Vangorda Creek / Grum Dump West Lobe
Surface Water Surveys 2009

Submitted to:

Daniel Mackie Senior Hydrogeologist

SRK Consulting Inc.

Vancouver, BC Canada

Submitted By:

Laberge
ENVIRONMENTAL SERVICES

October 26, 2009

Background

The following is the result of an assignment from Dan Mackie and Leslie Gomm. The investigators wanted to do two surface water surveys; one along Vangorda Creek below the Vangorda Pit and a second on the west side of the Grum Dump. On October 1, 2009 the surface water surveys were conducted at both flow pathways. Water quality results for the suite of parameters including low-level metals, major ions and physical parameters are included below and digital copies have been forwarded to Dan Mackie and Leslie Gomm. A slight increase in zinc and S04 was detected along the Vangorda Creek pathway. Below the west lobe of the Grum Dump very low zinc values were detected although there was presentation of S04 and elevated conductivity. All waters were slightly alkaline.
L.E.S. handled all shipping and receiving; all samples were analyzed and reported by Maxxam Analytics Inc. in Maxxam A956077.

Task One – Reconnaissance

In August 2009 a brief reconnaissance was done below the toe of the Grum West Dump. The result was that the drainages indicated on the map were dry as far as we walked (about 300 m downstream of the Grum West Dump). On the same day a brief reconnaissance of potential sample sites along Vangorda Creek was conducted to plan access to the proposed sample sites. There were no obstacles observed to collection of any of the proposed samples, although the area below the west lobe of the Grum Dump looked very dry.

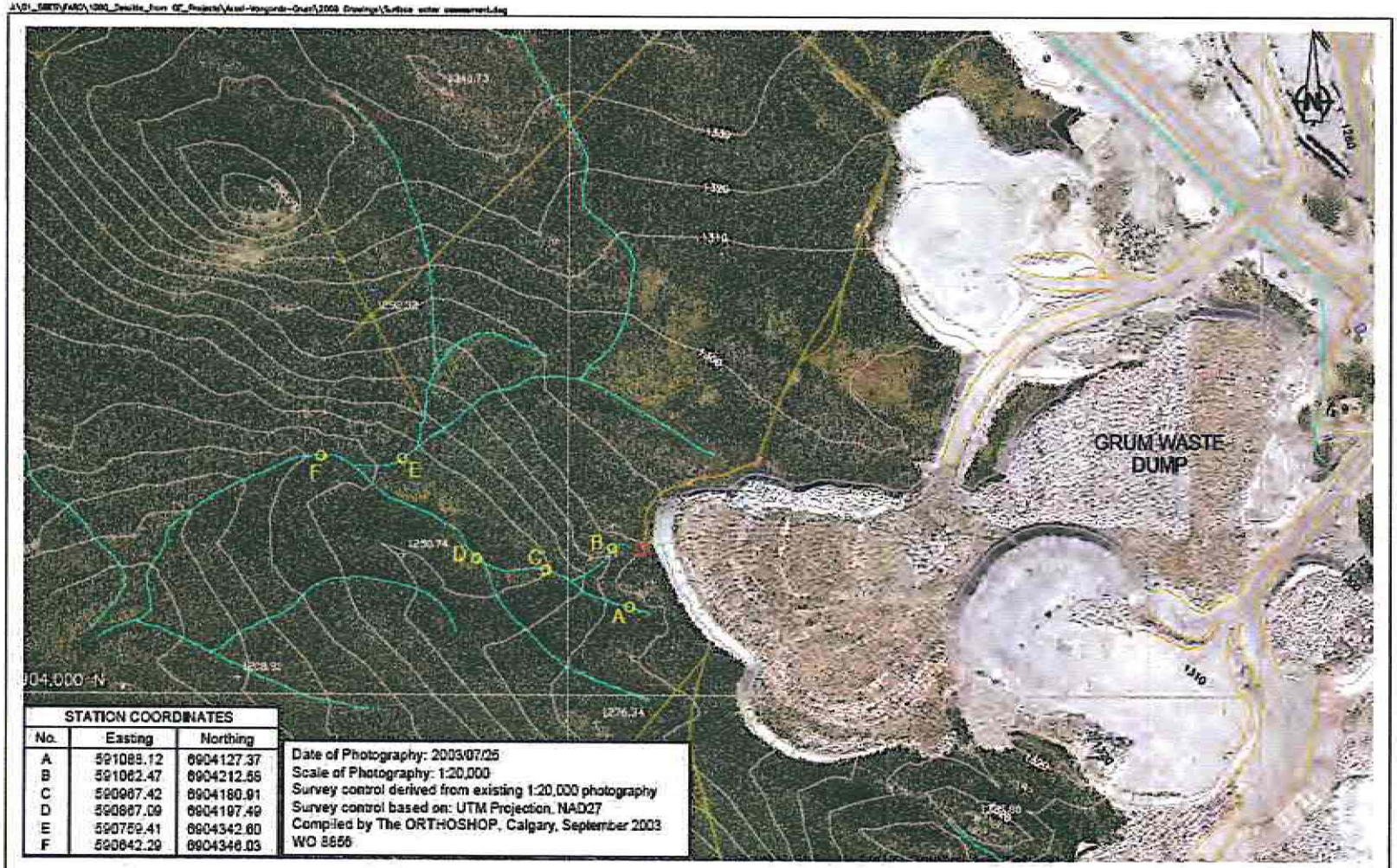
Task Two - Survey

Grum West

The area downstream of the West lobe of the Grum Dump was surveyed on October 1, 2009. We walked to all of the proposed sample sites along all of the indicated pathway. Starting at SRK 2009 wells (GD1301) we walked past site B, which was dry with no sign of flowing water this season. The confluence of A and B was dry with no sign of any flowing water or seasonal flowing water in either A or B channels (these are better described as topographic lows which may contain spring run-off and possibly extreme rainfall event flows only). The site C was found to be dry, and there was no sign of any tributary entering from the south at D. A significant seep was encountered near site D. The seep, sampled as G-1, was just upstream of a marshy pond which flowed into a confined channel through thick willow/sedges flowing towards site F. This area contained two open grassy areas with the channel flowing in a band of willows. The site E was inspected and found to be dry with no sign of channelized flow, although there was a topographic low to the west. The second sample G-2 was collected downstream of site E; in fact the site was close to the proposed site F. The channel began to display signs of continuously flowing water and the gradient increased. There were no other contributing surface water flows along the west Grum Dump pathway. In-situ measurements of pH, Conductivity and temperature were taken along with water samples.

Vangorda Creek

All of the proposed sample sites A through F were visited more or less where indicated on Figure 1 below. Discharge was measured at four of the sites using a Price mini meter meter. In-situ measurements of pH, Conductivity and Temperature were taken with freshly calibrated instruments. Every station was sampled in accordance with standard operating procedure including field filtration for dissolved metals. QA/QC included one field blank for the sampling event.
Site A was situated near the corrugated metal pipe under the haul road. Discharge measurement not possible due to steep grade and rapids.
Site B was about 100 m downstream of A and due north of the Little Creek pond.
Site C was in between the Moose pond and Little Creek pond.
Site D was downstream of the SRK06-08 and 09 wells downstream of Moose Pond and just upstream of the confluence of Tributary A.
Site E was just downstream of Tributary A
Site F was accessed from SRK05-07 and was taken downstream of Sweet Creek.



STATION COORDINATES		
No.	Easting	Northing
A	591088.12	6904127.37
B	591062.47	6904212.55
C	590987.42	6904180.91
D	590967.09	6904197.49
E	590759.41	6904342.60
F	590842.29	6904346.03

Date of Photography: 2003/07/25
Scale of Photography: 1:20,000
Survey control derived from existing 1:20,000 photography
Survey control based on: UTM Projection, NAD27
Compiled by The ORTHOSHOP, Calgary, September 2003
WO 8856

Note:

Red circle indicates existing groundwater wells P09-GD1,2 & 3. Check water level and sample if feasible.

1:7500 0 100 200 300 Meters

SRK Consulting Engineers and Scientists

SRK JOB NO.: 1CY001.034

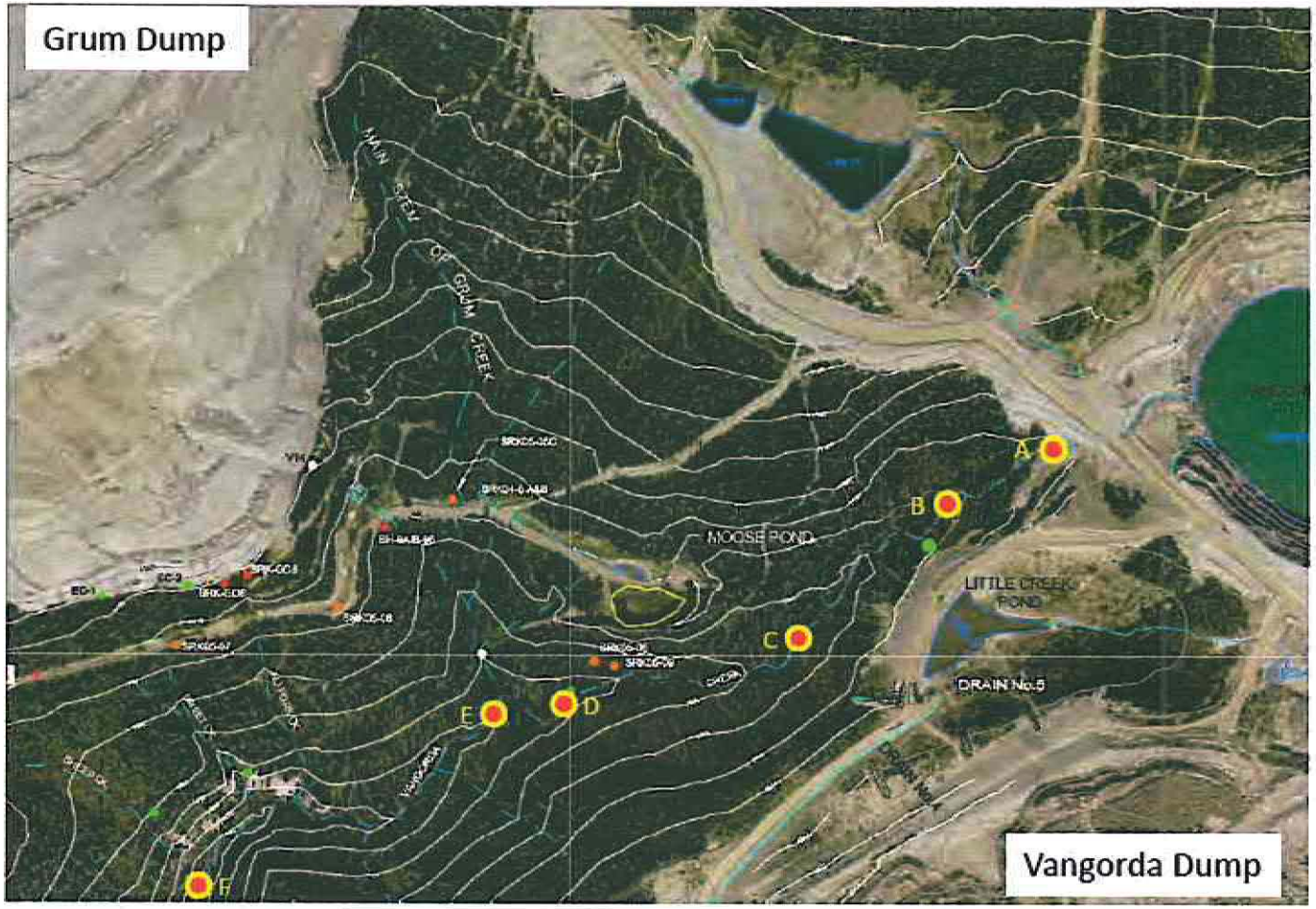
FILE NAME: Surface water assessment.dwg

Faro Mine Closure
Fermeture de la mine Faro

2009 Faro Groundwater Investigations

Grum Dump West
Surface Water Assessment

DATE: Sep. 2009 | APPROVED: - | FIGURE: 1



Water Quality and Flow

SRK Consulting
Engineers and Scientists

2009 Faro Groundwater Investigations

Vangorda Creek Surface Water Assessment

PROJECT:	DATE:	APPROVED:	FIGURE:
n/a	May 2009		2

Table 1 – summary of in-situ measurements

Time	Station	UTM mN Nad 27	UTM mE	Field pH	T°C	Cond	Q m^3/s	
14:00	Vangorda A	593634	6903253	7.52	2.4	111	nm	Near outlet of cmp, no Q possible.
14:30	Vangorda B	593345	6903098	7.46	2.5	118	0.398	Site is north of Little Creek pond
13:15	Vangorda C	593301	6903030	7.48	2.6	120	0.403	Site is between little creek and moose ponds
16:45	Vangorda D	na		7.58	2.9	197	0.399	Site is just upstream of Grum Creek/Tributary A
16:00	Vangorda E	592912	6902309	7.68	2.9	207	nm	Site is just downstream of confluence Tributary A
15:30	Vangorda F	592558	6902247	7.70	2.7	267	0.443	Accessed from SRK05-07. site is downstream of Sweet Ck.
18:00	Grum West G-1	590928	6904219	7.68	1.6	1750	1.5 L/sec	Seep daylights here, forms confined channel
19:00	Grum West G-2	590692	6904332	7.75	1.9	1280	2 L/sec	Channel starts to show signs of continuously flowing water


Vangorda Site A


Vangorda Site B


Vangorda Site C


Vangorda Site F


Grum west site G-1 near Site D


Grum west pond downstream G-1


Grum west typical terrain near E


Grum west channel near E


Grum west site G-2 near Site F

Your Project #: VANGORDA-GRUM SURFACE WATER
Your C.O.C. #: 06304779

Attention: Ken Nordin
LABERGE ENVIRONMENTAL SERVICES
WHITEHORSE
406 Ogilvie Street
PO Box 21072
Whitehorse, YT
CANADA Y1A 6P7

Report Date: 2009/10/14

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A956077
Received: 2009/10/05, 12:10

Sample Matrix: Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 a	9	N/A	2009/10/10	BRN SOP-00281 R3.0	Based on SM-2310
Alkalinity - Water	9	2009/10/13	2009/10/14	BRN SOP-00264 R4.0	Based on SM2320B
Bromide (ISE)	9	N/A	2009/10/13	BRN SOP-00245 R1.0	EPA 9211
Chloride by Automated Colourimetry	8	N/A	2009/10/09	BRN-SOP 00234 R3.0	Based on EPA 325.2
Chloride by Automated Colourimetry	1	N/A	2009/10/10	BRN-SOP 00234 R3.0	Based on EPA 325.2
Conductance - water	9	N/A	2009/10/14	BRN SOP-00264 R2.0	Based on SM-2510B
Fluoride - Mining Clients	9	N/A	2009/10/08	BRN SOP-00225 R1.0	Based SM - 4500 F C
Hardness Total (calculated as CaCO3)	9	N/A	2009/10/11		
Hardness (calculated as CaCO3)	9	N/A	2009/10/13		
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	9	N/A	2009/10/11	BRN SOP-00205 R7.0	Based on EPA 200.8
Elements by ICPMS Low Level (dissolved) a	9	N/A	2009/10/11	BRN SOP-00205 R7.0	Based on EPA 200.8
Elements by ICPMS Low Level (total) a	9	2009/10/09	2009/10/10	BRN SOP-00205 R7.0	Based on EPA 200.8
Na, K, Ca, Mg, S by CRC ICPMS (total)	9	2009/10/09	2009/10/10	BRN SOP-00205 R7.0	Based on EPA 200.8
Filter and HNO3 Preserve for Metals	9	N/A	2009/10/09	BRN WI-00008 R1.0	Based on EPA 200.2
pH Water	9	N/A	2009/10/14	BRN SOP-00264 R4.0	Based on SM-4500H+B
Sulphate by Automated Colourimetry	8	N/A	2009/10/09	BRN-SOP 00243 R1.0	Based on EPA 375.4
Sulphate by Automated Colourimetry	1	N/A	2009/10/10	BRN-SOP 00243 R1.0	Based on EPA 375.4

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

(1) SOC/CAEAL

Encryption Key

Ashley Nivison
14 Oct 2009 14:24:16 -07:00

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

ASHLEY NIVISON, BSY Customer Service
Email: ashley.nivison@maxxamanalytics.com
Phone# (604) 444-4808

Sampler Initials: KN

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		R13373		R13374		
Sampling Date		2009/10/01 14:00		2009/10/01 14:30		
COC Number		08304779		08304779		
	Units	VANGORDA CREEK A	QC Batch	VANGORDA CREEK B	RDL	QC Batch
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	3482975	<0.5	0.5	3482975
Acidity (pH 8.3)	mg/L	0.6	3482975	1.4	0.5	3482975
Bromide (Br)	mg/L	<0.4	3485735	<0.4	0.4	3485735
Fluoride (F)	mg/L	0.02	3480002	0.07	0.01	3480002
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	26	3486943	26	0.5	3486943
Alkalinity (PP as CaCO3)	mg/L	<0.5	3486943	<0.5	0.5	3486943
Bicarbonate (HCO3)	mg/L	31	3486943	32	0.5	3486943
Carbonate (CO3)	mg/L	<0.5	3486943	<0.5	0.5	3486943
Hydroxide (OH)	mg/L	<0.5	3486943	<0.5	0.5	3486943
Anions						
Dissolved Sulphate (SO4)	mg/L	25	3485948	28	0.5	3482653
Dissolved Chloride (Cl)	mg/L	0.5	3485847	1.2	0.5	3482132
Physical Properties						
Conductivity	uS/cm	114	3486941	119	1	3486941
pH	pH Units	7.6	3486939	7.6		3486939
RDL = Reportable Detection Limit						

Sampler Initials: KN

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		R13375	R13376	R13377		
Sampling Date		2009/10/01 13:15	2009/10/01 16:45	2009/10/01 16:00		
COC Number		08304779	08304779	08304779		
	Units	VANGORDA CREEK C	VANGORDA CREEK D	VANGORDA CREEK E	RDL	QC Batch
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	<0.5	<0.5	0.5	3482975
Acidity (pH 8.3)	mg/L	1.5	2.0	1.5	0.5	3482975
Bromide (Br)	mg/L	<0.4	<0.4	<0.4	0.4	3485735
Fluoride (F)	mg/L	0.07	0.07	0.07	0.01	3480002
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	28	35	37	0.5	3486943
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	<0.5	0.5	3486943
Bicarbonate (HCO3)	mg/L	34	43	45	0.5	3486943
Carbonate (CO3)	mg/L	<0.5	<0.5	<0.5	0.5	3486943
Hydroxide (OH)	mg/L	<0.5	<0.5	<0.5	0.5	3486943
Anions						
Dissolved Sulphate (SO4)	mg/L	31	55	59	0.5	3482653
Dissolved Chloride (Cl)	mg/L	<0.5	<0.5	<0.5	0.5	3482132
Physical Properties						
Conductivity	uS/cm	127	197	209	1	3486941
pH	pH Units	7.6	7.7	7.8		3486939
RDL = Reportable Detection Limit						

Sampler Initials: KN

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		R13378		R13379		
Sampling Date		2009/10/01 15:30		2009/10/01 16:00		
COC Number		08304779		08304779		
	Units	VANGORDA CREEK F	RDL	GRUM WEST DUMP FLOW G-1	RDL	QC Batch
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	0.5	<0.5	0.5	3482975
Acidity (pH 8.3)	mg/L	1.4	0.5	15.4	0.5	3482975
Bromide (Br)	mg/L	<0.4	0.4	<0.4	0.4	3485735
Fluoride (F)	mg/L	0.07	0.01	0.12	0.01	3480002
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	N/A	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	41	0.5	330	0.5	3486943
Alkalinity (PP as CaCO3)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Bicarbonate (HCO3)	mg/L	50	0.5	400	0.5	3486943
Carbonate (CO3)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Hydroxide (OH)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Anions						
Dissolved Sulphate (SO4)	mg/L	67	0.5	660	5	3482653
Dissolved Chloride (Cl)	mg/L	<0.5	0.5	1.0	0.5	3482132
Physical Properties						
Conductivity	uS/cm	271	1	1760	1	3486941
pH	pH Units	7.8		8.0		3486939
RDL = Reportable Detection Limit						

Sampler Initials: KN

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		R13380		R13381		
Sampling Date		2009/10/01 16:30				
COC Number		08304779		08304779		
	Units	GRUM WEST DUMP FLOW G-2	RDL	FIELD BLANK	RDL	QC Batch
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	0.5	<0.5	0.5	3482975
Acidity (pH 8.3)	mg/L	5.2	0.5	<0.5	0.5	3482975
Bromide (Br)	mg/L	<0.4	0.4	<0.4	0.4	3485735
Fluoride (F)	mg/L	0.12	0.01	<0.01	0.01	3480002
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	N/A	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	270	0.5	1.7	0.5	3486943
Alkalinity (PP as CaCO3)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Bicarbonate (HCO3)	mg/L	330	0.5	2.0	0.5	3486943
Carbonate (CO3)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Hydroxide (OH)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Anions						
Dissolved Sulphate (SO4)	mg/L	460	5	<0.5	0.5	3482653
Dissolved Chloride (Cl)	mg/L	1.2	0.5	<0.5	0.5	3482132
Physical Properties						
Conductivity	uS/cm	1290	1	1	1	3486941
pH	pH Units	8.1		5.2		3486939
RDL = Reportable Detection Limit						

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13373	R13374	R13375		
Sampling Date		2009/10/01 14:00	2009/10/01 14:30	2009/10/01 13:15		
COC Number		08304779	08304779	08304779		
	Units	VANGORDA CREEK A	VANGORDA CREEK B	VANGORDA CREEK C	RDL	QC Batch
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	50.8	53.9	55.3	0.5	3473076
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	16.9	16.1	14.1	0.2	3482652
Dissolved Antimony (Sb)	ug/L	0.04	0.04	0.04	0.02	3482652
Dissolved Arsenic (As)	ug/L	0.17	0.26	0.23	0.02	3482652
Dissolved Barium (Ba)	ug/L	24.8	25.5	25.0	0.02	3482652
Dissolved Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Bismuth (Bi)	ug/L	<0.005	0.006	<0.005	0.005	3482652
Dissolved Boron (B)	ug/L	<50	<50	<50	50	3482652
Dissolved Cadmium (Cd)	ug/L	0.044 (1)	0.033	0.044	0.005	3482652
Dissolved Chromium (Cr)	ug/L	<0.1	<0.1	<0.1	0.1	3482652
Dissolved Cobalt (Co)	ug/L	0.047	0.049	0.042	0.005	3482652
Dissolved Copper (Cu)	ug/L	0.50	0.55	0.47	0.05	3482652
Dissolved Iron (Fe)	ug/L	30	49	37	1	3482652
Dissolved Lead (Pb)	ug/L	0.215	0.248	0.157	0.005	3482652
Dissolved Lithium (Li)	ug/L	1.1	1.3	1.3	0.5	3482652
Dissolved Manganese (Mn)	ug/L	1.95	12.1	10.0	0.05	3482652
Dissolved Molybdenum (Mo)	ug/L	0.20	0.20	0.20	0.05	3482652
Dissolved Nickel (Ni)	ug/L	0.36	0.40	0.46	0.02	3482652
Dissolved Selenium (Se)	ug/L	0.08	0.09	0.10	0.04	3482652
Dissolved Silicon (Si)	ug/L	4610	4820	4590	100	3482652
Dissolved Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482652
Dissolved Strontium (Sr)	ug/L	69.1	72.2	73.5	0.05	3482652
Dissolved Thallium (Tl)	ug/L	0.005	0.006	0.007	0.002	3482652
Dissolved Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	0.5	3482652
Dissolved Uranium (U)	ug/L	0.376	0.392	0.405	0.002	3482652
Dissolved Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	3482652
Dissolved Zinc (Zn)	ug/L	17.2	18.0	22.5	0.1	3482652
Dissolved Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482652
Dissolved Calcium (Ca)	mg/L	16.2	17.1	17.6	0.05	3483676

RDL = Reportable Detection Limit
(1) Dissolved greater than total. Reanalysis yields similar results

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13373	R13374	R13375		
Sampling Date		2009/10/01 14:00	2009/10/01 14:30	2009/10/01 13:15		
COC Number		08304779	08304779	08304779		
	Units	VANGORDA CREEK A	VANGORDA CREEK B	VANGORDA CREEK C	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	2.52	2.70	2.77	0.05	3483676
Dissolved Potassium (K)	mg/L	0.37	0.38	0.38	0.05	3483676
Dissolved Sodium (Na)	mg/L	1.70	1.73	1.67	0.05	3483676
Dissolved Sulphur (S)	mg/L	11	12	12	3	3483676

RDL = Reportable Detection Limit

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13376	R13377	R13378		
Sampling Date		2009/10/01 16:45	2009/10/01 16:00	2009/10/01 15:30		
COC Number		08304779	08304779	08304779		
	Units	VANGORDA CREEK D	VANGORDA CREEK E	VANGORDA CREEK F	RDL	QC Batch
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	91.0	99.4	129	0.5	3473076
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	13.6	13.3	12.5	0.2	3482652
Dissolved Antimony (Sb)	ug/L	0.05	0.05	0.05	0.02	3482652
Dissolved Arsenic (As)	ug/L	0.26	0.26	0.25	0.02	3482652
Dissolved Barium (Ba)	ug/L	26.2	27.0	26.9	0.02	3482652
Dissolved Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Bismuth (Bi)	ug/L	0.035 (1)	0.006	<0.005	0.005	3482652
Dissolved Boron (B)	ug/L	<50	<50	<50	50	3482652
Dissolved Cadmium (Cd)	ug/L	0.059	0.054	0.045	0.005	3482652
Dissolved Chromium (Cr)	ug/L	<0.1	<0.1	<0.1	0.1	3482652
Dissolved Cobalt (Co)	ug/L	0.046	0.046	0.037	0.005	3482652
Dissolved Copper (Cu)	ug/L	0.52	0.54	0.53	0.05	3482652
Dissolved Iron (Fe)	ug/L	29	32	30	1	3482652
Dissolved Lead (Pb)	ug/L	0.155	0.206	0.161	0.005	3482652
Dissolved Lithium (Li)	ug/L	1.5	1.6	1.8	0.5	3482652
Dissolved Manganese (Mn)	ug/L	9.44	9.28	7.87	0.05	3482652
Dissolved Molybdenum (Mo)	ug/L	0.25	0.25	0.28	0.05	3482652
Dissolved Nickel (Ni)	ug/L	0.48	0.48	0.47	0.02	3482652
Dissolved Selenium (Se)	ug/L	0.09	0.10	0.12	0.04	3482652
Dissolved Silicon (Si)	ug/L	4460	4750	5000	100	3482652
Dissolved Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482652
Dissolved Strontium (Sr)	ug/L	94.3	101	120	0.05	3482652
Dissolved Thallium (Tl)	ug/L	0.009	0.010	0.012	0.002	3482652
Dissolved Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	0.5	3482652
Dissolved Uranium (U)	ug/L	1.22	1.36	1.97	0.002	3482652
Dissolved Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	3482652
Dissolved Zinc (Zn)	ug/L	22.9	21.8	21.2	0.1	3482652
Dissolved Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482652
Dissolved Calcium (Ca)	mg/L	24.7	26.7	32.7	0.05	3483676

RDL = Reportable Detection Limit
(1) Dissolved greater than total. Reanalysis yields similar results

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13376	R13377	R13378		
Sampling Date		2009/10/01 15:45	2009/10/01 16:00	2009/10/01 15:30		
COC Number		08304779	08304779	08304779		
	Units	VANGORDA CREEK D	VANGORDA CREEK E	VANGORDA CREEK F	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	7.11	7.98	11.4	0.05	3483676
Dissolved Potassium (K)	mg/L	0.46	0.47	0.51	0.05	3483676
Dissolved Sodium (Na)	mg/L	1.87	1.95	2.09	0.05	3483676
Dissolved Sulphur (S)	mg/L	23	24	33	3	3483676

RDL = Reportable Detection Limit

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13379	R13380	R13381		
Sampling Date		2009/10/01 16:00	2009/10/01 16:30			
COC Number		08304779	08304779	08304779		
	Units	GRUM WEST DUMP FLOW G-1	GRUM WEST DUMP FLOW G-2	FIELD BLANK	RDL	QC Batch
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	1120	772	<0.5	0.5	3473076
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	1.6	2.6 (1)	1.0	0.2	3482652
Dissolved Antimony (Sb)	ug/L	0.06	0.15	<0.02	0.02	3482652
Dissolved Arsenic (As)	ug/L	0.08	0.50	<0.02	0.02	3482652
Dissolved Barium (Ba)	ug/L	98.4	84.4	0.13	0.02	3482652
Dissolved Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Bismuth (Bi)	ug/L	0.010	<0.005	0.006	0.005	3482652
Dissolved Boron (B)	ug/L	<50	<50	<50	50	3482652
Dissolved Cadmium (Cd)	ug/L	0.024	0.027 (1)	<0.005	0.005	3482652
Dissolved Chromium (Cr)	ug/L	0.2	<0.1	<0.1	0.1	3482652
Dissolved Cobalt (Co)	ug/L	0.039	0.029	0.006	0.005	3482652
Dissolved Copper (Cu)	ug/L	0.27	1.04 (1)	0.13	0.05	3482652
Dissolved Iron (Fe)	ug/L	12	11	5	1	3482652
Dissolved Lead (Pb)	ug/L	0.059	0.060	0.069	0.005	3482652
Dissolved Lithium (Li)	ug/L	7.8	4.5	<0.5	0.5	3482652
Dissolved Manganese (Mn)	ug/L	0.10	0.32 (1)	0.60 (1)	0.05	3482652
Dissolved Molybdenum (Mo)	ug/L	0.97	0.91	<0.05	0.05	3482652
Dissolved Nickel (Ni)	ug/L	0.50	0.53	0.04	0.02	3482652
Dissolved Selenium (Se)	ug/L	3.52	0.53	<0.04	0.04	3482652
Dissolved Silicon (Si)	ug/L	5150	5410	<100	100	3482652
Dissolved Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482652
Dissolved Strontium (Sr)	ug/L	1090	772	0.05	0.05	3482652
Dissolved Thallium (Tl)	ug/L	0.003	<0.002	<0.002	0.002	3482652
Dissolved Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	0.5	3482652
Dissolved Uranium (U)	ug/L	17.6	12.8	<0.002	0.002	3482652
Dissolved Vanadium (V)	ug/L	<0.2	<0.2	0.2	0.2	3482652
Dissolved Zinc (Zn)	ug/L	0.9	1.5	3.4 (1)	0.1	3482652
Dissolved Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482652

RDL = Reportable Detection Limit
(1) Dissolved greater than total. Reanalysis yields similar results

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13379	R13380	R13381		
Sampling Date		2009/10/01 18:00	2009/10/01 18:30			
COC Number		08304779	08304779	08304779		
	Units	GRUM WEST DUMP FLOW G-1	GRUM WEST DUMP FLOW G-2	FIELD BLANK	RDL	QC Batch
Dissolved Calcium (Ca)	mg/L	248	175	0.06	0.05	3483676
Dissolved Magnesium (Mg)	mg/L	122	80.6	<0.05	0.05	3483676
Dissolved Potassium (K)	mg/L	1.51	1.38	<0.05	0.05	3483676
Dissolved Sodium (Na)	mg/L	4.60	3.77	<0.05	0.05	3483676
Dissolved Sulphur (S)	mg/L	260	187	<3	3	3483676

RDL = Reportable Detection Limit

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13373	R13374	R13375		
Sampling Date		2009/10/01 14:00	2009/10/01 14:30	2009/10/01 13:15		
COC Number		08304779	08304779	08304779		
	Units	VANGORDA CREEK A	VANGORDA CREEK B	VANGORDA CREEK C	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	46.9	49.8	51.2	0.5	3472885
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	19.8	18.7	18.1	0.2	3482654
Total Antimony (Sb)	ug/L	0.04	0.04	0.05	0.02	3482654
Total Arsenic (As)	ug/L	0.27	0.28	0.30	0.02	3482654
Total Barium (Ba)	ug/L	23.1	23.1	23.2	0.02	3482654
Total Beryllium (Be)	ug/L	0.02	<0.01	0.01	0.01	3482654
Total Bismuth (Bi)	ug/L	<0.005	<0.005	<0.005	0.005	3482654
Total Boron (B)	ug/L	<50	<50	<50	50	3482654
Total Cadmium (Cd)	ug/L	0.035	0.035	0.052	0.005	3482654
Total Chromium (Cr)	ug/L	<0.1	<0.1	<0.1	0.1	3482654
Total Cobalt (Co)	ug/L	0.051	0.051	0.057	0.005	3482654
Total Copper (Cu)	ug/L	0.43	0.46	0.63	0.05	3482654
Total Iron (Fe)	ug/L	57	65	56	1	3482654
Total Lead (Pb)	ug/L	0.377	0.357	0.471	0.005	3482654
Total Lithium (Li)	ug/L	1.5	1.5	1.6	0.5	3482654
Total Manganese (Mn)	ug/L	2.73	12.7	11.3	0.05	3482654
Total Molybdenum (Mo)	ug/L	0.19	0.20	0.20	0.05	3482654
Total Nickel (Ni)	ug/L	0.41	0.35	0.54	0.02	3482654
Total Selenium (Se)	ug/L	0.09	0.06	0.09	0.04	3482654
Total Silicon (Si)	ug/L	4640	4310	4500	100	3482654
Total Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482654
Total Strontium (Sr)	ug/L	65.1	65.4	69.1	0.05	3482654
Total Thallium (Tl)	ug/L	0.007	0.007	0.008	0.002	3482654
Total Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482654
Total Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	0.5	3482654
Total Uranium (U)	ug/L	0.371	0.370	0.360	0.002	3482654
Total Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	3482654
Total Zinc (Zn)	ug/L	17.0	17.4	25.0	0.1	3482654
Total Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482654
Total Calcium (Ca)	mg/L	14.9	15.8	16.1	0.05	3482725
Total Magnesium (Mg)	mg/L	2.33	2.52	2.67	0.05	3482725

RDL = Reportable Detection Limit

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13373	R13374	R13375		
Sampling Date		2009/10/01 14:00	2009/10/01 14:30	2009/10/01 13:15		
COC Number		08304779	08304779	08304779		
	Units	VANGORDA CREEK A	VANGORDA CREEK B	VANGORDA CREEK C	RDL	QC Batch
Total Potassium (K)	mg/L	0.33	0.34	0.35	0.05	3482725
Total Sodium (Na)	mg/L	1.65	1.67	1.65	0.05	3482725
Total Sulphur (S)	mg/L	11	12	10	3	3482725

RDL = Reportable Detection Limit

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13376	R13377	R13378		
Sampling Date		2009/10/01 15:45	2009/10/01 16:00	2009/10/01 15:30		
COC Number		08304779	08304779	08304779		
	Units	VANGORDA CREEK D	VANGORDA CREEK E	VANGORDA CREEK F	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	89.5	90.0	125	0.5	3472885
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	21.3	16.9	17.8	0.2	3482654
Total Antimony (Sb)	ug/L	0.05	0.07	0.05	0.02	3482654
Total Arsenic (As)	ug/L	0.36	0.35	0.32	0.02	3482654
Total Barium (Ba)	ug/L	24.8	24.5	25.3	0.02	3482654
Total Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	3482654
Total Bismuth (Bi)	ug/L	0.005	0.020	<0.005	0.005	3482654
Total Boron (B)	ug/L	<50	<50	<50	50	3482654
Total Cadmium (Cd)	ug/L	0.059	0.052	0.049	0.005	3482654
Total Chromium (Cr)	ug/L	<0.1	<0.1	<0.1	0.1	3482654
Total Cobalt (Co)	ug/L	0.084	0.067	0.049	0.005	3482654
Total Copper (Cu)	ug/L	0.66	0.71	0.59	0.05	3482654
Total Iron (Fe)	ug/L	60	61	59	1	3482654
Total Lead (Pb)	ug/L	0.842	0.678	0.433	0.005	3482654
Total Lithium (Li)	ug/L	1.8	1.8	2.0	0.5	3482654
Total Manganese (Mn)	ug/L	13.9	11.1	9.15	0.05	3482654
Total Molybdenum (Mo)	ug/L	0.23	0.25	0.28	0.05	3482654
Total Nickel (Ni)	ug/L	0.55	0.54	0.56	0.02	3482654
Total Selenium (Se)	ug/L	0.10	0.11	0.12	0.04	3482654
Total Silicon (Si)	ug/L	4370	4370	4420	100	3482654
Total Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482654
Total Strontium (Sr)	ug/L	89.2	90.7	111	0.05	3482654
Total Thallium (Tl)	ug/L	0.009	0.010	0.011	0.002	3482654
Total Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482654
Total Titanium (Ti)	ug/L	<0.5	<0.5	0.6	0.5	3482654
Total Uranium (U)	ug/L	1.20	1.25	1.86	0.002	3482654
Total Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	3482654
Total Zinc (Zn)	ug/L	25.9	27.3	24.7	0.1	3482654
Total Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482654
Total Calcium (Ca)	mg/L	23.8	23.8	31.3	0.05	3482725
Total Magnesium (Mg)	mg/L	7.28	7.44	11.5	0.05	3482725

RDL = Reportable Detection Limit

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13376	R13377	R13378		
Sampling Date		2009/10/01 16:45	2009/10/01 16:00	2009/10/01 15:30		
COC Number		08304779	08304779	08304779		
	Units	VANGORDA CREEK D	VANGORDA CREEK E	VANGORDA CREEK F	RDL	QC Batch
Total Potassium (K)	mg/L	0.42	0.43	0.49	0.05	3482725
Total Sodium (Na)	mg/L	1.88	1.91	2.13	0.05	3482725
Total Sulphur (S)	mg/L	22	24	33	3	3482725

RDL = Reportable Detection Limit

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13379	R13380	R13381		
Sampling Date		2009/10/01 16:00	2009/10/01 16:30			
COC Number		08304779	08304779	08304779		
	Units	GRUM WEST DUMP FLOW G-1	GRUM WEST DUMP FLOW G-2	FIELD BLANK	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	1090	747	<0.5	0.5	3472885
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	13.8	2.1	0.5	0.2	3482654
Total Antimony (Sb)	ug/L	0.05	0.15	<0.02	0.02	3482654
Total Arsenic (As)	ug/L	0.12	0.57	<0.02	0.02	3482654
Total Barium (Ba)	ug/L	89.8	77.2	0.34	0.02	3482654
Total Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	3482654
Total Bismuth (Bi)	ug/L	<0.005	<0.005	<0.005	0.005	3482654
Total Boron (B)	ug/L	<50	<50	<50	50	3482654
Total Cadmium (Cd)	ug/L	0.021	0.019	<0.005	0.005	3482654
Total Chromium (Cr)	ug/L	0.2	<0.1	<0.1	0.1	3482654
Total Cobalt (Co)	ug/L	0.057	0.035	<0.005	0.005	3482654
Total Copper (Cu)	ug/L	0.31	0.61	0.11	0.05	3482654
Total Iron (Fe)	ug/L	57	13	<1	1	3482654
Total Lead (Pb)	ug/L	0.221	0.068	0.165	0.005	3482654
Total Lithium (Li)	ug/L	8.0	4.8	<0.5	0.5	3482654
Total Manganese (Mn)	ug/L	0.56	0.23	<0.05	0.05	3482654
Total Molybdenum (Mo)	ug/L	0.88	0.87	<0.05	0.05	3482654
Total Nickel (Ni)	ug/L	0.60	0.55	<0.02	0.02	3482654
Total Selenium (Se)	ug/L	3.68	0.50	<0.04	0.04	3482654
Total Silicon (Si)	ug/L	5230	5230	<100	100	3482654
Total Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482654
Total Strontium (Sr)	ug/L	955	718	<0.05	0.05	3482654
Total Thallium (Tl)	ug/L	0.004	<0.002	<0.002	0.002	3482654
Total Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482654
Total Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	0.5	3482654
Total Uranium (U)	ug/L	17.9	12.5	<0.002	0.002	3482654
Total Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	3482654
Total Zinc (Zn)	ug/L	1.8	1.4	0.2	0.1	3482654
Total Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482654
Total Calcium (Ca)	mg/L	244	171	<0.05	0.05	3482725

RDL = Reportable Detection Limit

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13379	R13380	R13381		
Sampling Date		2009/10/01 18:00	2009/10/01 18:30			
COC Number		08304779	08304779	08304779		
	Units	GRUM WEST DUMP FLOW G-1	GRUM WEST DUMP FLOW G-2	FIELD BLANK	RDL	QC Batch
Total Magnesium (Mg)	mg/L	117	77.8	<0.05	0.05	3482725
Total Potassium (K)	mg/L	1.36	1.24	<0.05	0.05	3482725
Total Sodium (Na)	mg/L	5.00	3.88	<0.05	0.05	3482725
Total Sulphur (S)	mg/L	275	175	<3	3	3482725

RDL = Reportable Detection Limit

Maxxam Analytics Inc

8577 Commerce Court, Burnaby, BC V5A 4N5 · Phone: (604) 444-4808 · Fax: (604) 444-4511 · Toll-Free: 1-800-440-4808 · www.maxxamanalytics.com

CHAIN-OF CUSTODY RECORD AND ANALYSIS REQUEST

PAGE 1 OF 1

08304779

MAXXAM JOB #: A956077

ANALYSIS REQUEST

COC #:

COMPANY NAME: Laberge Environmental Services

CLIENT PROJECT NO.: Vangorda-Grum Surface Water Assessments

COMPANY ADDRESS: Physical Address 405 Ogilvie Street, Whitehorse YT Y
Mailing Address Box 21072
Whitehorse YT
Y1A 6P7

TEL: 1-867-668-6838

E-MAIL: Laberge@northwestel.net dmackie@srk.com

FAX:

SAMPLER NAME (PRINT): Ken Nordin, Dylan Nordin

PROJECT MANAGER: Daniel Mackie

LABORATORY CONTACT: Ashley Nivison

	FIELD SAMPLE ID	MATRIX	SAMPLING DATE (DD/MM/YY)	SAMPLING TIME	# CONTAINERS	pH, Conductivity	Alkalinity	Major Ions (SO4, Cl, F, Br)	Acidity	Low Level Total Metals ICP/OES	Low Level Dissolved Metals ICP/OES
1	Vangorda Creek A	SURFACE WATER	01/10/2009	14:00	4	x	x	x	x	x	x
2	Vangorda Creek B	SURFACE WATER	01/10/2009	14:30	4	x	x	x	x	x	x
3	Vangorda Creek C	SURFACE WATER	01/10/2009	13:15	4	x	x	x	x	x	x
4	Vangorda Creek D	SURFACE WATER	01/10/2009	16:45	4	x	x	x	x	x	x
5	Vangorda Creek E	SURFACE WATER	01/10/2009	16:00	4	x	x	x	x	x	x
6	Vangorda Creek F	SURFACE WATER	01/10/2009	15:30	4	x	x	x	x	x	x
7	Grum West Dump flow G-1	SURFACE WATER	01/10/2009	18:00	4	x	x	x	x	x	x
8	Grum West Dump flow G-2	SURFACE WATER	01/10/2009	18:30	4	x	x	x	x	x	x
9	Field Blank										
10											
11											
12											

TAT (Turnaround Time)
LEAVE THIS SECTION BLANK IF STANDARD TAT IS REQUIRED
* Some exceptions apply - please contact laboratory
STANDARD 5 BUSINESS DAYS x
RUSH 3 BUSINESS DAYS
RUSH 2 BUSINESS DAYS
URGENT 1 BUSINESS DAY
OTHER BUSINESS DAYS

ACCOUNTING CONTACT:

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE: Surface Water Flows Adjacent to Mine Waste Dumps

SPECIAL REPORTING OR BILLING INSTRUCTIONS: Bill to Laberge Environmental Services

RELINQUISHED BY SAMPLER: Ken Nordin — DATE (DD/MM/YY): 03/10/2009 — TIME: 15:00

RELINQUISHED BY: — DATE (DD/MM/YY): — TIME:

RELINQUISHED BY: — DATE (DD/MM/YY): 05/10/09 — TIME: 22:10

RECEIVED BY:

RECEIVED BY:

RECEIVED BY LABORATORY: Amo

ICDW / CSR / AB TIER 1 / OTHER

JARS USED

ARRIVAL TEMPERATURE °C: 9.0, 6

DUE DATE:

LOG IN CHECK:

CUSTODY RECORD