V9T 6J9
Contact: Deborah Epps

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-COL-VA	Water							
Batch R2941773								
WG1947162-2 CRM		**VA-ALKL-CONTROL**						
Alkalinity, Total (as CaCO3)			97.4		%		85-115	09-SEP-14
WG1947162-5 CRM		**VA-ALKM-CONTROL**						
Alkalinity, Total (as CaCO3)			103.7		%		85-115	09-SEP-14
WG1947162-8 CRM		**VA-ALKH-CONTROL**						
Alkalinity, Total (as CaCO3)			100.8		%		85-115	09-SEP-14
WG1947162-1 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
WG1947162-10 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
WG1947162-4 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
WG1947162-7 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
CARBONS-DOC-VA	Water							
Batch R2943332								
WG1947341-1 DUP		**L1514217-3**						
Dissolved Organic Carbon		0.77	0.79		mg/L	2.3	20	09-SEP-14
WG1947341-12 LCS								
Dissolved Organic Carbon			103.6		%		80-120	09-SEP-14
WG1947341-16 LCS								
Dissolved Organic Carbon			109.1		%		80-120	09-SEP-14
WG1947341-4 LCS								
Dissolved Organic Carbon			101.8		%		80-120	09-SEP-14
WG1947341-8 LCS								
Dissolved Organic Carbon			105.9		%		80-120	09-SEP-14
WG1947341-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-15 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-10 MS		**L1513619-2**						
Dissolved Organic Carbon			100.6		%		70-130	09-SEP-14
WG1947341-14 MS		**L1513418-11**						
Dissolved Organic Carbon			N/A	MS-B	%		-	09-SEP-14
WG1947341-2 MS		**L1514231-1**						

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	Water							
Batch R2943332								
WG1947341-2 MS		**L1514231-1**						
Dissolved Organic Carbon			104.6		%		70-130	09-SEP-14
WG1947341-6 MS		**L1514251-1**						
Dissolved Organic Carbon			106.5		%		70-130	09-SEP-14
CARBONS-TOC-VA	Water							
Batch R2943331								
WG1947339-2 DUP		**L1514217-3**						
Total Organic Carbon		0.68	0.74		mg/L	8.0	20	09-SEP-14
WG1947339-1 LCS								
Total Organic Carbon			100.0		%		80-120	09-SEP-14
WG1947339-13 LCS								
Total Organic Carbon			99.6		%		80-120	09-SEP-14
WG1947339-17 LCS								
Total Organic Carbon			101.1		%		80-120	09-SEP-14
WG1947339-5 LCS								
Total Organic Carbon			102.0		%		80-120	09-SEP-14
WG1947339-9 LCS								
Total Organic Carbon			99.95		%		80-120	09-SEP-14
WG1947339-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-16 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-15 MS		**L1513418-11**						
Total Organic Carbon			N/A	MS-B	%		-	09-SEP-14
WG1947339-3 MS		**L1514231-1**						
Total Organic Carbon			103.0		%		70-130	09-SEP-14
WG1947339-7 MS		**L1514251-1**						
Total Organic Carbon			102.5		%		70-130	09-SEP-14
HG-DIS-LOW-CVAFS-VA	Water							
Batch R2942725								
WG1947233-3 LCS								
Mercury (Hg)-Dissolved			89.2		%		80-120	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-DIS-LOW-CVAFS-VA	Water							
Batch R2943546								
WG1947233-1 MB								
Mercury (Hg)-Dissolved			<0.000010		mg/L		0.00001	10-SEP-14
HG-TOT-LOW-CVAFS-VA	Water							
Batch R2942725								
WG1947862-2 LCS								
Mercury (Hg)-Total			95.9		%		80-120	09-SEP-14
WG1947862-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	09-SEP-14
WG1947862-3 MS		**L1514076-1**						
Mercury (Hg)-Total			89.1		%		70-130	09-SEP-14
WG1947862-4 MS		**L1514076-3**						
Mercury (Hg)-Total			94.6		%		70-130	09-SEP-14
MET-D-CCMS-VA	Water							
Batch R2942770								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Aluminum (Al)-Dissolved			102.1		%		80-120	09-SEP-14
Antimony (Sb)-Dissolved			97.3		%		80-120	09-SEP-14
Arsenic (As)-Dissolved			97.4		%		80-120	09-SEP-14
Barium (Ba)-Dissolved			98.6		%		80-120	09-SEP-14
Beryllium (Be)-Dissolved			97.7		%		80-120	09-SEP-14
Bismuth (Bi)-Dissolved			97.7		%		80-120	09-SEP-14
Boron (B)-Dissolved			85.5		%		80-120	09-SEP-14
Cadmium (Cd)-Dissolved			96.8		%		80-120	09-SEP-14
Chromium (Cr)-Dissolved			96.9		%		80-120	09-SEP-14
Cobalt (Co)-Dissolved			96.3		%		80-120	09-SEP-14
Copper (Cu)-Dissolved			95.4		%		80-120	09-SEP-14
Lead (Pb)-Dissolved			96.9		%		80-120	09-SEP-14
Lithium (Li)-Dissolved			99.2		%		80-120	09-SEP-14
Manganese (Mn)-Dissolved			99.6		%		80-120	09-SEP-14
Molybdenum (Mo)-Dissolved			98.5		%		80-120	09-SEP-14
Nickel (Ni)-Dissolved			98.2		%		80-120	09-SEP-14
Selenium (Se)-Dissolved			98.9		%		80-120	09-SEP-14
Silver (Ag)-Dissolved			98.9		%		80-120	09-SEP-14
Sodium (Na)-Dissolved			97.2		%		80-120	09-SEP-14
Strontium (Sr)-Dissolved			99.1		%		80-120	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	Water							
Batch R2942770								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Thallium (Tl)-Dissolved			98.2		%		80-120	09-SEP-14
Tin (Sn)-Dissolved			97.1		%		80-120	09-SEP-14
Titanium (Ti)-Dissolved			99.4		%		80-120	09-SEP-14
Uranium (U)-Dissolved			99.5		%		80-120	09-SEP-14
Vanadium (V)-Dissolved			97.4		%		80-120	09-SEP-14
Zinc (Zn)-Dissolved			95.8		%		80-120	09-SEP-14
WG1947233-1 MB								
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	09-SEP-14
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Bismuth (Bi)-Dissolved			<0.00050		mg/L		0.0005	09-SEP-14
Boron (B)-Dissolved			<0.010		mg/L		0.01	09-SEP-14
Cadmium (Cd)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	09-SEP-14
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Lithium (Li)-Dissolved			<0.00050		mg/L		0.0005	09-SEP-14
Manganese (Mn)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	09-SEP-14
Selenium (Se)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	09-SEP-14
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Titanium (Ti)-Dissolved			<0.010		mg/L		0.01	09-SEP-14
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Vanadium (V)-Dissolved			<0.0010		mg/L		0.001	09-SEP-14
Zinc (Zn)-Dissolved			0.0024	MB-LOR	mg/L		0.001	09-SEP-14
MET-DIS-LOW-ICP-VA	Water							

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-LOW-ICP-VA	Water							
Batch R2942645								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Calcium (Ca)-Dissolved			101.0		%		80-120	09-SEP-14
Iron (Fe)-Dissolved			95.0		%		80-120	09-SEP-14
Magnesium (Mg)-Dissolved			100.6		%		80-120	09-SEP-14
Phosphorus (P)-Dissolved			99.6		%		80-120	09-SEP-14
Potassium (K)-Dissolved			97.4		%		80-120	09-SEP-14
Silicon (Si)-Dissolved			98.5		%		80-120	09-SEP-14
WG1947233-1 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	09-SEP-14
Magnesium (Mg)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Potassium (K)-Dissolved			<0.10		mg/L		0.1	09-SEP-14
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
MET-T-CCMS-VA	Water							
Batch R2942770								
WG1947258-3 CRM		**VA-HIGH-WATRM**						
Aluminum (Al)-Total			101.1		%		80-120	09-SEP-14
Antimony (Sb)-Total			97.5		%		80-120	09-SEP-14
Arsenic (As)-Total			99.4		%		80-120	09-SEP-14
Barium (Ba)-Total			100.1		%		80-120	09-SEP-14
Beryllium (Be)-Total			97.0		%		80-120	09-SEP-14
Bismuth (Bi)-Total			96.9		%		80-120	09-SEP-14
Boron (B)-Total			83.9		%		80-120	09-SEP-14
Cadmium (Cd)-Total			98.7		%		80-120	09-SEP-14
Chromium (Cr)-Total			99.3		%		80-120	09-SEP-14
Cobalt (Co)-Total			98.5		%		80-120	09-SEP-14
Copper (Cu)-Total			96.3		%		80-120	09-SEP-14
Lead (Pb)-Total			96.6		%		80-120	09-SEP-14
Lithium (Li)-Total			96.9		%		80-120	09-SEP-14
Manganese (Mn)-Total			101.1		%		80-120	09-SEP-14
Molybdenum (Mo)-Total			99.1		%		80-120	09-SEP-14
Nickel (Ni)-Total			99.8		%		80-120	09-SEP-14
Selenium (Se)-Total			99.6		%		80-120	09-SEP-14
Silver (Ag)-Total			95.4		%		80-120	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	Water							
Batch R2942770								
WG1947258-3 CRM		**VA-HIGH-WATRM**						
Sodium (Na)-Total			98.7		%		80-120	09-SEP-14
Strontium (Sr)-Total			100.3		%		80-120	09-SEP-14
Thallium (Tl)-Total			97.8		%		80-120	09-SEP-14
Tin (Sn)-Total			97.7		%		80-120	09-SEP-14
Titanium (Ti)-Total			91.4		%		80-120	09-SEP-14
Uranium (U)-Total			98.5		%		80-120	09-SEP-14
Vanadium (V)-Total			99.8		%		80-120	09-SEP-14
Zinc (Zn)-Total			96.6		%		80-120	09-SEP-14
WG1947258-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	09-SEP-14
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Arsenic (As)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Barium (Ba)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Bismuth (Bi)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Boron (B)-Total			<0.010		mg/L		0.01	09-SEP-14
Cadmium (Cd)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Copper (Cu)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Lead (Pb)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Lithium (Li)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Manganese (Mn)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Selenium (Se)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Silver (Ag)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Sodium (Na)-Total			<0.050		mg/L		0.05	09-SEP-14
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	09-SEP-14
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Tin (Sn)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Titanium (Ti)-Total			<0.010		mg/L		0.01	09-SEP-14
Uranium (U)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Vanadium (V)-Total			<0.0010		mg/L		0.001	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	Water							
Batch R2942770								
WG1947258-1 MB								
Zinc (Zn)-Total			<0.0030		mg/L		0.003	09-SEP-14
MET-TOT-LOW-ICP-VA	Water							
Batch R2942851								
WG1947258-3 CRM		**VA-HIGH-WATRM**						
Calcium (Ca)-Total			98.5		%		80-120	09-SEP-14
Iron (Fe)-Total			95.5		%		80-120	09-SEP-14
Magnesium (Mg)-Total			101.0		%		80-120	09-SEP-14
Phosphorus (P)-Total			97.8		%		80-120	09-SEP-14
Potassium (K)-Total			96.6		%		80-120	09-SEP-14
Silicon (Si)-Total			96.1		%		80-120	09-SEP-14
WG1947258-1 MB								
Calcium (Ca)-Total			<0.050		mg/L		0.05	09-SEP-14
Iron (Fe)-Total			<0.010		mg/L		0.01	09-SEP-14
Magnesium (Mg)-Total			<0.050		mg/L		0.05	09-SEP-14
Phosphorus (P)-Total			<0.050		mg/L		0.05	09-SEP-14
Potassium (K)-Total			<0.10		mg/L		0.1	09-SEP-14
Silicon (Si)-Total			<0.050		mg/L		0.05	09-SEP-14
PH-PCT-VA	Water							
Batch R2943649								
WG1947450-25 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	09-SEP-14
WG1947450-26 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-27 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	09-SEP-14
WG1947450-28 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-29 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-30 CRM		**VA-PH7-BUF**						
pH			6.99		pH		6.9-7.1	09-SEP-14
WG1947450-31 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-32 CRM		**VA-PH7-BUF**						
pH			7.03		pH		6.9-7.1	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
S-DIS-ICP-VA	Water							
Batch R2942645								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Sulfur (S)-Dissolved			101.7		%		80-120	09-SEP-14
WG1947233-1 MB								
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	09-SEP-14
S-TOT-ICP-VA	Water							
Batch R2942851								
WG1947258-3 CRM		**VA-HIGH-WATRM**						
Sulfur (S)-Total			101.6		%		80-120	09-SEP-14
WG1947258-1 MB								
Sulfur (S)-Total			<0.50		mg/L		0.5	09-SEP-14
SO4-TUR-VA	Water							
Batch R2943291								
WG1948014-2 CRM		**VA-SO4-L-CONTROL**						
Sulfate (SO4)			98.4		%		85-115	10-SEP-14
WG1948014-6 CRM		**VA-SO4-H-CONTROL**						
Sulfate (SO4)			102.8		%		85-115	10-SEP-14
WG1948014-1 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	10-SEP-14
WG1948014-5 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	10-SEP-14
WG1948014-4 MS		**L1512411-2**						
Sulfate (SO4)			92.1		%		75-125	10-SEP-14
WG1948014-8 MS		**L1510555-1**						
Sulfate (SO4)			N/A	MS-B	%		-	10-SEP-14
TURBIDITY-VA	Water							
Batch R2941561								
WG1947074-2 CRM		**VA-FORM-40**						
Turbidity			101.8		%		85-115	08-SEP-14
WG1947074-1 MB								
Turbidity			<0.10		NTU		0.1	08-SEP-14

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH by Meter (Automated)							
	1	06-SEP-14 18:20	09-SEP-14 23:00	0.25	77	hours	EHTR-FM
	2	06-SEP-14 18:23	09-SEP-14 23:00	0.25	77	hours	EHTR-FM
	3	06-SEP-14 18:26	09-SEP-14 23:00	0.25	77	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1514217 were received on 07-SEP-14 09:30.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

WATER & GENERAL CHEMISTRY REQUISITION

Province Of British Columbia

Ministry of Environment

Maxxam Analytics Inc.
4606 Canada Way
Burnaby, BC V5G1K5

Req # 50212392

Urgent?	Csr No.	Office 10	Client CA
Study		Project N/A	
Lab	Maxxam Analytics Inc.		
Ministry Contact	NCOBEE Nicole Obee		
Sampler	Nicole Obee		
Signature			
EMS Id		Well Plate #	
Location	Site 1 ~200m from Myra Falls		

Sampling Agency

Code 10 Name Vancouver Island, Nanaimo
Address 2080-A Labieux Road
City Nanaimo
Postal Code V9T6J9 Phone (250)751-3100

Number of Containers

Instructions To Lab Pls include total and dissolved mercury at ICPMS level

State FW Descriptor GE Collection Method GRB

No.	Class	Collection Start YYYY-MM-DD HH:MI	Collection End YYYY-MM-DD HH:MI	Depth Upper	Depth Lower	Tide	Comment
1	REG	2014-09-06	2014-09-06 1820	0.5			
2	REG	"	" 1823	5.0			
3	REG	"	" 1826	10.0			
4							
5							
6							

L1514217-COFC

GENERAL (1L)	Med'm	Pres'n
	Acidity pH 4.5	
	Acidity pH 8.3	
	Alk. Titration Curve	
	Alkalinity: Phen.	
X	Alkalinity: Total: pH 4.5	
	Colour: S.W.	
	Colour: TAC	
	Colour: True	
X	pH	
	Residue: Filterable: 0.45µm (TDS)	
	Residue: Nonfilt., fixed (TSS: fixed)	
	Residue: Nonfilterable (TSS)	
	Residue: Total	
	Residue: Total, Fixed	
	Specific Conductance	
X	Turbidity	

SPECIFIC Test	Med'm	Pres'n	Med'm	Pres'n
Biochemical Oxygen D.	02	01		
Carb. Biochem. Oxygen D.	02	01		
Carbon: DIC				
X Carbon: DOC				
Carbon: TIC				
X Carbon: TOC				
Chemical Oxygen D.	04	05		
Chlorophyll "a"				
Cyanide: SAD + SCN	02	24		
Cyanide: WAD	02	24		
Phaeophytin				
Residue:NFR Whole Bottle	03	01		
SWEP (Extraction Prep.)				
Sulphide: Total	03	08		

GENERAL (120 mL)	Med'm	Pres'n
	Anion Package (Cl,Br,SO4)	
	Chloride	
	Fluoride	
	Nit.: Nitrate and Nitrite (Col'm)	
	Nitrogen: Nitrate (Col'm)	
	Nitrogen: Nitrite (Col'm)	
	Silica: Reactive	
X	Sulfate	

ORGANICS	Med'm	Pres'n
	AOX	
	Acid Extr. Herb.-Scan	
	BTEX	
	EPH	
	Glyphosate / AMPA	
	Oil and Grease: Gravimetric	
	Organochlorine P.-scan	
	Organophosphorus P.-scan	
	PAH	
	Penta/Tetra Cl-phenols	
	Phenols (GC/MS)	
	Phenols: Colorimetric	
	Polychlor. Biphenyls	
	Resin Acids	
	Trihalomethanes (THM)	

GENERAL IONS (120 mL)	Med'm	55	Pres'n	64
	Nitrogen: Ammonia (Col'm)			
	Nitrogen: Organic			
	Nitrogen: Tot. Kjeldahl (Calc)			
	Nitrogen: Total			

PHOSPHORUS (120 mL)	Med'm	Pres'n
	Phos. Diss. O-phosphate (Col'm)	
	Phosphorus: Tot. Diss. (Col'm)	
	Phosphorus: Total (Col'm)	

OTHER	Med'm	Pres'n	Test
			Total and dissolved mercury at ICPMS level

METALS (TOTAL)	Med'm	55	Pres'n	02	Med'm	Pres'n
High Low						
	Metal Pkg. (ICP)					
X	Metal Pkg. (ICPMS)					
X	Hardness					
X	Mercury					
	Sediment, Sieve to < 63µ					

METALS (DISSOLVED; 0.45 MICROMETERS)	Med'm	55	Pres'n	62	Med'm	Pres'n
High Low						
	Metal Pkg. (ICP)					
X	Metal Pkg. (ICPMS)					
X	Hardness					
X	Mercury					

FIELD TEST DETAILS

No.	Parameter	Method	Results	Units

Report ID: EMSR0900

Rec by Dim

Sep 7 9:30 2C

Date: 2014-09-06 11:46

BC MINISTRY OF ENVIRONMENT
ATTN: Deborah Epps
Section Head, Provincial Water Quality
2080A Labieux Road
Nanaimo BC V9T 6J9

Date Received: 07-SEP-14
Report Date: 10-SEP-14 17:34 (MT)
Version: FINAL

Client Phone: 604-793-8770

Certificate of Analysis

Lab Work Order #: L1514222

Project P.O. #: NOT SUBMITTED
Job Reference: SITE 2 ~ 200M FROM MYRA FALLS
C of C Numbers: 50212393
Legal Site Desc:

Dean Watt
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1514222-1	L1514222-2	L1514222-3		
	Description	WATER	WATER	WATER		
	Sampled Date	06-SEP-14	06-SEP-14	06-SEP-14		
	Sampled Time	18:50	18:53	18:56		
	Client ID	SITE 2 ~ 200M FROM MYRA FALLS 0.5M	SITE 2 ~ 200M FROM MYRA FALLS 5.0M	SITE 2 ~ 200M FROM MYRA FALLS 10.0M		
Grouping	**Analyte**					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	29.8	30.7	33.4		
	pH (pH)	7.78	7.77	7.74		
	Turbidity (NTU)	0.28	0.14	0.22		
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	25.2	24.4	25.8		
	Sulfate (SO4) (mg/L)	6.28	6.32	9.20		
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.71	0.73	0.67		
	Total Organic Carbon (mg/L)	0.69	0.65	0.66		
Total Metals	Aluminum (Al)-Total (ug/L)	13.3	13.0	14.9		
	Antimony (Sb)-Total (ug/L)	<0.10	<0.10	<0.10		
	Arsenic (As)-Total (ug/L)	0.22	0.19	0.22		
	Barium (Ba)-Total (ug/L)	4.71	4.72	5.33		
	Beryllium (Be)-Total (ug/L)	<0.10	<0.10	<0.10		
	Bismuth (Bi)-Total (ug/L)	<0.50	<0.50	<0.50		
	Boron (B)-Total (ug/L)	<10	<10	<10		
	Cadmium (Cd)-Total (ug/L)	0.022	0.020	0.030		
	Calcium (Ca)-Total (ug/L)	10800	10800	12100		
	Chromium (Cr)-Total (ug/L)	<0.10	<0.10	<0.10		
	Cobalt (Co)-Total (ug/L)	<0.10	<0.10	<0.10		
	Copper (Cu)-Total (ug/L)	0.64	0.59	0.79		
	Iron (Fe)-Total (ug/L)	<10	<10	15		
	Lead (Pb)-Total (ug/L)	<0.050	<0.050	<0.050		
	Lithium (Li)-Total (ug/L)	<0.50	<0.50	<0.50		
	Magnesium (Mg)-Total (ug/L)	900	900	980		
	Manganese (Mn)-Total (ug/L)	1.69	2.14	4.90		
	Mercury (Hg)-Total (ug/L)	<0.010	<0.010	<0.010		
	Molybdenum (Mo)-Total (ug/L)	0.278	0.292	0.390		
	Nickel (Ni)-Total (ug/L)	<0.50	<0.50	<0.50		
	Phosphorus (P)-Total (ug/L)	<50	<50	<50		
	Potassium (K)-Total (ug/L)	150	150	170		
	Selenium (Se)-Total (ug/L)	0.12	0.13	0.14		
	Silicon (Si)-Total (ug/L)	1270	1270	1320		
	Silver (Ag)-Total (ug/L)	<0.010	<0.010	<0.010		
	Sodium (Na)-Total (ug/L)	1010	1030	1350		
	Strontium (Sr)-Total (ug/L)	16.6	16.9	20.3		
	Sulfur (S)-Total (ug/L)	2350	2340	3350		
	Thallium (Tl)-Total (ug/L)	<0.010	<0.010	<0.010		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1514222-1	L1514222-2	L1514222-3		
	Description	WATER	WATER	WATER		
	Sampled Date	06-SEP-14	06-SEP-14	06-SEP-14		
	Sampled Time	18:50	18:53	18:56		
	Client ID	SITE 2 ~ 200M FROM MYRA FALLS 0.5M	SITE 2 ~ 200M FROM MYRA FALLS 5.0M	SITE 2 ~ 200M FROM MYRA FALLS 10.0M		
Grouping	Analyte					
WATER						
Total Metals	Tin (Sn)-Total (ug/L)	<0.10	<0.10	<0.10		
	Titanium (Ti)-Total (ug/L)	<10	<10	<10		
	Uranium (U)-Total (ug/L)	0.011	0.011	0.011		
	Vanadium (V)-Total (ug/L)	<1.0	<1.0	<1.0		
	Zinc (Zn)-Total (ug/L)	6.0	5.3	7.7		
Dissolved Metals	Dissolved Mercury Filtration Location	LAB	LAB	LAB		
	Dissolved Metals Filtration Location	LAB	LAB	LAB		
	Aluminum (Al)-Dissolved (ug/L)	8.7	9.7	10.4		
	Antimony (Sb)-Dissolved (ug/L)	<0.10	<0.10	<0.10		
	Arsenic (As)-Dissolved (ug/L)	0.20	0.20	0.21		
	Barium (Ba)-Dissolved (ug/L)	4.64	4.56	5.15		
	Beryllium (Be)-Dissolved (ug/L)	<0.10	<0.10	<0.10		
	Bismuth (Bi)-Dissolved (ug/L)	<0.50	<0.50	<0.50		
	Boron (B)-Dissolved (ug/L)	<10	<10	<10		
	Cadmium (Cd)-Dissolved (ug/L)	0.017	0.016	0.019		
	Calcium (Ca)-Dissolved (ug/L)	10500	10800	11800		
	Chromium (Cr)-Dissolved (ug/L)	<0.10	<0.10	<0.10		
	Cobalt (Co)-Dissolved (ug/L)	<0.10	<0.10	<0.10		
	Copper (Cu)-Dissolved (ug/L)	0.48	0.48	0.56		
	Iron (Fe)-Dissolved (ug/L)	<10	<10	<10		
	Lead (Pb)-Dissolved (ug/L)	<0.050	<0.050	<0.050		
	Lithium (Li)-Dissolved (ug/L)	<0.50	<0.50	<0.50		
	Magnesium (Mg)-Dissolved (ug/L)	860	890	940		
	Manganese (Mn)-Dissolved (ug/L)	0.164	0.103	<0.050		
	Mercury (Hg)-Dissolved (ug/L)	<0.010	<0.010	<0.010		
	Molybdenum (Mo)-Dissolved (ug/L)	0.291	0.297	0.390		
	Nickel (Ni)-Dissolved (ug/L)	<0.50	<0.50	<0.50		
	Phosphorus (P)-Dissolved (ug/L)	<50	<50	<50		
	Potassium (K)-Dissolved (ug/L)	150	120	170		
	Selenium (Se)-Dissolved (ug/L)	0.13	0.11	0.11		
	Silicon (Si)-Dissolved (ug/L)	1210	1250	1280		
	Silver (Ag)-Dissolved (ug/L)	<0.010	<0.010	<0.010		
	Sodium (Na)-Dissolved (ug/L)	1050	1030	1280		
	Strontium (Sr)-Dissolved (ug/L)	16.4	16.7	19.2		
	Sulfur (S)-Dissolved (ug/L)	2210	2290	3220		
	Thallium (Tl)-Dissolved (ug/L)	<0.010	<0.010	<0.010		
	Tin (Sn)-Dissolved (ug/L)	<0.10	<0.10	<0.10		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1514222-1	L1514222-2	L1514222-3		
	Description	WATER	WATER	WATER		
	Sampled Date	06-SEP-14	06-SEP-14	06-SEP-14		
	Sampled Time	18:50	18:53	18:56		
	Client ID	SITE 2 ~ 200M FROM MYRA FALLS 0.5M	SITE 2 ~ 200M FROM MYRA FALLS 5.0M	SITE 2 ~ 200M FROM MYRA FALLS 10.0M		
Grouping	**Analyte**					
WATER						
Dissolved Metals	Titanium (Ti)-Dissolved (ug/L)	<10	<10	<10		
	Uranium (U)-Dissolved (ug/L)	0.011	0.010	0.010		
	Vanadium (V)-Dissolved (ug/L)	<1.0	<1.0	<1.0		
	Zinc (Zn)-Dissolved (ug/L)	<5.0 DLB	<6.0 DLB	<7.0 DLB		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Zinc (Zn)-Dissolved	MB-LOR	L1514222-1, -2, -3
Matrix Spike	Sulfate (SO4)	MS-B	L1514222-1, -2, -3
Matrix Spike	Total Organic Carbon	MS-B	L1514222-1, -2, -3
Matrix Spike	Dissolved Organic Carbon	MS-B	L1514222-1, -2, -3

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLB	Detection Limit was raised due to detection of analyte at comparable level in Method Blank.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-DIS-LOW-CVAFS-VA	Water	Dissolved Mercury in Water by CVAFS(Low)	EPA SW-846 3005A & EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

HG-TOT-LOW-CVAFS-VA	Water	Total Mercury in Water by CVAFS(Low)	EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

MET-DIS-LOW-ICP-VA	Water	Dissolved Metals in Water by ICPOES	EPA 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United

Reference Information

States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

MET-TOT-LOW-ICP-VA Water Total Metals in Water by ICPOES EPA 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H "pH Value"

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

S-DIS-ICP-VA Water Dissolved Sulfur in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

S-TOT-ICP-VA Water Total Sulfur in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

SO4-TUR-VA Water Sulfate(SO4) by Turbidity APHA 4500-SO4 E. SULFATE

This analysis is carried out using procedures adapted from APHA Method 4500-SO4 "Sulfate". Sulfate is determined using the turbidimetric method.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 "Turbidity"

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

50212393

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1514222 Report Date: 10-SEP-14

Client: BC MINISTRY OF ENVIRONMENT
Section Head, Provincial Water Quality 2080A Labieux Road
Nanaimo BC V9T 6J9
Contact: Deborah Epps

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-COL-VA	Water							
Batch R2941773								
WG1947162-2 CRM		**VA-ALKL-CONTROL**						
Alkalinity, Total (as CaCO3)			97.4		%		85-115	09-SEP-14
WG1947162-5 CRM		**VA-ALKM-CONTROL**						
Alkalinity, Total (as CaCO3)			103.7		%		85-115	09-SEP-14
WG1947162-8 CRM		**VA-ALKH-CONTROL**						
Alkalinity, Total (as CaCO3)			100.8		%		85-115	09-SEP-14
WG1947162-6 DUP		**L1514222-1**						
Alkalinity, Total (as CaCO3)		25.2	25.5		mg/L	1.1	20	09-SEP-14
WG1947162-1 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
WG1947162-10 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
WG1947162-4 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
WG1947162-7 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
CARBONS-DOC-VA	Water							
Batch R2943332								
WG1947341-12 LCS								
Dissolved Organic Carbon			103.6		%		80-120	09-SEP-14
WG1947341-16 LCS								
Dissolved Organic Carbon			109.1		%		80-120	09-SEP-14
WG1947341-4 LCS								
Dissolved Organic Carbon			101.8		%		80-120	09-SEP-14
WG1947341-8 LCS								
Dissolved Organic Carbon			105.9		%		80-120	09-SEP-14
WG1947341-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-15 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-10 MS		**L1513619-2**						
Dissolved Organic Carbon			100.6		%		70-130	09-SEP-14
WG1947341-14 MS		**L1513418-11**						
Dissolved Organic Carbon			N/A	MS-B	%		-	09-SEP-14
WG1947341-2 MS		**L1514231-1**						

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	Water							
Batch R2943332								
WG1947341-2 MS		**L1514231-1**						
Dissolved Organic Carbon			104.6		%		70-130	09-SEP-14
WG1947341-6 MS		**L1514251-1**						
Dissolved Organic Carbon			106.5		%		70-130	09-SEP-14
CARBONS-TOC-VA	Water							
Batch R2943331								
WG1947339-1 LCS								
Total Organic Carbon			100.0		%		80-120	09-SEP-14
WG1947339-13 LCS								
Total Organic Carbon			99.6		%		80-120	09-SEP-14
WG1947339-17 LCS								
Total Organic Carbon			101.1		%		80-120	09-SEP-14
WG1947339-5 LCS								
Total Organic Carbon			102.0		%		80-120	09-SEP-14
WG1947339-9 LCS								
Total Organic Carbon			99.95		%		80-120	09-SEP-14
WG1947339-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-16 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-15 MS		**L1513418-11**						
Total Organic Carbon			N/A	MS-B	%		-	09-SEP-14
WG1947339-3 MS		**L1514231-1**						
Total Organic Carbon			103.0		%		70-130	09-SEP-14
WG1947339-7 MS		**L1514251-1**						
Total Organic Carbon			102.5		%		70-130	09-SEP-14
HG-DIS-LOW-CVAFS-VA	Water							
Batch R2942725								
WG1947233-3 LCS								
Mercury (Hg)-Dissolved			89.2		%		80-120	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-DIS-LOW-CVAFS-VA	Water							
Batch R2943546								
WG1947233-1 MB								
Mercury (Hg)-Dissolved			<0.000010		mg/L		0.00001	10-SEP-14
HG-TOT-LOW-CVAFS-VA	Water							
Batch R2942725								
WG1947862-2 LCS								
Mercury (Hg)-Total			95.9		%		80-120	09-SEP-14
WG1947862-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	09-SEP-14
WG1947862-3 MS		**L1514076-1**						
Mercury (Hg)-Total			89.1		%		70-130	09-SEP-14
WG1947862-4 MS		**L1514076-3**						
Mercury (Hg)-Total			94.6		%		70-130	09-SEP-14
MET-D-CCMS-VA	Water							
Batch R2942770								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Aluminum (Al)-Dissolved			102.1		%		80-120	09-SEP-14
Antimony (Sb)-Dissolved			97.3		%		80-120	09-SEP-14
Arsenic (As)-Dissolved			97.4		%		80-120	09-SEP-14
Barium (Ba)-Dissolved			98.6		%		80-120	09-SEP-14
Beryllium (Be)-Dissolved			97.7		%		80-120	09-SEP-14
Bismuth (Bi)-Dissolved			97.7		%		80-120	09-SEP-14
Boron (B)-Dissolved			85.5		%		80-120	09-SEP-14
Cadmium (Cd)-Dissolved			96.8		%		80-120	09-SEP-14
Chromium (Cr)-Dissolved			96.9		%		80-120	09-SEP-14
Cobalt (Co)-Dissolved			96.3		%		80-120	09-SEP-14
Copper (Cu)-Dissolved			95.4		%		80-120	09-SEP-14
Lead (Pb)-Dissolved			96.9		%		80-120	09-SEP-14
Lithium (Li)-Dissolved			99.2		%		80-120	09-SEP-14
Manganese (Mn)-Dissolved			99.6		%		80-120	09-SEP-14
Molybdenum (Mo)-Dissolved			98.5		%		80-120	09-SEP-14
Nickel (Ni)-Dissolved			98.2		%		80-120	09-SEP-14
Selenium (Se)-Dissolved			98.9		%		80-120	09-SEP-14
Silver (Ag)-Dissolved			98.9		%		80-120	09-SEP-14
Sodium (Na)-Dissolved			97.2		%		80-120	09-SEP-14
Strontium (Sr)-Dissolved			99.1		%		80-120	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	Water							
Batch R2942770								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Thallium (Tl)-Dissolved			98.2		%		80-120	09-SEP-14
Tin (Sn)-Dissolved			97.1		%		80-120	09-SEP-14
Titanium (Ti)-Dissolved			99.4		%		80-120	09-SEP-14
Uranium (U)-Dissolved			99.5		%		80-120	09-SEP-14
Vanadium (V)-Dissolved			97.4		%		80-120	09-SEP-14
Zinc (Zn)-Dissolved			95.8		%		80-120	09-SEP-14
WG1947233-1 MB								
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	09-SEP-14
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Bismuth (Bi)-Dissolved			<0.00050		mg/L		0.0005	09-SEP-14
Boron (B)-Dissolved			<0.010		mg/L		0.01	09-SEP-14
Cadmium (Cd)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	09-SEP-14
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Lithium (Li)-Dissolved			<0.00050		mg/L		0.0005	09-SEP-14
Manganese (Mn)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	09-SEP-14
Selenium (Se)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	09-SEP-14
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Titanium (Ti)-Dissolved			<0.010		mg/L		0.01	09-SEP-14
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Vanadium (V)-Dissolved			<0.0010		mg/L		0.001	09-SEP-14
Zinc (Zn)-Dissolved			0.0024	MB-LOR	mg/L		0.001	09-SEP-14
MET-DIS-LOW-ICP-VA	Water							

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-LOW-ICP-VA	Water							
Batch R2942645								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Calcium (Ca)-Dissolved			101.0		%		80-120	09-SEP-14
Iron (Fe)-Dissolved			95.0		%		80-120	09-SEP-14
Magnesium (Mg)-Dissolved			100.6		%		80-120	09-SEP-14
Phosphorus (P)-Dissolved			99.6		%		80-120	09-SEP-14
Potassium (K)-Dissolved			97.4		%		80-120	09-SEP-14
Silicon (Si)-Dissolved			98.5		%		80-120	09-SEP-14
WG1947233-1 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	09-SEP-14
Magnesium (Mg)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Potassium (K)-Dissolved			<0.10		mg/L		0.1	09-SEP-14
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
MET-T-CCMS-VA	Water							
Batch R2942770								
WG1947258-3 CRM		**VA-HIGH-WATRM**						
Aluminum (Al)-Total			101.1		%		80-120	09-SEP-14
Antimony (Sb)-Total			97.5		%		80-120	09-SEP-14
Arsenic (As)-Total			99.4		%		80-120	09-SEP-14
Barium (Ba)-Total			100.1		%		80-120	09-SEP-14
Beryllium (Be)-Total			97.0		%		80-120	09-SEP-14
Bismuth (Bi)-Total			96.9		%		80-120	09-SEP-14
Boron (B)-Total			83.9		%		80-120	09-SEP-14
Cadmium (Cd)-Total			98.7		%		80-120	09-SEP-14
Chromium (Cr)-Total			99.3		%		80-120	09-SEP-14
Cobalt (Co)-Total			98.5		%		80-120	09-SEP-14
Copper (Cu)-Total			96.3		%		80-120	09-SEP-14
Lead (Pb)-Total			96.6		%		80-120	09-SEP-14
Lithium (Li)-Total			96.9		%		80-120	09-SEP-14
Manganese (Mn)-Total			101.1		%		80-120	09-SEP-14
Molybdenum (Mo)-Total			99.1		%		80-120	09-SEP-14
Nickel (Ni)-Total			99.8		%		80-120	09-SEP-14
Selenium (Se)-Total			99.6		%		80-120	09-SEP-14
Silver (Ag)-Total			95.4		%		80-120	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	Water							
Batch R2942770								
WG1947258-3 CRM		**VA-HIGH-WATRM**						
Sodium (Na)-Total			98.7		%		80-120	09-SEP-14
Strontium (Sr)-Total			100.3		%		80-120	09-SEP-14
Thallium (Tl)-Total			97.8		%		80-120	09-SEP-14
Tin (Sn)-Total			97.7		%		80-120	09-SEP-14
Titanium (Ti)-Total			91.4		%		80-120	09-SEP-14
Uranium (U)-Total			98.5		%		80-120	09-SEP-14
Vanadium (V)-Total			99.8		%		80-120	09-SEP-14
Zinc (Zn)-Total			96.6		%		80-120	09-SEP-14
WG1947258-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	09-SEP-14
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Arsenic (As)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Barium (Ba)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Bismuth (Bi)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Boron (B)-Total			<0.010		mg/L		0.01	09-SEP-14
Cadmium (Cd)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Copper (Cu)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Lead (Pb)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Lithium (Li)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Manganese (Mn)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Selenium (Se)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Silver (Ag)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Sodium (Na)-Total			<0.050		mg/L		0.05	09-SEP-14
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	09-SEP-14
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Tin (Sn)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Titanium (Ti)-Total			<0.010		mg/L		0.01	09-SEP-14
Uranium (U)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Vanadium (V)-Total			<0.0010		mg/L		0.001	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	Water							
Batch R2942770								
WG1947258-1 MB								
Zinc (Zn)-Total			<0.0030		mg/L		0.003	09-SEP-14
MET-TOT-LOW-ICP-VA	Water							
Batch R2942851								
WG1947258-3 CRM		**VA-HIGH-WATRM**						
Calcium (Ca)-Total			98.5		%		80-120	09-SEP-14
Iron (Fe)-Total			95.5		%		80-120	09-SEP-14
Magnesium (Mg)-Total			101.0		%		80-120	09-SEP-14
Phosphorus (P)-Total			97.8		%		80-120	09-SEP-14
Potassium (K)-Total			96.6		%		80-120	09-SEP-14
Silicon (Si)-Total			96.1		%		80-120	09-SEP-14
WG1947258-1 MB								
Calcium (Ca)-Total			<0.050		mg/L		0.05	09-SEP-14
Iron (Fe)-Total			<0.010		mg/L		0.01	09-SEP-14
Magnesium (Mg)-Total			<0.050		mg/L		0.05	09-SEP-14
Phosphorus (P)-Total			<0.050		mg/L		0.05	09-SEP-14
Potassium (K)-Total			<0.10		mg/L		0.1	09-SEP-14
Silicon (Si)-Total			<0.050		mg/L		0.05	09-SEP-14
PH-PCT-VA	Water							
Batch R2943649								
WG1947450-25 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	09-SEP-14
WG1947450-26 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-27 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	09-SEP-14
WG1947450-28 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-29 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-30 CRM		**VA-PH7-BUF**						
pH			6.99		pH		6.9-7.1	09-SEP-14
WG1947450-31 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-32 CRM		**VA-PH7-BUF**						
pH			7.03		pH		6.9-7.1	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
S-DIS-ICP-VA	Water							
Batch R2942645								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Sulfur (S)-Dissolved			101.7		%		80-120	09-SEP-14
WG1947233-1 MB								
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	09-SEP-14
S-TOT-ICP-VA	Water							
Batch R2942851								
WG1947258-3 CRM		**VA-HIGH-WATRM**						
Sulfur (S)-Total			101.6		%		80-120	09-SEP-14
WG1947258-1 MB								
Sulfur (S)-Total			<0.50		mg/L		0.5	09-SEP-14
SO4-TUR-VA	Water							
Batch R2943291								
WG1948014-2 CRM		**VA-SO4-L-CONTROL**						
Sulfate (SO4)			98.4		%		85-115	10-SEP-14
WG1948014-6 CRM		**VA-SO4-H-CONTROL**						
Sulfate (SO4)			102.8		%		85-115	10-SEP-14
WG1948014-1 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	10-SEP-14
WG1948014-5 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	10-SEP-14
WG1948014-4 MS		**L1512411-2**						
Sulfate (SO4)			92.1		%		75-125	10-SEP-14
WG1948014-8 MS		**L1510555-1**						
Sulfate (SO4)			N/A	MS-B	%		-	10-SEP-14
TURBIDITY-VA	Water							
Batch R2941561								
WG1947074-2 CRM		**VA-FORM-40**						
Turbidity			101.8		%		85-115	08-SEP-14
WG1947074-3 DUP		**L1514222-1**						
Turbidity		0.28	0.27		NTU	2.9	15	08-SEP-14
WG1947074-1 MB								
Turbidity			<0.10		NTU		0.1	08-SEP-14

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH by Meter (Automated)							
	1	06-SEP-14 18:50	09-SEP-14 23:00	0.25	76	hours	EHTR-FM
	2	06-SEP-14 18:53	09-SEP-14 23:00	0.25	76	hours	EHTR-FM
	3	06-SEP-14 18:56	09-SEP-14 23:00	0.25	76	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1514222 were received on 07-SEP-14 09:30.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

WATER & GENERAL CHEMISTRY REQUISITION

Province Of British Columbia

Ministry of Environment

Maxxam Analytics Inc.
4606 Canada Way
Burnaby, BC V5G1K5

Req # 50212393

L1514222-COFC

Urgent?	Csr No.	Office 10	Client CA
Study		Project N/A	
Lab	Maxxam Analytics Inc.		
Ministry Contact	NCOBEE Nicole Obee		
Sampler	Nicole Obee		
Signature			
EMS Id		Well Plate #	
Location	Site 2 ~200m from Myra Falls		

Sampling Agency

Code 10	Name Vancouver Island, Nanaimo
Address	2080-A Labieux Road
City	Nanaimo
Postal Code	V9T6J9 Phone (250)751-3100

Number of Containers

Instructions To Lab: Pls include total and dissolved mercury at ICPMS level

State FW Descriptor GE Collection Method GRB

No.	Class	Collection Start YYYY-MM-DD HH:MI	Collection End YYYY-MM-DD HH:MI	Depth Upper	Depth Lower	Tide
1	REG	2014-09-06	2014-09-06 1850h	0.5		
2	REG	"	" 1853h	5.0		
3	REG	"	" 1856h	10.0		
4						
5						
6						

P **RUSH**

Priority processing

GENERAL (1L)		Med'm		Pres'n	
	Acidity pH 4.5				
	Acidity pH 8.3				
	Alk. Titration Curve				
	Alkalinity: Phen.				
X	Alkalinity: Total: pH 4.5				
	Colour: S.W.				
	Colour: TAC				
	Colour: True				
X	pH				
	Residue: Filterable: 0.45µm (TDS)				
	Residue: Nonfilt., fixed (TSS: fixed)				
	Residue: Nonfilterable (TSS)				
	Residue: Total				
	Residue: Total, Fixed				
	Specific Conductance				
X	Turbidity				

GENERAL (120 mL)		Med'm		Pres'n	
	Anion Package (Cl,Br,SO4)				
	Chloride				
	Fluoride				
	Nit.: Nitrate and Nitrite (Col'm)				
	Nitrogen: Nitrate (Col'm)				
	Nitrogen: Nitrite (Col'm)				
	Silica: Reactive				
X	Sulfate				

GENERAL IONS (120 mL)		Med'm	55	Pres'n	64
	Nitrogen: Ammonia (Col'm)				
	Nitrogen: Organic				
	Nitrogen: Tot. Kjeldahl (Calc)				
	Nitrogen: Total				

PHOSPHORUS (120 mL)		Med'm		Pres'n	
	Phos. Diss. O-phosphate (Col'm)				
	Phosphorus: Tot. Diss. (Col'm)				
	Phosphorus: Total (Col'm)				

METALS (TOTAL)		Med'm	Pres'n	Med'm	Pres'n
High	Low	55	02		
	Metal Pkg. (ICP)				
X	Metal Pkg. (ICPMS)				
X	Hardness				
X	Mercury				
	Sediment, Sieve to < 63µ				

METALS (DISSOLVED; 0.45 MICROMETERS)		Med'm	Pres'n	Med'm	Pres'n
High	Low	55	62		
	Metal Pkg. (ICP)				
X	Metal Pkg. (ICPMS)				
X	Hardness				
X	Mercury				

SPECIFIC Test		Med'm	Pres'n	Med'm	Pres'n
	Biochemical Oxygen D.	02	01		
	Carb. Biochem. Oxygen D.	02	01		
	Carbon: DIC				
X	Carbon: DOC				
	Carbon: TIC				
X	Carbon: TOC				
	Chemical Oxygen D.	04	05		
	Chlorophyll "a"				
	Cyanide: SAD + SCN	02	24		
	Cyanide: WAD	02	24		
	Phaeophytin				
	Residue:NFR Whole Bottle	03	01		
	SWEP (Extraction Prep.)				
	Sulphide: Total	03	08		

ORGANICS		Med'm	Pres'n
	AOX		
	Acid Extr. Herb.-Scan		
	BTEX		
	EPH		
	Glyphosate / AMPA		
	Oil and Grease: Gravimetric		
	Organochlorine P.-scan		
	Organophosphorus P.-scan		
	PAH		
	Penta/Tetra Cl-phenols		
	Phenols (GC/MS)		
	Phenols: Colorimetric		
	Polychlor. Biphenyls		
	Resin Acids		
	Trihalomethanes (THM)		

OTHER		Med'm	Pres'n	Test
				Total and dissolved mercury at ICPMS level

FIELD TEST DETAILS	No.	Parameter	Method	Results	Units

Report ID: EMSR0900

Date: 2014-09-06 11:47

Rec by Paul
Sep 7 9:30 2C

BC MINISTRY OF ENVIRONMENT
ATTN: Deborah Epps
Section Head, Provincial Water Quality
2080A Labieux Road
Nanaimo BC V9T 6J9

Date Received: 07-SEP-14
Report Date: 10-SEP-14 17:56 (MT)
Version: FINAL

Client Phone: 604-793-8770

Certificate of Analysis

Lab Work Order #: L1514231

Project P.O. #: NOT SUBMITTED
Job Reference: SITE 3 ~ 200M FROM MYRA FALLS
C of C Numbers: 50212394
Legal Site Desc:

Dean Watt
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1514231-1 WATER 06-SEP-14 19:10 SITE 3 ~ 200M FROM MYRA FALLS 0.5M	L1514231-2 WATER 06-SEP-14 19:13 SITE 3 ~ 200M FROM MYRA FALLS 5.0M	L1514231-3 WATER 06-SEP-14 19:16 SITE 3 ~ 200M FROM MYRA FALLS 10.0M	L1514231-4 WATER 06-SEP-14 19:16 SITE 3 ~ 200M FROM MYRA FALLS DUP	
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	31.2	31.7	33.7		
	pH (pH)	7.76	7.77	7.76		
	Turbidity (NTU)	0.16	0.26	0.15		
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	25.4	25.5	25.8		
	Sulfate (SO4) (mg/L)	5.97	16.6	7.07		
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.62	0.71	0.72		
	Total Organic Carbon (mg/L)	0.73	0.60	0.63		
Total Metals	Aluminum (Al)-Total (ug/L)	11.8	14.5	13.0		
	Antimony (Sb)-Total (ug/L)	<0.10	<0.10	<0.10		
	Arsenic (As)-Total (ug/L)	0.21	0.22	0.22		
	Barium (Ba)-Total (ug/L)	4.65	5.02	4.87		
	Beryllium (Be)-Total (ug/L)	<0.10	<0.10	<0.10		
	Bismuth (Bi)-Total (ug/L)	<0.50	<0.50	<0.50		
	Boron (B)-Total (ug/L)	<10	<10	<10		
	Cadmium (Cd)-Total (ug/L)	0.019	0.025	0.022		
	Calcium (Ca)-Total (ug/L)	11000	11500	11800		
	Chromium (Cr)-Total (ug/L)	<0.10	0.11	0.11		
	Cobalt (Co)-Total (ug/L)	<0.10	<0.10	<0.10		
	Copper (Cu)-Total (ug/L)	0.67	0.70	1.02		
	Iron (Fe)-Total (ug/L)	<10	13	16		
	Lead (Pb)-Total (ug/L)	<0.050	<0.050	<0.050		
	Lithium (Li)-Total (ug/L)	<0.50	<0.50	<0.50		
	Magnesium (Mg)-Total (ug/L)	930	970	980		
	Manganese (Mn)-Total (ug/L)	1.49	2.60	3.62		
	Mercury (Hg)-Total (ug/L)	<0.010	<0.010	<0.010		
	Molybdenum (Mo)-Total (ug/L)	0.297	0.325	0.335		
	Nickel (Ni)-Total (ug/L)	<0.50	<0.50	<0.50		
	Phosphorus (P)-Total (ug/L)	<50	<50	<50		
	Potassium (K)-Total (ug/L)	130	140	180		
	Selenium (Se)-Total (ug/L)	0.12	0.13	0.12		
	Silicon (Si)-Total (ug/L)	1310	1330	1330		
	Silver (Ag)-Total (ug/L)	<0.010	<0.010	<0.010		
	Sodium (Na)-Total (ug/L)	1010	1100	1120		
	Strontium (Sr)-Total (ug/L)	17.0	18.1	18.1		
	Sulfur (S)-Total (ug/L)	2200	2550	2700		
	Thallium (Tl)-Total (ug/L)	<0.010	<0.010	<0.010		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1514231-1 WATER 06-SEP-14 19:10 SITE 3 ~ 200M FROM MYRA FALLS 0.5M	L1514231-2 WATER 06-SEP-14 19:13 SITE 3 ~ 200M FROM MYRA FALLS 5.0M	L1514231-3 WATER 06-SEP-14 19:16 SITE 3 ~ 200M FROM MYRA FALLS 10.0M	L1514231-4 WATER 06-SEP-14 19:16 SITE 3 ~ 200M FROM MYRA FALLS DUP	
WATER						
Total Metals	Tin (Sn)-Total (ug/L)	<0.10	<0.10	<0.10		
	Titanium (Ti)-Total (ug/L)	<10	<10	<10		
	Uranium (U)-Total (ug/L)	0.012	0.013	0.011		
	Vanadium (V)-Total (ug/L)	<1.0	<1.0	<1.0		
	Zinc (Zn)-Total (ug/L)	4.8	6.4	5.8		
Dissolved Metals	Dissolved Mercury Filtration Location	LAB	LAB	LAB	LAB	
	Dissolved Metals Filtration Location	LAB	LAB	LAB	LAB	
	Aluminum (Al)-Dissolved (ug/L)	10.8	10.1	9.9	9.9	
	Antimony (Sb)-Dissolved (ug/L)	<0.10	<0.10	<0.10	<0.10	
	Arsenic (As)-Dissolved (ug/L)	0.18	0.19	0.20	0.18	
	Barium (Ba)-Dissolved (ug/L)	4.60	4.86	4.86	4.82	
	Beryllium (Be)-Dissolved (ug/L)	<0.10	<0.10	<0.10	<0.10	
	Bismuth (Bi)-Dissolved (ug/L)	<0.50	<0.50	<0.50	<0.50	
	Boron (B)-Dissolved (ug/L)	<10	<10	<10	<10	
	Cadmium (Cd)-Dissolved (ug/L)	0.016	0.016	0.016	0.015	
	Calcium (Ca)-Dissolved (ug/L)	11000	11200	11900	11900	
	Chromium (Cr)-Dissolved (ug/L)	<0.10	<0.10	<0.10	<0.10	
	Cobalt (Co)-Dissolved (ug/L)	<0.10	<0.10	<0.10	<0.10	
	Copper (Cu)-Dissolved (ug/L)	0.42	0.49	0.49	0.46	
	Iron (Fe)-Dissolved (ug/L)	<10	<10	<10	<10	
	Lead (Pb)-Dissolved (ug/L)	<0.050	<0.050	<0.050	<0.050	
	Lithium (Li)-Dissolved (ug/L)	<0.50	<0.50	<0.50	<0.50	
	Magnesium (Mg)-Dissolved (ug/L)	920	930	990	990	
	Manganese (Mn)-Dissolved (ug/L)	0.091	0.056	<0.050	<0.050	
	Mercury (Hg)-Dissolved (ug/L)	<0.010	<0.010	<0.010	<0.010	
	Molybdenum (Mo)-Dissolved (ug/L)	0.281	0.324	0.328	0.350	
	Nickel (Ni)-Dissolved (ug/L)	<0.50	<0.50	<0.50	<0.50	
	Phosphorus (P)-Dissolved (ug/L)	<50	<50	<50	<50	
	Potassium (K)-Dissolved (ug/L)	130	150	180	160	
	Selenium (Se)-Dissolved (ug/L)	0.14	0.12	0.10	0.11	
	Silicon (Si)-Dissolved (ug/L)	1290	1280	1340	1350	
	Silver (Ag)-Dissolved (ug/L)	<0.010	<0.010	<0.010	<0.010	
	Sodium (Na)-Dissolved (ug/L)	991	1070	1120	1110	
	Strontium (Sr)-Dissolved (ug/L)	16.4	17.3	17.7	17.8	
	Sulfur (S)-Dissolved (ug/L)	2270	2510	2680	2640	
	Thallium (Tl)-Dissolved (ug/L)	<0.010	<0.010	<0.010	<0.010	
	Tin (Sn)-Dissolved (ug/L)	<0.10	<0.10	<0.10	<0.10	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1514231-1	L1514231-2	L1514231-3	L1514231-4	
	Description	WATER	WATER	WATER	WATER	
	Sampled Date	06-SEP-14	06-SEP-14	06-SEP-14	06-SEP-14	
	Sampled Time	19:10	19:13	19:16	19:16	
	Client ID	SITE 3 ~ 200M FROM MYRA FALLS 0.5M	SITE 3 ~ 200M FROM MYRA FALLS 5.0M	SITE 3 ~ 200M FROM MYRA FALLS 10.0M	SITE 3 ~ 200M FROM MYRA FALLS DUP	
Grouping	**Analyte**					
WATER						
Dissolved Metals	Titanium (Ti)-Dissolved (ug/L)	<10	<10	<10	<10	
	Uranium (U)-Dissolved (ug/L)	0.011	0.011	0.011	0.011	
	Vanadium (V)-Dissolved (ug/L)	<1.0	<1.0	<1.0	<1.0	
	Zinc (Zn)-Dissolved (ug/L)	<5.0 DLB	<6.0 DLB	<6.0 DLB	<6.0 DLB	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Zinc (Zn)-Dissolved	MB-LOR	L1514231-1, -2, -3, -4
Matrix Spike	Sulfate (SO4)	MS-B	L1514231-1, -2, -3
Matrix Spike	Total Organic Carbon	MS-B	L1514231-1, -2, -3
Matrix Spike	Dissolved Organic Carbon	MS-B	L1514231-1, -2, -3

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLB	Detection Limit was raised due to detection of analyte at comparable level in Method Blank.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-DIS-LOW-CVAFS-VA	Water	Dissolved Mercury in Water by CVAFS(Low)	EPA SW-846 3005A & EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

HG-TOT-LOW-CVAFS-VA	Water	Total Mercury in Water by CVAFS(Low)	EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

MET-DIS-LOW-ICP-VA	Water	Dissolved Metals in Water by ICPOES	EPA 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United

Reference Information

States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

MET-TOT-LOW-ICP-VA Water Total Metals in Water by ICPOES EPA 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H "pH Value"

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

S-DIS-ICP-VA Water Dissolved Sulfur in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

S-TOT-ICP-VA Water Total Sulfur in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

SO4-TUR-VA Water Sulfate(SO4) by Turbidity APHA 4500-SO4 E. SULFATE

This analysis is carried out using procedures adapted from APHA Method 4500-SO4 "Sulfate". Sulfate is determined using the turbidimetric method.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 "Turbidity"

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

50212394

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1514231 Report Date: 10-SEP-14

Client: BC MINISTRY OF ENVIRONMENT
Section Head, Provincial Water Quality 2080A Labieux Road
Nanaimo BC V9T 6J9
Contact: Deborah Epps

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-COL-VA	Water							
Batch R2941773								
WG1947162-2 CRM		**VA-ALKL-CONTROL**						
Alkalinity, Total (as CaCO3)			97.4		%		85-115	09-SEP-14
WG1947162-5 CRM		**VA-ALKM-CONTROL**						
Alkalinity, Total (as CaCO3)			103.7		%		85-115	09-SEP-14
WG1947162-8 CRM		**VA-ALKH-CONTROL**						
Alkalinity, Total (as CaCO3)			100.8		%		85-115	09-SEP-14
WG1947162-1 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
WG1947162-10 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
WG1947162-4 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
WG1947162-7 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
CARBONS-DOC-VA	Water							
Batch R2943332								
WG1947341-12 LCS								
Dissolved Organic Carbon			103.6		%		80-120	09-SEP-14
WG1947341-16 LCS								
Dissolved Organic Carbon			109.1		%		80-120	09-SEP-14
WG1947341-4 LCS								
Dissolved Organic Carbon			101.8		%		80-120	09-SEP-14
WG1947341-8 LCS								
Dissolved Organic Carbon			105.9		%		80-120	09-SEP-14
WG1947341-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-15 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-10 MS		**L1513619-2**						
Dissolved Organic Carbon			100.6		%		70-130	09-SEP-14
WG1947341-14 MS		**L1513418-11**						
Dissolved Organic Carbon			N/A	MS-B	%		-	09-SEP-14
WG1947341-2 MS		**L1514231-1**						
Dissolved Organic Carbon			104.6		%		70-130	09-SEP-14
WG1947341-6 MS		**L1514251-1**						

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	Water							
Batch R2943332								
WG1947341-6 MS		**L1514251-1**						
Dissolved Organic Carbon			106.5		%		70-130	09-SEP-14
CARBONS-TOC-VA	Water							
Batch R2943331								
WG1947339-1 LCS								
Total Organic Carbon			100.0		%		80-120	09-SEP-14
WG1947339-13 LCS								
Total Organic Carbon			99.6		%		80-120	09-SEP-14
WG1947339-17 LCS								
Total Organic Carbon			101.1		%		80-120	09-SEP-14
WG1947339-5 LCS								
Total Organic Carbon			102.0		%		80-120	09-SEP-14
WG1947339-9 LCS								
Total Organic Carbon			99.95		%		80-120	09-SEP-14
WG1947339-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-16 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-15 MS		**L1513418-11**						
Total Organic Carbon			N/A	MS-B	%		-	09-SEP-14
WG1947339-3 MS		**L1514231-1**						
Total Organic Carbon			103.0		%		70-130	09-SEP-14
WG1947339-7 MS		**L1514251-1**						
Total Organic Carbon			102.5		%		70-130	09-SEP-14
HG-DIS-LOW-CVAFS-VA	Water							
Batch R2942725								
WG1947233-3 LCS								
Mercury (Hg)-Dissolved			89.2		%		80-120	09-SEP-14
Batch R2943546								
WG1947233-1 MB								
Mercury (Hg)-Dissolved			<0.000010		mg/L		0.00001	10-SEP-14

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-TOT-LOW-CVAFS-VA	Water							
Batch R2942725								
WG1947862-2 LCS								
Mercury (Hg)-Total			95.9		%		80-120	09-SEP-14
WG1947862-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	09-SEP-14
WG1947862-3 MS		**L1514076-1**						
Mercury (Hg)-Total			89.1		%		70-130	09-SEP-14
WG1947862-4 MS		**L1514076-3**						
Mercury (Hg)-Total			94.6		%		70-130	09-SEP-14
MET-D-CCMS-VA	Water							
Batch R2942770								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Aluminum (Al)-Dissolved			102.1		%		80-120	09-SEP-14
Antimony (Sb)-Dissolved			97.3		%		80-120	09-SEP-14
Arsenic (As)-Dissolved			97.4		%		80-120	09-SEP-14
Barium (Ba)-Dissolved			98.6		%		80-120	09-SEP-14
Beryllium (Be)-Dissolved			97.7		%		80-120	09-SEP-14
Bismuth (Bi)-Dissolved			97.7		%		80-120	09-SEP-14
Boron (B)-Dissolved			85.5		%		80-120	09-SEP-14
Cadmium (Cd)-Dissolved			96.8		%		80-120	09-SEP-14
Chromium (Cr)-Dissolved			96.9		%		80-120	09-SEP-14
Cobalt (Co)-Dissolved			96.3		%		80-120	09-SEP-14
Copper (Cu)-Dissolved			95.4		%		80-120	09-SEP-14
Lead (Pb)-Dissolved			96.9		%		80-120	09-SEP-14
Lithium (Li)-Dissolved			99.2		%		80-120	09-SEP-14
Manganese (Mn)-Dissolved			99.6		%		80-120	09-SEP-14
Molybdenum (Mo)-Dissolved			98.5		%		80-120	09-SEP-14
Nickel (Ni)-Dissolved			98.2		%		80-120	09-SEP-14
Selenium (Se)-Dissolved			98.9		%		80-120	09-SEP-14
Silver (Ag)-Dissolved			98.9		%		80-120	09-SEP-14
Sodium (Na)-Dissolved			97.2		%		80-120	09-SEP-14
Strontium (Sr)-Dissolved			99.1		%		80-120	09-SEP-14
Thallium (Tl)-Dissolved			98.2		%		80-120	09-SEP-14
Tin (Sn)-Dissolved			97.1		%		80-120	09-SEP-14
Titanium (Ti)-Dissolved			99.4		%		80-120	09-SEP-14
Uranium (U)-Dissolved			99.5		%		80-120	09-SEP-14
Vanadium (V)-Dissolved			97.4		%		80-120	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	Water							
Batch R2942770								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Zinc (Zn)-Dissolved			95.8		%		80-120	09-SEP-14
WG1947233-1 MB								
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	09-SEP-14
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Bismuth (Bi)-Dissolved			<0.00050		mg/L		0.0005	09-SEP-14
Boron (B)-Dissolved			<0.010		mg/L		0.01	09-SEP-14
Cadmium (Cd)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	09-SEP-14
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Lithium (Li)-Dissolved			<0.00050		mg/L		0.0005	09-SEP-14
Manganese (Mn)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	09-SEP-14
Selenium (Se)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	09-SEP-14
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Titanium (Ti)-Dissolved			<0.010		mg/L		0.01	09-SEP-14
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Vanadium (V)-Dissolved			<0.0010		mg/L		0.001	09-SEP-14
Zinc (Zn)-Dissolved			0.0024	MB-LOR	mg/L		0.001	09-SEP-14
MET-DIS-LOW-ICP-VA	Water							
Batch R2942645								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Calcium (Ca)-Dissolved			101.0		%		80-120	09-SEP-14
Iron (Fe)-Dissolved			95.0		%		80-120	09-SEP-14
Magnesium (Mg)-Dissolved			100.6		%		80-120	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-LOW-ICP-VA	Water							
Batch R2942645								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Phosphorus (P)-Dissolved			99.6		%		80-120	09-SEP-14
Potassium (K)-Dissolved			97.4		%		80-120	09-SEP-14
Silicon (Si)-Dissolved			98.5		%		80-120	09-SEP-14
WG1947233-1 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	09-SEP-14
Magnesium (Mg)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Potassium (K)-Dissolved			<0.10		mg/L		0.1	09-SEP-14
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
MET-T-CCMS-VA	Water							
Batch R2942770								
WG1947258-3 CRM		**VA-HIGH-WATRM**						
Aluminum (Al)-Total			101.1		%		80-120	09-SEP-14
Antimony (Sb)-Total			97.5		%		80-120	09-SEP-14
Arsenic (As)-Total			99.4		%		80-120	09-SEP-14
Barium (Ba)-Total			100.1		%		80-120	09-SEP-14
Beryllium (Be)-Total			97.0		%		80-120	09-SEP-14
Bismuth (Bi)-Total			96.9		%		80-120	09-SEP-14
Boron (B)-Total			83.9		%		80-120	09-SEP-14
Cadmium (Cd)-Total			98.7		%		80-120	09-SEP-14
Chromium (Cr)-Total			99.3		%		80-120	09-SEP-14
Cobalt (Co)-Total			98.5		%		80-120	09-SEP-14
Copper (Cu)-Total			96.3		%		80-120	09-SEP-14
Lead (Pb)-Total			96.6		%		80-120	09-SEP-14
Lithium (Li)-Total			96.9		%		80-120	09-SEP-14
Manganese (Mn)-Total			101.1		%		80-120	09-SEP-14
Molybdenum (Mo)-Total			99.1		%		80-120	09-SEP-14
Nickel (Ni)-Total			99.8		%		80-120	09-SEP-14
Selenium (Se)-Total			99.6		%		80-120	09-SEP-14
Silver (Ag)-Total			95.4		%		80-120	09-SEP-14
Sodium (Na)-Total			98.7		%		80-120	09-SEP-14
Strontium (Sr)-Total			100.3		%		80-120	09-SEP-14
Thallium (Tl)-Total			97.8		%		80-120	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	Water							
Batch R2942770								
WG1947258-3 CRM		**VA-HIGH-WATRM**						
Tin (Sn)-Total			97.7		%		80-120	09-SEP-14
Titanium (Ti)-Total			91.4		%		80-120	09-SEP-14
Uranium (U)-Total			98.5		%		80-120	09-SEP-14
Vanadium (V)-Total			99.8		%		80-120	09-SEP-14
Zinc (Zn)-Total			96.6		%		80-120	09-SEP-14
WG1947258-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	09-SEP-14
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Arsenic (As)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Barium (Ba)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Bismuth (Bi)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Boron (B)-Total			<0.010		mg/L		0.01	09-SEP-14
Cadmium (Cd)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Copper (Cu)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Lead (Pb)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Lithium (Li)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Manganese (Mn)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Selenium (Se)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Silver (Ag)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Sodium (Na)-Total			<0.050		mg/L		0.05	09-SEP-14
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	09-SEP-14
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Tin (Sn)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Titanium (Ti)-Total			<0.010		mg/L		0.01	09-SEP-14
Uranium (U)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Vanadium (V)-Total			<0.0010		mg/L		0.001	09-SEP-14
Zinc (Zn)-Total			<0.0030		mg/L		0.003	09-SEP-14
MET-TOT-LOW-ICP-VA	Water							

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-TOT-LOW-ICP-VA	Water							
Batch R2942851								
WG1947258-3 CRM		**VA-HIGH-WATRM**						
Calcium (Ca)-Total			98.5		%		80-120	09-SEP-14
Iron (Fe)-Total			95.5		%		80-120	09-SEP-14
Magnesium (Mg)-Total			101.0		%		80-120	09-SEP-14
Phosphorus (P)-Total			97.8		%		80-120	09-SEP-14
Potassium (K)-Total			96.6		%		80-120	09-SEP-14
Silicon (Si)-Total			96.1		%		80-120	09-SEP-14
WG1947258-1 MB								
Calcium (Ca)-Total			<0.050		mg/L		0.05	09-SEP-14
Iron (Fe)-Total			<0.010		mg/L		0.01	09-SEP-14
Magnesium (Mg)-Total			<0.050		mg/L		0.05	09-SEP-14
Phosphorus (P)-Total			<0.050		mg/L		0.05	09-SEP-14
Potassium (K)-Total			<0.10		mg/L		0.1	09-SEP-14
Silicon (Si)-Total			<0.050		mg/L		0.05	09-SEP-14
PH-PCT-VA	Water							
Batch R2943649								
WG1947450-25 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	09-SEP-14
WG1947450-26 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-27 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	09-SEP-14
WG1947450-28 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-29 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-30 CRM		**VA-PH7-BUF**						
pH			6.99		pH		6.9-7.1	09-SEP-14
WG1947450-31 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-32 CRM		**VA-PH7-BUF**						
pH			7.03		pH		6.9-7.1	09-SEP-14
S-DIS-ICP-VA	Water							
Batch R2942645								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Sulfur (S)-Dissolved			101.7		%		80-120	09-SEP-14
WG1947233-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
S-DIS-ICP-VA	Water							
Batch R2942645								
WG1947233-1 MB								
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	09-SEP-14
S-TOT-ICP-VA	Water							
Batch R2942851								
WG1947258-3 CRM		**VA-HIGH-WATRM**						
Sulfur (S)-Total			101.6		%		80-120	09-SEP-14
WG1947258-1 MB								
Sulfur (S)-Total			<0.50		mg/L		0.5	09-SEP-14
SO4-TUR-VA	Water							
Batch R2943291								
WG1948014-2 CRM		**VA-SO4-L-CONTROL**						
Sulfate (SO4)			98.4		%		85-115	10-SEP-14
WG1948014-6 CRM		**VA-SO4-H-CONTROL**						
Sulfate (SO4)			102.8		%		85-115	10-SEP-14
WG1948014-1 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	10-SEP-14
WG1948014-5 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	10-SEP-14
WG1948014-4 MS		**L1512411-2**						
Sulfate (SO4)			92.1		%		75-125	10-SEP-14
WG1948014-8 MS		**L1510555-1**						
Sulfate (SO4)			N/A	MS-B	%		-	10-SEP-14
TURBIDITY-VA	Water							
Batch R2941561								
WG1947074-2 CRM		**VA-FORM-40**						
Turbidity			101.8		%		85-115	08-SEP-14
WG1947074-1 MB								
Turbidity			<0.10		NTU		0.1	08-SEP-14

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH by Meter (Automated)							
	1	06-SEP-14 19:10	09-SEP-14 23:00	0.25	76	hours	EHTR-FM
	2	06-SEP-14 19:13	09-SEP-14 23:00	0.25	76	hours	EHTR-FM
	3	06-SEP-14 19:16	09-SEP-14 23:00	0.25	76	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1514231 were received on 07-SEP-14 09:30.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

WATER & GENERAL CHEMISTRY REQUISITION

Province Of British Columbia

Ministry of Environment

Maxxam Analytics Inc.
4606 Canada Way
Burnaby, BC V5G1K5

Req # 50212394

Urgent?	Csr No.	Office 10	Client CA
Study		Project N/A	
Lab	Maxxam Analytics Inc.		
Ministry Contact	NCOBEE Nicole Obee		
Sampler	Nicole Obee		
Signature			
EMS Id		Well Plate #	
Location	Site 3 ~200m from Myra Falls		

Sampling Agency

Code 10 Name Vancouver Island, Nanaimo
Address 2080-A Labieux Road
City Nanaimo
Postal Code V9T6J9 Phone (250)751-3100

Number of Containers

Instructions To Lab Pls include total and dissolved mercury at ICPMS level

State FW Descriptor SE Collection Method GRB

No.	Class	Collection Start YYYY-MM-DD HH:MI	Collection End YYYY-MM-DD HH:MI	Depth Upper	Depth Lower	Tide
1	REG	2014-09-06	2014-09-06 1910	0.5		
2	REG	"	" 1913	5.0		
3	REG	"	" 1916	10.0		
4	DUP	"	" 1916			
5						
6						

RUSH

Priority processing

L1514231-COFC

GENERAL (1L)	Med'm		Pres'n	
	Acidity pH 4.5			
	Acidity pH 8.3			
	Alk. Titration Curve			
	Alkalinity: Phen.			
X	Alkalinity: Total: pH 4.5			
	Colour: S.W.			
	Colour: TAC			
	Colour: True			
X	pH			
	Residue: Filterable: 0.45µm (TDS)			
	Residue: Nonfilt., fixed (TSS: fixed)			
	Residue: Nonfilterable (TSS)			
	Residue: Total			
	Residue: Total, Fixed			
	Specific Conductance			
X	Turbidity			

GENERAL (120 mL)	Med'm		Pres'n	
	Anion Package (Cl,Br,SO4)			
	Chloride			
	Fluoride			
	Nit.: Nitrate and Nitrite (Col'm)			
	Nitrogen: Nitrate (Col'm)			
	Nitrogen: Nitrite (Col'm)			
	Silica: Reactive			
X	Sulfate			

GENERAL IONS (120 mL)	Med'm	55	Pres'n	64
	Nitrogen: Ammonia (Col'm)			
	Nitrogen: Organic			
	Nitrogen: Tot. Kjeldahl (Calc)			
	Nitrogen: Total			

PHOSPHORUS (120 mL)	Med'm		Pres'n	
	Phos. Diss. O-phosphate (Col'm)			
	Phosphorus: Tot. Diss. (Col'm)			
	Phosphorus: Total (Col'm)			

METALS (TOTAL)		Med'm	Pres'n	Med'm	Pres'n
High	Low	55	02		
		Metal Pkg. (ICP)			
	X	Metal Pkg. (ICPMS)			
X		Hardness			
	X	Mercury			
		Sediment, Sieve to < 63µ			

METALS (DISSOLVED; 0.45 MICROMETERS)		Med'm	Pres'n	Med'm	Pres'n
High	Low	55	62		
		Metal Pkg. (ICP)			
	X	Metal Pkg. (ICPMS)			
X		Hardness			
	X	Mercury			

SPECIFIC	Test	Med'm	Pres'n	Med'm	Pres'n
	Biochemical Oxygen D.	02	01		
	Carb. Biochem. Oxygen D.	02	01		
	Carbon: DIC				
X	Carbon: DOC				
	Carbon: TIC				
X	Carbon: TOC				
	Chemical Oxygen D.	04	05		
	Chlorophyll "a"				
	Cyanide: SAD + SCN	02	24		
	Cyanide: WAD	02	24		
	Phaeophytin				
	Residue:NFR Whole Bottle	03	01		
	SWEP (Extraction Prep.)				
	Sulphide: Total	03	08		

ORGANICS	Med'm	Pres'n
AOX		
Acid Extr. Herb.-Scan		
BTEX		
EPH		
Glyphosate / AMPA		
Oil and Grease: Gravimetric		
Organochlorine P.-scan		
Organophosphorus P.-scan		
PAH		
Penta/Tetra Cl-phenols		
Phenols (GC/MS)		
Phenols: Colorimetric		
Polychlor. Biphenyls		
Resin Acids		
Trihalomethanes (THM)		

OTHER	Med'm	Pres'n	Test
			Total and dissolved mercury at ICPMS level

FIELD TEST DETAILS	No.	Parameter	Method	Results	Units

Report ID: EMSR0900

Rec by Paul
Sep 7 9:30 2C

Date: 2014-09-06 11:47

BC MINISTRY OF ENVIRONMENT
ATTN: Deborah Epps
Section Head, Provincial Water Quality
2080A Labieux Road
Nanaimo BC V9T 6J9

Date Received: 07-SEP-14
Report Date: 10-SEP-14 17:39 (MT)
Version: FINAL

Client Phone: 604-793-8770

Certificate of Analysis

Lab Work Order #: L1514241

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 50212391
Legal Site Desc:

Dean Watt
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1514241-1	L1514241-2			
	Description	WATER	WATER			
	Sampled Date	06-SEP-14	06-SEP-14			
	Sampled Time	18:00	18:05			
	Client ID	MYRA CREEK @ BUTTLE LAKE 0.5M	MYRA CREEK @ BATTLE LAKE 3.0M			
Grouping	Analyte					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	35.2	153			
	pH (pH)	7.77	7.58			
	Turbidity (NTU)	0.20	0.38			
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	24.9	24.6			
	Sulfate (SO4) (mg/L)	9.89	149			
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.85	0.87			
	Total Organic Carbon (mg/L)	0.70	0.84			
Total Metals	Aluminum (Al)-Total (ug/L)	22.6	66.7			
	Antimony (Sb)-Total (ug/L)	0.14	1.40			
	Arsenic (As)-Total (ug/L)	0.22	0.34			
	Barium (Ba)-Total (ug/L)	6.83	18.8			
	Beryllium (Be)-Total (ug/L)	<0.10	<0.10			
	Bismuth (Bi)-Total (ug/L)	<0.50	<0.50			
	Boron (B)-Total (ug/L)	<10	13			
	Cadmium (Cd)-Total (ug/L)	0.055	0.625			
	Calcium (Ca)-Total (ug/L)	12800	54800			
	Chromium (Cr)-Total (ug/L)	<0.10	<0.10			
	Cobalt (Co)-Total (ug/L)	<0.10	0.54			
	Copper (Cu)-Total (ug/L)	1.28	9.10			
	Iron (Fe)-Total (ug/L)	28	19			
	Lead (Pb)-Total (ug/L)	0.061	0.550			
	Lithium (Li)-Total (ug/L)	<0.50	0.90			
	Magnesium (Mg)-Total (ug/L)	1070	4470			
	Manganese (Mn)-Total (ug/L)	10.2	172			
	Mercury (Hg)-Total (ug/L)	<0.010	<0.010			
	Molybdenum (Mo)-Total (ug/L)	0.492	4.88			
	Nickel (Ni)-Total (ug/L)	<0.50	1.23			
	Phosphorus (P)-Total (ug/L)	<50	<50			
	Potassium (K)-Total (ug/L)	250	2630			
	Selenium (Se)-Total (ug/L)	0.15	0.60			
	Silicon (Si)-Total (ug/L)	1320	1900			
	Silver (Ag)-Total (ug/L)	<0.010	0.093			
	Sodium (Na)-Total (ug/L)	1650	16000			
	Strontium (Sr)-Total (ug/L)	22.6	157			
	Sulfur (S)-Total (ug/L)	4440	54200			
	Thallium (Tl)-Total (ug/L)	<0.010	<0.010			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1514241-1	L1514241-2			
	Description	WATER	WATER			
	Sampled Date	06-SEP-14	06-SEP-14			
	Sampled Time	18:00	18:05			
	Client ID	MYRA CREEK @ BUTTLE LAKE 0.5M	MYRA CREEK @ BATTLE LAKE 3.0M			
Grouping	Analyte					
WATER						
Total Metals	Tin (Sn)-Total (ug/L)	<0.10	<0.10			
	Titanium (Ti)-Total (ug/L)	<10	<10			
	Uranium (U)-Total (ug/L)	0.013	0.022			
	Vanadium (V)-Total (ug/L)	<1.0	<1.0			
	Zinc (Zn)-Total (ug/L)	10.9	136			
Dissolved Metals	Dissolved Mercury Filtration Location	LAB	LAB			
	Dissolved Metals Filtration Location	LAB	LAB			
	Aluminum (Al)-Dissolved (ug/L)	18.1	44.7			
	Antimony (Sb)-Dissolved (ug/L)	<0.10	1.33			
	Arsenic (As)-Dissolved (ug/L)	0.21	0.33			
	Barium (Ba)-Dissolved (ug/L)	6.49	17.1			
	Beryllium (Be)-Dissolved (ug/L)	<0.10	<0.10			
	Bismuth (Bi)-Dissolved (ug/L)	<0.50	<0.50			
	Boron (B)-Dissolved (ug/L)	<10	13			
	Cadmium (Cd)-Dissolved (ug/L)	0.075	0.627			
	Calcium (Ca)-Dissolved (ug/L)	12400	54300			
	Chromium (Cr)-Dissolved (ug/L)	<0.10	<0.10			
	Cobalt (Co)-Dissolved (ug/L)	<0.10	0.53			
	Copper (Cu)-Dissolved (ug/L)	0.94	5.90			
	Iron (Fe)-Dissolved (ug/L)	14	<10			
	Lead (Pb)-Dissolved (ug/L)	0.096	0.066			
	Lithium (Li)-Dissolved (ug/L)	<0.50	0.89			
	Magnesium (Mg)-Dissolved (ug/L)	1040	4290			
	Manganese (Mn)-Dissolved (ug/L)	0.548	170			
	Mercury (Hg)-Dissolved (ug/L)	<0.010	<0.010			
	Molybdenum (Mo)-Dissolved (ug/L)	0.403	4.56			
	Nickel (Ni)-Dissolved (ug/L)	<0.50	1.20			
	Phosphorus (P)-Dissolved (ug/L)	<50	<50			
	Potassium (K)-Dissolved (ug/L)	230	2440			
	Selenium (Se)-Dissolved (ug/L)	0.15	0.60			
	Silicon (Si)-Dissolved (ug/L)	1320	1820			
	Silver (Ag)-Dissolved (ug/L)	<0.010	0.092			
	Sodium (Na)-Dissolved (ug/L)	1410	15000			
	Strontium (Sr)-Dissolved (ug/L)	19.5	149			
	Sulfur (S)-Dissolved (ug/L)	3640	56000			
	Thallium (Tl)-Dissolved (ug/L)	<0.010	<0.010			
	Tin (Sn)-Dissolved (ug/L)	<0.10	<0.10			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1514241-1	L1514241-2			
	Description	WATER	WATER			
	Sampled Date	06-SEP-14	06-SEP-14			
	Sampled Time	18:00	18:05			
	Client ID	MYRA CREEK @ BUTTLE LAKE 0.5M	MYRA CREEK @ BATTLE LAKE 3.0M			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Titanium (Ti)-Dissolved (ug/L)	<10	<10			
	Uranium (U)-Dissolved (ug/L)	0.013	0.021			
	Vanadium (V)-Dissolved (ug/L)	<1.0	<1.0			
	Zinc (Zn)-Dissolved (ug/L)	9.9	131			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Zinc (Zn)-Dissolved	MB-LOR	L1514241-1, -2
Matrix Spike	Sulfate (SO4)	MS-B	L1514241-1, -2
Matrix Spike	Total Organic Carbon	MS-B	L1514241-1, -2
Matrix Spike	Dissolved Organic Carbon	MS-B	L1514241-1, -2

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-DIS-LOW-CVAFS-VA	Water	Dissolved Mercury in Water by CVAFS(Low)	EPA SW-846 3005A & EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

HG-TOT-LOW-CVAFS-VA	Water	Total Mercury in Water by CVAFS(Low)	EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

MET-DIS-LOW-ICP-VA	Water	Dissolved Metals in Water by ICPOES	EPA 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method

Reference Information

6020A).

MET-TOT-LOW-ICP-VA Water Total Metals in Water by ICPOES EPA 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H "pH Value"

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

S-DIS-ICP-VA Water Dissolved Sulfur in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

S-TOT-ICP-VA Water Total Sulfur in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

SO4-TUR-VA Water Sulfate(SO4) by Turbidity APHA 4500-SO4 E. SULFATE

This analysis is carried out using procedures adapted from APHA Method 4500-SO4 "Sulfate". Sulfate is determined using the turbidimetric method.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 "Turbidity"

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

50212391

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1514241 Report Date: 10-SEP-14

Client: BC MINISTRY OF ENVIRONMENT
Section Head, Provincial Water Quality 2080A Labieux Road
Nanaimo BC V9T 6J9
Contact: Deborah Epps

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-COL-VA	Water							
Batch R2941773								
WG1947162-2 CRM		**VA-ALKL-CONTROL**						
Alkalinity, Total (as CaCO3)			97.4		%		85-115	09-SEP-14
WG1947162-5 CRM		**VA-ALKM-CONTROL**						
Alkalinity, Total (as CaCO3)			103.7		%		85-115	09-SEP-14
WG1947162-8 CRM		**VA-ALKH-CONTROL**						
Alkalinity, Total (as CaCO3)			100.8		%		85-115	09-SEP-14
WG1947162-1 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
WG1947162-10 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
WG1947162-4 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
WG1947162-7 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
CARBONS-DOC-VA	Water							
Batch R2943332								
WG1947341-5 DUP		**L1514241-1**						
Dissolved Organic Carbon		0.85	0.91		mg/L	7.1	20	09-SEP-14
WG1947341-12 LCS								
Dissolved Organic Carbon			103.6		%		80-120	09-SEP-14
WG1947341-16 LCS								
Dissolved Organic Carbon			109.1		%		80-120	09-SEP-14
WG1947341-4 LCS								
Dissolved Organic Carbon			101.8		%		80-120	09-SEP-14
WG1947341-8 LCS								
Dissolved Organic Carbon			105.9		%		80-120	09-SEP-14
WG1947341-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-15 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-10 MS		**L1513619-2**						
Dissolved Organic Carbon			100.6		%		70-130	09-SEP-14
WG1947341-14 MS		**L1513418-11**						
Dissolved Organic Carbon			N/A	MS-B	%		-	09-SEP-14
WG1947341-2 MS		**L1514231-1**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	Water							
Batch R2943332								
WG1947341-2 MS		**L1514231-1**						
Dissolved Organic Carbon			104.6		%		70-130	09-SEP-14
WG1947341-6 MS		**L1514251-1**						
Dissolved Organic Carbon			106.5		%		70-130	09-SEP-14
CARBONS-TOC-VA	Water							
Batch R2943331								
WG1947339-6 DUP		**L1514241-1**						
Total Organic Carbon		0.70	0.71		mg/L	0.5	20	09-SEP-14
WG1947339-1 LCS								
Total Organic Carbon			100.0		%		80-120	09-SEP-14
WG1947339-13 LCS								
Total Organic Carbon			99.6		%		80-120	09-SEP-14
WG1947339-17 LCS								
Total Organic Carbon			101.1		%		80-120	09-SEP-14
WG1947339-5 LCS								
Total Organic Carbon			102.0		%		80-120	09-SEP-14
WG1947339-9 LCS								
Total Organic Carbon			99.95		%		80-120	09-SEP-14
WG1947339-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-16 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-15 MS		**L1513418-11**						
Total Organic Carbon			N/A	MS-B	%		-	09-SEP-14
WG1947339-3 MS		**L1514231-1**						
Total Organic Carbon			103.0		%		70-130	09-SEP-14
WG1947339-7 MS		**L1514251-1**						
Total Organic Carbon			102.5		%		70-130	09-SEP-14
HG-DIS-LOW-CVAFS-VA	Water							
Batch R2942725								
WG1947233-3 LCS								
Mercury (Hg)-Dissolved			89.2		%		80-120	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-DIS-LOW-CVAFS-VA	Water							
Batch R2943546								
WG1947233-1 MB								
Mercury (Hg)-Dissolved			<0.000010		mg/L		0.00001	10-SEP-14
HG-TOT-LOW-CVAFS-VA	Water							
Batch R2942725								
WG1947862-2 LCS								
Mercury (Hg)-Total			95.9		%		80-120	09-SEP-14
WG1947862-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	09-SEP-14
WG1947862-3 MS		**L1514076-1**						
Mercury (Hg)-Total			89.1		%		70-130	09-SEP-14
WG1947862-4 MS		**L1514076-3**						
Mercury (Hg)-Total			94.6		%		70-130	09-SEP-14
MET-D-CCMS-VA	Water							
Batch R2942770								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Aluminum (Al)-Dissolved			102.1		%		80-120	09-SEP-14
Antimony (Sb)-Dissolved			97.3		%		80-120	09-SEP-14
Arsenic (As)-Dissolved			97.4		%		80-120	09-SEP-14
Barium (Ba)-Dissolved			98.6		%		80-120	09-SEP-14
Beryllium (Be)-Dissolved			97.7		%		80-120	09-SEP-14
Bismuth (Bi)-Dissolved			97.7		%		80-120	09-SEP-14
Boron (B)-Dissolved			85.5		%		80-120	09-SEP-14
Cadmium (Cd)-Dissolved			96.8		%		80-120	09-SEP-14
Chromium (Cr)-Dissolved			96.9		%		80-120	09-SEP-14
Cobalt (Co)-Dissolved			96.3		%		80-120	09-SEP-14
Copper (Cu)-Dissolved			95.4		%		80-120	09-SEP-14
Lead (Pb)-Dissolved			96.9		%		80-120	09-SEP-14
Lithium (Li)-Dissolved			99.2		%		80-120	09-SEP-14
Manganese (Mn)-Dissolved			99.6		%		80-120	09-SEP-14
Molybdenum (Mo)-Dissolved			98.5		%		80-120	09-SEP-14
Nickel (Ni)-Dissolved			98.2		%		80-120	09-SEP-14
Selenium (Se)-Dissolved			98.9		%		80-120	09-SEP-14
Silver (Ag)-Dissolved			98.9		%		80-120	09-SEP-14
Sodium (Na)-Dissolved			97.2		%		80-120	09-SEP-14
Strontium (Sr)-Dissolved			99.1		%		80-120	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	Water							
Batch R2942770								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Thallium (Tl)-Dissolved			98.2		%		80-120	09-SEP-14
Tin (Sn)-Dissolved			97.1		%		80-120	09-SEP-14
Titanium (Ti)-Dissolved			99.4		%		80-120	09-SEP-14
Uranium (U)-Dissolved			99.5		%		80-120	09-SEP-14
Vanadium (V)-Dissolved			97.4		%		80-120	09-SEP-14
Zinc (Zn)-Dissolved			95.8		%		80-120	09-SEP-14
WG1947233-1 MB								
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	09-SEP-14
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Bismuth (Bi)-Dissolved			<0.00050		mg/L		0.0005	09-SEP-14
Boron (B)-Dissolved			<0.010		mg/L		0.01	09-SEP-14
Cadmium (Cd)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	09-SEP-14
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Lithium (Li)-Dissolved			<0.00050		mg/L		0.0005	09-SEP-14
Manganese (Mn)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	09-SEP-14
Selenium (Se)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	09-SEP-14
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Titanium (Ti)-Dissolved			<0.010		mg/L		0.01	09-SEP-14
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Vanadium (V)-Dissolved			<0.0010		mg/L		0.001	09-SEP-14
Zinc (Zn)-Dissolved			0.0024	MB-LOR	mg/L		0.001	09-SEP-14
MET-DIS-LOW-ICP-VA	Water							

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-LOW-ICP-VA	Water							
Batch R2942645								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Calcium (Ca)-Dissolved			101.0		%		80-120	09-SEP-14
Iron (Fe)-Dissolved			95.0		%		80-120	09-SEP-14
Magnesium (Mg)-Dissolved			100.6		%		80-120	09-SEP-14
Phosphorus (P)-Dissolved			99.6		%		80-120	09-SEP-14
Potassium (K)-Dissolved			97.4		%		80-120	09-SEP-14
Silicon (Si)-Dissolved			98.5		%		80-120	09-SEP-14
WG1947233-1 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	09-SEP-14
Magnesium (Mg)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Potassium (K)-Dissolved			<0.10		mg/L		0.1	09-SEP-14
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
MET-T-CCMS-VA	Water							
Batch R2942770								
WG1947258-3 CRM		**VA-HIGH-WATRM**						
Aluminum (Al)-Total			101.1		%		80-120	09-SEP-14
Antimony (Sb)-Total			97.5		%		80-120	09-SEP-14
Arsenic (As)-Total			99.4		%		80-120	09-SEP-14
Barium (Ba)-Total			100.1		%		80-120	09-SEP-14
Beryllium (Be)-Total			97.0		%		80-120	09-SEP-14
Bismuth (Bi)-Total			96.9		%		80-120	09-SEP-14
Boron (B)-Total			83.9		%		80-120	09-SEP-14
Cadmium (Cd)-Total			98.7		%		80-120	09-SEP-14
Chromium (Cr)-Total			99.3		%		80-120	09-SEP-14
Cobalt (Co)-Total			98.5		%		80-120	09-SEP-14
Copper (Cu)-Total			96.3		%		80-120	09-SEP-14
Lead (Pb)-Total			96.6		%		80-120	09-SEP-14
Lithium (Li)-Total			96.9		%		80-120	09-SEP-14
Manganese (Mn)-Total			101.1		%		80-120	09-SEP-14
Molybdenum (Mo)-Total			99.1		%		80-120	09-SEP-14
Nickel (Ni)-Total			99.8		%		80-120	09-SEP-14
Selenium (Se)-Total			99.6		%		80-120	09-SEP-14
Silver (Ag)-Total			95.4		%		80-120	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	Water							
Batch R2942770								
WG1947258-3 CRM		**VA-HIGH-WATRM**						
Sodium (Na)-Total			98.7		%		80-120	09-SEP-14
Strontium (Sr)-Total			100.3		%		80-120	09-SEP-14
Thallium (Tl)-Total			97.8		%		80-120	09-SEP-14
Tin (Sn)-Total			97.7		%		80-120	09-SEP-14
Titanium (Ti)-Total			91.4		%		80-120	09-SEP-14
Uranium (U)-Total			98.5		%		80-120	09-SEP-14
Vanadium (V)-Total			99.8		%		80-120	09-SEP-14
Zinc (Zn)-Total			96.6		%		80-120	09-SEP-14
WG1947258-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	09-SEP-14
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Arsenic (As)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Barium (Ba)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Bismuth (Bi)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Boron (B)-Total			<0.010		mg/L		0.01	09-SEP-14
Cadmium (Cd)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Copper (Cu)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Lead (Pb)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Lithium (Li)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Manganese (Mn)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Selenium (Se)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Silver (Ag)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Sodium (Na)-Total			<0.050		mg/L		0.05	09-SEP-14
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	09-SEP-14
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Tin (Sn)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Titanium (Ti)-Total			<0.010		mg/L		0.01	09-SEP-14
Uranium (U)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Vanadium (V)-Total			<0.0010		mg/L		0.001	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	Water							
Batch R2942770								
WG1947258-1 MB								
Zinc (Zn)-Total			<0.0030		mg/L		0.003	09-SEP-14
MET-TOT-LOW-ICP-VA	Water							
Batch R2942851								
WG1947258-3 CRM		**VA-HIGH-WATRM**						
Calcium (Ca)-Total			98.5		%		80-120	09-SEP-14
Iron (Fe)-Total			95.5		%		80-120	09-SEP-14
Magnesium (Mg)-Total			101.0		%		80-120	09-SEP-14
Phosphorus (P)-Total			97.8		%		80-120	09-SEP-14
Potassium (K)-Total			96.6		%		80-120	09-SEP-14
Silicon (Si)-Total			96.1		%		80-120	09-SEP-14
WG1947258-1 MB								
Calcium (Ca)-Total			<0.050		mg/L		0.05	09-SEP-14
Iron (Fe)-Total			<0.010		mg/L		0.01	09-SEP-14
Magnesium (Mg)-Total			<0.050		mg/L		0.05	09-SEP-14
Phosphorus (P)-Total			<0.050		mg/L		0.05	09-SEP-14
Potassium (K)-Total			<0.10		mg/L		0.1	09-SEP-14
Silicon (Si)-Total			<0.050		mg/L		0.05	09-SEP-14
PH-PCT-VA	Water							
Batch R2943649								
WG1947450-25 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	09-SEP-14
WG1947450-26 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-27 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	09-SEP-14
WG1947450-28 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-29 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-30 CRM		**VA-PH7-BUF**						
pH			6.99		pH		6.9-7.1	09-SEP-14
WG1947450-31 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-32 CRM		**VA-PH7-BUF**						
pH			7.03		pH		6.9-7.1	09-SEP-14

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
S-DIS-ICP-VA	Water							
Batch R2942645								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Sulfur (S)-Dissolved			101.7		%		80-120	09-SEP-14
WG1947233-1 MB								
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	09-SEP-14
S-TOT-ICP-VA	Water							
Batch R2942851								
WG1947258-3 CRM		**VA-HIGH-WATRM**						
Sulfur (S)-Total			101.6		%		80-120	09-SEP-14
WG1947258-1 MB								
Sulfur (S)-Total			<0.50		mg/L		0.5	09-SEP-14
SO4-TUR-VA	Water							
Batch R2943291								
WG1948014-2 CRM		**VA-SO4-L-CONTROL**						
Sulfate (SO4)			98.4		%		85-115	10-SEP-14
WG1948014-6 CRM		**VA-SO4-H-CONTROL**						
Sulfate (SO4)			102.8		%		85-115	10-SEP-14
WG1948014-1 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	10-SEP-14
WG1948014-5 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	10-SEP-14
WG1948014-4 MS		**L1512411-2**						
Sulfate (SO4)			92.1		%		75-125	10-SEP-14
WG1948014-8 MS		**L1510555-1**						
Sulfate (SO4)			N/A	MS-B	%		-	10-SEP-14
TURBIDITY-VA	Water							
Batch R2941561								
WG1947074-2 CRM		**VA-FORM-40**						
Turbidity			101.8		%		85-115	08-SEP-14
WG1947074-1 MB								
Turbidity			<0.10		NTU		0.1	08-SEP-14

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH by Meter (Automated)							
	1	06-SEP-14 18:00	09-SEP-14 23:00	0.25	77	hours	EHTR-FM
	2	06-SEP-14 18:05	09-SEP-14 23:00	0.25	77	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1514241 were received on 07-SEP-14 09:30.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

WATER & GENERAL CHEMISTRY REQUISITION

Province Of British Columbia

Ministry of Environment

Maxxam Analytics Inc.
4606 Canada Way
Burnaby, BC V5G1K5

Req # 50212391

Urgent?	Csr No.	Office 10	Client CA
Study		Project N/A	
Lab	Maxxam Analytics Inc.		
Ministry Contact	NCOBEE Nicole Obee		
Sampler	Nicole Obee		
Signature			
EMS Id		Well Plate #	
Location	Myra Creek @ Battle Lake		

Sampling Agency

Code 10 Name Vancouver Island, Nanaimo
Address 2080-A Labieux Road
City Nanaimo
Postal Code V9T6J9 Phone (250)751-3100

Number of Containers

Instructions To Lab Pls include total and dissolved mercury at ICPMS level

State FW Descriptor SE Collection Method GRB

No.	Class	Collection Start YYYY-MM-DD HH:MI	Collection End YYYY-MM-DD HH:MI	Depth Upper	Depth Lower	Tide	
1	REG	2014-09-06	2014-09-06 1800h	0.5			
2	REG	"	" 1805h	3.0			
3							
4							
5							
6							

p **RUSH**

Priority processing

L1514241-COFC

GENERAL (1L)	Med'm	Pres'n
	Acidity pH 4.5	
	Acidity pH 8.3	
	Alk. Titration Curve	
	Alkalinity: Phen.	
X	Alkalinity: Total: pH 4.5	
	Colour: S.W.	
	Colour: TAC	
	Colour: True	
X	pH	
	Residue: Filterable: 0.45µm (TDS)	
	Residue: Nonfilt., fixed (TSS: fixed)	
	Residue: Nonfilterable (TSS)	
	Residue: Total	
	Residue: Total, Fixed	
	Specific Conductance	
X	Turbidity	

GENERAL (120 mL)	Med'm	Pres'n
	Anion Package (Cl,Br,SO4)	
	Chloride	
	Fluoride	
	Nit.: Nitrate and Nitrite (Col'm)	
	Nitrogen: Nitrate (Col'm)	
	Nitrogen: Nitrite (Col'm)	
	Silica: Reactive	
X	Sulfate	

GENERAL IONS (120 mL)	Med'm	55	Pres'n	64
	Nitrogen: Ammonia (Col'm)			
	Nitrogen: Organic			
	Nitrogen: Tot. Kjeldahl (Calc)			
	Nitrogen: Total			

PHOSPHORUS (120 mL)	Med'm	Pres'n
	Phos. Diss. O-phosphate (Col'm)	
	Phosphorus: Tot. Diss. (Col'm)	
	Phosphorus: Total (Col'm)	

METALS (TOTAL)		Med'm 55	Pres'n 02	Med'm	Pres'n
High	Low				
		Metal Pkg. (ICP)			
	X	Metal Pkg. (ICPMS)			
X		Hardness			
	X	Mercury			
		Sediment, Sieve to < 63µ			

METALS (DISSOLVED; 0.45 MICROMETERS)		Med'm 55	Pres'n 62	Med'm	Pres'n
High	Low				
		Metal Pkg. (ICP)			
	X	Metal Pkg. (ICPMS)			
X		Hardness			
	X	Mercury			

SPECIFIC	Test	Med'm	Pres'n	Med'm	Pres'n
	Biochemical Oxygen D.	02	01		
	Carb. Biochem. Oxygen D.	02	01		
	Carbon: DIC				
X	Carbon: DOC				
	Carbon: TIC				
X	Carbon: TOC				
	Chemical Oxygen D.	04	05		
	Chlorophyll "a"				
	Cyanide: SAD + SCN	02	24		
	Cyanide: WAD	02	24		
	Phaeophytin				
	Residue:NFR Whole Bottle	03	01		
	SWEP (Extraction Prep.)				
	Sulphide: Total	03	08		

ORGANICS	Med'm	Pres'n
	AOX	
	Acid Extr. Herb.-Scan	
	BTEX	
	EPH	
	Glyphosate / AMPA	
	Oil and Grease: Gravimetric	
	Organochlorine P.-scan	
	Organophosphorus P.-scan	
	PAH	
	Penta/Tetra Cl-phenols	
	Phenols (GC/MS)	
	Phenols: Colorimetric	
	Polychlor. Biphenyls	
	Resin Acids	
	Trihalomethanes (THM)	

OTHER	Med'm	Pres'n	Test
			Total and dissolved mercury at ICPMS level

FIELD TEST DETAILS

No.	Parameter	Method	Results	Units

Report ID: EMSR0900

Rec by Paul
Sep 7 9:30 2014

Date: 2014-09-06 11:46

BC MINISTRY OF ENVIRONMENT
ATTN: Deborah Epps
Section Head, Provincial Water Quality
2080A Labieux Road
Nanaimo BC V9T 6J9

Date Received: 07-SEP-14
Report Date: 10-SEP-14 17:46 (MT)
Version: FINAL

Client Phone: 604-793-8770

Certificate of Analysis

Lab Work Order #: L1514251

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 50212390
Legal Site Desc:

Dean Watt
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1514251-1
	Description	WATER
	Sampled Date	06-SEP-14
	Sampled Time	17:30
	Client ID	MYRA CREEK BELOW FALLS 0.5M
Grouping	**Analyte**	
WATER		
Physical Tests	Hardness (as CaCO3) (mg/L)	35.6
	pH (pH)	7.80
	Turbidity (NTU)	0.16
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	25.0
	Sulfate (SO4) (mg/L)	15.0
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.65
	Total Organic Carbon (mg/L)	0.80
Total Metals	Aluminum (Al)-Total (ug/L)	21.4
	Antimony (Sb)-Total (ug/L)	0.12
	Arsenic (As)-Total (ug/L)	0.22
	Barium (Ba)-Total (ug/L)	6.47
	Beryllium (Be)-Total (ug/L)	<0.10
	Bismuth (Bi)-Total (ug/L)	<0.50
	Boron (B)-Total (ug/L)	<10
	Cadmium (Cd)-Total (ug/L)	0.111
	Calcium (Ca)-Total (ug/L)	12500
	Chromium (Cr)-Total (ug/L)	0.12
	Cobalt (Co)-Total (ug/L)	<0.10
	Copper (Cu)-Total (ug/L)	2.07
	Iron (Fe)-Total (ug/L)	34
	Lead (Pb)-Total (ug/L)	0.112
	Lithium (Li)-Total (ug/L)	<0.50
	Magnesium (Mg)-Total (ug/L)	1040
	Manganese (Mn)-Total (ug/L)	7.37
	Mercury (Hg)-Total (ug/L)	<0.010
	Molybdenum (Mo)-Total (ug/L)	0.424
	Nickel (Ni)-Total (ug/L)	<0.50
	Phosphorus (P)-Total (ug/L)	<50
	Potassium (K)-Total (ug/L)	220
	Selenium (Se)-Total (ug/L)	0.15
	Silicon (Si)-Total (ug/L)	1340
	Silver (Ag)-Total (ug/L)	<0.010
	Sodium (Na)-Total (ug/L)	1430
	Strontium (Sr)-Total (ug/L)	20.0
	Sulfur (S)-Total (ug/L)	3720
	Thallium (Tl)-Total (ug/L)	<0.010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1514251-1
	Description	WATER
	Sampled Date	06-SEP-14
	Sampled Time	17:30
	Client ID	MYRA CREEK BELOW FALLS 0.5M
Grouping	**Analyte**	
WATER		
Total Metals	Tin (Sn)-Total (ug/L)	0.15
	Titanium (Ti)-Total (ug/L)	<10
	Uranium (U)-Total (ug/L)	0.012
	Vanadium (V)-Total (ug/L)	<1.0
	Zinc (Zn)-Total (ug/L)	10.5
Dissolved Metals	Dissolved Mercury Filtration Location	LAB
	Dissolved Metals Filtration Location	LAB
	Aluminum (Al)-Dissolved (ug/L)	15.5
	Antimony (Sb)-Dissolved (ug/L)	<0.10
	Arsenic (As)-Dissolved (ug/L)	0.20
	Barium (Ba)-Dissolved (ug/L)	6.46
	Beryllium (Be)-Dissolved (ug/L)	<0.10
	Bismuth (Bi)-Dissolved (ug/L)	<0.50
	Boron (B)-Dissolved (ug/L)	<10
	Cadmium (Cd)-Dissolved (ug/L)	0.092
	Calcium (Ca)-Dissolved (ug/L)	12500
	Chromium (Cr)-Dissolved (ug/L)	<0.10
	Cobalt (Co)-Dissolved (ug/L)	<0.10
	Copper (Cu)-Dissolved (ug/L)	0.83
	Iron (Fe)-Dissolved (ug/L)	13
	Lead (Pb)-Dissolved (ug/L)	<0.050
	Lithium (Li)-Dissolved (ug/L)	<0.50
	Magnesium (Mg)-Dissolved (ug/L)	1040
	Manganese (Mn)-Dissolved (ug/L)	0.975
	Mercury (Hg)-Dissolved (ug/L)	<0.010
	Molybdenum (Mo)-Dissolved (ug/L)	0.405
	Nickel (Ni)-Dissolved (ug/L)	<0.50
	Phosphorus (P)-Dissolved (ug/L)	<50
	Potassium (K)-Dissolved (ug/L)	220
	Selenium (Se)-Dissolved (ug/L)	0.14
	Silicon (Si)-Dissolved (ug/L)	1310
	Silver (Ag)-Dissolved (ug/L)	<0.010
	Sodium (Na)-Dissolved (ug/L)	1420
	Strontium (Sr)-Dissolved (ug/L)	19.6
	Sulfur (S)-Dissolved (ug/L)	3710
	Thallium (Tl)-Dissolved (ug/L)	<0.010
	Tin (Sn)-Dissolved (ug/L)	<0.10

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1514251-1
	Description	WATER
	Sampled Date	06-SEP-14
	Sampled Time	17:30
	Client ID	MYRA CREEK BELOW FALLS 0.5M
Grouping	**Analyte**	
WATER		
Dissolved Metals	Titanium (Ti)-Dissolved (ug/L)	<10
	Uranium (U)-Dissolved (ug/L)	0.011
	Vanadium (V)-Dissolved (ug/L)	<1.0
	Zinc (Zn)-Dissolved (ug/L)	10.3

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Zinc (Zn)-Dissolved	MB-LOR	L1514251-1
Matrix Spike	Sulfate (SO4)	MS-B	L1514251-1
Matrix Spike	Total Organic Carbon	MS-B	L1514251-1
Matrix Spike	Dissolved Organic Carbon	MS-B	L1514251-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-DIS-LOW-CVAFS-VA	Water	Dissolved Mercury in Water by CVAFS(Low)	EPA SW-846 3005A & EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

HG-TOT-LOW-CVAFS-VA	Water	Total Mercury in Water by CVAFS(Low)	EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

MET-DIS-LOW-ICP-VA	Water	Dissolved Metals in Water by ICPOES	EPA 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method

Reference Information

6020A).

MET-TOT-LOW-ICP-VA Water Total Metals in Water by ICPOES EPA 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H "pH Value"

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

S-DIS-ICP-VA Water Dissolved Sulfur in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

S-TOT-ICP-VA Water Total Sulfur in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

SO4-TUR-VA Water Sulfate(SO4) by Turbidity APHA 4500-SO4 E. SULFATE

This analysis is carried out using procedures adapted from APHA Method 4500-SO4 "Sulfate". Sulfate is determined using the turbidimetric method.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 "Turbidity"

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

50212390

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1514251 Report Date: 10-SEP-14

Client: BC MINISTRY OF ENVIRONMENT
Section Head, Provincial Water Quality 2080A Labieux Road
Nanaimo BC V9T 6J9

Contact: Deborah Epps

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-COL-VA	Water							
Batch R2941773								
WG1947162-2 CRM		**VA-ALKL-CONTROL**						
Alkalinity, Total (as CaCO3)			97.4		%		85-115	09-SEP-14
WG1947162-5 CRM		**VA-ALKM-CONTROL**						
Alkalinity, Total (as CaCO3)			103.7		%		85-115	09-SEP-14
WG1947162-8 CRM		**VA-ALKH-CONTROL**						
Alkalinity, Total (as CaCO3)			100.8		%		85-115	09-SEP-14
WG1947162-1 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
WG1947162-10 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
WG1947162-4 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
WG1947162-7 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
CARBONS-DOC-VA	Water							
Batch R2943332								
WG1947341-12 LCS								
Dissolved Organic Carbon			103.6		%		80-120	09-SEP-14
WG1947341-16 LCS								
Dissolved Organic Carbon			109.1		%		80-120	09-SEP-14
WG1947341-4 LCS								
Dissolved Organic Carbon			101.8		%		80-120	09-SEP-14
WG1947341-8 LCS								
Dissolved Organic Carbon			105.9		%		80-120	09-SEP-14
WG1947341-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-15 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-10 MS		**L1513619-2**						
Dissolved Organic Carbon			100.6		%		70-130	09-SEP-14
WG1947341-14 MS		**L1513418-11**						
Dissolved Organic Carbon			N/A	MS-B	%		-	09-SEP-14
WG1947341-2 MS		**L1514231-1**						
Dissolved Organic Carbon			104.6		%		70-130	09-SEP-14
WG1947341-6 MS		**L1514251-1**						

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	Water							
Batch R2943332								
WG1947341-6 MS		**L1514251-1**						
Dissolved Organic Carbon			106.5		%		70-130	09-SEP-14
CARBONS-TOC-VA	Water							
Batch R2943331								
WG1947339-1 LCS								
Total Organic Carbon			100.0		%		80-120	09-SEP-14
WG1947339-13 LCS								
Total Organic Carbon			99.6		%		80-120	09-SEP-14
WG1947339-17 LCS								
Total Organic Carbon			101.1		%		80-120	09-SEP-14
WG1947339-5 LCS								
Total Organic Carbon			102.0		%		80-120	09-SEP-14
WG1947339-9 LCS								
Total Organic Carbon			99.95		%		80-120	09-SEP-14
WG1947339-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-16 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-15 MS		**L1513418-11**						
Total Organic Carbon			N/A	MS-B	%		-	09-SEP-14
WG1947339-3 MS		**L1514231-1**						
Total Organic Carbon			103.0		%		70-130	09-SEP-14
WG1947339-7 MS		**L1514251-1**						
Total Organic Carbon			102.5		%		70-130	09-SEP-14
HG-DIS-LOW-CVAFS-VA	Water							
Batch R2942725								
WG1947233-3 LCS								
Mercury (Hg)-Dissolved			89.2		%		80-120	09-SEP-14
Batch R2943546								
WG1947233-1 MB								
Mercury (Hg)-Dissolved			<0.000010		mg/L		0.00001	10-SEP-14

Quality Control Report

Workorder: L1514251 Report Date: 10-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-TOT-LOW-CVAFS-VA	Water							
Batch R2942725								
WG1947862-2 LCS								
Mercury (Hg)-Total			95.9		%		80-120	09-SEP-14
WG1947862-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	09-SEP-14
WG1947862-3 MS		**L1514076-1**						
Mercury (Hg)-Total			89.1		%		70-130	09-SEP-14
WG1947862-4 MS		**L1514076-3**						
Mercury (Hg)-Total			94.6		%		70-130	09-SEP-14
MET-D-CCMS-VA	Water							
Batch R2942770								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Aluminum (Al)-Dissolved			102.1		%		80-120	09-SEP-14
Antimony (Sb)-Dissolved			97.3		%		80-120	09-SEP-14
Arsenic (As)-Dissolved			97.4		%		80-120	09-SEP-14
Barium (Ba)-Dissolved			98.6		%		80-120	09-SEP-14
Beryllium (Be)-Dissolved			97.7		%		80-120	09-SEP-14
Bismuth (Bi)-Dissolved			97.7		%		80-120	09-SEP-14
Boron (B)-Dissolved			85.5		%		80-120	09-SEP-14
Cadmium (Cd)-Dissolved			96.8		%		80-120	09-SEP-14
Chromium (Cr)-Dissolved			96.9		%		80-120	09-SEP-14
Cobalt (Co)-Dissolved			96.3		%		80-120	09-SEP-14
Copper (Cu)-Dissolved			95.4		%		80-120	09-SEP-14
Lead (Pb)-Dissolved			96.9		%		80-120	09-SEP-14
Lithium (Li)-Dissolved			99.2		%		80-120	09-SEP-14
Manganese (Mn)-Dissolved			99.6		%		80-120	09-SEP-14
Molybdenum (Mo)-Dissolved			98.5		%		80-120	09-SEP-14
Nickel (Ni)-Dissolved			98.2		%		80-120	09-SEP-14
Selenium (Se)-Dissolved			98.9		%		80-120	09-SEP-14
Silver (Ag)-Dissolved			98.9		%		80-120	09-SEP-14
Sodium (Na)-Dissolved			97.2		%		80-120	09-SEP-14
Strontium (Sr)-Dissolved			99.1		%		80-120	09-SEP-14
Thallium (Tl)-Dissolved			98.2		%		80-120	09-SEP-14
Tin (Sn)-Dissolved			97.1		%		80-120	09-SEP-14
Titanium (Ti)-Dissolved			99.4		%		80-120	09-SEP-14
Uranium (U)-Dissolved			99.5		%		80-120	09-SEP-14
Vanadium (V)-Dissolved			97.4		%		80-120	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	Water							
Batch R2942770								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Zinc (Zn)-Dissolved			95.8		%		80-120	09-SEP-14
WG1947233-1 MB								
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	09-SEP-14
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Bismuth (Bi)-Dissolved			<0.00050		mg/L		0.0005	09-SEP-14
Boron (B)-Dissolved			<0.010		mg/L		0.01	09-SEP-14
Cadmium (Cd)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	09-SEP-14
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Lithium (Li)-Dissolved			<0.00050		mg/L		0.0005	09-SEP-14
Manganese (Mn)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	09-SEP-14
Selenium (Se)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	09-SEP-14
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Titanium (Ti)-Dissolved			<0.010		mg/L		0.01	09-SEP-14
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Vanadium (V)-Dissolved			<0.0010		mg/L		0.001	09-SEP-14
Zinc (Zn)-Dissolved			0.0024	MB-LOR	mg/L		0.001	09-SEP-14
MET-DIS-LOW-ICP-VA	Water							
Batch R2942645								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Calcium (Ca)-Dissolved			101.0		%		80-120	09-SEP-14
Iron (Fe)-Dissolved			95.0		%		80-120	09-SEP-14
Magnesium (Mg)-Dissolved			100.6		%		80-120	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-LOW-ICP-VA	Water							
Batch R2942645								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Phosphorus (P)-Dissolved			99.6		%		80-120	09-SEP-14
Potassium (K)-Dissolved			97.4		%		80-120	09-SEP-14
Silicon (Si)-Dissolved			98.5		%		80-120	09-SEP-14
WG1947233-1 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	09-SEP-14
Magnesium (Mg)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Potassium (K)-Dissolved			<0.10		mg/L		0.1	09-SEP-14
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
MET-T-CCMS-VA	Water							
Batch R2942770								
WG1947258-3 CRM		**VA-HIGH-WATRM**						
Aluminum (Al)-Total			101.1		%		80-120	09-SEP-14
Antimony (Sb)-Total			97.5		%		80-120	09-SEP-14
Arsenic (As)-Total			99.4		%		80-120	09-SEP-14
Barium (Ba)-Total			100.1		%		80-120	09-SEP-14
Beryllium (Be)-Total			97.0		%		80-120	09-SEP-14
Bismuth (Bi)-Total			96.9		%		80-120	09-SEP-14
Boron (B)-Total			83.9		%		80-120	09-SEP-14
Cadmium (Cd)-Total			98.7		%		80-120	09-SEP-14
Chromium (Cr)-Total			99.3		%		80-120	09-SEP-14
Cobalt (Co)-Total			98.5		%		80-120	09-SEP-14
Copper (Cu)-Total			96.3		%		80-120	09-SEP-14
Lead (Pb)-Total			96.6		%		80-120	09-SEP-14
Lithium (Li)-Total			96.9		%		80-120	09-SEP-14
Manganese (Mn)-Total			101.1		%		80-120	09-SEP-14
Molybdenum (Mo)-Total			99.1		%		80-120	09-SEP-14
Nickel (Ni)-Total			99.8		%		80-120	09-SEP-14
Selenium (Se)-Total			99.6		%		80-120	09-SEP-14
Silver (Ag)-Total			95.4		%		80-120	09-SEP-14
Sodium (Na)-Total			98.7		%		80-120	09-SEP-14
Strontium (Sr)-Total			100.3		%		80-120	09-SEP-14
Thallium (Tl)-Total			97.8		%		80-120	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	Water							
Batch R2942770								
WG1947258-3 CRM		**VA-HIGH-WATRM**						
Tin (Sn)-Total			97.7		%		80-120	09-SEP-14
Titanium (Ti)-Total			91.4		%		80-120	09-SEP-14
Uranium (U)-Total			98.5		%		80-120	09-SEP-14
Vanadium (V)-Total			99.8		%		80-120	09-SEP-14
Zinc (Zn)-Total			96.6		%		80-120	09-SEP-14
WG1947258-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	09-SEP-14
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Arsenic (As)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Barium (Ba)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Bismuth (Bi)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Boron (B)-Total			<0.010		mg/L		0.01	09-SEP-14
Cadmium (Cd)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Copper (Cu)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Lead (Pb)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Lithium (Li)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Manganese (Mn)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Selenium (Se)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Silver (Ag)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Sodium (Na)-Total			<0.050		mg/L		0.05	09-SEP-14
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	09-SEP-14
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Tin (Sn)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Titanium (Ti)-Total			<0.010		mg/L		0.01	09-SEP-14
Uranium (U)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Vanadium (V)-Total			<0.0010		mg/L		0.001	09-SEP-14
Zinc (Zn)-Total			<0.0030		mg/L		0.003	09-SEP-14
MET-TOT-LOW-ICP-VA	Water							

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-TOT-LOW-ICP-VA	Water							
Batch R2942851								
WG1947258-3 CRM		**VA-HIGH-WATRM**						
Calcium (Ca)-Total			98.5		%		80-120	09-SEP-14
Iron (Fe)-Total			95.5		%		80-120	09-SEP-14
Magnesium (Mg)-Total			101.0		%		80-120	09-SEP-14
Phosphorus (P)-Total			97.8		%		80-120	09-SEP-14
Potassium (K)-Total			96.6		%		80-120	09-SEP-14
Silicon (Si)-Total			96.1		%		80-120	09-SEP-14
WG1947258-1 MB								
Calcium (Ca)-Total			<0.050		mg/L		0.05	09-SEP-14
Iron (Fe)-Total			<0.010		mg/L		0.01	09-SEP-14
Magnesium (Mg)-Total			<0.050		mg/L		0.05	09-SEP-14
Phosphorus (P)-Total			<0.050		mg/L		0.05	09-SEP-14
Potassium (K)-Total			<0.10		mg/L		0.1	09-SEP-14
Silicon (Si)-Total			<0.050		mg/L		0.05	09-SEP-14
PH-PCT-VA	Water							
Batch R2943649								
WG1947450-25 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	09-SEP-14
WG1947450-26 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-27 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	09-SEP-14
WG1947450-28 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-29 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-30 CRM		**VA-PH7-BUF**						
pH			6.99		pH		6.9-7.1	09-SEP-14
WG1947450-31 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-32 CRM		**VA-PH7-BUF**						
pH			7.03		pH		6.9-7.1	09-SEP-14
WG1947450-33 DUP		**L1514251-1**						
pH		7.80	7.77	J	pH	0.03	0.3	09-SEP-14
S-DIS-ICP-VA	Water							

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
S-DIS-ICP-VA	Water							
Batch R2942645								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Sulfur (S)-Dissolved			101.7		%		80-120	09-SEP-14
WG1947233-1 MB								
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	09-SEP-14
S-TOT-ICP-VA	Water							
Batch R2942851								
WG1947258-3 CRM		**VA-HIGH-WATRM**						
Sulfur (S)-Total			101.6		%		80-120	09-SEP-14
WG1947258-1 MB								
Sulfur (S)-Total			<0.50		mg/L		0.5	09-SEP-14
SO4-TUR-VA	Water							
Batch R2943291								
WG1948014-2 CRM		**VA-SO4-L-CONTROL**						
Sulfate (SO4)			98.4		%		85-115	10-SEP-14
WG1948014-6 CRM		**VA-SO4-H-CONTROL**						
Sulfate (SO4)			102.8		%		85-115	10-SEP-14
WG1948014-1 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	10-SEP-14
WG1948014-5 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	10-SEP-14
WG1948014-4 MS		**L1512411-2**						
Sulfate (SO4)			92.1		%		75-125	10-SEP-14
WG1948014-8 MS		**L1510555-1**						
Sulfate (SO4)			N/A	MS-B	%		-	10-SEP-14
TURBIDITY-VA	Water							
Batch R2941561								
WG1947074-2 CRM		**VA-FORM-40**						
Turbidity			101.8		%		85-115	08-SEP-14
WG1947074-1 MB								
Turbidity			<0.10		NTU		0.1	08-SEP-14

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH by Meter (Automated)							
	1	06-SEP-14 17:30	09-SEP-14 23:00	0.25	78	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1514251 were received on 07-SEP-14 09:30.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

WATER & GENERAL CHEMISTRY REQUISITION

Province Of British Columbia

Ministry of Environment

Maxxam Analytics Inc.
4606 Canada Way
Burnaby, BC V5G1K5

Req # 50212390

L1514251-COFC

Urgent?	Csr No.	Office 10	Client CA
Study		Project N/A	
Lab	Maxxam Analytics Inc.		
Ministry Contact	NCOBEE Nicole Obee		
Sampler	Nicole Obee		
Signature			
EMS Id		Well Plate #	
Location	Myra Creek Below Falls		

Sampling Agency

Code 10 Name Vancouver Island, Nanaimo

Address 2080-A Labieux Road

City Nanaimo

Postal Code V9T6J9 Phone (250)751-3100

Number of Containers

Instructions To Lab Pls include total and dissolved mercury at ICPMS level

State FW Descriptor GE Collection Method GRB

No.	Class	Collection Start YYYY-MM-DD HH:MI	Collection End YYYY-MM-DD HH:MI	Depth Upper	Depth Lower	Tide
1	REG	2014-09-06	2014-09-06 1730h	0.5		
2						
3						
4						
5						
6						

RUSH

Priority processing

	GENERAL (1L)	Med'm	Pres'n
	Acidity pH 4.5		
	Acidity pH 8.3		
	Alk. Titration Curve		
	Alkalinity: Phen.		
X	Alkalinity: Total: pH 4.5		
	Colour: S.W.		
	Colour: TAC		
	Colour: True		
X	pH		
	Residue: Filterable: 0.45µm (TDS)		
	Residue: Nonfilt., fixed (TSS: fixed)		
	Residue: Nonfilterable (TSS)		
	Residue: Total		
	Residue: Total, Fixed		
	Specific Conductance		
X	Turbidity		

	SPECIFIC Test	Med'm	Pres'n	Med'm	Pres'n
	Biochemical Oxygen D.	02	01		
	Carb. Biochem. Oxygen D.	02	01		
	Carbon: DIC				
X	Carbon: DOC				
	Carbon: TIC				
X	Carbon: TOC				
	Chemical Oxygen D.	04	05		
	Chlorophyll "a"				
	Cyanide: SAD + SCN	02	24		
	Cyanide: WAD	02	24		
	Phaeophytin				
	Residue:NFR Whole Bottle	03	01		
	SWEP (Extraction Prep.)				
	Sulphide: Total	03	08		

	GENERAL (120 mL)	Med'm	Pres'n
	Anion Package (Cl,Br,SO4)		
	Chloride		
	Fluoride		
	Nit.: Nitrate and Nitrite (Col'm)		
	Nitrogen: Nitrate (Col'm)		
	Nitrogen: Nitrite (Col'm)		
	Silica: Reactive		
X	Sulfate		

Alk -Col
Metals - BCMDG

	GENERAL IONS (120 mL)	Med'm	55
	Nitrogen: Ammonia (Col'm)		
	Nitrogen: Organic		
	Nitrogen: Tot. Kjeldahl (Calc)		
	Nitrogen: Total		

	PHOSPHORUS (120 mL)	Med'm	
	Phos. Diss. O-phosphate (Col'm)		
	Phosphorus: Tot. Diss. (Col'm)		
	Phosphorus: Total (Col'm)		

	ORGANICS	Med'm	Pres'n
	AOX		
	Acid Extr. Herb.-Scan		
	BTEX		
	EPH		

imetric
in
-scan

	METALS (TOTAL) High Low	Med'm 55	Pres'n 02	Med'm	Pres'n
	Metal Pkg. (ICP)				
X	Metal Pkg. (ICPMS)				
	Hardness				
X	Mercury				
	Sediment, Sieve to < 63µ				

	METALS (DISSOLVED; 0.45 MICROMETERS) High Low	Med'm 55	Pres'n 62	Med'm	Pres'n
	Metal Pkg. (ICP)				
X	Metal Pkg. (ICPMS)				
	Hardness				
X	Mercury				

OTHER Med'm	Pres'n	Test
		Total and dissolved mercury at ICPMS level

FIELD TEST DETAILS

No.	Parameter	Method	Results	Units

Report ID: EMSR0900

Rec by Paul
Sep 7 9:30 2°C

Date: 2014-09-06 11:45

BC MINISTRY OF ENVIRONMENT
ATTN: Deborah Epps
Section Head, Provincial Water Quality
2080A Labieux Road
Nanaimo BC V9T 6J9

Date Received: 07-SEP-14
Report Date: 12-SEP-14 18:30 (MT)
Version: FINAL

Client Phone: 604-793-8770

Certificate of Analysis

Lab Work Order #: L1514340

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 50212395
Legal Site Desc:

Dean Watt
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1514340-1				
	Description	WATER				
	Sampled Date	06-SEP-14				
	Sampled Time	20:50				
	Client ID	MYRA FALLS MINE SOURCE MATERIAL				
Grouping	**Analyte**					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	40.1				
	pH (pH)	3.93				
Anions and Nutrients	Sulfate (SO4) (mg/L)	2080				
Total Metals	Aluminum (Al)-Total (ug/L)	385000				
	Antimony (Sb)-Total (ug/L)	<2.0 DLA				
	Arsenic (As)-Total (ug/L)	<2.0 DLA				
	Barium (Ba)-Total (ug/L)	7.3				
	Beryllium (Be)-Total (ug/L)	<2.0 DLA				
	Bismuth (Bi)-Total (ug/L)	<10 DLA				
	Boron (B)-Total (ug/L)	<200 DLA				
	Cadmium (Cd)-Total (ug/L)	0.21				
	Calcium (Ca)-Total (ug/L)	12600				
	Chromium (Cr)-Total (ug/L)	2.9				
	Cobalt (Co)-Total (ug/L)	<2.0 DLA				
	Copper (Cu)-Total (ug/L)	<10 DLA				
	Iron (Fe)-Total (ug/L)	73				
	Lead (Pb)-Total (ug/L)	7.6				
	Lithium (Li)-Total (ug/L)	<10 DLA				
	Magnesium (Mg)-Total (ug/L)	1920				
	Manganese (Mn)-Total (ug/L)	13.0				
	Mercury (Hg)-Total (ug/L)	<0.010				
	Molybdenum (Mo)-Total (ug/L)	<1.0 DLA				
	Nickel (Ni)-Total (ug/L)	<10 DLA				
	Phosphorus (P)-Total (ug/L)	<250 DLA				
	Potassium (K)-Total (ug/L)	<500 DLA				
	Selenium (Se)-Total (ug/L)	<2.0 DLA				
	Silicon (Si)-Total (ug/L)	2290				
	Silver (Ag)-Total (ug/L)	<0.20 DLA				
	Sodium (Na)-Total (ug/L)	2900				
	Strontium (Sr)-Total (ug/L)	13.7				
	Sulfur (S)-Total (ug/L)	714000				
	Thallium (Tl)-Total (ug/L)	<0.20 DLA				
	Tin (Sn)-Total (ug/L)	<2.0 DLA				
	Titanium (Ti)-Total (ug/L)	<200 DLA				
	Uranium (U)-Total (ug/L)	0.28				
	Vanadium (V)-Total (ug/L)	<20 DLA				
	Zinc (Zn)-Total (ug/L)	137				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1514340-1
	Description	WATER
	Sampled Date	06-SEP-14
	Sampled Time	20:50
	Client ID	MYRA FALLS MINE SOURCE MATERIAL
Grouping	**Analyte**	
WATER		
Dissolved Metals	Dissolved Mercury Filtration Location	LAB
	Dissolved Metals Filtration Location	LAB
	Aluminum (Al)-Dissolved (ug/L)	363000
	Antimony (Sb)-Dissolved (ug/L)	<2.0 DLA
	Arsenic (As)-Dissolved (ug/L)	<2.0 DLA
	Barium (Ba)-Dissolved (ug/L)	5.4
	Beryllium (Be)-Dissolved (ug/L)	<2.0 DLA
	Bismuth (Bi)-Dissolved (ug/L)	<10 DLA
	Boron (B)-Dissolved (ug/L)	<200 DLA
	Cadmium (Cd)-Dissolved (ug/L)	<0.20 DLA
	Calcium (Ca)-Dissolved (ug/L)	12800
	Chromium (Cr)-Dissolved (ug/L)	2.5
	Cobalt (Co)-Dissolved (ug/L)	<2.0 DLA
	Copper (Cu)-Dissolved (ug/L)	<4.0 DLA
	Iron (Fe)-Dissolved (ug/L)	<50 DLA
	Lead (Pb)-Dissolved (ug/L)	6.4
	Lithium (Li)-Dissolved (ug/L)	<10 DLA
	Magnesium (Mg)-Dissolved (ug/L)	1940
	Manganese (Mn)-Dissolved (ug/L)	9.2
	Mercury (Hg)-Dissolved (ug/L)	<0.010
	Molybdenum (Mo)-Dissolved (ug/L)	<1.0 DLA
	Nickel (Ni)-Dissolved (ug/L)	<10 DLA
	Phosphorus (P)-Dissolved (ug/L)	<250 DLA
	Potassium (K)-Dissolved (ug/L)	<500 DLA
	Selenium (Se)-Dissolved (ug/L)	<2.0 DLA
	Silicon (Si)-Dissolved (ug/L)	2260
	Silver (Ag)-Dissolved (ug/L)	<0.20 DLA
	Sodium (Na)-Dissolved (ug/L)	2600
	Strontium (Sr)-Dissolved (ug/L)	13.3
	Sulfur (S)-Dissolved (ug/L)	711000
	Thallium (Tl)-Dissolved (ug/L)	<0.20 DLA
	Tin (Sn)-Dissolved (ug/L)	<2.0 DLA
	Titanium (Ti)-Dissolved (ug/L)	<200 DLA
	Uranium (U)-Dissolved (ug/L)	<0.20 DLA
	Vanadium (V)-Dissolved (ug/L)	<20 DLA
	Zinc (Zn)-Dissolved (ug/L)	122

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Antimony (Sb)-Total	DLA	L1514340-1
Duplicate	Arsenic (As)-Total	DLA	L1514340-1
Duplicate	Beryllium (Be)-Total	DLA	L1514340-1
Duplicate	Bismuth (Bi)-Total	DLA	L1514340-1
Duplicate	Boron (B)-Total	DLA	L1514340-1
Duplicate	Cadmium (Cd)-Total	DLA	L1514340-1
Duplicate	Cobalt (Co)-Total	DLA	L1514340-1
Duplicate	Copper (Cu)-Total	DLA	L1514340-1
Duplicate	Lithium (Li)-Total	DLA	L1514340-1
Duplicate	Molybdenum (Mo)-Total	DLA	L1514340-1
Duplicate	Nickel (Ni)-Total	DLA	L1514340-1
Duplicate	Selenium (Se)-Total	DLA	L1514340-1
Duplicate	Silver (Ag)-Total	DLA	L1514340-1
Duplicate	Thallium (Tl)-Total	DLA	L1514340-1
Duplicate	Tin (Sn)-Total	DLA	L1514340-1
Duplicate	Titanium (Ti)-Total	DLA	L1514340-1
Duplicate	Vanadium (V)-Total	DLA	L1514340-1
Matrix Spike	Sulfate (SO4)	MS-B	L1514340-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1514340-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1514340-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1514340-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-DIS-LOW-CVAFS-VA	Water	Dissolved Mercury in Water by CVAFS(Low)	EPA SW-846 3005A & EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

HG-TOT-LOW-CVAFS-VA	Water	Total Mercury in Water by CVAFS(Low)	EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method

Reference Information

6020A).

MET-DIS-LOW-ICP-VA Water Dissolved Metals in Water by ICPOES EPA 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

MET-TOT-LOW-ICP-VA Water Total Metals in Water by ICPOES EPA 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H "pH Value"

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

S-DIS-ICP-VA Water Dissolved Sulfur in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

S-TOT-ICP-VA Water Total Sulfur in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

SO4-TUR-VA Water Sulfate(SO4) by Turbidity APHA 4500-SO4 E. SULFATE

This analysis is carried out using procedures adapted from APHA Method 4500-SO4 "Sulfate". Sulfate is determined using the turbidimetric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

50212395

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1514340 Report Date: 12-SEP-14

Client: BC MINISTRY OF ENVIRONMENT
Section Head, Provincial Water Quality 2080A Labieux Road
Nanaimo BC V9T 6J9
Contact: Deborah Epps

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-DIS-LOW-CVAFS-VA	Water							
Batch R2943546								
WG1947666-3 LCS								
Mercury (Hg)-Dissolved			98.4		%		80-120	10-SEP-14
WG1947666-1 MB								
Mercury (Hg)-Dissolved			<0.000010		mg/L		0.00001	10-SEP-14
HG-TOT-LOW-CVAFS-VA	Water							
Batch R2943546								
WG1948561-2 LCS								
Mercury (Hg)-Total			94.4		%		80-120	10-SEP-14
WG1948561-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	10-SEP-14
WG1948561-4 MS		**L1514553-10**						
Mercury (Hg)-Total			102.0		%		70-130	10-SEP-14
WG1948561-5 MS		**L1514611-1**						
Mercury (Hg)-Total			85.0		%		70-130	10-SEP-14
MET-D-CCMS-VA	Water							
Batch R2943403								
WG1947666-2 CRM		**VA-HIGH-WATRM**						
Aluminum (Al)-Dissolved			97.8		%		80-120	09-SEP-14
Antimony (Sb)-Dissolved			98.9		%		80-120	09-SEP-14
Arsenic (As)-Dissolved			98.2		%		80-120	09-SEP-14
Barium (Ba)-Dissolved			97.6		%		80-120	09-SEP-14
Beryllium (Be)-Dissolved			99.6		%		80-120	09-SEP-14
Bismuth (Bi)-Dissolved			93.5		%		80-120	09-SEP-14
Boron (B)-Dissolved			87.1		%		80-120	09-SEP-14
Cadmium (Cd)-Dissolved			97.1		%		80-120	09-SEP-14
Chromium (Cr)-Dissolved			100.1		%		80-120	09-SEP-14
Cobalt (Co)-Dissolved			96.5		%		80-120	09-SEP-14
Copper (Cu)-Dissolved			96.1		%		80-120	09-SEP-14
Lead (Pb)-Dissolved			94.9		%		80-120	09-SEP-14
Lithium (Li)-Dissolved			98.1		%		80-120	09-SEP-14
Manganese (Mn)-Dissolved			99.0		%		80-120	09-SEP-14
Molybdenum (Mo)-Dissolved			98.7		%		80-120	09-SEP-14
Nickel (Ni)-Dissolved			97.1		%		80-120	09-SEP-14
Selenium (Se)-Dissolved			98.6		%		80-120	09-SEP-14
Silver (Ag)-Dissolved			98.7		%		80-120	09-SEP-14
Sodium (Na)-Dissolved			98.8		%		80-120	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	Water							
Batch R2943403								
WG1947666-2 CRM		**VA-HIGH-WATRM**						
Strontium (Sr)-Dissolved			100.6		%		80-120	09-SEP-14
Thallium (Tl)-Dissolved			95.1		%		80-120	09-SEP-14
Tin (Sn)-Dissolved			98.0		%		80-120	09-SEP-14
Titanium (Ti)-Dissolved			87.9		%		80-120	09-SEP-14
Uranium (U)-Dissolved			96.3		%		80-120	09-SEP-14
Vanadium (V)-Dissolved			99.2		%		80-120	09-SEP-14
Zinc (Zn)-Dissolved			96.6		%		80-120	09-SEP-14
WG1947666-1 MB								
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	09-SEP-14
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Bismuth (Bi)-Dissolved			<0.00050		mg/L		0.0005	09-SEP-14
Boron (B)-Dissolved			<0.010		mg/L		0.01	09-SEP-14
Cadmium (Cd)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	09-SEP-14
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Lithium (Li)-Dissolved			<0.00050		mg/L		0.0005	09-SEP-14
Manganese (Mn)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	09-SEP-14
Selenium (Se)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	09-SEP-14
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Titanium (Ti)-Dissolved			<0.010		mg/L		0.01	09-SEP-14
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Vanadium (V)-Dissolved			<0.0010		mg/L		0.001	09-SEP-14
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	Water							
Batch R2943770								
WG1947666-5 MS		**L1514011-4**						
Aluminum (Al)-Dissolved			96.2		%		70-130	10-SEP-14
Antimony (Sb)-Dissolved			99.5		%		70-130	10-SEP-14
Arsenic (As)-Dissolved			99.5		%		70-130	10-SEP-14
Barium (Ba)-Dissolved			N/A	MS-B	%		-	10-SEP-14
Beryllium (Be)-Dissolved			96.1		%		70-130	10-SEP-14
Bismuth (Bi)-Dissolved			97.4		%		70-130	10-SEP-14
Boron (B)-Dissolved			104.0		%		70-130	10-SEP-14
Cadmium (Cd)-Dissolved			97.4		%		70-130	10-SEP-14
Chromium (Cr)-Dissolved			96.7		%		70-130	10-SEP-14
Cobalt (Co)-Dissolved			95.6		%		70-130	10-SEP-14
Copper (Cu)-Dissolved			93.9		%		70-130	10-SEP-14
Lead (Pb)-Dissolved			96.7		%		70-130	10-SEP-14
Lithium (Li)-Dissolved			96.0		%		70-130	10-SEP-14
Manganese (Mn)-Dissolved			94.5		%		70-130	10-SEP-14
Molybdenum (Mo)-Dissolved			96.6		%		70-130	10-SEP-14
Nickel (Ni)-Dissolved			92.6		%		70-130	10-SEP-14
Selenium (Se)-Dissolved			100.3		%		70-130	10-SEP-14
Silver (Ag)-Dissolved			97.1		%		70-130	10-SEP-14
Sodium (Na)-Dissolved			N/A	MS-B	%		-	10-SEP-14
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	10-SEP-14
Thallium (Tl)-Dissolved			98.9		%		70-130	10-SEP-14
Tin (Sn)-Dissolved			98.9		%		70-130	10-SEP-14
Titanium (Ti)-Dissolved			94.0		%		70-130	10-SEP-14
Uranium (U)-Dissolved			99.7		%		70-130	10-SEP-14
Vanadium (V)-Dissolved			98.0		%		70-130	10-SEP-14
Zinc (Zn)-Dissolved			95.0		%		70-130	10-SEP-14
MET-DIS-LOW-ICP-VA	Water							
Batch R2943812								
WG1947666-2 CRM		**VA-HIGH-WATRM**						
Calcium (Ca)-Dissolved			103.1		%		80-120	09-SEP-14
Iron (Fe)-Dissolved			99.1		%		80-120	09-SEP-14
Magnesium (Mg)-Dissolved			104.6		%		80-120	09-SEP-14
Phosphorus (P)-Dissolved			98.6		%		80-120	09-SEP-14
Potassium (K)-Dissolved			99.5		%		80-120	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-LOW-ICP-VA	Water							
Batch R2943812								
WG1947666-2 CRM		**VA-HIGH-WATRM**						
Silicon (Si)-Dissolved			100.7		%		80-120	09-SEP-14
WG1947666-1 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	09-SEP-14
Magnesium (Mg)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Potassium (K)-Dissolved			<0.10		mg/L		0.1	09-SEP-14
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
MET-T-CCMS-VA	Water							
Batch R2943403								
WG1947899-3 CRM		**VA-HIGH-WATRM**						
Aluminum (Al)-Total			109.3		%		80-120	09-SEP-14
Antimony (Sb)-Total			108.9		%		80-120	09-SEP-14
Arsenic (As)-Total			106.6		%		80-120	09-SEP-14
Barium (Ba)-Total			106.9		%		80-120	09-SEP-14
Beryllium (Be)-Total			109.0		%		80-120	09-SEP-14
Bismuth (Bi)-Total			105.8		%		80-120	09-SEP-14
Boron (B)-Total			98.4		%		80-120	09-SEP-14
Cadmium (Cd)-Total			104.8		%		80-120	09-SEP-14
Chromium (Cr)-Total			105.9		%		80-120	09-SEP-14
Cobalt (Co)-Total			105.3		%		80-120	09-SEP-14
Copper (Cu)-Total			102.6		%		80-120	09-SEP-14
Lead (Pb)-Total			106.0		%		80-120	09-SEP-14
Lithium (Li)-Total			107.4		%		80-120	09-SEP-14
Manganese (Mn)-Total			106.8		%		80-120	09-SEP-14
Molybdenum (Mo)-Total			107.4		%		80-120	09-SEP-14
Nickel (Ni)-Total			106.2		%		80-120	09-SEP-14
Selenium (Se)-Total			108.1		%		80-120	09-SEP-14
Silver (Ag)-Total			106.4		%		80-120	09-SEP-14
Sodium (Na)-Total			106.2		%		80-120	09-SEP-14
Strontium (Sr)-Total			108.2		%		80-120	09-SEP-14
Thallium (Tl)-Total			106.4		%		80-120	09-SEP-14
Tin (Sn)-Total			107.7		%		80-120	09-SEP-14
Titanium (Ti)-Total			100.9		%		80-120	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	Water							
Batch R2943403								
WG1947899-3 CRM		**VA-HIGH-WATRM**						
Uranium (U)-Total			106.1		%		80-120	09-SEP-14
Vanadium (V)-Total			106.5		%		80-120	09-SEP-14
Zinc (Zn)-Total			102.7		%		80-120	09-SEP-14
WG1947899-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	09-SEP-14
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Arsenic (As)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Barium (Ba)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Bismuth (Bi)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Boron (B)-Total			<0.010		mg/L		0.01	09-SEP-14
Cadmium (Cd)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Copper (Cu)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Lead (Pb)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Lithium (Li)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	09-SEP-14
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	09-SEP-14
Selenium (Se)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Silver (Ag)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Sodium (Na)-Total			<0.050		mg/L		0.05	09-SEP-14
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	09-SEP-14
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Tin (Sn)-Total			<0.00010		mg/L		0.0001	09-SEP-14
Titanium (Ti)-Total			<0.010		mg/L		0.01	09-SEP-14
Uranium (U)-Total			<0.000010		mg/L		0.00001	09-SEP-14
Vanadium (V)-Total			<0.0010		mg/L		0.001	09-SEP-14
Zinc (Zn)-Total			<0.0030		mg/L		0.003	09-SEP-14
Batch R2943770								
WG1947899-2 DUP		**L1514340-1**						
Aluminum (Al)-Total		385	384		mg/L	0.2	20	10-SEP-14
Antimony (Sb)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	10-SEP-14
Arsenic (As)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	10-SEP-14
Barium (Ba)-Total		0.0073	0.0075		mg/L	2.8	20	10-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	Water							
Batch R2943770								
WG1947899-2 DUP		**L1514340-1**						
Beryllium (Be)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	10-SEP-14
Bismuth (Bi)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	10-SEP-14
Boron (B)-Total		<0.20	<0.20	RPD-NA	mg/L	N/A	20	10-SEP-14
Cadmium (Cd)-Total		0.00021	<0.00020	RPD-NA	mg/L	N/A	20	10-SEP-14
Chromium (Cr)-Total		0.0029	0.0025		mg/L	17	20	10-SEP-14
Cobalt (Co)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	10-SEP-14
Copper (Cu)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	10-SEP-14
Lead (Pb)-Total		0.0076	0.0075		mg/L	1.2	20	10-SEP-14
Lithium (Li)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	10-SEP-14
Manganese (Mn)-Total		0.0130	0.0113		mg/L	14	20	10-SEP-14
Molybdenum (Mo)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	10-SEP-14
Nickel (Ni)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	10-SEP-14
Selenium (Se)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	10-SEP-14
Silver (Ag)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	10-SEP-14
Sodium (Na)-Total		2.9	2.8		mg/L	4.1	20	10-SEP-14
Strontium (Sr)-Total		0.0137	0.0136		mg/L	0.9	20	10-SEP-14
Thallium (Tl)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	10-SEP-14
Tin (Sn)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	10-SEP-14
Titanium (Ti)-Total		<0.20	<0.20	RPD-NA	mg/L	N/A	20	10-SEP-14
Uranium (U)-Total		0.00028	0.00021	J	mg/L	0.00006	0.0004	10-SEP-14
Vanadium (V)-Total		<0.020	<0.020	RPD-NA	mg/L	N/A	20	10-SEP-14
Zinc (Zn)-Total		0.137	0.145		mg/L	5.7	20	10-SEP-14
WG1947899-1 MB								
Manganese (Mn)-Total			<0.000050		mg/L		0.00005	10-SEP-14
MET-TOT-LOW-ICP-VA	Water							
Batch R2943458								
WG1947899-3 CRM		**VA-HIGH-WATRM**						
Calcium (Ca)-Total			103.2		%		80-120	09-SEP-14
Iron (Fe)-Total			97.3		%		80-120	09-SEP-14
Magnesium (Mg)-Total			102.4		%		80-120	09-SEP-14
Phosphorus (P)-Total			101.8		%		80-120	09-SEP-14
Potassium (K)-Total			99.7		%		80-120	09-SEP-14
Silicon (Si)-Total			98.9		%		80-120	09-SEP-14
WG1947899-1 MB								
Calcium (Ca)-Total			<0.050		mg/L		0.05	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-TOT-LOW-ICP-VA	Water							
Batch R2943458								
WG1947899-1 MB								
Iron (Fe)-Total			<0.010		mg/L		0.01	09-SEP-14
Magnesium (Mg)-Total			<0.050		mg/L		0.05	09-SEP-14
Phosphorus (P)-Total			<0.050		mg/L		0.05	09-SEP-14
Potassium (K)-Total			<0.10		mg/L		0.1	09-SEP-14
Silicon (Si)-Total			<0.050		mg/L		0.05	09-SEP-14
Batch R2943758								
WG1947899-2 DUP		**L1514340-1**						
Calcium (Ca)-Total		12.6	12.6		mg/L	0.1	20	10-SEP-14
Iron (Fe)-Total		0.073	0.068		mg/L	7.2	20	10-SEP-14
Magnesium (Mg)-Total		1.92	1.92		mg/L	0.3	20	10-SEP-14
Phosphorus (P)-Total		<0.25	<0.25	RPD-NA	mg/L	N/A	20	10-SEP-14
Potassium (K)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	20	10-SEP-14
Silicon (Si)-Total		2.29	2.27		mg/L	1.0	20	10-SEP-14
PH-PCT-VA	Water							
Batch R2943649								
WG1947450-25 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	09-SEP-14
WG1947450-26 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-27 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	09-SEP-14
WG1947450-28 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-29 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-30 CRM		**VA-PH7-BUF**						
pH			6.99		pH		6.9-7.1	09-SEP-14
WG1947450-31 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-32 CRM		**VA-PH7-BUF**						
pH			7.03		pH		6.9-7.1	09-SEP-14
S-DIS-ICP-VA	Water							
Batch R2943812								
WG1947666-2 CRM		**VA-HIGH-WATRM**						
Sulfur (S)-Dissolved			102.2		%		80-120	09-SEP-14
WG1947666-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
S-DIS-ICP-VA	Water							
Batch R2943812								
WG1947666-1 MB								
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	09-SEP-14
S-TOT-ICP-VA	Water							
Batch R2943458								
WG1947899-3 CRM		**VA-HIGH-WATRM**						
Sulfur (S)-Total			104.2		%		80-120	09-SEP-14
WG1947899-1 MB								
Sulfur (S)-Total			<0.50		mg/L		0.5	09-SEP-14
Batch R2943758								
WG1947899-2 DUP		**L1514340-1**						
Sulfur (S)-Total		714	711		mg/L	0.4	20	10-SEP-14
SO4-TUR-VA	Water							
Batch R2943291								
WG1948014-2 CRM		**VA-SO4-L-CONTROL**						
Sulfate (SO4)			98.4		%		85-115	10-SEP-14
WG1948014-6 CRM		**VA-SO4-H-CONTROL**						
Sulfate (SO4)			102.8		%		85-115	10-SEP-14
WG1948014-1 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	10-SEP-14
WG1948014-5 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	10-SEP-14
WG1948014-4 MS		**L1512411-2**						
Sulfate (SO4)			92.1		%		75-125	10-SEP-14
WG1948014-8 MS		**L1510555-1**						
Sulfate (SO4)			N/A	MS-B	%		-	10-SEP-14

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH by Meter (Automated)							
	1	06-SEP-14 20:50	09-SEP-14 23:00	0.25	74	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1514340 were received on 07-SEP-14 09:30.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

WATER & GENERAL CHEMISTRY REQUISITION

Province Of British Columbia

Ministry of Environment

Maxxam Analytics Inc.
4606 Canada Way
Burnaby, BC V5G1K5

Req # 50212395

Urgent?	Csr No.	Office 10	Client CA
Study		Project N/A	
Lab	Maxxam Analytics Inc.		
Ministry Contact	NCOBEE Nicole Obee		
Sampler	Nicole Obee		
Signature			
EMS Id		Well Plate #	
Location	Mya Falls Mine Sarcee Natural		

Sampling Agency

Code 10 Name Vancouver Island, Nanaimo
Address 2080-A Labieux Road
City Nanaimo
Postal Code V9T6J9 Phone (250)751-3100

Number of Containers

Instructions To Lab Pls include total and dissolved mercury at ICPMS level

State FW Descriptor GE Collection Method GRB

No.	Class	Collection Start YYYY-MM-DD HH:MI	Collection End YYYY-MM-DD HH:MI	Depth Upper	Depth Lower	Tide
1	REG	2014-09-06	2014-09-06 2050			
2	QAC	"	" 2050			
3						
4						
5						
6						

RUSH

Priority processing

GENERAL (1L)		Med'm	Pres'n
	Acidity pH 4.5		
	Acidity pH 8.3		
	Alk. Titration Curve		
	Alkalinity: Phen.		
X	Alkalinity: Total: pH 4.5		
	Colour: S.W.		
	Colour: TAC		
	Colour: True		
X	pH		
	Residue: Filterable: 0.45µm (TDS)		
	Residue: Nonfilt., fixed (TSS: fixed)		
	Residue: Nonfilterable (TSS)		
	Residue: Total		
	Residue: Total, Fixed		
	Specific Conductance		
X	Turbidity		

GENERAL (120 mL)		Med'm	Pres'n
	Anion Package (Cl,Br,SO4)		
	Chloride		
	Fluoride		
	Nit.: Nitrate and Nitrite (Col'm)		
	Nitrogen: Nitrate (Col'm)		
	Nitrogen: Nitrite (Col'm)		
	Silica: Reactive		
X	Sulfate		

GENERAL IONS (120 mL)		Med'm	55	Pres'n	64
	Nitrogen: Ammonia (Col'm)				
	Nitrogen: Organic				
	Nitrogen: Tot. Kjeldahl (Calc)				
	Nitrogen: Total				

PHOSPHORUS (120 mL)		Med'm	Pres'n
	Phos. Diss. O-phosphate (Col'm)		
	Phosphorus: Tot. Diss. (Col'm)		
	Phosphorus: Total (Col'm)		

METALS (TOTAL)		Med'm	Pres'n	Med'm	Pres'n
High	Low	55	02		
		Metal Pkg. (ICP)			
	X	Metal Pkg. (ICPMS)			
X		Hardness			
	X	Mercury			
		Sediment, Sieve to < 63µ			

METALS (DISSOLVED; 0.45 MICROMETERS)		Med'm	Pres'n	Med'm	Pres'n
High	Low	55	62		
		Metal Pkg. (ICP)			
	X	Metal Pkg. (ICPMS)			
X		Hardness			
	X	Mercury			

SPECIFIC	Test	Med'm	Pres'n	Med'm	Pres'n
	Biochemical Oxygen D.	02	01		
	Carb. Biochem. Oxygen D.	02	01		
	Carbon: DIC				
X	Carbon: DOC				
	Carbon: TIC				
X	Carbon: TOC				
	Chemical Oxygen D.	04	05		
	Chlorophyll "a"				
	Cyanide: SAD + SCN	02	24		
	Cyanide: WAD	02	24		
	Phaeophytin				
	Residue:NFR Whole Bottle	03	01		
	SWEP (Extraction Prep.)				
	Sulphide: Total	03	08		

ORGANICS		Med'm	Pres'n
	AOX		
	Acid Extr. Herb.-Scan		
	BTEX		
	EPH		
	Glyphosate / AMPA		
	Oil and Grease: Gravimetric		
	Organochlorine P.-scan		
	Organophosphorus P.-scan		
	PAH		
	Penta/Tetra Cl-phenols		
	Phenols (GC/MS)		
	Phenols: Colorimetric		
	Polychlor. Biphenyls		
	Resin Acids		
	Trihalomethanes (THM)		

OTHER	Med'm	Pres'n	Test
			Total and dissolved mercury at ICPMS level

FIELD TEST DETAILS	No.	Parameter	Method	Results	Units

L1514340-COFC

Report ID: EMSR0900

Date: 2014-09-06 12:04

Rec by Paul
Sep 7 9:30 2C.

email to Deb Epps re: sample analysis
① pH ② Metals (2) ③ ? To discuss

BC MINISTRY OF ENVIRONMENT
ATTN: Deborah Epps
Section Head, Provincial Water Quality
2080A Labieux Road
Nanaimo BC V9T 6J9

Date Received: 07-SEP-14
Report Date: 10-SEP-14 17:31 (MT)
Version: FINAL

Client Phone: 604-793-8770

Certificate of Analysis

Lab Work Order #: L1514194

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 50212388
Legal Site Desc:

Dean Watt
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1514194-1
	Description	WATER
	Sampled Date	06-SEP-14
	Sampled Time	20:45
	Client ID	MYRA CREEK AT PUMPHOUSE #4. (PE-06858) 0.5M
Grouping	Analyte	
WATER		
Physical Tests	Hardness (as CaCO3) (mg/L)	170
	pH (pH)	7.05
	Turbidity (NTU)	0.26
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	23.9
	Sulfate (SO4) (mg/L)	174
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.08
	Total Organic Carbon (mg/L)	1.08
Total Metals	Aluminum (Al)-Total (ug/L)	65.0
	Antimony (Sb)-Total (ug/L)	1.73
	Arsenic (As)-Total (ug/L)	0.45
	Barium (Ba)-Total (ug/L)	18.2
	Beryllium (Be)-Total (ug/L)	<0.10
	Bismuth (Bi)-Total (ug/L)	<0.50
	Boron (B)-Total (ug/L)	16
	Cadmium (Cd)-Total (ug/L)	0.621
	Calcium (Ca)-Total (ug/L)	61700
	Chromium (Cr)-Total (ug/L)	<0.10
	Cobalt (Co)-Total (ug/L)	0.63
	Copper (Cu)-Total (ug/L)	11.3
	Iron (Fe)-Total (ug/L)	15
	Lead (Pb)-Total (ug/L)	0.624
	Lithium (Li)-Total (ug/L)	1.58
	Magnesium (Mg)-Total (ug/L)	4510
	Manganese (Mn)-Total (ug/L)	186
	Mercury (Hg)-Total (ug/L)	<0.010
	Molybdenum (Mo)-Total (ug/L)	6.88
	Nickel (Ni)-Total (ug/L)	1.34
	Phosphorus (P)-Total (ug/L)	<50
	Potassium (K)-Total (ug/L)	3170
	Selenium (Se)-Total (ug/L)	0.69
	Silicon (Si)-Total (ug/L)	1950
	Silver (Ag)-Total (ug/L)	0.132
	Sodium (Na)-Total (ug/L)	20700
	Strontium (Sr)-Total (ug/L)	197
	Sulfur (S)-Total (ug/L)	62400
	Thallium (Tl)-Total (ug/L)	<0.010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1514194-1
		Description	WATER
		Sampled Date	06-SEP-14
		Sampled Time	20:45
		Client ID	MYRA CREEK AT PUMPHOUSE #4. (PE-06858) 0.5M
Grouping	**Analyte**		
WATER			
Total Metals	Tin (Sn)-Total (ug/L)		<0.10
	Titanium (Ti)-Total (ug/L)		<10
	Uranium (U)-Total (ug/L)		0.023
	Vanadium (V)-Total (ug/L)		<1.0
	Zinc (Zn)-Total (ug/L)		140
Dissolved Metals	Dissolved Mercury Filtration Location		LAB
	Dissolved Metals Filtration Location		LAB
	Aluminum (Al)-Dissolved (ug/L)		49.2
	Antimony (Sb)-Dissolved (ug/L)		1.72
	Arsenic (As)-Dissolved (ug/L)		0.41
	Barium (Ba)-Dissolved (ug/L)		16.8
	Beryllium (Be)-Dissolved (ug/L)		<0.10
	Bismuth (Bi)-Dissolved (ug/L)		<0.50
	Boron (B)-Dissolved (ug/L)		18
	Cadmium (Cd)-Dissolved (ug/L)		0.599
	Calcium (Ca)-Dissolved (ug/L)		61000
	Chromium (Cr)-Dissolved (ug/L)		<0.10
	Cobalt (Co)-Dissolved (ug/L)		0.58
	Copper (Cu)-Dissolved (ug/L)		7.90
	Iron (Fe)-Dissolved (ug/L)		<10
	Lead (Pb)-Dissolved (ug/L)		0.10
	Lithium (Li)-Dissolved (ug/L)		1.69
	Magnesium (Mg)-Dissolved (ug/L)		4220
	Manganese (Mn)-Dissolved (ug/L)		182
	Mercury (Hg)-Dissolved (ug/L)		<0.010
	Molybdenum (Mo)-Dissolved (ug/L)		6.80
	Nickel (Ni)-Dissolved (ug/L)		1.31
	Phosphorus (P)-Dissolved (ug/L)		<50
	Potassium (K)-Dissolved (ug/L)		2770
	Selenium (Se)-Dissolved (ug/L)		0.63
	Silicon (Si)-Dissolved (ug/L)		1850
	Silver (Ag)-Dissolved (ug/L)		0.127
	Sodium (Na)-Dissolved (ug/L)		20700
	Strontium (Sr)-Dissolved (ug/L)		197
	Sulfur (S)-Dissolved (ug/L)		70700
	Thallium (Tl)-Dissolved (ug/L)		<0.010
	Tin (Sn)-Dissolved (ug/L)		<0.10

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1514194-1				
	Description	WATER				
	Sampled Date	06-SEP-14				
	Sampled Time	20:45				
	Client ID	MYRA CREEK AT PUMPHOUSE #4. (PE-06858) 0.5M				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Titanium (Ti)-Dissolved (ug/L)	<10				
	Uranium (U)-Dissolved (ug/L)	0.022				
	Vanadium (V)-Dissolved (ug/L)	<1.0				
	Zinc (Zn)-Dissolved (ug/L)	135				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Zinc (Zn)-Dissolved	MB-LOR	L1514194-1
Matrix Spike	Sulfate (SO4)	MS-B	L1514194-1
Matrix Spike	Total Organic Carbon	MS-B	L1514194-1
Matrix Spike	Dissolved Organic Carbon	MS-B	L1514194-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-DIS-LOW-CVAFS-VA	Water	Dissolved Mercury in Water by CVAFS(Low)	EPA SW-846 3005A & EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

HG-TOT-LOW-CVAFS-VA	Water	Total Mercury in Water by CVAFS(Low)	EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

MET-DIS-LOW-ICP-VA	Water	Dissolved Metals in Water by ICPOES	EPA 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method

Reference Information

6020A).

MET-TOT-LOW-ICP-VA Water Total Metals in Water by ICPOES EPA 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H "pH Value"

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

S-DIS-ICP-VA Water Dissolved Sulfur in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

S-TOT-ICP-VA Water Total Sulfur in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

SO4-TUR-VA Water Sulfate(SO4) by Turbidity APHA 4500-SO4 E. SULFATE

This analysis is carried out using procedures adapted from APHA Method 4500-SO4 "Sulfate". Sulfate is determined using the turbidimetric method.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 "Turbidity"

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

50212388

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1514194 Report Date: 10-SEP-14

Client: BC MINISTRY OF ENVIRONMENT
Section Head, Provincial Water Quality 2080A Labieux Road
Nanaimo BC V9T 6J9
Contact: Deborah Epps

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-COL-VA	Water							
Batch R2941773								
WG1947162-2 CRM		**VA-ALKL-CONTROL**						
Alkalinity, Total (as CaCO3)			97.4		%		85-115	09-SEP-14
WG1947162-5 CRM		**VA-ALKM-CONTROL**						
Alkalinity, Total (as CaCO3)			103.7		%		85-115	09-SEP-14
WG1947162-8 CRM		**VA-ALKH-CONTROL**						
Alkalinity, Total (as CaCO3)			100.8		%		85-115	09-SEP-14
WG1947162-1 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
WG1947162-10 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
WG1947162-4 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
WG1947162-7 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	09-SEP-14
CARBONS-DOC-VA	Water							
Batch R2943332								
WG1947341-12 LCS								
Dissolved Organic Carbon			103.6		%		80-120	09-SEP-14
WG1947341-16 LCS								
Dissolved Organic Carbon			109.1		%		80-120	09-SEP-14
WG1947341-4 LCS								
Dissolved Organic Carbon			101.8		%		80-120	09-SEP-14
WG1947341-8 LCS								
Dissolved Organic Carbon			105.9		%		80-120	09-SEP-14
WG1947341-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-15 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947341-10 MS		**L1513619-2**						
Dissolved Organic Carbon			100.6		%		70-130	09-SEP-14
WG1947341-14 MS		**L1513418-11**						
Dissolved Organic Carbon			N/A	MS-B	%		-	09-SEP-14
WG1947341-2 MS		**L1514231-1**						
Dissolved Organic Carbon			104.6		%		70-130	09-SEP-14
WG1947341-6 MS		**L1514251-1**						

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	Water							
Batch R2943332								
WG1947341-6 MS		**L1514251-1**						
Dissolved Organic Carbon			106.5		%		70-130	09-SEP-14
CARBONS-TOC-VA	Water							
Batch R2943331								
WG1947339-1 LCS								
Total Organic Carbon			100.0		%		80-120	09-SEP-14
WG1947339-13 LCS								
Total Organic Carbon			99.6		%		80-120	09-SEP-14
WG1947339-17 LCS								
Total Organic Carbon			101.1		%		80-120	09-SEP-14
WG1947339-5 LCS								
Total Organic Carbon			102.0		%		80-120	09-SEP-14
WG1947339-9 LCS								
Total Organic Carbon			99.95		%		80-120	09-SEP-14
WG1947339-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-16 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-14
WG1947339-15 MS		**L1513418-11**						
Total Organic Carbon			N/A	MS-B	%		-	09-SEP-14
WG1947339-3 MS		**L1514231-1**						
Total Organic Carbon			103.0		%		70-130	09-SEP-14
WG1947339-7 MS		**L1514251-1**						
Total Organic Carbon			102.5		%		70-130	09-SEP-14
HG-DIS-LOW-CVAFS-VA	Water							
Batch R2942725								
WG1947233-3 LCS								
Mercury (Hg)-Dissolved			89.2		%		80-120	09-SEP-14
Batch R2943546								
WG1947233-1 MB								
Mercury (Hg)-Dissolved			<0.000010		mg/L		0.00001	10-SEP-14

Quality Control Report

Workorder: L1514194 Report Date: 10-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-TOT-LOW-CVAFS-VA	Water							
Batch R2943546								
WG1948561-2 LCS								
Mercury (Hg)-Total			94.4		%		80-120	10-SEP-14
WG1948561-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	10-SEP-14
WG1948561-4 MS		**L1514553-10**						
Mercury (Hg)-Total			102.0		%		70-130	10-SEP-14
WG1948561-5 MS		**L1514611-1**						
Mercury (Hg)-Total			85.0		%		70-130	10-SEP-14
MET-D-CCMS-VA	Water							
Batch R2942770								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Aluminum (Al)-Dissolved			102.1		%		80-120	09-SEP-14
Antimony (Sb)-Dissolved			97.3		%		80-120	09-SEP-14
Arsenic (As)-Dissolved			97.4		%		80-120	09-SEP-14
Barium (Ba)-Dissolved			98.6		%		80-120	09-SEP-14
Beryllium (Be)-Dissolved			97.7		%		80-120	09-SEP-14
Bismuth (Bi)-Dissolved			97.7		%		80-120	09-SEP-14
Boron (B)-Dissolved			85.5		%		80-120	09-SEP-14
Cadmium (Cd)-Dissolved			96.8		%		80-120	09-SEP-14
Chromium (Cr)-Dissolved			96.9		%		80-120	09-SEP-14
Cobalt (Co)-Dissolved			96.3		%		80-120	09-SEP-14
Copper (Cu)-Dissolved			95.4		%		80-120	09-SEP-14
Lead (Pb)-Dissolved			96.9		%		80-120	09-SEP-14
Lithium (Li)-Dissolved			99.2		%		80-120	09-SEP-14
Manganese (Mn)-Dissolved			99.6		%		80-120	09-SEP-14
Molybdenum (Mo)-Dissolved			98.5		%		80-120	09-SEP-14
Nickel (Ni)-Dissolved			98.2		%		80-120	09-SEP-14
Selenium (Se)-Dissolved			98.9		%		80-120	09-SEP-14
Silver (Ag)-Dissolved			98.9		%		80-120	09-SEP-14
Sodium (Na)-Dissolved			97.2		%		80-120	09-SEP-14
Strontium (Sr)-Dissolved			99.1		%		80-120	09-SEP-14
Thallium (Tl)-Dissolved			98.2		%		80-120	09-SEP-14
Tin (Sn)-Dissolved			97.1		%		80-120	09-SEP-14
Titanium (Ti)-Dissolved			99.4		%		80-120	09-SEP-14
Uranium (U)-Dissolved			99.5		%		80-120	09-SEP-14
Vanadium (V)-Dissolved			97.4		%		80-120	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	Water							
Batch R2942770								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Zinc (Zn)-Dissolved			95.8		%		80-120	09-SEP-14
WG1947233-1 MB								
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	09-SEP-14
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Bismuth (Bi)-Dissolved			<0.00050		mg/L		0.0005	09-SEP-14
Boron (B)-Dissolved			<0.010		mg/L		0.01	09-SEP-14
Cadmium (Cd)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	09-SEP-14
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Lithium (Li)-Dissolved			<0.00050		mg/L		0.0005	09-SEP-14
Manganese (Mn)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	09-SEP-14
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	09-SEP-14
Selenium (Se)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	09-SEP-14
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	09-SEP-14
Titanium (Ti)-Dissolved			<0.010		mg/L		0.01	09-SEP-14
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	09-SEP-14
Vanadium (V)-Dissolved			<0.0010		mg/L		0.001	09-SEP-14
Zinc (Zn)-Dissolved			0.0024	MB-LOR	mg/L		0.001	09-SEP-14
MET-DIS-LOW-ICP-VA	Water							
Batch R2942645								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Calcium (Ca)-Dissolved			101.0		%		80-120	09-SEP-14
Iron (Fe)-Dissolved			95.0		%		80-120	09-SEP-14
Magnesium (Mg)-Dissolved			100.6		%		80-120	09-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-LOW-ICP-VA	Water							
Batch R2942645								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Phosphorus (P)-Dissolved			99.6		%		80-120	09-SEP-14
Potassium (K)-Dissolved			97.4		%		80-120	09-SEP-14
Silicon (Si)-Dissolved			98.5		%		80-120	09-SEP-14
WG1947233-1 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	09-SEP-14
Magnesium (Mg)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
Potassium (K)-Dissolved			<0.10		mg/L		0.1	09-SEP-14
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	09-SEP-14
MET-T-CCMS-VA	Water							
Batch R2943713								
WG1948036-3 CRM		**VA-HIGH-WATRM**						
Aluminum (Al)-Total			97.2		%		80-120	10-SEP-14
Antimony (Sb)-Total			97.6		%		80-120	10-SEP-14
Arsenic (As)-Total			97.1		%		80-120	10-SEP-14
Barium (Ba)-Total			102.9		%		80-120	10-SEP-14
Beryllium (Be)-Total			93.5		%		80-120	10-SEP-14
Bismuth (Bi)-Total			92.8		%		80-120	10-SEP-14
Boron (B)-Total			91.0		%		80-120	10-SEP-14
Cadmium (Cd)-Total			96.7		%		80-120	10-SEP-14
Chromium (Cr)-Total			97.3		%		80-120	10-SEP-14
Cobalt (Co)-Total			97.1		%		80-120	10-SEP-14
Copper (Cu)-Total			94.3		%		80-120	10-SEP-14
Lead (Pb)-Total			91.4		%		80-120	10-SEP-14
Lithium (Li)-Total			94.8		%		80-120	10-SEP-14
Manganese (Mn)-Total			98.1		%		80-120	10-SEP-14
Molybdenum (Mo)-Total			93.8		%		80-120	10-SEP-14
Nickel (Ni)-Total			95.4		%		80-120	10-SEP-14
Selenium (Se)-Total			93.9		%		80-120	10-SEP-14
Silver (Ag)-Total			91.8		%		80-120	10-SEP-14
Sodium (Na)-Total			98.1		%		80-120	10-SEP-14
Strontium (Sr)-Total			94.4		%		80-120	10-SEP-14
Thallium (Tl)-Total			92.6		%		80-120	10-SEP-14

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	Water							
Batch R2943713								
WG1948036-3 CRM		**VA-HIGH-WATRM**						
Tin (Sn)-Total			95.5		%		80-120	10-SEP-14
Titanium (Ti)-Total			100.5		%		80-120	10-SEP-14
Uranium (U)-Total			91.5		%		80-120	10-SEP-14
Vanadium (V)-Total			98.4		%		80-120	10-SEP-14
Zinc (Zn)-Total			93.4		%		80-120	10-SEP-14
WG1948036-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	10-SEP-14
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	10-SEP-14
Arsenic (As)-Total			<0.00010		mg/L		0.0001	10-SEP-14
Barium (Ba)-Total			<0.000050		mg/L		0.00005	10-SEP-14
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	10-SEP-14
Bismuth (Bi)-Total			<0.00050		mg/L		0.0005	10-SEP-14
Boron (B)-Total			<0.010		mg/L		0.01	10-SEP-14
Cadmium (Cd)-Total			<0.000010		mg/L		0.00001	10-SEP-14
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	10-SEP-14
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	10-SEP-14
Copper (Cu)-Total			<0.00050		mg/L		0.0005	10-SEP-14
Lead (Pb)-Total			<0.000050		mg/L		0.00005	10-SEP-14
Lithium (Li)-Total			<0.00050		mg/L		0.0005	10-SEP-14
Manganese (Mn)-Total			<0.000050		mg/L		0.00005	10-SEP-14
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	10-SEP-14
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	10-SEP-14
Selenium (Se)-Total			<0.00010		mg/L		0.0001	10-SEP-14
Silver (Ag)-Total			<0.000010		mg/L		0.00001	10-SEP-14
Sodium (Na)-Total			<0.050		mg/L		0.05	10-SEP-14
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	10-SEP-14
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	10-SEP-14
Tin (Sn)-Total			<0.00010		mg/L		0.0001	10-SEP-14
Titanium (Ti)-Total			<0.010		mg/L		0.01	10-SEP-14
Uranium (U)-Total			<0.000010		mg/L		0.00001	10-SEP-14
Vanadium (V)-Total			<0.0010		mg/L		0.001	10-SEP-14
Zinc (Zn)-Total			<0.0030		mg/L		0.003	10-SEP-14
MET-TOT-LOW-ICP-VA	Water							

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-TOT-LOW-ICP-VA	Water							
Batch R2943704								
WG1948036-3 CRM		**VA-HIGH-WATRM**						
Calcium (Ca)-Total			104.6		%		80-120	10-SEP-14
Iron (Fe)-Total			98.6		%		80-120	10-SEP-14
Magnesium (Mg)-Total			104.4		%		80-120	10-SEP-14
Phosphorus (P)-Total			98.7		%		80-120	10-SEP-14
Potassium (K)-Total			101.5		%		80-120	10-SEP-14
Silicon (Si)-Total			103.4		%		80-120	10-SEP-14
WG1948036-1 MB								
Calcium (Ca)-Total			<0.050		mg/L		0.05	10-SEP-14
Iron (Fe)-Total			<0.010		mg/L		0.01	10-SEP-14
Magnesium (Mg)-Total			<0.050		mg/L		0.05	10-SEP-14
Phosphorus (P)-Total			<0.050		mg/L		0.05	10-SEP-14
Potassium (K)-Total			<0.10		mg/L		0.1	10-SEP-14
Silicon (Si)-Total			<0.050		mg/L		0.05	10-SEP-14
PH-PCT-VA	Water							
Batch R2943649								
WG1947450-25 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	09-SEP-14
WG1947450-26 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-27 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	09-SEP-14
WG1947450-28 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-29 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-30 CRM		**VA-PH7-BUF**						
pH			6.99		pH		6.9-7.1	09-SEP-14
WG1947450-31 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	09-SEP-14
WG1947450-32 CRM		**VA-PH7-BUF**						
pH			7.03		pH		6.9-7.1	09-SEP-14
S-DIS-ICP-VA	Water							
Batch R2942645								
WG1947233-2 CRM		**VA-HIGH-WATRM**						
Sulfur (S)-Dissolved			101.7		%		80-120	09-SEP-14
WG1947233-1 MB								

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
S-DIS-ICP-VA	Water							
Batch R2942645								
WG1947233-1 MB								
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	09-SEP-14
S-TOT-ICP-VA	Water							
Batch R2943704								
WG1948036-3 CRM		**VA-HIGH-WATRM**						
Sulfur (S)-Total			102.3		%		80-120	10-SEP-14
WG1948036-1 MB								
Sulfur (S)-Total			<0.50		mg/L		0.5	10-SEP-14
SO4-TUR-VA	Water							
Batch R2943291								
WG1948014-2 CRM		**VA-SO4-L-CONTROL**						
Sulfate (SO4)			98.4		%		85-115	10-SEP-14
WG1948014-6 CRM		**VA-SO4-H-CONTROL**						
Sulfate (SO4)			102.8		%		85-115	10-SEP-14
WG1948014-1 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	10-SEP-14
WG1948014-5 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	10-SEP-14
WG1948014-4 MS		**L1512411-2**						
Sulfate (SO4)			92.1		%		75-125	10-SEP-14
WG1948014-8 MS		**L1510555-1**						
Sulfate (SO4)			N/A	MS-B	%		-	10-SEP-14
TURBIDITY-VA	Water							
Batch R2941561								
WG1947074-2 CRM		**VA-FORM-40**						
Turbidity			101.8		%		85-115	08-SEP-14
WG1947074-1 MB								
Turbidity			<0.10		NTU		0.1	08-SEP-14

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH by Meter (Automated)							
	1	06-SEP-14 20:45	09-SEP-14 23:00	0.25	74	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1514194 were received on 07-SEP-14 09:30.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

WATER & GENERAL CHEMISTRY REQUISITION

Province Of British Columbia

Ministry of Environment

Maxxam Analytics Inc.
4606 Canada Way
Burnaby, BC V5G1K5

Req # 50212388

Urgent?	Csr No.	Office 10	Client CA
Study		Project N/A	
Lab	Maxxam Analytics Inc.		
Ministry Contact	NCOBEE Nicole Obee		
Sampler	Nicole Obee		
Signature			
EMS Id	E206805	Well Plate #	
Location	MYRA CREEK AT PUMPHOUSE #4. (PE-06858)		

Sampling Agency

Code 10 Name Vancouver Island, Nanaimo
Address 2080-A Labieux Road
City Nanaimo
Postal Code V9T6J9 Phone (250)751-3100

Number of Containers

Instructions To Lab Pls include total and dissolved mercury at ICPMS level

State FW Descriptor GE Collection Method GRB

No.	Class	Collection Start YYYY-MM-DD HH:MI	Collection End YYYY-MM-DD HH:MI	Depth Upper	Depth Lower	Tide
1	REG	2014-09-06	2014-09-06 2045	0.5		
2						
3						
4						
5						
6						

RUSH

Priority processing

L1514194-COFC

GENERAL (1L)		Med'm	Pres'n
	Acidity pH 4.5		
	Acidity pH 8.3		
	Alk. Titration Curve		
	Alkalinity: Phen.		
X	Alkalinity: Total: pH 4.5		
	Colour: S.W.		
	Colour: TAC		
	Colour: True		
X	pH		
	Residue: Filterable: 0.45µm (TDS)		
	Residue: Nonfilt., fixed (TSS: fixed)		
	Residue: Nonfilterable (TSS)		
	Residue: Total		
	Residue: Total, Fixed		
	Specific Conductance		
X	Turbidity		

GENERAL (120 mL)		Med'm	Pres'n
	Anion Package (Cl,Br,SO4)		
	Chloride		
	Fluoride		
	Nit.: Nitrate and Nitrite (Col'm)		
	Nitrogen: Nitrate (Col'm)		
	Nitrogen: Nitrite (Col'm)		
	Silica: Reactive		
X	Sulfate		

GENERAL IONS (120 mL)		Med'm	55	Pres'n	64
	Nitrogen: Ammonia (Col'm)				
	Nitrogen: Organic				
	Nitrogen: Tot. Kjeldahl (Calc)				
	Nitrogen: Total				

PHOSPHORUS (120 mL)		Med'm	Pres'n
	Phos. Diss. O-phosphate (Col'm)		
	Phosphorus: Tot. Diss. (Col'm)		
	Phosphorus: Total (Col'm)		

METALS (TOTAL)		Med'm	Pres'n	Med'm	Pres'n
High	Low	55	02		
		Metal Pkg. (ICP)			
	X	Metal Pkg. (ICPMS)			
X		Hardness			
	X	Mercury			
		Sediment, Sieve to < 63µ			

METALS (DISSOLVED; 0.45 MICROMETERS)		Med'm	Pres'n	Med'm	Pres'n
High	Low	55	62		
		Metal Pkg. (ICP)			
	X	Metal Pkg. (ICPMS)			
X		Hardness			
	X	Mercury	✓		

SPECIFIC	Test	Med'm	Pres'n	Med'm	Pres'n
	Biochemical Oxygen D.	02	01		
	Carb. Biochem. Oxygen D.	02	01		
	Carbon: DIC				
X	Carbon: DOC				
	Carbon: TIC				
X	Carbon: TOC				
	Chemical Oxygen D.	04	05		
	Chlorophyll "a"				
	Cyanide: SAD + SCN	02	24		
	Cyanide: WAD	02	24		
	Phaeophytin				
	Residue:NFR Whole Bottle	03	01		
	SWEP (Extraction Prep.)				
	Sulphide: Total	03	08		

ORGANICS		Med'm	Pres'n
	AOX		
	Acid Extr. Herb.-Scan		
	BTEX		
	EPH		
	Glyphosate / AMPA		
	Oil and Grease: Gravimetric		
	Organochlorine P.-scan		
	Organophosphorus P.-scan		
	PAH		
	Penta/Tetra Cl-phenols		
	Phenols (GC/MS)		
	Phenols: Colorimetric		
	Polychlor. Biphenyls		
	Resin Acids		
	Trihalomethanes (THM)		

OTHER	Med'm	Pres'n	Test
			Total and dissolved mercury at ICPMS level

FIELD TEST DETAILS	No.	Parameter	Method	Results	Units

Report ID: EMSR0900

Rec by Paul
Sep 7 9:30 2°C

Date: 2014-09-06 11:44

Austad, Bob ENV:EX

From: Miller, Aaron W ENV:EX
Sent: Friday, September 19, 2014 4:01 PM
To: ENV PPA Situation Report
Cc: Smith, Andy B ENV:EX; Cadden, Don ENV:EX; Miller, Aaron W ENV:EX; Nanaimo ENV Filing ENV:EX
Subject: SR-WC-1 - Nystar Spill, Strathcona Park - UPDATE
Attachments: Nyrstar Mine Spill Situation Report Update Sept 17 2014.pdf

Hi folks:

Here is an updated Situation Report for the above noted occurrence with most recent monitoring results taken by EP on site.

Thanks,

Aaron Miller
Section Head, BC Parks, Central Coast/North Island
Ministry of Environment
BC Parks and Conservation Officer Service Division
1812 Miracle Beach Dr
Black Creek B.C. V9J 1K1
Phone: 250 337-2402
Toll Free: 1 800 663-7867

Situation Report – Update September 17, 2014

To:

(ADM) Assistant Deputy Minister, - Lori Halls;

(EDRO) Executive Director, Regional Operations, BC Parks - A/Tom Bell;

Division Issues Manager, ADM's Office - Danielle Grbavac;

(GCPE) Government Communications & Public Engagement - Kimberley Franklin;

Safety, Compliance & Enforcement Officer - Stuart Walsh;

Region Specific:

Regional Director Don Cadden;

PPA Section Head Aaron Miller;

Cc:

(EDVS) Executive Director, Visitor Services – A/Bob Austad;

(EDPP&M) Executive Director, Parks Planning and Management - Brian Bawtinheimer;

Area Supervisor – Andy Smith ;

(Manager, Visitor Programs) - Angus Carnie;

(Admin Co-ordinator) - Dorothy Hewison

Occurrence Date/Time:

2014-09-05 Time: 12:00 p.m.

Environmental Protection Branch staff reported a spill of cement catalyst from Nyrstar Mine into Myra Creek, Strathcona-Westmin Park. Spill occurred at 12:00 p.m. Friday and EP reported the spill to BC Parks (Don Cadden) at 1:00 a.m. Saturday.;

Title: Nyrstar Mining Spill

SR-WC - 1

Location:

Strathcona-Westmin Park upstream from Buttle Lake. Closest community is Campbell River. Closest park facility is Ralph River campground which is located on Buttle Lake approximately 5 kilometres from the spill site.

More detailed location if necessary (include map if useful)

Agency Response:

Ministry of Mines is lead agency and staff have been notified – Mines Inspector on way to site. Environmental Protection Branch staff (Spill Response officer) is on site to take samples. COS, Vancouver Island Health Authority and City of Campbell River have also been notified.

Alex Grant (Spill Response Officer) from MOE Nanaimo office is the lead contact for MOE.

Aaron Miller is lead contact for BC Parks.

Occurrence Details:

- Sept 8, 2014 - Approximately 16,000 litres of cement catalyst was accidently released into Myra Creek, upstream from Buttle Lake. Mine staff responded immediately and contacted government agencies responsible for response (MOE spill response staff and MEM staff).
- Response staff arrived on site the following morning and samples were taken **(see details below under Sept 17, update below)**.
- No health or public safety concerns for park visitors
- No need for park operational staff to be on the site.

Updates:

September 8, 2014

- Don Cadden had a follow up meeting with the Environmental Protection Branch (EP) staff Sept 8. EP confirmed that Nyrstar mine staff only notified EP at 12:00 a.m. – 12 hours after the event. EP notified BC Parks as soon as they received notification.
- The emergency response plan for Nyrstar mine requires the mine staff to notify government immediately when a spill occurs. That plan was not followed and EP is following up.
- EP will provide BC Parks with a summary of the actions taken since they received notification of the spill and will also provide an update on discussions with Nyrstar around their reporting requirements.

September 9, 2014

Andy Smith, Area Supervisor contacted Ivor McWilliams, Environmental Superintendent of Nyrstar Mining to get more details of spill incident.

- Spill Details: As a safety precaution to deflect random rocks falling from the high wall above the main office complex, surplus 1000 litre plastic "totes" were being used (previously cement barriers had been used but replaced when they were found to cause ricocheting into the parking lot area). These plastic totes originally held "Meyco FA 160" , an accelerant used to speed curing of the shotcrete in the underground mine areas. The totes after being emptied as much as possible still had residual amounts of compound contained in them, which could not be easily flushed out due to treatment needs. As a result when filled with clean water to provide weight and prevent movement in their new containment/protection role, the residual compound mixed with the water to form a low pH solution between 2 and 3 pH.

  During September 5th, as part of an enhancement and upgrade project,16 of these totes were emptied into a ditch catchment system. The water flowed to a sump pump which would normally pump the effluent to the mine's super pond, however the pump's automatic controls failed resulting in an overflow which ultimately lead into Myra Creek. While it is not known why the controls failed at this time, the pump itself was confirmed OK when manually operated.

  As the totes each had a volume of 1000 litres and 16 were emptied, the spill was reported as 16,000 litres of a high acidic solution.

- Water Sampling: Following the spill, samples were taken at the confluence of the ditch and Myra Creek where a pH reading of 4.16 was recorded. Further downstream approximately 50m the pH was recorded at 5.5 while further downstream, approximately 250 m, another sample was taken with a recorded 6.8 pH. The normal average pH of Myra Creek is approximately 7.1 (for information only, the mine's sampling regime has samples taken automatically every 3 hours totalling 8 samples per day). The discharged effluent has no metal content and therefore the impact is believed to be more of a pH related issue.

  Minstry of Environment staff were on site early Sept. 6th to carry out their own sampling procedures. The results of those samples are not known yet.

- Spill Reporting: Protocol was for Environmental Superintendent to report an incident immediately to all official stakeholders including BC Parks.

  The Environmental Superintendent, Ivor McWilliams s.22 at the time and was not reached until 4pm on Sept 5th. The Superintendent relayed known information to Ministry

of Environment staff by 5:30 that same day. Under normal circumstances the Environmental Technician would follow reporting protocol s.22 s.22 A summer student did what they could by gathering information and collecting samples immediately.

Provincial Emergency Program was called by 11:45 pm on Sept 5th once the Superintendent returned and was provided with more information. A notification email was sent out to all official stakeholders/agencies, including BC Parks, at 12:50 am, whose email addresses could be accessed from home. It was later learned that some of these addresses were wrong and a second email was sent on Sept 6th.

- Media: The General Manager of Nyrstar Mine was interviewed by CHEK TV on Sunday morning September 7th and later aired on TV that day.

- Official Incident Report: The mine is required to submit a full report on the incident within 30 days. The report will detail the reasons for the spill, the impacts recorded and solutions

September 17, 2014

The following report was prepared by Nicole Obee, R.P. Bio., Environmental Impact Assessment, Ministry of Environment, Mining Operations (file # PE : 6858):

"A spill of 16 cubic metres of acidic wash water containing aluminum sulphate and 2,2'-iminodiethanol occurred at the NVI-Myra Falls mine on September 5, 2014. Ministry of Environment staff collected water quality samples from Myra Creek and Buttle Lake on September 6, 2014 to determine potential impacts on aquatic life and human health. In addition to surface water grabs, samples were collected at specific depths at the mouth of Myra Creek and in Buttle Lake up to 200 metres from the mouth to target any plume associated with the spill. The collection of samples from within the plume can help determine "worst case" scenario, but don't actually represent water quality throughout the entire water column.

The parameters analysed include pH, conductivity, turbidity, total organic carbon, dissolved organic carbon, hardness, alkalinity, general ions, total and dissolved metals. Samples were not analysed for E.coli. Due to a short hold time for pH samples, field pH results were used instead of the lab samples. Results were compared to the BC water quality guidelines for aquatic life and drinking water, as well as to the 2013 Annual Environmental and Reclamation Report submitted by the mine as part of their operating permit requirements.

Water samples were collected from the following sites and depths:

- Source material
- TP4 Myra Creek at Pumphouse (creek sample)
- Myra Creek below waterfall (creek sample)
- Myra Creek at Buttle Lake, 35 metres from waterfall (lake samples, 0.5 and 3.0 metres deep)
- Three sites in Buttle Lake 200 metres from Myra Falls (lake samples, 0.5, 5.0 and 10.0 metres deep)

Results showed that there were no exceedances of the drinking water guidelines at any receiving environment sites for any of the parameters sampled.

In the source material, pH was very low (3.93) and aluminum and sulphate were very high (385 mg/L and 2,080 mg/L, respectively). Hardness was 40.1 mg/L.

At TP4, the first sample site downstream, pH and aluminum results were similar to levels seen at this site in 2013. Sulphate exceeded the aquatic life guideline, but was not measured at this site in 2013 and so no comparison with typical conditions can be made. Other metals (cadmium, copper and zinc) also exceeded the aquatic life guidelines and were slightly higher than in 2013. However, these metals were higher at TP4 than in the source material, and therefore appear to be unrelated to the spill.

At Myra Creek below the waterfall, surface pH, aluminum and sulphate met the aquatic life guidelines. At Myra Creek at Buttle Lake, at a depth of 3 metres, hardness, sulphate and aluminum were higher than at other sites and depths. Aluminum met the aquatic life guideline, but the measured sulphate (149 mg/L) exceeded the guideline (128 mg/L). As the hardness at this site was 153 mg/L, much higher than in the source material, it is unlikely that these elevated values were the result of the spill.

At Buttle Lake 200 metres from the waterfall, pH, aluminum and sulphate all met the aquatic life guidelines. Results were not elevated above typical conditions, as compared with the 2013 results measured at the nearest regular lake monitoring site.

Based on the relatively small volume of material spilled, the short duration of the spill, and the significant dilution provided by Buttle Lake, there are no concerns for human health, and impacts to aquatic life are expected to be minimal. No further sampling is planned at this time."

Nicole Obee, R.P. Bio.
Environmental Impact Assessment Biologist
Ministry of Environment, Mining Operations

Austad, Bob ENV:EX

From: Cadden, Don ENV:EX
Sent: Wednesday, September 10, 2014 11:04 AM
To: Halls, Lori D ENV:EX; Bell, Tom G ENV:EX; Grbavac, Danielle ENV:EX; Franklin, Kimberley GCPE:EX; Walsh, Stuart G ENV:EX; Miller, Aaron W ENV:EX
Cc: Austad, Bob ENV:EX; Bawtinheimer, Brian ENV:EX; Smith, Andy B ENV:EX; Hewison, Dorothy J ENV:EX; Carnie, Angus A ENV:EX
Subject: RE: Myra Spill Sit Rep.dotx
Attachments: Nyrstar Mine Spill Situation Report Update Sept 9 2014.docx

Updated sit rep to Sept 9, 2014.

Don

Situation Report

To:

(ADM) Assistant Deputy Minister, - Lori Halls;

(EDRO) Executive Director, Regional Operations, BC Parks - A/Tom Bell;

Division Issues Manager, ADM's Office - Danielle Grbavac;

(GCPE) Government Communications & Public Engagement - Kimberley Franklin;

Safety, Compliance & Enforcement Officer - Stuart Walsh;

Region Specific:

Regional Director Don Cadden;

PPA Section Head Aaron Miller;

Cc:

(EDVS) Executive Director, Visitor Services – A/Bob Austad;

(EDPP&M) Executive Director, Parks Planning and Management - Brian Bawtinheimer;

Area Supervisor – Andy Smith ;

(Manager, Visitor Programs) - Angus Carnie;

(Admin Co-ordinator) - Dorothy Hewison

Occurrence Date/Time:

2014-09-05 Time: 12:00 p.m.

Environmental Protection Branch staff reported a spill of cement catalyst from Nyrstar Mine into Myra Creek, Strathcona-Westmin Park. Spill occurred at 12:00 p.m. Friday and EP reported the spill to BC Parks (Don Cadden) at 1:00 a.m. Saturday.;

Title: Nyrstar Mining Spill

SR-WC - 1

Location:

Strathcona-Westmin Park upstream from Buttle Lake. Closest community is Campbell River. Closest park facility is Ralph River campground which is located on Buttle Lake approximately 5 kilometres from the spill site.

More detailed location if necessary (include map if useful)

Agency Response:

Ministry of Mines is lead agency and staff have been notified – Mines Inspector on way to site. Environmental Protection Branch staff (Spill Response officer) is on site to take samples. COS, Vancouver Island Health Authority and City of Campbell River have also been notified.

Alex Grant (Spill Response Officer) from MOE Nanaimo office is the lead contact for MOE.

Aaron Miller is lead contact for BC Parks.

Occurrence Details:

- Approximately 16,000 litres of cement catalyst were accidently released into Myra Creek, upstream from Buttle Lake. Mine staff responded immediately and contacted government agencies responsible for response – MOE spill response staff and MEM staff.
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- No health or public safety concerns for park visitors
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Update:

September 8, 2014

- Don Cadden had a follow up meeting with the Environmental Protection Branch (EP) staff Sept 8. EP confirmed that Nyrstar mine staff only notified EP at 12:00 a.m. – 12 hours after the event. EP notified BC Parks as soon as they received notification.
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- EP will provide BC Parks with a summary of the actions taken since they received notification of the spill and will also provide an update on discussions with Nyrstar around their reporting requirements.

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- Official Incident Report: The mine is required to submit a full report on the incident within 30 days. The report will detail the reasons for the spill, the impacts recorded and solutions

Austad, Bob ENV:EX

From: Cadden, Don ENV:EX
Sent: Saturday, September 6, 2014 2:31 PM
To: Halls, Lori D ENV:EX; Bell, Tom G ENV:EX; Grbavac, Danielle ENV:EX; Franklin, Kimberley GCPE:EX; Walsh, Stuart G ENV:EX; Miller, Aaron W ENV:EX
Cc: Austad, Bob ENV:EX; Bawtinheimer, Brian ENV:EX; Smith, Andy B ENV:EX; Hewison, Dorothy J ENV:EX; Carnie, Angus A ENV:EX
Subject: Myra Spill Sit Rep.dotx
Attachments: Myra Spill Sit Rep.dotx

Sit Rep re: Myra Creek spill.

Situation Report

To:

(ADM) Assistant Deputy Minister, - **Lori Halls**;
(EDRO) Executive Director, Regional Operations, BC Parks - A/**Tom Bell**;
Division Issues Manager, ADM's Office - **Danielle Grbavac**;
(GCPE) Government Communications & Public Engagement - **Kimberley Franklin**;
Safety, Compliance & Enforcement Officer - **Stuart Walsh**;
Region Specific:

(RD) , Regional Director Don Cadden;
(PPA SH) , PPA Section Head Aaron Miller;

Cc:

(EDVS) Executive Director, Visitor Services – A/**Bob Austad**;
(EDPP&M) Executive Director, Parks Planning and Management - **Brian Bawtinheimer**;
Area Supervisor – **Andy Smith** ;
(Manager, Visitor Programs) - **Angus Carnie**;
(Admin Co-ordinator) - **Dorothy Hewison**
Overwrite with Name(s) **add name if required** .

Please note that there are additional ccs for the Wildfire report section.

Occurrence Date/Time:

2014-09-05 Time: 12:00 p.m.

Environmental Protection Branch staff reported a spill of cement catalyst from Nyrstar Mine into Myra Creek, Strathcona-Westmin Park. Spill occurred at 12:00 p.m. Friday and EP reported the spill to BC Parks (Don Cadden) at 1:00 a.m. Saturday.;

Title:

SR-WC - , 1 *(number created by person sending email),* Spill from r *(Title of Occurrence=relates to occurrence type)*

Location:

Provincial Park Strathcona-Westmin Park upstream from Buttle Lake. Closest community is Campbell River. Closest park facility is Ralph River campground which is located on Buttle Lake approximately 10 kilometres from the spill site.

More detailed location if necessary (include map if useful)

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Update:

Click here to enter a date.

- Next update will be Monday morning, Sept 8 when spill response staff provide specific information regarding the nature of the spill and provide estimate of time for lab analysis results.

Page 15 to/à Page 16

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NR

Austad, Bob ENV:EX

From: Cadden, Don ENV:EX
Sent: Monday, September 8, 2014 11:02 AM
To: Cadden, Don ENV:EX; Halls, Lori D ENV:EX; Bell, Tom G ENV:EX; Grbavac, Danielle ENV:EX; Franklin, Kimberley GCPE:EX; Walsh, Stuart G ENV:EX; Miller, Aaron W ENV:EX
Cc: Austad, Bob ENV:EX; Bawtinheimer, Brian ENV:EX; Smith, Andy B ENV:EX; Hewison, Dorothy J ENV:EX; Carnie, Angus A ENV:EX
Subject: RE: Myra Spill Sit Rep.dotx
Attachments: Myra Spill Sit Rep.dotx

Updated sit rep attached.

Don

Situation Report

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Page 21 to/à Page 22

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