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Report

Deloitte & Touche Inc.

Anvil Range Mine Complex
2008 Annual Environmental Report
Water Licence QZ03-059

AECOM

Delloitte and Touche Inc.
(acting as the Court Appointed Interim Receiver for Anvil Range Mining Corporation)

Anvil Range Mine Complex
2008 Annual Environmental Report
Water Licence QZ03-059

Prepared by:

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Project Number:

107417 - 80631

Date:

February 2009

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February 26, 2009 Project Number: 107417 - 80631

Yukon Territory Water Board
Suite 106 - 419 Range Road
Whitehorse, Yukon, Y1A 3V1

Dear Board:

Re: Water Licence QZ03-059, Annual Environmental Report for 2008

We are pleased to submit five bound copies and one unbound original of the report Anvil Range Mine Complex, 2008 Annual Environmental Report, Water Licence QZ03-059. AECOM has prepared this report on behalf of Deloitte & Touche Inc., acting as court appointed Interim Receiver for Anvil Range Mining Corporation. The report is also enclosed in electronic format.

In addition to the above report are five bound plus one unbound copies of two accompanying reports that fulfill the reporting requirements for 2008:

> 2008 Annual Inspection – Waste and Water Management Facilities, Vangorda Mine, Yukon Territory, SRK Consulting, Prepared for Deloitte and Touche, Interim Receiver, January, 2009.
>
> 2008 Annual Geotechnical Evaluation and Instrument Review – Various Facilities at Faro Mine, Yukon (in 2 Volumes), BGC Engineering Inc., Prepared for Deloitte and Touche, Interim Receiver, February 13, 2009.

We draw your attention also to the report, Anvil Range Mine Adaptive Management Plan - Annual Review for 2008, which is appended.

If you have any questions please do not hesitate to contact us.

Sincerely,
AECOM Canada Ltd.

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Executive Summary

The Anvil Range Mine was "shut down" in February 1998 due to poor economic circumstances and projections. The mine owner at that time was Anvil Range Mining Corporation. The owner entered into receivership in April 1998 and, since that time, management of the mine property has been under the direction of Deloitte and Touche Inc. acting as the court appointed Interim Receiver. Mining and ore processing activities have never been restarted and the mine is considered to be permanently closed.

Care and maintenance activities at the Faro and Vangorda Plateau mine sites are regulated under Water Licence QZ03-059. The licence, in general, allows for the continuation of care and maintenance activities and the development of a Final Closure and Reclamation Plan.

The Water Licence required that a Final Closure and Reclamation Plan (FCRP) for the mine facilities be prepared and submitted to the Yukon Water Board (YWB) by December 31, 2006. In October 2006, the Interim Receiver submitted an application to amend Clause 58 of the Licence, to extend the date for filing of the final closure and reclamation plan from December 31, 2006 to February 28, 2009. The YWB granted this request and issued amendment #1 to the Water Licence on December 20, 2006. The FCRP is being prepared under the general management of Indian and Northern Affairs Canada and the Government of Yukon through the Faro Project Management Team (FPMT). The FCRP is to be submitted by these two governments (refer to Section 9.2 of this 2008 Annual Environmental Report).

The amendment also requires quarterly updates to the YWB regarding the FCRP beginning in June 2007. Quarterly update reports were submitted to the Board as required throughout 2008, outlining the status of the closure planning process.

The environmental monitoring programs required under the Water Licence are largely a continuation or a refinement of programs that have been carried out for years under this and previous water licences. These programs include surface water monitoring, groundwater monitoring, biological monitoring and physical stability monitoring. There is also an adaptive management plan that is reviewed on an annual basis as well as a number of specific projects that may require separate reports.

All of the requirements for environmental monitoring and for special projects for 2008 were completed and the results are presented in this report.

The Water Licence does not allow for any mining or ore processing activities to recommence. Therefore, no tailings or process water were deposited into the mined-out Faro Main Pit or into the Down Valley tailings impoundments in 2008. The backfilled Faro Zone II Pit was dewatered into the Faro Main Pit as required to maintain an acceptable water level in the Zone II pit. Water from the Faro Main pit and the Intermediate Pond was successfully treated with lime through the on-site water treatment systems and released to the environment according to the terms of the Water Licence. For the first time since 2005, pumping and treatment of the Vangorda pit was carried out in 2008, after pit levels reached the maximum recommended elevation. Vangorda pit water was successfully treated with lime through the on-site water treatment system and released to the environment according to the terms of the Water Licence.

The summary highlights of the 2008 environmental monitoring programs are as follows:

- All of the required monitoring, projects and reporting were completed;
- The required annual volumes of water were treated and released from the Faro Main Pit and the Intermediate Pond. The internally managed low water level target was not met at the Vangorda pit in 2008 due to equipment component failure related to poor water quality (low pH) impacting the integrity of the equipment. However, sufficient volumes of water were pumped to sustain the water level until pumping recommences in 2009. Portions of the Vangorda water treatment system are being replaced prior to spring start up in 2009;
- A change to the Faro site water management strategy was designed and constructed in 2006/2007 that reduced the need for operating the less efficient Down Valley treatment system. Under the new system, water was pumped from the Intermediate Pond directly to the Mill water treatment system. The Down Valley Treatment system remained in place throughout 2007 on a standby status. In 2008, this system was required for water management and water was discharged from the Intermediate Pond to the Cross Valley Pond;
- Compliance of effluent with the maximum allowable discharge criteria was excellent; no licence discharge limits were exceeded in 2008;
- No substantive or high-risk issues were identified for any of the water retention dams or dykes on the property that were not already being actively managed;
- Repairs were made to the Faro Creek Diversion, and while BGC Engineering, in their review of the diversion noted that repairs made in 2007 appeared to have been effective and that the diversion performed in a satisfactory manner in 2008, they also noted that there is still a high potential for another significant seepage or failure event to occur due to the poor soil and foundation conditions. The report recommends relocation of the diversion within a three year period given the nature of the ground conditions and seepage occurring along the road;
- The benthic invertebrate community remains healthy in Rose Creek;
- Fish populations remain healthy in both Vangorda and Rose Creeks; although fewer juvenile Chinook salmon were observed than in previous years, adult Chinook salmon populations were lower throughout the Yukon systems and therefore the juvenile observation results were expected;
- Maintenance programs were successfully completed for the water treatment facilities, pumping systems, dams, diversions, roads and other facilities that are required for the care and maintenance programs, including on-going work to arrange for repairs to the Vangorda pumping systems;
- The Adaptive Management Plan continued to be successfully implemented and appropriate investigations and responses were developed as required;
- Stemming from trigger activation through the Adaptive Management Plan, detailed assessments were carried out in 2008 near the North Fork of Rose Creek, south of the Haul Road and south east of the Faro Waste Rock Dumps (“S-Wells” area). An intervention was required and a groundwater collection system was installed with pumping through a heat-traced line to the Faro Pit. While much of the planning and design work occurred in 2008, physical construction was undertaken in January and February of 2009. A detailed description of work in this area is included in the Adaptive Management Plan Annual Review for 2008, which is appended to this Annual Environmental Report.

- Several investigations and assessment studies were carried out at the mine site to further the governments' work to develop a FCRP.

This will be the final annual report filed with the Yukon Water Board by Deloitte and Touche Inc. in its appointment capacity as the Interim Receiver of Anvil Range Mining Corporation. Over two years ago, Deloitte and Touche advised the Federal and Yukon governments that a more permanent solution was required to ensure that adequate resources would be available to oversee the continuing care and maintenance programs at the Faro mine site. The governments supported the Interim Receiver's recommendation to transition the care and maintenance to a third party contractor by February 28, 2009, the date on which the Water Licence will expire. The governments designed and carried out an extensive program to secure a new third party contractor and have signed a contract with Denison Environmental Services. Representatives of Deloitte and Touche Inc. have, during the past several months, been meeting with representatives of Denison Environmental Services to ensure an orderly and smooth transition of responsibilities.

The Interim Receiver recently prepared its 50th Court Report and attended in the Ontario Court on January 19, 2009, and received a signed Court Order of the same date, discharging the Interim Receiver effective as of midnight February 28, 2009. The Interim Receiver's Yukon legal counsel attended in the Yukon Courts to seek a Recognition Order of the Ontario Court Order. The Water Board was served with materials regarding the hearing before the Yukon Court. On February 24, 2009, the Recognition Order was granted. As required by the Court Order, the Interim Receiver is filing the 2008 Annual Environmental Report (Water Licence QZ03-059) and will file the monthly reports for January and February 2009. Once this is completed, Deloitte and Touche Inc. will have fulfilled all of the requirements under the current Water Licence. As set out in previous correspondence and as noted in the 2008 Annual Environmental Report, Section 9.12, filing a Final Closure and Reclamation Plan is the responsibility of the Federal and Yukon governments.

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1. Introduction

1.1 Background

The Anvil Range Mine was "shut down" in February 1998 due to poor economic circumstances and projections. The mine owner at that time was Anvil Range Mining Corporation. The owner entered into receivership in April 1998 and, since that time, management of the mine property has been under the direction of Deloitte and Touche Inc. acting as the court appointed Interim Receiver (the "Interim Receiver"). Mining and ore processing activities have never been restarted and the mine is considered to be permanently closed.

Since their appointment in April 1998, the Interim Receiver has successfully maintained compliance with the terms of the water licence by implementing a broad scope of tasks related to environmental protection and environmental monitoring, which have included:

- Pumping and treatment of water from the Faro Main pit and the Faro Zone II pit;
- Treatment of water in the Intermediate Pond (the Tailings Impoundment Facility);
- Compliance with the effluent discharge criteria in the water licences;
- Conversion of mill equipment for use as a water treatment plant;
- Water quality, biological and physical stability monitoring in accordance with and in excess of terms of the water licences;
- Preparation and submission to the Yukon Water Board of monthly water quality reports and annual environmental reports;
- Assistance with large-scale DIAND scrap steel reclamation projects;
- Removal of laboratory and process chemicals, PCB containing equipment, used oil, used tires and residual concentrate from the mine sites;
- Physical maintenance of water retention and diversion structures;
- Undertaking of a Comprehensive Risk Assessment with Annual Updates;
- Completion of comprehensive hydrogeological and geochemical studies of the Rose Creek Tailings Facility;
- Assistance with development of the Final Closure and Reclamation Plan including managing major site investigations such as drilling programs;
- Renewal of the Water Licence;
- Obtaining new permitting to incinerate waste oil for heat and to operate the operational landfill;
- Substantive improvement in the interception of clean water to reduce the volumes of water requiring treatment;
- Emergency responses to major weather events to minimize environmental effects and damage to mine facilities;
- Refurbishments to primary water diversions including the Rose Creek Diversion Canal, the Vangorda Creek Diversion Flume and the Faro Creek Diversion Channel;

- Design and construction of a positive change to the water management strategy at the Faro site including the collection of contaminated seeps from the Emergency Tailings Area (ETA) and pumping of this water to the Intermediate Pond. Water from the Intermediate Pond is then pump to the Mill water treatment system;
- Design and construction of a groundwater collection and pumping system in the area at the toe of the Faro Waste Rock Dumps and south of the Haul Road (S-Wells area) (Note that construction was carried out in January and February 2009); and
- Design and procurement of materials for repairs to the Vangorda water treatment and pumping/delivery system, including pumps on barges, valves and portions of the pipeline water delivery system.

1.2 Summary of Water Licence Requirements

Prior to 2004, activities at the Faro and Vangorda Plateau mine sites were regulated under two separate Water Licences, QZ95-003 (Faro) and IN89-002 (Vangorda Plateau). Both of those water licences expired on December 31, 2003. The regulatory process for renewal of those water licences was initiated in May 2002 and subsequently proceeded through environmental assessment and regulatory review. The result of those activities was the issuance of new Water Licence QZ03-059 (The "Water Licence"). The "new" Water Licence combined activities at both mine sites into one licence that, in general, allows for the continuation of care and maintenance activities and the development of a Final Closure and Reclamation Plan ("FCRP").

Part F, Item 58 of the Water Licence required that a FCRP for the mine facilities be prepared and submitted to the Board by December 31, 2006. In October 2006, the Interim Receiver wrote to the Yukon Water Board (YWB) to request, on behalf of the two responsible governments, an extension to the timing for submission of the FCRP. The two governments had jointly informed the Interim Receiver that a submission by December 31, 2006 was not possible and requested that the Interim Receiver apply to the YWB for an extension. The YWB granted this request and issued amendment #1 to the Water Licence on December 20, 2006. The extension requested was to February 28, 2009, the expiry of the Water Licence. The plan is currently being prepared under the general management of Indian and Northern Affairs Canada and the Government of Yukon through the Faro Project Management Team (FPMT). The plan is to be submitted by those two governments (refer to Section 9.2 of this 2008 Environmental Annual Report).

The amendment also required quarterly updates to the YWB regarding the FCRP beginning in June 2007. The development of the FCRP will continue to be the responsibility of the FPMT with no involvement by the Interim Receiver in the development of the closure plan.

The environmental monitoring programs required under the Water Licence are largely a continuation or a refinement of the programs that were being carried out under the two previous water licences. These programs include surface water monitoring, groundwater monitoring, biological monitoring and physical stability monitoring. There are also several new environmental programs that were introduced in 2004 under the Water Licence. These include an Adaptive Management Plan ("AMP"), regular fisheries monitoring and a number of special projects, each with a unique due date and each requiring a stand-alone report. All have been completed and filed successfully with the YWB.

The Water Licence requirements for 2008 are summarized in Table 1-1. The requirements for 2008 include several reports and special projects.

Table 1-1. Summary of Water Licence Requirements for 2008

Item	Licence Clause	Dates
Monitoring Activities		
Surface Water	54, 59, 60, 61, Sch.A	Varies, weekly to annual
Groundwater	54, 59, Sch.A	Twice per year
Benthic Invertebrates & Sediment	64, Sch.B	Vangorda Creek in odd years; Rose Creek in even years
Fish	53	Annual
Physical stability	66, 67	Inspection annual; instrumentation varies
Glaciation in Rose Creek Diversion Canal	69	Monthly during winter
Routine Reporting (from the terms of the Water Licence)		
Monthly data report	11, 12, 15	Monthly – 30 days following
Annual Env. Report	11, 12, 13, 14	Annual – February 28
Comprehensive Risk Assessment	55	Part of Annual Env. Report
Water Treatment Plant Performance Evaluation	65	Part of Annual Env. Report
Physical Stability	66	Part of Annual Env. Report
Maintenance Related to Dam Safety	71	Part of Annual Env. Report
Benthic Invertebrates & Sediment	B.8	Part of Annual Env. Report
Special Reports & Projects		
HazMat Inventory	19	Maintain but do not submit
Terrestrial Effects Study	49	December 31, 2005
Annual Reporting (from submitted plans and studies)		
Fish Monitoring	53	Annual
Adaptive Management Plan	54	Annual
Town of Faro Water Wells Study	50	2006/2007 Annual Env. Report

1.3 Organization of Report

This annual environmental report for the year 2008 has been prepared according to the provisions of Part A, Section 13 of the Water Licence. This report, including all data presentations and interpretations, was prepared by AECOM based on information provided by the Interim Receiver, including site staff, by AECOM (formerly Gartner Lee Ltd.), by BGC Engineering Inc. (BGC), SRK Consulting Engineers and Scientists (SRK), Gomm Environmental Engineering Consulting, Laberge Environmental Services and White Mountain Environmental Consulting.

This report is broadly organized into the following sections. Where applicable, the Rose Creek Drainage/Faro mine site and the Vangorda Creek Drainage/Vangorda Plateau mine site are reported separately within these sections:

Summary;
1. Introduction;
2. Water Use;

3. Water Quality Monitoring – Rose Creek Drainage: Surface water, groundwater and effluent quality;
4. Water Quality Monitoring – Vangorda Creek Drainage: Surface water, groundwater and effluent quality;
5. Water Treatment Plant Performance: Three water treatment systems;
6. Biological Monitoring: Benthic invertebrates, sediment, fish and wildlife;
7. Physical Stability Monitoring: Engineering inspections and instrumentation data review for both mine sites;
8. Maintenance Activities; and
9. Special Projects.

Detailed reports on the following individual monitoring programs and projects as prepared by specialist consultants are summarized within this report. Where these have not previously been submitted to the Water Board, they accompany or are appended to this report:

- Benthic Invertebrates and Sediment, Laberge Environmental Services (appended);
- Fish, White Mountain Environmental Consulting (appended);
- Physical Stability – Annual Inspection Report, Faro Mine Site, BGC Engineering Inc. (separate cover);
- Physical Stability, - Annual Inspection Report Vangorda Plateau Mine Site, SRK Consulting (separate cover); and
- Adaptive Management Plan, 2008 Annual Review, AECOM (appended).

Included in the body of the report (Section 9.9) is the annual update of the Comprehensive Risk Assessment by the Interim Receiver.

Figures 1-1, 1-2 and 1-3, included in the Figures section of this report, illustrate the general layout of the mine property and facilities, and include surface water and groundwater monitoring locations.

2. Water Use

2.1 Rose Creek Drainage

2.1.1 Summary

The Water Licence authorizes the direct use of water from Rose Creek up to a maximum rate of 65,465 m^3/day (Part B, Items 21a and 21b). Information that was provided in the Water Licence Application Report suggested an average annual direct use of water of 4.1 million m^3 per year. The Water Licence specifically recognizes the following water uses:

- Pumping from the Zone II pit;
- Pumping from the Faro Main pit; and
- Diversion through the Intermediate Pond.

Table 2-1 summarizes the total water obtained from Rose Creek in 2007 for the authorized purposes. There was no use of water for unauthorized purposes and actual use was significantly below the allowable limit.

Table 2-1. Summary of 2008 Direct Water Use from Rose Creek

Water Use	Maximum Rate (m3/day)	Total (million m3)
Zone II Pit Pumping (260 usgpm)	1,417	0.07
Main Pit Pumping	15,528	2.27
Intermediate Pond[2]	21,774	2.0
Total Estimated Water Use	**38,689**	**4.3**
Total Allowable	**65,465**	**4.1**[1]

1. *As suggested in the Water Licence Application Report.*
2. *Includes both water pumped to Mill and syphoned to the Cross Valley Pond.*

Table 2-1 shows that the volume of water pumped from the Faro Mine area in 2008 was greater than the annual volume that was suggested in the Water Licence Application. In 2008, due to the higher than normal precipitation at the site, a larger volume of water needed to be pumped (and treated) from the Intermediate Pond to maintain the pond water level below the maximum recommended elevation and ensure sufficient capacity for spring freshet inflows in 2009.

For general interest as related to water use, Table 2-2 presents measured monthly precipitation at the Faro airport over the available period of record, 1978 to 2007. At the time of report preparation, the precipitation data for 2008 was not available for public use. It is expected that precipitation data for 2008 will show very high precipitation levels. Hydrograph data from April to October at X14, R7, and V8 as shown in Figures 2-7, 2-8 and 2-13, respectively, show that July peak flows exceeded freshet peak flows, an unusual occurrence. An additional three summer peak flows, one in June, one in July and one in August are shown in the hydrographs, associated with severe rainfall events.

Table 2-2. Monthly Precipitation at Faro Airport to 2007

Year	Jan	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total (mm)
1978	0.4	**miss.**	trace	4.1	11.6	27.0	38.1	41.6	7.8	32.4	20.2	19.0	
1979	8.9	18.3	20.2	6.7	10.5	68.2	55.4	13.8	13.4	11.6	12.4	34.4	273.8
1980	19.7	2.4	11.7	12.5	10.5	11.1	95.4	33.2	46.7	**miss.**	21.3	13.3	
1981	6.5	23.1	4.0	4.5	7.8	42.8	41.3	22.5	41.9	21.5	17.0	5.4	238.3
1982	10.2	18.0	9.5	4.1	18.2	14.3	58.3	47.3	47.2	42.3	11.8	13.6	294.8
1983	35.7	6.6	9.8	2.2	20.6	55.6	49.1	65.8	21.2	16.3	11.4	3.9	298.2
1984	27.6	24.1	5.9	2.4	38.8	49.0	16.6	64.9	5.5	10.8	10.7	22.5	278.8
1985	22.5	24.8	2.2	13.8	17.2	28.1	62.6	80.8	46.3	20.0	22.2	26.1	366.6
1986	8.4	4.7	34.6	12.9	35.1	12.8	81.8	77.4	44.4	22.7	15.9	5.6	356.3
1987	3.1	14.0	2.8	10	40.1	50.8	92.4	63.5	30.2	26.6	17.8	6.2	357.5
1988	7.0	10.4	17.2	8.2	38.0	37.3	97.2	25.5	43.8	29.0	17.9	16.5	348.0
1989	19.8	3.6	19.8	2.0	17.9	41.0	51.7	16.9	30.8	46.3	39.8	13.8	303.4
1990	14.4	25.8	5.0	7.0	23.4	45.4	30.0	64.4	66.2	22.7	25.4	24.8	354.5
1991	17.2	22.6	16.6	2.8	22.4	30.2	115.4	33.0	48.2	49.6	43.4	40.0	441.4
1992	22.8	24.6	7.6	15.8	14.4	11.4	66.1	34.4	47.8	13.8	18.8	13.0	290.5
1993	22.2	15.0	1.6	6.0	76.7	48.6	50.2	56.0	50.8	35.7	**miss.**	**miss.**	
1994	20.2	8.4	11.4	5.0	39.8	24.2	19.6	25.2	45.6	41.6	24.4	8.0	273.4
1995	8.4	7.8	18.4	5.2	10.9	33.9	73.4	63.4	28.8	12.2	22.3	15.4	300.1
1996	10.2	9.1	27.1	7.2	13.4	20.0	64.4	70.8	52.7	34.8	3.5	5.9	319.1
1997	6.6	8.7	1.4	14	16.5	39.3	86.4	33.2	trace	25.2	6.4	12.4	250.1
1998	7.0	2.8	4.8	4.2	14.4	29.6	19.2	24.2	23.4	24.0	4.6	8.2	166.4
1999	24.4	10.0	15.4	1.8	44.4	64.8	42.0	33.8	27.0	22.4	12.8	21.6	320.4
2000	12.2	2.0	trace	6.0	9.6	39.6	48.1	116.2	102.2	8.6	19.4	5.8	369.7
2001	7.4	3.0	4.0	14.6	30.8	35	58.4	14.2	44.6	28.6	12.2	15.4	268.2
2002	9.2	5.8	9.0	7.0	19.6	19.4	34.9	64.1	38.4	18.2	9.6	9.4	244.6
2003	22.4	8.0	16.0	0.4	7.6	45.2	63.2	30.4	30.8	12.8	32.8	19.9	289.5
2004	31.1	11.4	45.0	4.0	15.6	34.0	13.5	38.0	48.5	33.6	9.8	45.0	329.5
2005	26.7	12.4	2.6	19.5	58.6	41.0	83.8	38.6	36.6	13.0	30.0	10.8	373.6
2006	11.0	7.0	18.5	21.6	16.2	38.0	33.4	33.3	35.6	21.0	33.1	8.3	277.0
2007	16.4	16.4	14.4	3.6	11.4	52	43.5	33.5	50.7	39.6	13.4	28	322.9
2008	Miss.	Miss.	Miss.	Miss.	Miss.	Miss.	Miss.	Miss.	Miss.	Miss.	Miss.	Miss.	
Max	**35.7**	**25.8**	**45**	**21.6**	**76.7**	**68.2**	**115.4**	**116.2**	**102.2**	**49.6**	**43.4**	**45**	
Year	1983	1990	2004	2005	1993	1979	1991	2000	2000	1991	1991	2004	
Mean	**15.3**	**12.1**	**12.7**	**7.6**	**23.7**	**36.3**	**56.2**	**45.3**	**39.9**	**25.4**	**18.6**	**16.3**	**307.7**
Min	0.4	2	1.4	0.4	7.6	11.1	13.5	13.8	5.5	8.6	3.5	3.9	
Year	1978	2000	1978	2003	2003	1980	2004	1979	1997	2000	1996	1983	
St.Dev	8.9	7.7	10.4	5.5	16.3	14.9	26.1	23.6	18.4	11.4	9.9	10.6	

All values expressed in mm as compiled by BGC Engineering Inc.

2008 precipitation data is not available at time of document preparation. It is expected that 2008 precipitation data will show that 2008 was a higher precipitation year.

2.1.2 Zone II Pit

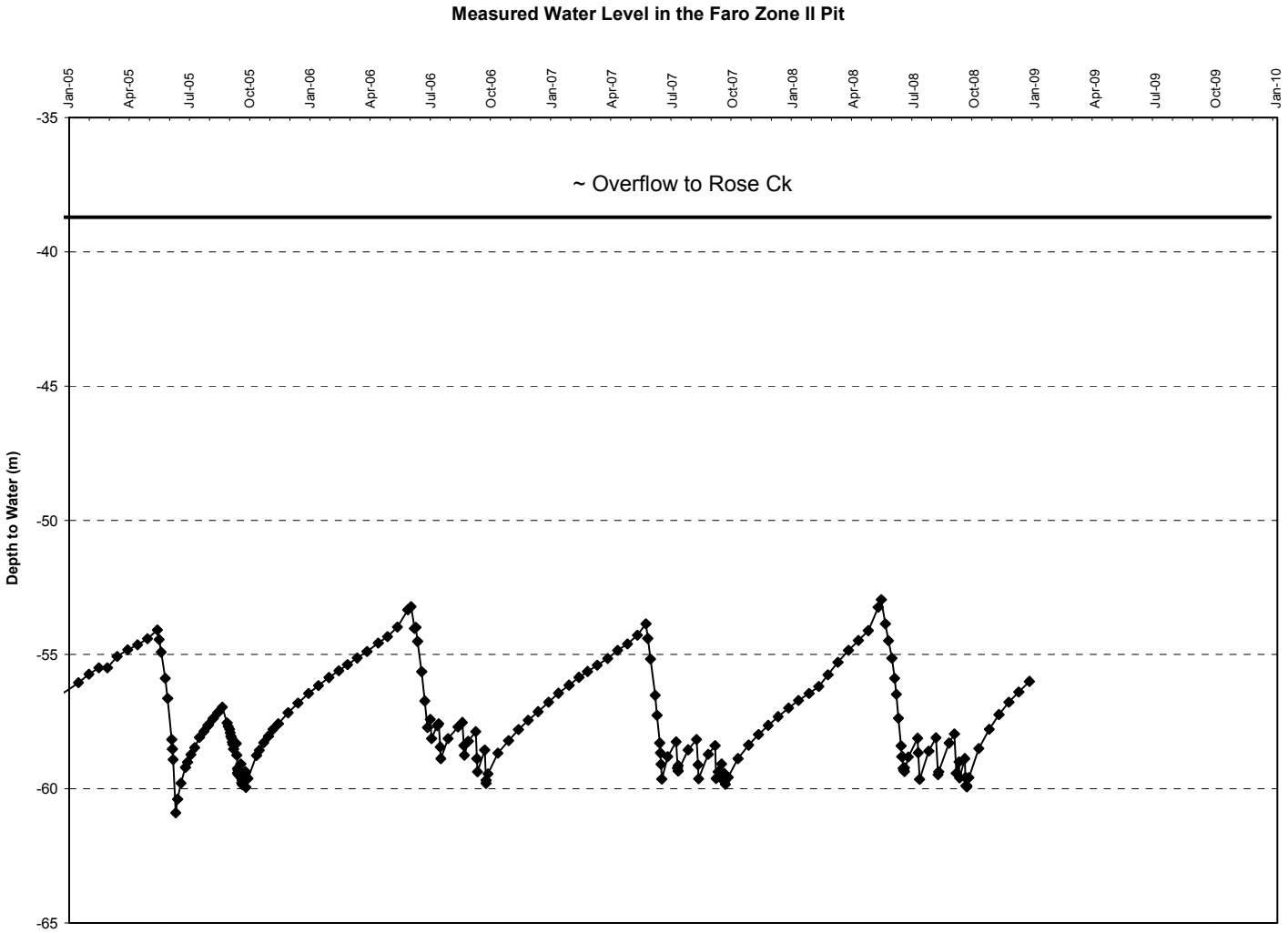
The Zone II Pit is backfilled with waste rock but still serves as a collection point for runoff water. A downhole pump is used to pump water from the backfilled pit on an as-required basis to maintain the water level within the desired range. The pump is operated only in the summer season.

An open riser pipe was installed in the pumping well in March 1997 that allowed direct water level measurements. The measured water levels are illustrated on Figure 2-1. The total volume pumped during 2008 is estimated at 65,210 m^3 based on the pumping hours and a pumping rate of 0.0164 m^3/s (260 USgpm). Pumping from Zone II Pit started on May 15th and operated on an as needed basis until September 27th. This volume compares to estimates for previous years as follows:

- 1995: Zone II volume pumped = 139,000 m^3
- 1996: Zone II volume pumped = 75,000 m^3
- 1997: Zone II volume pumped = 51,000 m^3
- 1998: Zone II volume pumped = 43,000 m^3
- 1999: Zone II volume pumped = 73,500 m^3
- 2000: Zone II volume pumped = 64,500 m^3
- 2001: Zone II volume pumped = 157,500 m^3
- 2002: Zone II volume pumped = 99,500 m^3
- 2003: Zone II volume pumped = 135,000 m^3
- 2004: Zone II volume pumped = 66,500 m^3
- 2005: Zone II volume pumped = 101,500 m^3
- 2006: Zone II volume pumped = 75,250 m^3
- 2007: Zone II volume pumped = 69,230m^3

The Water Licence requires that the water level in the Zone II pit be maintained at least 50 m below ground level (Part B, Item 24). This was achieved through 2008, as illustrated on Figure 2-1.

Figure 2-1. Faro Zone II Pit Water Elevation, 1997 to 2008



2.1.3 Main Pit

The recycle water system which provided water from the Faro Main pit to the mill was installed during the summer of 1997 and was used to provide an estimated minimum 95% of the water required for processing while the mill was operating prior to February 1998. The system has been used since mine operations ceased to pump water from the Faro Main pit to the mill for treatment in order to maintain the in-pit water level within the desired range.

The water pumping system is made up of the following primary components:

1. Three electric pumps, rated at 5,000 USgpm, mounted on a floating barge in the pit, providing on average, based on weekly flow measurements, 2,800 USgpm each to the mill (only one or occasionally two pumps are operated at one time). In March 2008, a new barge pump, rated at the same capacity as the existing pumps, was ordered and delivered to the site. The pump can be installed in the spring of 2009, before start up of the water treatment system;
2. An overhead powerline from the substation adjacent to the mill to the pumps; and
3. 30" sclair pipeline from the barge to the mill with flexible sections near the barge that minimize the risk of damage to the pipeline which might otherwise result from vertical movement of the barge.

The measured Faro Main pit water levels are illustrated on Figures 2-2 and 2-3. The complete filling curve from 1992 to 2008 (Figure 2-2) shows the rate of filling prior to activation of the recycle water system in late July 1997 and the subsequent changes in the water level resulting from pumping for supply of water for processing and/or discharge. The water levels for recent years (Figure 2-3) illustrate seasonal pumping program that has been implemented. Figure 2-3 also illustrates the effect of modifications to the barge mount that were completed in 2002 to allow pumping water to a lower level than was previously possible.

The recommended maximum elevation of 3750 feet above sea level ("asl") (3859 feet mine datum) as illustrated on Figures 2-2 and 2-3 is approximately 15.2 m (approximately 50 feet) below the low point in the pit perimeter where water would be expected to overflow from the Main pit into the Zone II pit. This safety margin was incorporated into the design of the recycle water system in 1997 as a means of providing containment for an unexpected breach of the Faro Creek diversion into the pit and to reduce the risk of an increase in seepage into the Zone II pit through the fractured and faulted wallrock that separates the two pits. This elevation also corresponds to the current elevation of the fixed base of the swivel at the shore. The higher recommended maximum elevation of 3864 feet mine datum presented on Figures 2-2 and 2-3 is the maximum level that the barge can be raised without compromising the electrics.

The Water Licence requires that the water level in the Main pit be maintained below 1178.35 m (3866 ft) mine datum (Part B, Item 23). This was achieved through 2008, as illustrated on Figures 2-2 and 2-3.

Figure 2-2. Faro Main Pit Filling Curve, 1992 to 2008

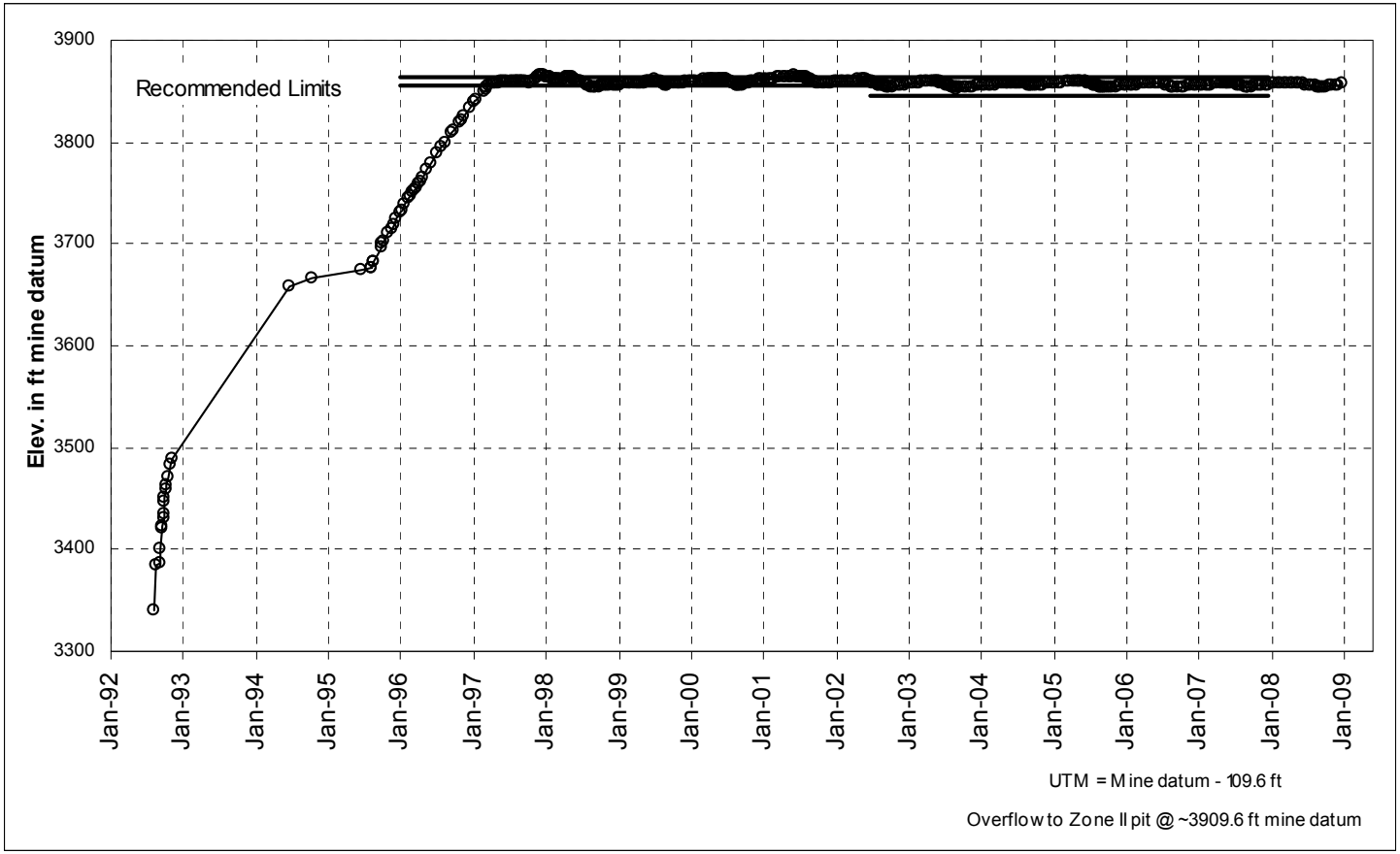
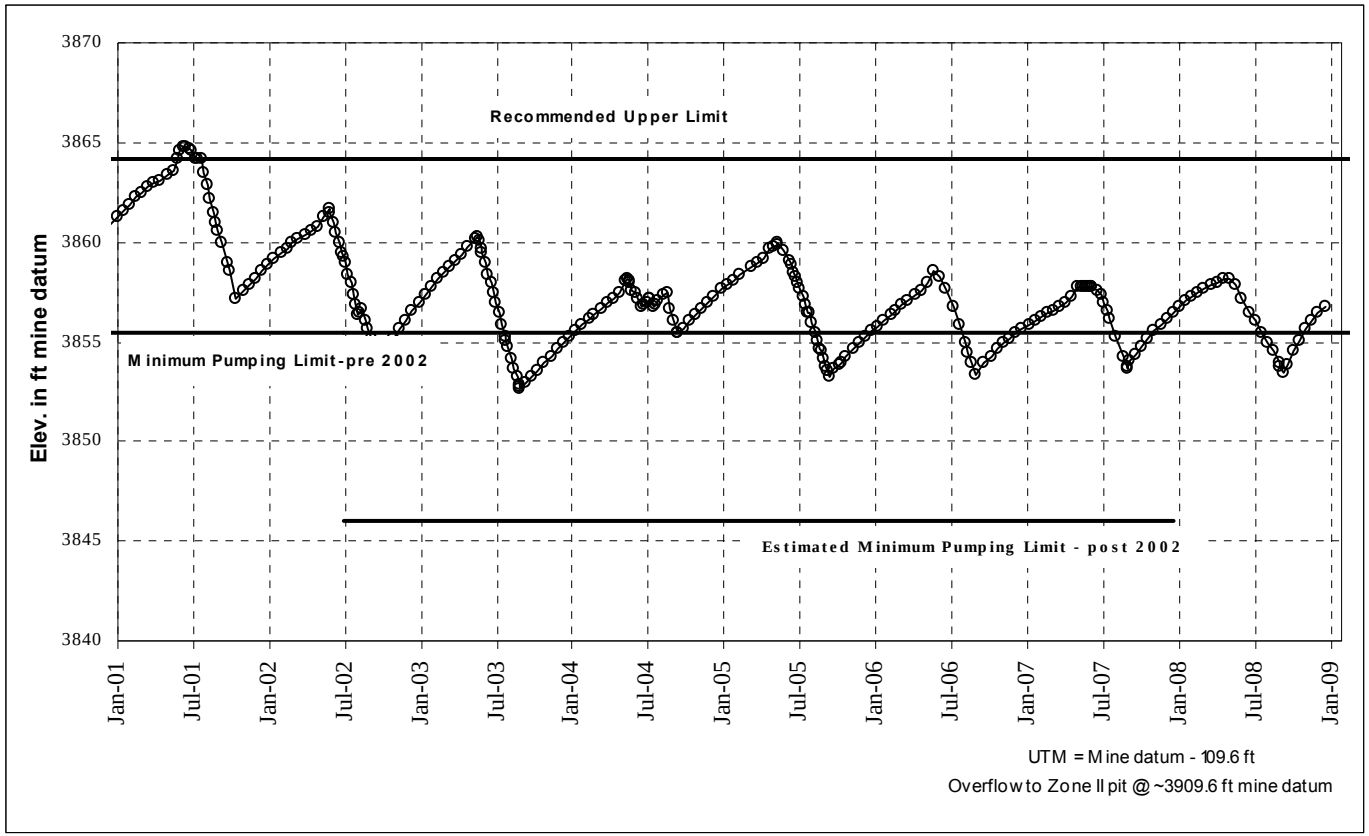


Figure 2-3. Faro Main Pit Water Level, 2001 to 2008



Pumping from the Faro Pit in 2008 started on April 29, and shutdown on September 21. From May to July weekly measurements of the flow rates from the Faro Pit to Mill were collected and are presented in Table 2-3.

Table 2-3. Summary of Weekly Flow Measurements- Faro Pit to Mill

Date	Flow (USgpm)
2-May-08	1681
5-May-08	1633
12-May-08	2282
20-May-08	2018
26-May-08	2414
2-Jun-08	2306
5-Jun-08	3339
9-Jun-08	4287
17-Jun-08	4167
23-Jun-08	3720
7-Jul-08	3120
14-Jul-08	3252
21-Jul-08	3578
28-Jul-08	2065
Average	2847

A simple water balance can be described for the Faro Main pit that is based on the known values of pit water level measurements, the height-volume relationship and the dates of pumping. In this case, the water balance parameters are:

- "Zone II water";
- "Net uncontrolled inflows" (groundwater seepage in/out, runoff, precipitation, etc.) calculated from observed changes in the pit pond water elevation during strategic periods;
- "Water pumped"; and
- Overall "net inflow" calculated from the overall change in the water elevation for the year.

The simple water balance could be expressed as follows with application of the subsequent notes:

$$\textit{Zone II Water}^{1} + \textit{Net Uncontrolled Inflows}^{2} - \textit{Water Pumped}^{3} = \textit{Net Inflow}^{4}$$

Therefore, the 2008 water balance for the Faro Main pit can be expressed as:

$$0.07 + 2.24 - 2.27 = +0.04 \ \ (\text{in millions } m^3)$$

Notes (also see Table 2-3):

1. The quantity of water pumped from the Zone II pit into the Main pit in 2008 is estimated to be 65,210 m^3 (Section 2.1.2).

2. The estimated volume of net uncontrolled inflows entering the Main pit from direct precipitation, evaporation, local run off, seepage inflow and seepage losses was 2.24 million m^3 for 2008 (avg. 3,804 m^3/day or 44 L/s). This estimate was developed from direct measurements of the pond water level during periods in 2008 where the only inflows/outflows were the uncontrolled water. Net uncontrolled inflows during the period where there was active pumping from the pit and active pumping from Zone II Pit was calculated using the estimated volumes of pumping to and from the pit and direct measurements of pond water levels. The estimate of net uncontrolled water inflows for 2008 is higher than the range of calculated values from 1995 to 2007 (1.0 to 2.0 million m^3), due to the higher levels of precipitation experienced at the site during the summer.

3. The quantity of water pumped out during the pumping period is estimated using the average pumping rate of 2,847 USgpm (15,528 m^3/day) presented in Table 2-3 and 146 days of pumping. The estimated volume pumped in 2008 is 2.27 million m^3.

4. The net inflow of water entering the Main pit (for the year) is accurately tracked via the change in water elevation from January 1 to December 31. This volume is inclusive of all uncontrolled inflows, inflows from the Zone II pit and water pumped out. In 2008, there was a net increase in the pond level of 0.08 m (0.25 feet) representing a net volume increase of 0.04 million m^3.

Table 2-4. Faro Main Pit Water Balance, 2008

Period (days)	Elevation Change (ft mine datum)	Net Volume Change	Zone II Average	Net Uncontrolled Inflows	Water Pumped Out
Jan01-April28 (119)	3856.48 – 3858.21 (+4.4 mm/day)	+288,432 m^3 (+2,424 m^3/day)	Nil	+288,432 m^3 (+2,424 m^3/day)	Nil
April29-Sep21 (146)	3858.21 – 3853.45 (-9.9 mm/day)	-793,606 m^3 (-5,436 m^3/day)	+61,968 m^3 (+424 m^3/day)	+1,411,514 m^3 (+9,668 m^3/day calc)	-2,267,088 m^3 (-15,528 m^3/day)
Sep22-Sep27 (6)	3853.45 – 3853.74 (+14.4 mm/day)	+48,350 m^3 (+8,058 m^3/day)	+3,242 m^3 (+540 m^3/day)	+45,108 m^3 (+7518 m^3/day calc.)	Nil
Sep28-Dec31 (95)	3853.74 – 3856.73 (+9.6 mm/day)	+498,505 m^3 (+5,247 m^3/day)	Nil	+498,505 m^3 (+5,247 m^3/day)	Nil
Total 2008 (366)	**3856.48 – 3856.73 (+0.25 mm/day)**	**+41,681 m^3 (+114 m^3/day)**	**+65,210m^3 (+178 m^3/day)**	**+2,243,559 m^3 (+6,130 m^3/day)**	**-2,267,088 m^3 (-6,194 m^3/day)**

The water level in the Main pit was lowered by approximately 1.5 m during the pumping period and ended the year at an estimated 3856.73 ft asl (mine datum), which was 0.25 m higher than the start of the year. As a result, the storage volume created is adequate to contain the anticipated inflows until the scheduled restart of the pumping program in 2009.

The volume pumped from the pit in 2008 was the highest since 1999 (Table 2-5). Table 2-5 also lists the annual change in pit level, estimated annual net inflows and annual precipitation. These values suggest that the 2008 pumping program maintained an overall constant water elevation with a relatively high volume of water pumped out. This is primarily in response to the higher levels of precipitation experienced at the site during the summer of 2008.

The estimated volumes of annual net inflows are plotted against annual precipitation on Figure 2-4. The plot suggests that there is a consistent linear relationship between net inflows and precipitation for the five years up to 2003 (R^2=0.87). Figure 2-4 suggests that there may be a different relationship between net inflows and precipitation for 2004 and 2005 wherein the net inflows are less than preceding years. This can reasonably be linked to the maintenance work performed on the Faro Pit diversions, primarily from 2003 through 2005. If true, then this simply confirms the observations of site management. For 2007, the natural inflows entering the pit versus total precipitation is not close to the relationship for 1999-2003, but more in line with the values of 2004 and 2005, which may demonstrate the positive effects of maintenance work in the diversion. Another means of demonstrating this trend is the “Inflow Factor” listed in Figure 2-4, which shows a lower factor for 2004 and 2005 than for other years and that the value for 2007 is within the range of the values for 2004 and 2005. Continued annual assessments of inflows, and particularly the detailed analyses being conducted for the FCRP, may confirm or disprove this suggestion.

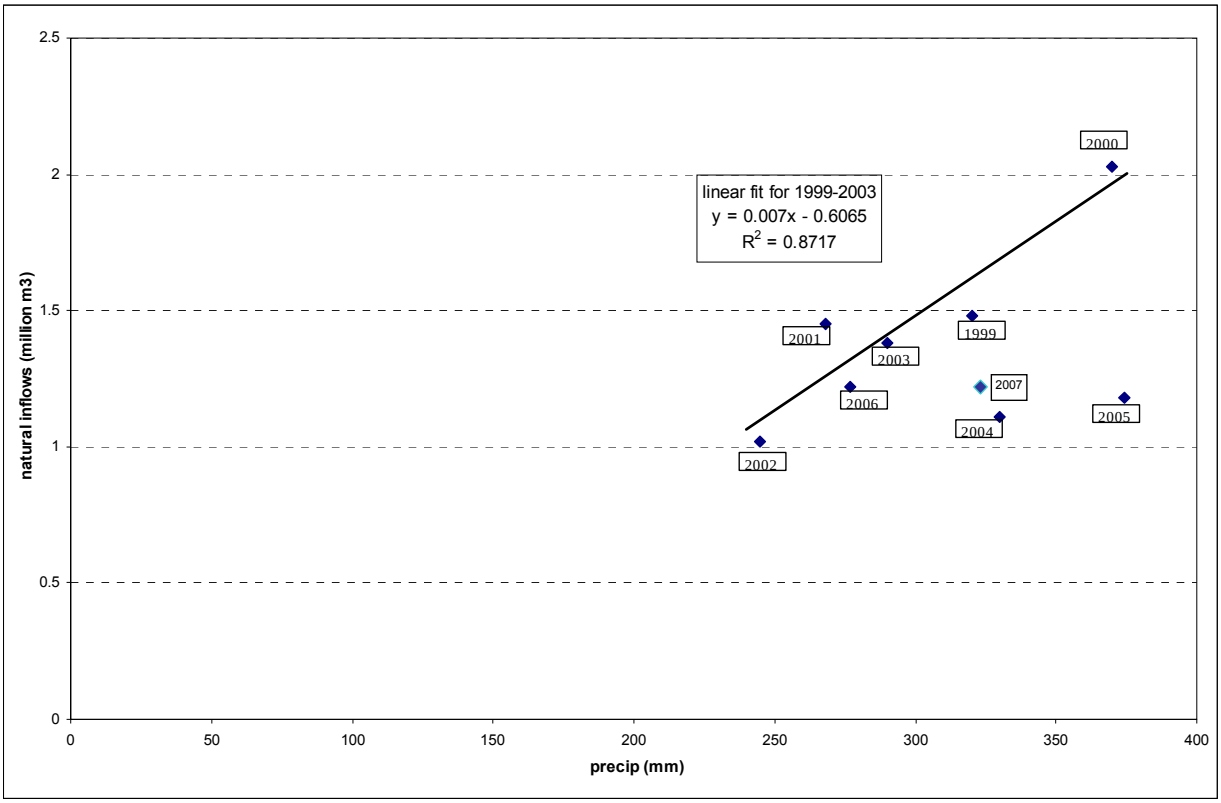
This assessment is not possible at this time for 2008 as the precipitation data from the Faro Airport is not available for public use. Additional site-specific data is available from the two climate stations on site: one at the Faro side and one at the Vangorda/Grum side. However, this data is not available at this time. Once this information is compiled and reviewed, this assessment can be carried out for 2008.

Table 2-5. Summary Main Pit Water Volumes

Year	Water Treated[1] (million m3)	Annual Change in Pit Level[1]	Natural Inflows[1] (million m3)	Annual Precipitation[2] (mm)	Inflow Factor[3] (million L/mm)
1999	1.06	+0.9 m	1.48	320	4.6
2000	1.80	+0.6 m	2.03	370	5.5
2001	1.93	-0.7 m	1.45	268	5.4
2002	1.94	-1.5 m	1.02	245	4.2
2003	1.76	-0.5 m	1.38	290	4.8
2004	0.78	+0.7 m	1.11	330	3.4
2005	1.62	-2.1 m	1.18	374	3.2
2006	1.28	+0.0 m	1.22	277	4.4
2007	1.15	+0.25 m	1.22	323	3.8
2008	2.27	+0.25 m	2.24	n/a	n/a

Notes: 1. As reported in the Annual Environmental Reports.
2. At the Faro airport as compiled by BGC Engineering Inc. as summarized from Table 2-2.
3. Calculated as natural inflows divided by annual precipitation

Figure 2-4. Summary of Main Pit Water Volumes*



* 2008 precipitation data was unavailable at the time of preparation of this report and is therefore not shown in Figure 2-4.

2.1.4 Emergency Tailings Area

Various studies carried out during the past few years concluded that surface and groundwater flows through the Emergency Tailings Area (ETA) contribute a significant contaminant load to the downstream area and that a portion of this contaminate loading was escaping collection leading to possible contaminate loading to the aquifer below the Rose Creek Tailings. In response to this issue, a collection and treatment system for the ETA water was installed during the fall and winter of 2006/2007. Key components of this system include the following:

- Dual sump water collection system with cutoff trench below the ETA;
- Gravity-feed pipeline from ETA to the Intermediate Pond;
- Barge mounted vertical turbine pump at the intermediate Pond; and
- Pipeline from Intermediate Pond to Mill Water Treatment System.

Water from the ETA is collected in the collection sump and transported by pipeline to the Intermediate Pond. The water from the Intermediate Pond is then pumped using the floating barge system to the Mill Water Treatment System to be treated. The treated water then is conveyed to the Polishing Pond using the existing piping system and discharged to Rose Cree via siphon. The management of water from the ETA is an internal operating practice and the Water Licence does not regulate this water use.

In 2008, the ETA collection system was started up on May 12 and shutdown on October 22 due to freezing conditions. Flow rates were collected and recorded weekly from start up to the end of July for each month of operations at the ETA collection sump and the channel weir just below the collection area (Table 2-6). Based on the flow rates from mid-June to the end of September, excluding the measurements from July 10, an average of 79% of the ETA drainage was collected and pumped to the Intermediate Pond while 21% bypassed the collection system. In June, July, and August, the ETA collection boxes required cleaning of fines build-up several times due to ongoing precipitation events.

Table 2-6. ETA Collection System Flow Rates, 2008

Date	ETA Collection Sump (USgpm)	Channel Weir (USgpm)
13-May-08	192	44
20-May-08	124	42
2-Jun-08	101	24
9-Jun-08	100	70
17-Jun-08	87	18
23-Jun-08	116	23
10-Jul-08	plugged	>159
14-Jul-08	97	17
21-Jul-08	132	23
28-Jul-08	106	17
Average	**117**	**31**

An estimated 104,698 m^3 was collected and piped to the intermediate Pond at the estimated average flow rate of 117 USgpm over the 164 day operating period.

2.1.5 Intermediate Pond

In previous years, the Intermediate Pond was managed by maintaining the water level below the spillway elevation by periodically syphoning water out into the Cross Valley Pond (also referred to as the polishing pond) with treatment using the Down Valley Treatment System. As outlined in the previous section, in 2007 a barge was installed in the Intermediate Pond and water was pumped up to the Mill Water Treatment System. This practice of lowering the pond water level reduces the environmental and physical stability risks associated with operating a retained water pond at full supply level as demonstrated to the Yukon Water Board in a technical report previously submitted under Part F, Item 56 of the Water Licence. This is an internal operating practice and the Water Licence does not regulate pond level or discharge from the Intermediate Pond.

From April 17 to August 28, 2008, non-compliant water was pump continuously from the barge in the Intermediate Pond to the Mill Water Treatment System, except for a several minor shutdowns for ongoing maintenance of the barge pumping system. An estimated 887,616 m^3 was pumped (and treated) from the Intermediate Pond in 2008 from April 17 to August 28 at an estimated average flow rate of 6,624 m^3/day (1214 USgpm) average over the 134 day operating period inclusive of maintenance shutdowns.

For May and June weekly measurements of the flow rates from the Intermediate Pond to the Mill were collected from May 2 to July 28 and are presented in Table 2-8.

Table 2-7. Summary of Weekly Flow Measurements- Intermediate Pond to Mill - 2008

Date	Flow (USgpm)
02-May-08	1934
05-May-08	1946
12-May-08	2018
20-May-08	1801
26-May-08	2090
02-Jun-08	1825
05-Jun-08	444
09-Jun-08	420
17-Jun-08	324
23-Jun-08	384
07-Jul-08	864
14-Jul-08	768
21-Jul-08	456
28-Jul-08	1729
Average	**1214**

To provide for further reduction in the water level in the Intermediate Pond, exacerbated by the higher levels of precipitation that occurred in 2008, water was also managed by syphoning water out into the Cross Valley Pond with treatment in the Down Valley Treatment System. This system is also an internal operating practice and as such is not regulated by the Water Licence. Syphoning to the Cross Valley Pond with treatment using the Down Valley Treatment System occurred over two periods in 2008, from April 30 to June 4 and from August 25 to October 2. As per the established operating practice, operation of this system in the spring

allows for storage for the upcoming freshet while operation in late summer provides for storage for the (low) winter inflows and the following spring freshet.

For May and June weekly measurements of the flow rates from the Intermediate Pond were collected and are presented in Table 2-8.

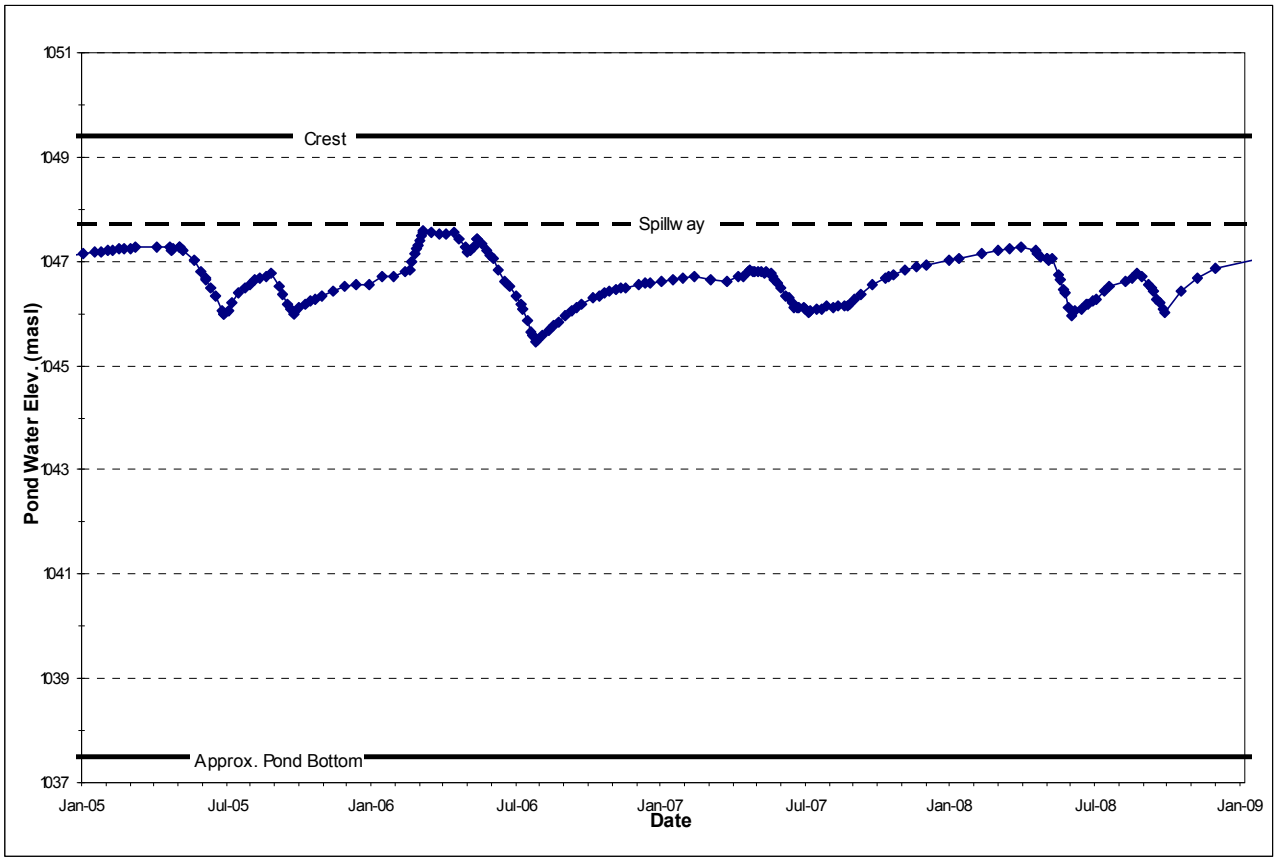
Table 2-8. Summary of Weekly Flow Measurements- Intermediate Pond to Down Valley Treatment

Date	Flow (USgpm)
02-May-08	2702
05-May-08	3002
12-May-08	2114
20-May-08	3098
26-May-08	2858
02-Jun-08	2870
Average	**2774**

An estimated 1,134,000 m^3 was syphoned from the Intermediate Pond in 2008 at an estimated average flow rate of 15,120 m^3/day (2774 USgpm) average over the 75 day operating period: 36 in the spring and 39 in later summer/early fall.

Figure 2-4 illustrates the water level measurements in the Intermediate Pond from 2005 to 2008. The pond level was 0.07 m lower at year end than at the beginning of the year.

Figure 2-5. Intermediate Pond Water Level, 2005-2008



A simple water balance can be described for the Intermediate Pond that is based on the measured pond water levels, average flow rate for syphoning to the Cross Valley Pond, the height-volume relationship and the dates of active pumping to the Mill Water Treatment System. In this case, the water balance parameters are the quantities of:

- "Net uncontrolled inflows" (groundwater seepage in/out, runoff, precipitation, inflows from the ETA collection system, residual drainage from the ETA/Old Faro Creek area, residual drainage from pond catchment area, etc.) calculated from observed changes in the pit pond water elevation during strategic periods;
- "Water syphoned to Cross Valley Pond";
- "Water Pumped to Mill Water Treatment System"; and
- Overall "net inflow" calculated from the overall change in the water elevation for the year.

The simple water balance could be expressed as follows with application of the subsequent notes:

Net Uncontrolled Inflows[1] - Water Syphoned to Cross Valley Pond[2] – Water Pumped to Mill Water Treatment System[3] = Net Inflow[4]

Therefore, the 2008 water balance for the Intermediate Pond pit can be expressed as:

+2.01[1]- 1.13[2] – 0.9[3] = +0.02[4] (in millions m^3)

Notes (also see Table 2-5):

1. The estimated volume of net uncontrolled inflows entering the Intermediate Pond from direct precipitation, evaporation, local run off, seepage inflow and seepage losses was 2.01 million m^3 for 2008 (avg. 63 L/s). This estimate was developed from direct measurements of the pond water level during periods in 2008 where the only inflows/outflows were the uncontrolled water. For the periods of there was pumping to the Mill Water Treatment System and/or syphoning to the Cross Valley Pond, the net uncontrolled inflow was calculated using the estimated volumes of pumping and syphoning from the pond and direct measurements of pond water levels.

2. The water quantity siphoned out to the Cross Valley Pond is calculated for each syphoning period using the days of syphoning and assuming the average syphon flow rate of 2774 USgpm (Table 2-8). In total there were 75 days of syphoning in 2008: 36 in the spring and 39 in later summer/early fall. The estimated volume syphoned is 1,134,000 m^3 at an average daily flow rate of 15,120 m^3/day.

3. The water pump out to the Mill Treatment System is calculated for the pumping period using the days of pumping and assuming the average pumping rate of 1214 USgpm or 6,624 m^3/day (Table 2-7). Based on a total of 134 days of pumping the estimated volume pumped to the mill is 887,616 m^3.

4. The net inflow of water entering the Intermediate Pond (for the year) is accurately tracked via the change in water elevation from January 1 to December 31. This volume is inclusive of all uncontrolled inflows and water pumped out. In 2008, there was a net decrease in the pond level of 0.07 m representing a net decrease in volume of 16,347 m^3.

Table 2-9. Intermediate Pond Water Balance, 2008

Period (days)	Elevation Change (m asl)	Net Volume Change	Net Uncontrolled Inflows	Syphoned to Cross Valley Pond/	Pumped to Mill Treatment System
Jan01-Apr16 (107)	1047.02 - 1047.23 (+1.9 mm/day)	+49,041 m^3 (+458 m^3/day)	+49,041 m^3 (+458 m^3/day)	Nil	Nil
Apr17-Apr29 (13)	1047.23 – 1047.08 (-17.1 mm/day)	-35,029 m^3 (-2,695 m^3/day)	+51,083 m^3 (+3,929 m^3/day) calc	Nil	-86,112 m^3 (-6,624 m^3/day) (-1214 USgpm)
Apr30-June4 (36)	1047.08 – 1046.01 (-29.7 mm/day)	-241,977 m^3 (-6,722 m^3/day)	+540,807 m^3 (+15,022 m^3/day) calc	-544,320 m^3 (-15,120 m^3/day) (-2774 USgpm)	-238,464 m^3 (-6,624 m^3/day) (-1214 USgpm)
June5-Aug24 (81)	1046.01– 1046.74 (+9.0 mm/day)	+162,577 m^3 (+2,007 m^3/day)	+699,121 m^3 (+8,631 m^3/day) calc	Nil	-536,544 m^3 (-6,624 m^3/day) (-1214 USgpm)
Aug25-Aug28 (4)	1046.74– 1046.78 (+10.0 mm/day)	+9,341 m^3 (+2,335 m^3/day)	+96,317 m^3 (+24,079 m^3/day) calc	-60,480 m^3 (-15,120 m^3/day) (-2774 USgpm)	-26,496 m^3 (-6,624 m^3/day) (-1214 USgpm)
Aug29-Oct2 (35)	1046.78– 1046.43 (-10.0 mm/day)	-78,644 m^3 (-2,2246 m^3/day)	+450,556 m^3 (+12,873 m^3/day) assumed	-529,200 m^3 (-15,120 m^3/day) (-2774 USgpm)	Nil
Oct2-Dec31 (90)	1046.43– 1046.95 (+5.8 mm/day)	+118,344 m^3 (+1,315 m^3/day)	+118,344 m^3 (+1,315 m^3/day)	Nil	Nil
Total 2008 (366)	**1047.02– 1046.95 (-0.2 mm/day)**	**-16,347 m^3 (-45 m^3/day)**	**+2,005,279 m^3 (+5,479 m^3/day)**	**-1,134,000 m^3 (-3,098 m^3/day)**	**-887,616 m^3 (-2,425 m^3/day)**

2.1.6 Cross Valley Pond

The Cross Valley Pond is managed by maintaining the water level below the spillway elevation by periodically syphoning water out to Rose Creek. This practice reduces the environmental and physical stability risks associated with operating a retained water pond at full supply level. This water is the final effluent and it is not released unless it meets the maximum allowable discharge limits specified in the Water Licence (Part C, Items 27 through 31).

The potential sources of water entering the Cross Valley pond are:

- surface inflow syphoned (and treated) from the Intermediate pond (Section 2.1.5);
- water that is pumped from the Faro Main Pit and Intermediate Pond (includes ETA water) and treated in mill treatment system (Section 2.1.3, 2.1.4 and 2.1.5);
- groundwater that may possibly discharge into the pond from the underlying aquifer; and
- precipitation and local runoff.

There were 195 days of Cross Valley discharge syphon operation from April 10 to October 22, 2008. As per the established operating practice, the system was operated through the summer to pass (treated) water inflows from the mill treatment system. Site environmental staff recorded staff gauge readings on a daily

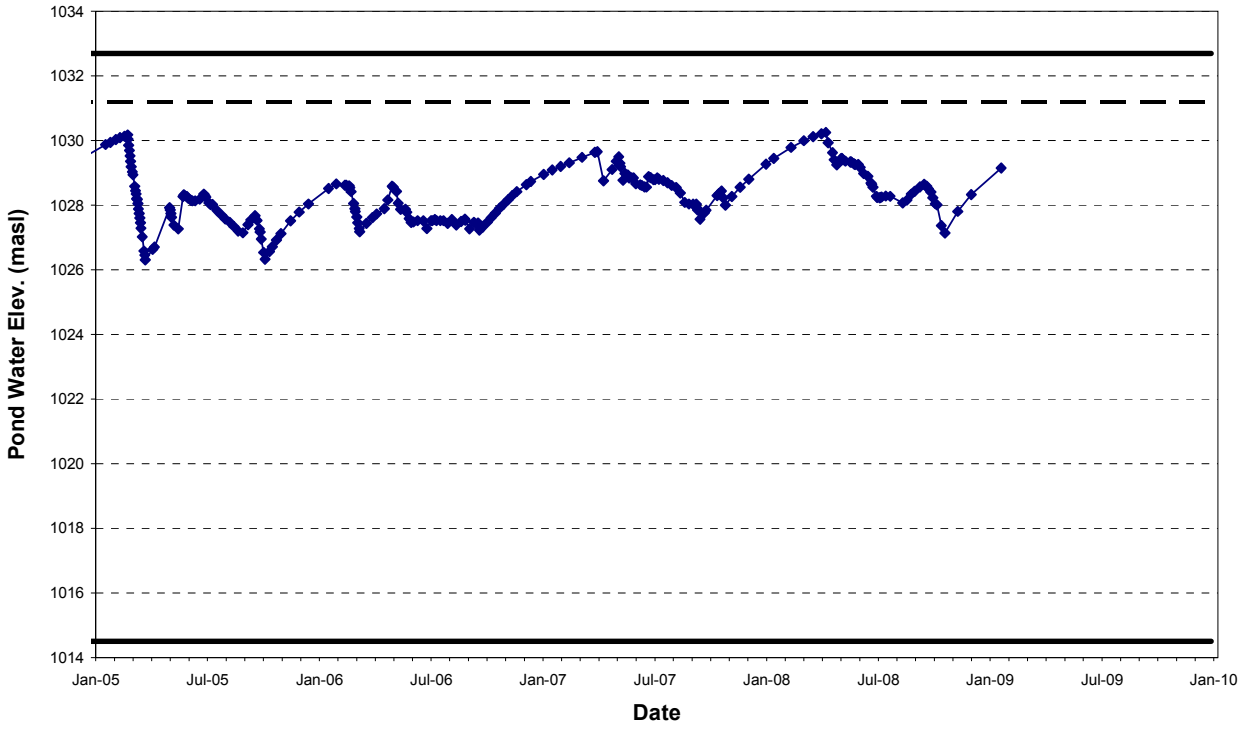
basis and collected weekly flow measurements at location X5 when the discharge syphon was operating. The measured flow would be inclusive of the North Wall Interceptor (NWI) Ditch, which directs clean water to this location. The NWI flow would be a minor portion (in the order of 1% maximum) of the total measured flow at times when the effluent discharge syphon was operating. The weekly flow measurements are presented in Table 2-10. Based on these measurements the syphon operated at an estimated average flow rate of 436 L/s (6,920 USgpm),

Table 2-10. Summary of Weekly Flow Measurements- Discharge from Cross Valley Pond

Date	Flow (USgpm)
2-May-08	4683
6-May-08	7866
13-May-08	8527
20-May-08	8323
27-May-08	9079
3-Jun-08	9127
10-Jun-08	7349
17-Jun-08	7386
24-Jun-08	7344
1-Jul-08	7356
8-Jul-08	4920
15-Jul-08	5220
22-Jul-08	5584
29-Jul-08	5188
5-Aug-08	5232
12-Aug-08	5112
19-Aug-08	5276
26-Aug-08	5250
2-Sep-08	9220
9-Sep-08	9186
16-Sep-08	9120
23-Sep-08	9156
30-Sep-08	9220
7-Oct-08	4920
14-Oct-08	5100
21-Oct-08	5176
Average	**6920**

Figure 2-6 illustrates the water level measurements in the Cross Valley Pond from 2005 to 2008. The pond level was 0.46 m lower at year end (2008) than at the beginning of the year.

Figure 2-6. Cross Valley Pond Water Level, 2005-2008



An estimated 7.3 million m^3 of (compliant) water was released via location X5 in 2008 based on an average flow rate of 436 L/s. This is inclusive of:

- Via the Mill Water Treatment System:
  - inflow from the Main Pit (2.3 million m^3); and
  - inflow from the Intermediate Pond (0.9 million m^3);
- Water siphoned from the Intermediate Pond (1.13 million m^3);
- Net decrease in the pond level by 0.46 m over the course of the year; and
- Any other inflows and outflows, including the North Wall Interceptor Ditch.

Based on the above numbers, there was approximately 3 million m^3 of water that was discharged that is not attributed to a source. While it is expected that a portion of this consists of groundwater inflow and precipitation, it is unlikely that these sources account for the entire additional volume. Further investigation is required to determine the cause of this discrepancy in the water balance.

2.1.7 Seepage at Cross Valley Dam

A continuous flow of seepage emerges to surface at the toe of the Cross Valley Dam. This is generally thought to consist primarily of seepage through the dam and the dam foundation from the Cross Valley Pond with some portion of deeper groundwater flow also. Additional information on this topic is being developed through studies that are currently underway for development of the FCRP. However, the information is not available for reporting at this time.

The total volume of effluent that entered Rose Creek via location X13 in 2008 was estimated to be 0.87 million m^3 at an average rate of flow of 27.6 Lps, as compiled by BGC Engineering Inc.

2.1.8 Freshwater

No freshwater was drawn from Rose Creek for industrial purposes in 2008. Freshwater from Rose Creek was not used for reagent mixing in the water treatment systems, drinking water nor wash water.

Some components of the fresh water supply system that was previously used (during mine operations) to supply water to the mill from Rose Creek remain in place. The system is, however, inoperable and no longer allowed under the terms of the Water Licence.

The previous fresh water dam and reservoir in the South Fork of Rose Creek represented a large component of the fresh water supply system. The dam was breached to original ground level in 2004 and there is no longer any ponding or storage of water in a reservoir. The work, which includes follow up monitoring and reporting, is conducted under a separate water licence that was issued specifically for that project.

The fresh water supply system also includes the following (unused) components which remain largely in place:

1. Pumphouse Pond located at the confluence of the North and South Forks of Rose Creek;
   The pond continues to pass all of the flow from the South Fork and most of the flow from the North Fork of Rose Creek (high flows in the North Fork partially spill into the North Fork Diversion). The North Fork channel into the Pumphouse Pond includes several settling/groundwater recharge ponds. The pond itself represents overwintering habitat for fish.
2. Pumphouse Building; and
   The building is largely empty. Pumps and motors have been previously removed for alternate use.
3. Freshwater Pipeline;
   The steel pipeline is buried where it passes under the (former) copper sulphate and bulk explosives manufacturing yard and access road and is then overland to the mill.

Prior to 2005, there were also two ground water wells, PW3 and PW6, located in the Rose Creek valley near the Pumphouse Pond. In 2005, the wells were capped and surface structures removed.

2.1.9 Continuous Flow Monitoring

Continuous flow monitoring at location R7 in the North Fork of Rose Creek and location X14 in Rose Creek immediately downstream of the tailings facility is a requirement of the Water Licence (Schedule A, Part III). The water levels have been monitored on a continuous basis using a pressure transducer and datalogger since 1996 (R7) and 1994 (X14) except during periods of malfunction or damage. These flow records for 2008 were subject to an annual technical review by a hydrologist.

Figure 2-7 (R7) and Figure 2-8 (X14) are graphs of the 2008 water levels and flow rates.

Figure 2-7. Preliminary 2008 Flow Record for Location R7, North Fork Rose Creek

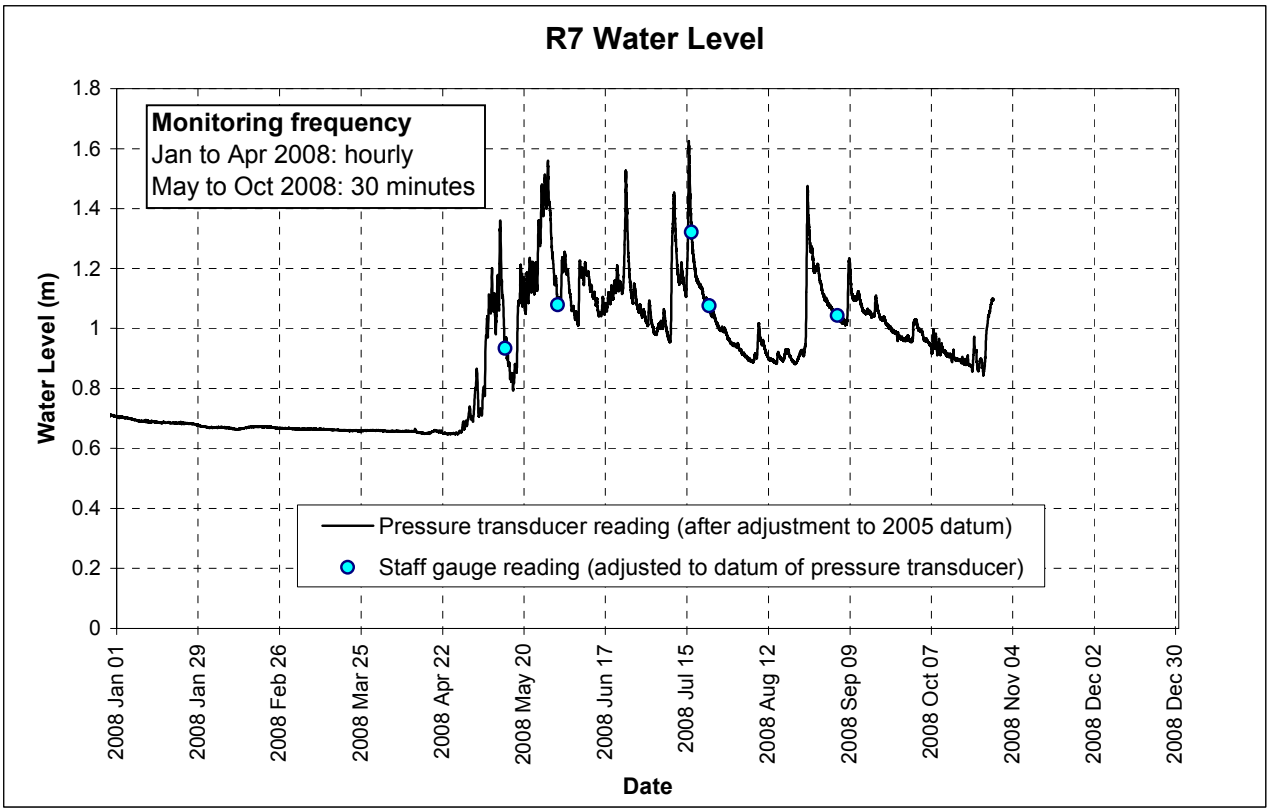
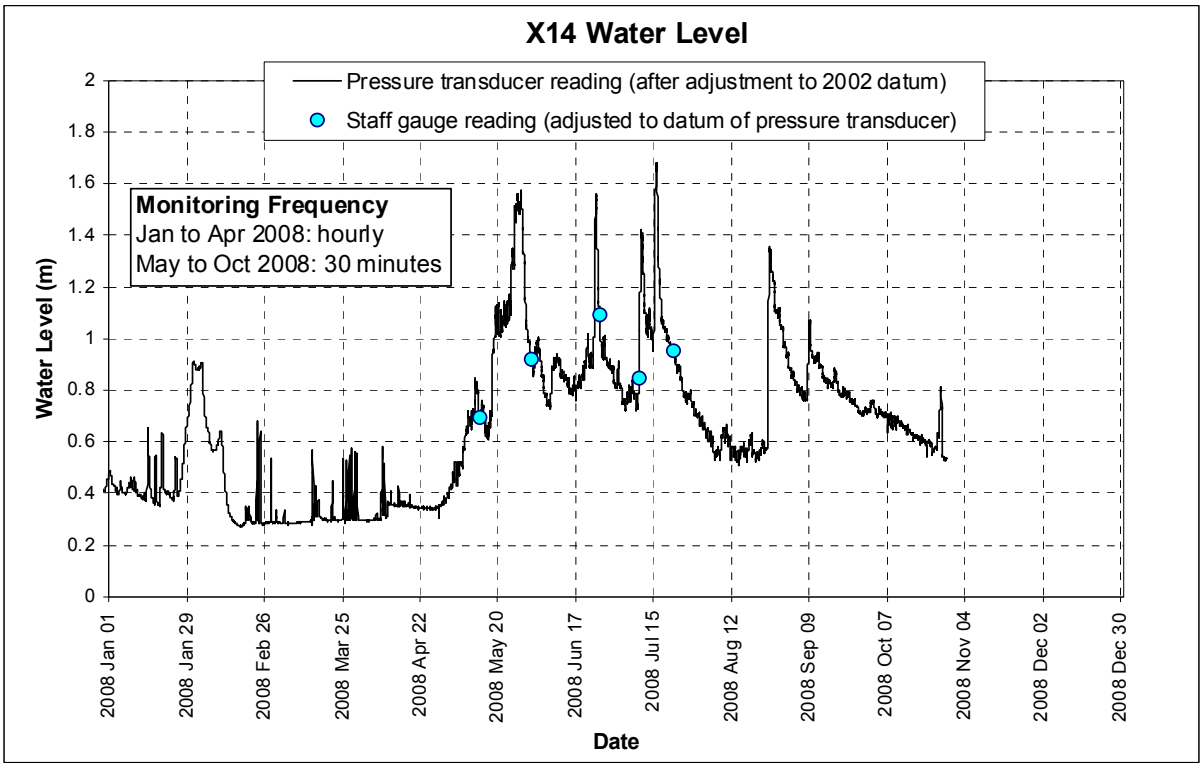
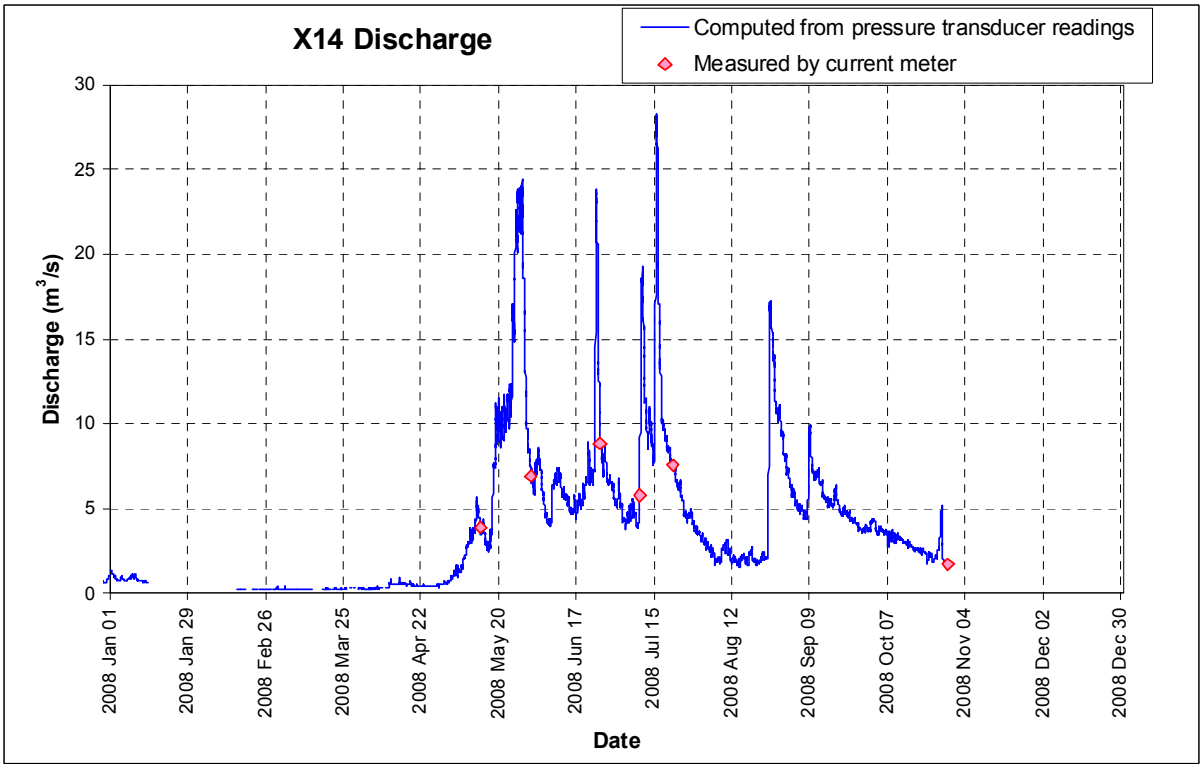


Figure 2-8. Preliminary 2008 Flow Record for Location X14, Rose Creek





2.2 Vangorda Creek Drainage

2.2.1 Summary

The Water Licence authorizes the use of water from Vangorda Creek up to a maximum rate of 19,930 m^3/day (Part B, Items 21a and 21c). Information that was provided in the Water Licence Application suggested an average annual direct use of water of 951,000 m^3 per year. The Water Licence specifically recognizes the following water uses:

- Pumping from the Little Creek Dam Pond;
- Pumping from the Vangorda pit;
- Pumping from the Freshwater Supply Pond; and
- Possible Future Pumping from the Grum pit.

Table 2-11 summarizes the total water obtained from Vangorda Creek in 2008 for the authorized purposes. One of the authorized water uses is possible future pumping from the Grum Pit (300,000 m^3 per year at a rate of 6,000 m^3/day) which was not required in 2008. Therefore, these amounts are not included in the amounts listed in Table 2-11. There was no use of water for unauthorized purposes.

Table 2-11. Summary of 2008 Water Use from Vangorda Creek

Water Use	Maximum Rate (m3/day)	Total (m3)
Pumping from Little Creek Dam Pond	2,472	69,975
Pumping from the Vangorda Pit	12,432	788,416
Pumping from Freshwater Supply Pond	30	1,967
Possible Future Pumping from the Grum Pit	Not required	Not required
Total Estimated Water Use	**14,934**	**860,358**
Total Allowable Water Use	**13,930**[1]	**651,000**[1,2]

1.Excluding Possible Future Pumping from the Grum Pit.

2. As suggested in the Water Licence Application Report.

Table 2-11 shows that the volume of water pumped (and treated) from Vangorda Pit in 2008 was greater than the annual volume that was suggested in the Water Licence Application. In 2008, due to the higher than normal precipitation at the site, a larger volume of water needed to be pumped (and treated) from the pit to maintain the pit water level below the maximum recommended elevation and ensure sufficient capacity for spring freshet inflows in 2009.

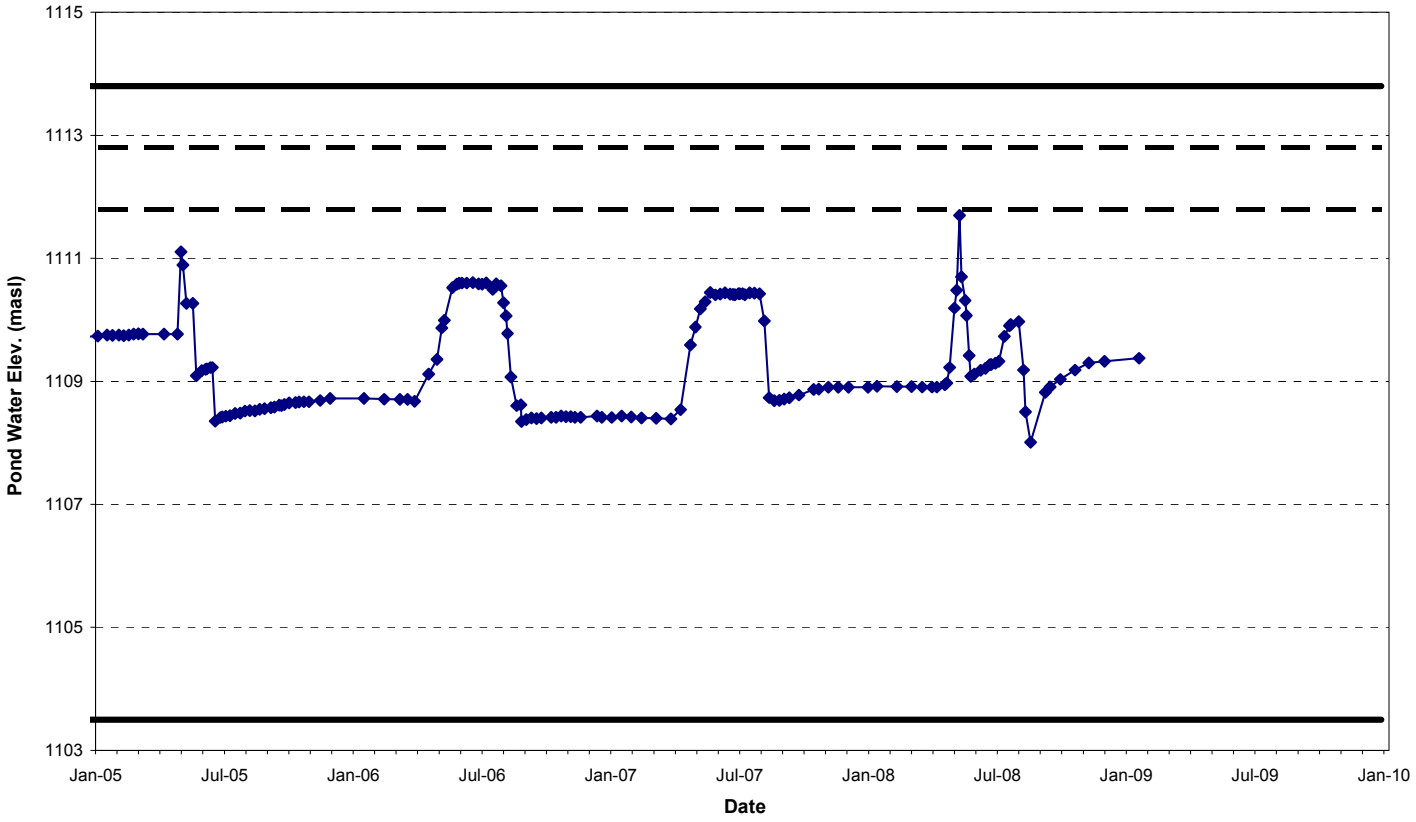
2.2.2 Little Creek Dam Pond

The water that collects in Little Creek Dam Pond is (contaminated) runoff and seepage from the Vangorda waste rock dump. This water is pumped to the Vangorda pit on an as-required basis, typically on only one or two occasions each summer, to maintain the water level below the prescribed “safe” elevations.

There were a total of 28 days of pumping between May 12 and May 29 and August 6 and August 17. An estimated 69,975 m^3 was pumped from Little Creek Dam Pond in 2008, 49,138 m^3 in May and 20,837 m^3 in August. This is estimated from the measured pond elevations and the height-capacity relationship. The estimated average flow rate over the entire pumping period is 2,472 m^3/day (453 USgpm).

Figure 2-9 illustrates the water level measurements in Little Creek Dam Pond from 2005 to 2008. The pond level was approximately 0.5 m higher at year end than at the beginning of the year. The Water Licence requires that the water level in Little Creek Dam Pond be maintained no less than 1 m below the overflow structure (Part B, Item 26). This was achieved through 2008.

Figure 2-9. Little Creek Dam Pond Water Levels, 2005 to 2008



2.2.3 Vangorda Pit

From mine shut down in 1998 to 2001, the water level in the Vangorda pit rose to its recommended "maximum" allowable elevation. This elevation provides approximately 30 m of safety freeboard below the estimated overflow elevation. The pit water is contaminated from rock piles and pit walls. The inflows into the pit include local area runoff, leakage and underflow from the Vangorda Creek Diversion, direct precipitation and water pumped from Little Creek Dam Pond.

In 2002, the Grum/Vangorda water treatment plant was reactivated and a new overland pumping system was installed from the Vangorda pit. From 2002 to 2005, an annual seasonal pumping program was conducted to maintain the pit water level below the maximum recommended elevation. In 2005, a sufficiently large volume of water was pumped to eliminate the need for any pumping in 2006 and 2007.

In 2008, the seasonal pumping and treating was carried out to manage the water levels in Vangorda pit from June 5 to August 20 with several shutdowns during the pumping period. A leak developed in the booster station check valve and the system was shutdown from June 24 to June 29. The Vangorda booster pump failed on July 8 and the system was shut down from July 8 to July 9. During the remainder of July and August, the Vangorda pumping system continued to operate intermittently due to ongoing component failure related to poor water quality (low pH) impacting the integrity of the equipment. In addition, due to lack of lime supply associated with delivery problems, the system was shutdown on July 31 for half a day, and again on August 13 and 14 for just under 2 days. In total, over the 76 day pumping period, the system operated for approximately 63.4 days.

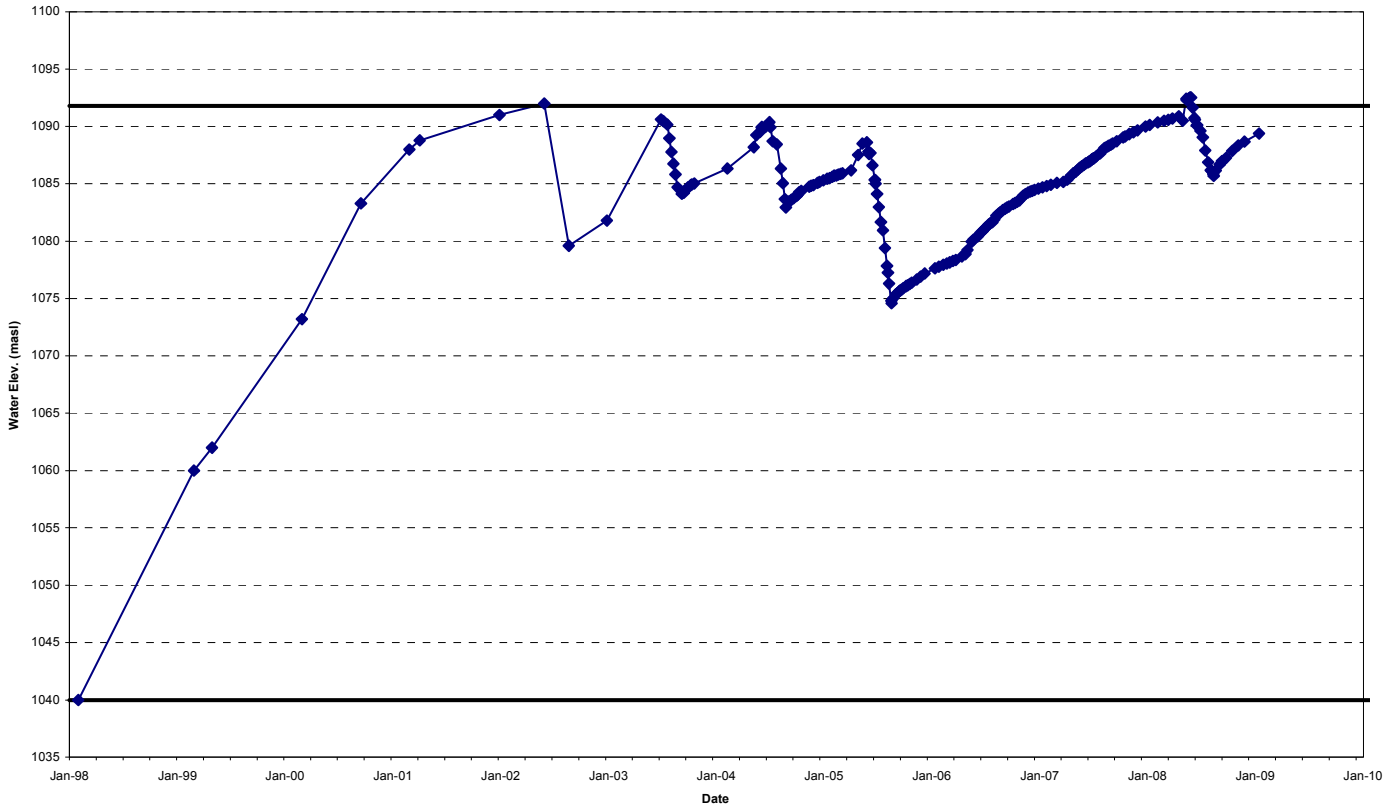
From May to July weekly measurements of the flow rates from the Vangorda Pit to Treatment Plant were collected and are presented in Table 2-12.

Table 2-12. Summary of Weekly Flow Measurements- Vangorda Pit to Treatment Plant

Date	Flow (USgpm)
05-Jun-08	2882
09-Jun-08	2570
17-Jun-08	2726
23-Jun-08	1608
07-Jul-08	1068
14-Jul-08	2484
21-Jul-08	-
28-Jul-08	2642
Average	**2283**

The filling curve for the Vangorda pit through 2008 is illustrated on Figure 2-10. The Water Licence requires that the water level in the Vangorda pit be maintained below 1092.0 m asl (Part B, Item 25). This was achieved through 2008 except a two week period during spring freshet in late May/ earlier June, prior to the initiation of the season pumping program, with a peak water level of 1092.5 m asl.

Figure 2-10. Filling Curve for Vangorda Pit, 1998 to 2008



A simple water balance can be described for the Vangorda pit that is based on the known values of pit water level measurements, the height-volume relationship and the dates of pumping. In this case, the water balance parameters are:

- "Little Creek Dam (LCD) water inflow";
- "Net uncontrolled inflows" (groundwater seepage in/out, runoff, precipitation, etc.) calculated from observed changes in the pit pond water elevation during strategic periods;
- "Water pumped"; and
- Overall "net inflow" calculated from the overall change in the water elevation for the year.

The simple water balance could be expressed as follows with application of the subsequent notes:

LCD Water[1] + Net Uncontrolled Inflows[2] - Water Pumped[3] = Net Inflow[4]

Therefore, the 2008 water balance for the Vangorda pit can be expressed as:

0.07 + 0.66 – 0.79= -0.06 (in millions m^3)

Notes (also see Table 2-7):

1. The quantity of water pumped from Little Creek Dam into the Vangorda pit in 2007 is estimated to be 69,975 m^3 (Section 2.2.2).

2. The estimated volume of net uncontrolled inflows entering the Vangorda pit from direct precipitation, evaporation, local run off, seepage inflow and seepage losses is 0.66 million m^3 for 2008. During periods when there is not pumping from the pit, this estimate was developed from direct measurements of the pond water level during 2008 where the only inflows/outflows were the uncontrolled water and inflow pumped from Little Creek Dam. During the period of active pumping from the pit, this estimated volume of uncontrolled water inflows is calculated based on the direct water level measurements, estimates of inflow from Little Creek Dam and the estimate of the quantity of water pumped out during that period (see 3). The estimate of net uncontrolled water inflows for 2008 is on the high end of the range of calculated values from 1998 to 2007 (0.2 to 1.0 million m^3) due to the higher levels of precipitation at the site during 2008.

3. The quantity of water pumped out of Vangorda Pit during the pumping period is estimated using the average pumping rate of 2,283 USgpm (12,432 m^3/day) presented in Table 2-12 and 63.4 days of pumping from June 5 to August 20. The estimated volume pumped in 2008 is 788,416 m^3.

4. The net inflow of water entering the Vangorda pit (for the year) is accurately tracked via the change in water elevation from January 1 to December 31. This volume is inclusive of all uncontrolled inflows, inflows from Little Creek Dam and water pumped out. In 2008, there was a net decrease in the pond level of 0.9 m representing a net volume decrease of 0.06 million m^3.

Table 2-13. Vangorda Pit Water Balance, 2008

Period (Days)	Elevation Change (m)	Net Volume Change	Water Pumped from Little Creek Dam	Net Uncontrolled Inflows	Water Pumped Out
Jan01-June05 (157)	1089.97 – 1092.54 (+16 mm/day)	+190,709 m^3 (+1,214 m^3/day)	+49,138 m^3 (+2,890 m^3/day) (17 days)	+141,571 m^3 (+902 m^3/day)	Nil
June05-Aug20 (76)	1092.54 – 1085.77 (-89 mm/day)	-468,133 m^3 (-6,159 m^3/day)	+20,837 m^3 (+1,842 m^3/day) (11days)	+299,446 m^3 (+3,940 m^3/day) calc	-788,416 m^3 (-12,432 m^3/day) (63.4 days)
Aug21-Dec31 (133)	1085.77 – 1089.07 (+24 mm/day)	+217,976 m^3 (+1,638 m^3/day)	Nil	+217,976 m^3 (+1,638 m^3/day)	Nil
2008 (366)	1089.97 – 1089.07 (-2.5 mm/day)	-59,448 m^3 (+162 m^3/day)	+69,975 m^3 (+167 m^3/day)	+658,993 m^3 (+1,801 m^3/day)	-788,416 m^3 (-2,154 m^3/day)

Substantive maintenance work was completed on the Vangorda clean water diversion ditches in 2003 and 2004. This work provided a visibly improved catchment of clean water, especially in the northeast diversion ditch. It is of interest to investigate whether this work results in a noticeable difference in the amount of water entering the Vangorda Pit, as calculated through the Vangorda pit water balance.

The estimated volumes of annual net inflows are plotted against annual precipitation on Figure 2-11. The plot suggests that there is a consistent exponential relationship between net inflows and precipitation for the five years up to 2002 (R^2=0.92). This is representative of the period before the substantive maintenance work was completed on the northeast, and other, diversion ditches.

Figure 2-11 suggests that 2003 is different than all of the other years plotted and the reason for this is unknown. We note, however, that the frequency and procedure for monitoring the pit water level were upgraded in mid-2003 such that the data for the first-half of 2003 contain a greater degree of extrapolation that may skew some of the indications.

Figure 2-11 does suggest that 2004 to 2007 show a different relationship between precipitation and estimated natural inflows. It should be noted, that the natural inflows for 2004 include an unknown volume representative of a 12-hour diversion of Vangorda Creek into the pit during a flood event. This would have the effect of artificially increasing the estimated natural inflows. The data for 2005, 2006 and 2007 indicate lower natural inflows than would be predicted using the 1998 to 2002 exponential relationship, which could be related to a general reduction of inflows. If true, then this would confirm the observations of site management that the improvements implement in 2003 have had a noticeable effect on a reduction of inflows to the pit. Continued annual assessments of inflows will confirm or disprove this suggestion.

Because the water balance presented herein is coarse and based, in part, on generalized inputs compiled over a number of years, the true effect of the improvements to the Vangorda Pit diversions are thought to be understated.

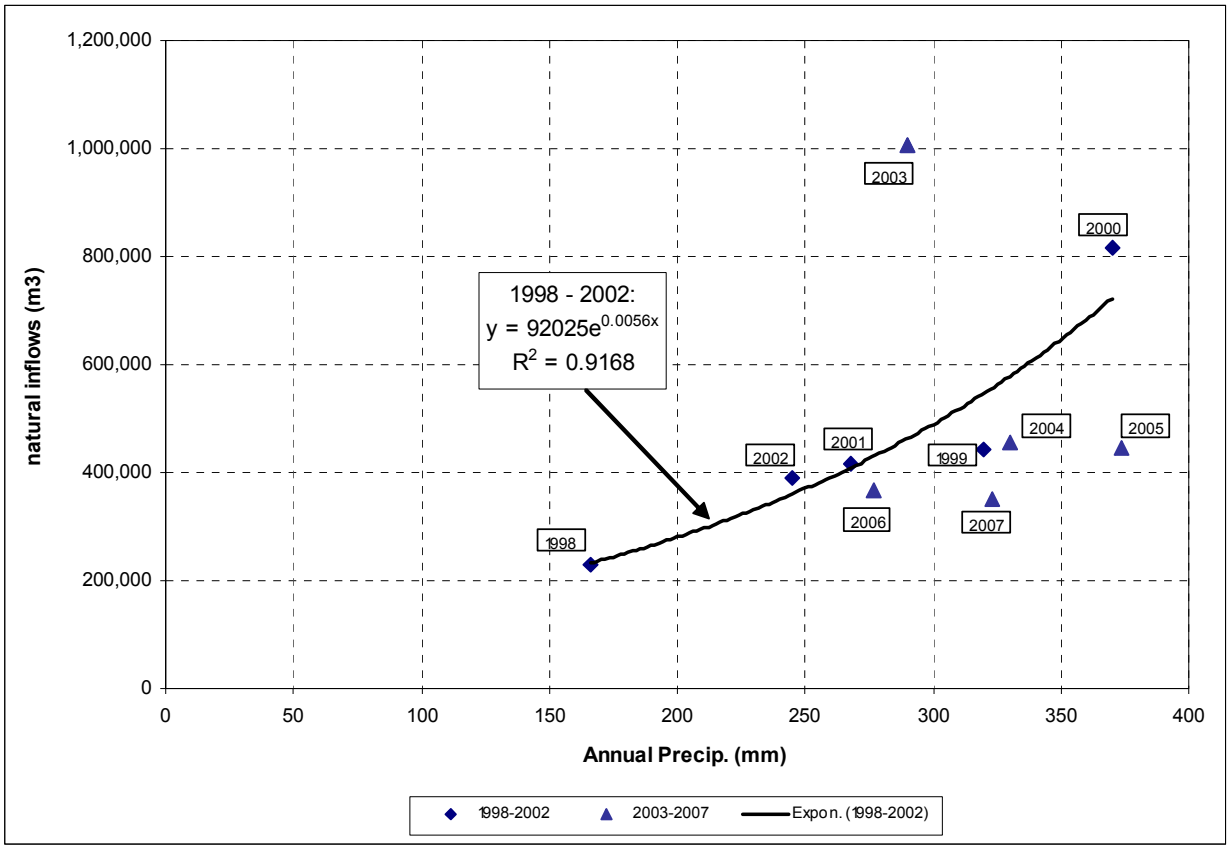
Similar to the Faro Main Pit, this assessment is not possible at this time for 2008 due Faro Airport precipitation data being unavailable. Additional site-specific climate data is collected from two climate stations: one at the Faro side and one at the Vangorda/Grum side. However, at this time the 2008 data is not available.

Table 2-14. Summary Vangorda Pit Water Volumes

Year	Water Treated[1] (m3)	Annual Change in Pit Level	Natural Inflows[2] (m3)	Annual Precipitation[3] (mm)
1998	Nil	+20.0 m	231,100	166
1999	Nil	+13.2 m	441,500	320
2000	Nil	+14.8 m	817,000	370
2001	Nil	+3.0 m	417,000	268
2002	894,000	-7.0 m	389,000	245
2003	750,000	+4.4 m	1,006,500	290
2004	556,000	-1.1 m	456,500[4]	330
2005	924,500	-7.8 m	446,000	374
2006	Nil	+2.2 m	368,000	277
2007	Nil	+5.4 m	352,419	323
2008	788,416	-0.9 m	658,993	n/a

Notes: 1. As reported in the Annual Environmental Reports.
2. As estimated from the Vangorda Pit water balance.
3. At the Faro airport as compiled by BGC Engineering Inc. as summarized from Table 2-2.
4. Includes the inflow of a portion of Vangorda Creek for ~12 hrs related to extreme flooding.

Figure 2-11. Summary Vangorda Pit Water Volumes



* 2008 precipitation data was unavailable at the time of preparation of this report and is therefore not shown in Figure 2-11.

2.2.4 Grum/Vangorda Freshwater Supply Pond

During years when the Grum/Vangorda water treatment plant is operated, a relatively small amount of freshwater is drawn from Vangorda Creek for mixing lime in the plant. This water is drawn from the Grum/Vangorda Freshwater Supply Pond which stores some surface runoff that flows into the Grum Interceptor Ditch just upgradient of the water treatment plant. Water is pumped from the pond to the plant on an on-demand basis to maintain an adequate supply of mix water in a storage tank located in the plant.

The quantity of water used for mixing of lime in 2008 is estimated to be 1,967 m^3 based on the assumed pumping rate (30 m^3/day) and the estimated operating days (63.4 days plus 52 hours initial filling of the Clarification Pond).

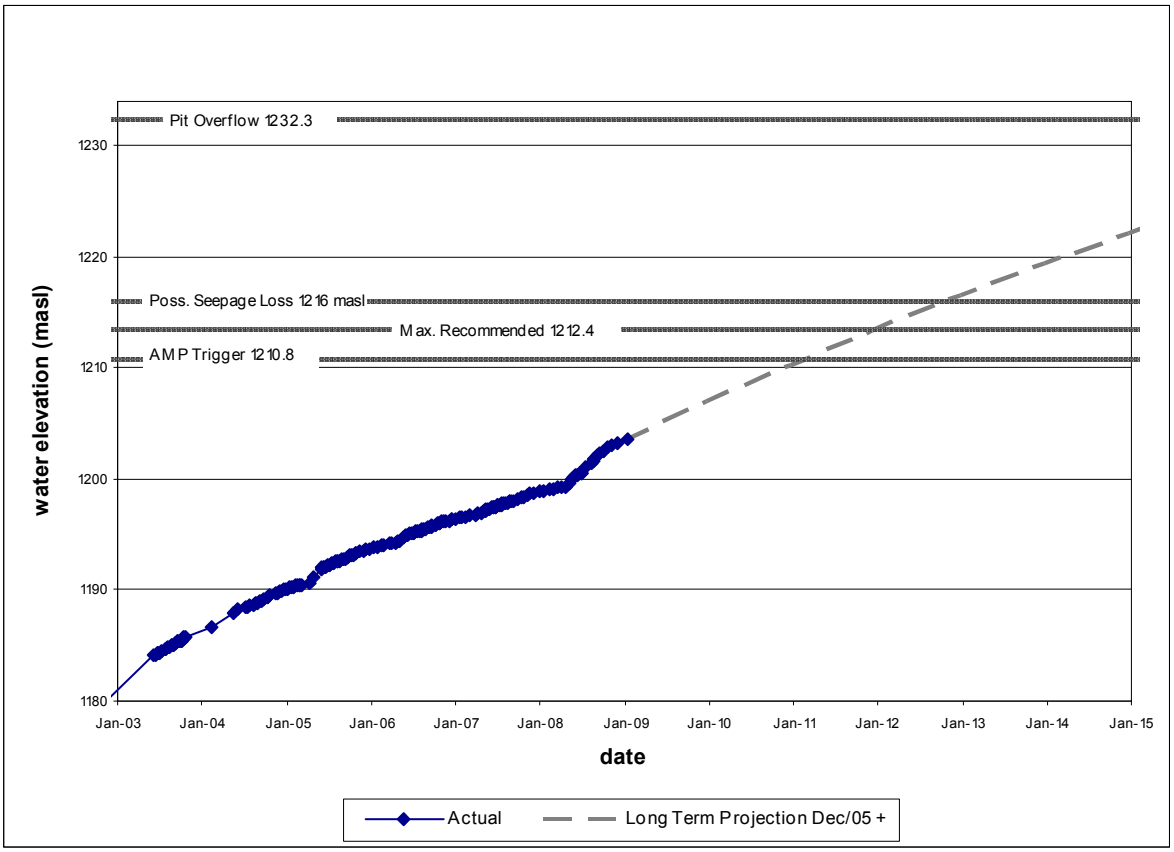
2.2.5 Grum Pit

Since the cessation of mining activities in 1998, the Grum pit has been allowed to accumulate natural runoff water. The rate of filling has been slower than the Vangorda pit because of the relatively smaller inflows and relatively larger size. In 2003, a study was undertaken by Gartner Lee that developed a height-capacity relationship and that recommended a maximum recommended water elevation where treatment or some other intervention should be considered if the water were non-compliant.

The pit filling curve illustrated on Figure 2-10 shows that no "action" levels were reached in 2008. Further, rough conservative projections of the rate of filling indicate that the earliest that the action level prescribed in the Adaptive Management Plan (AMP) might be reached in early 2011. This is projected to be a minimum 2 years prior to the water level reaching the elevation at which subsurface seepage might occur (1216 m asl). The projected rate of filling is one of the elements of the Adaptive Management Plan and is also discussed in the AMP Annual Report, included in Appendix 10.

The estimated net quantity of water that accumulated in the Grum Pit in 2008, based on the measured elevations and the height-capacity curve, is 610,227 m^3 (19 L/s average).

Figure 2-12. Grum Pit Filling Curve



2.2.6 Effluent Discharge

The quantity of effluent discharge from the Vangorda/Grum water treatment plant in 2008 is the sum of the two inflows into the plant. These inflows are contaminated water pumped from the Vangorda Pit and freshwater pumped from the Grum/Vangorda freshwater supply pond. These inflows total 790,383 m^3 for 2008.

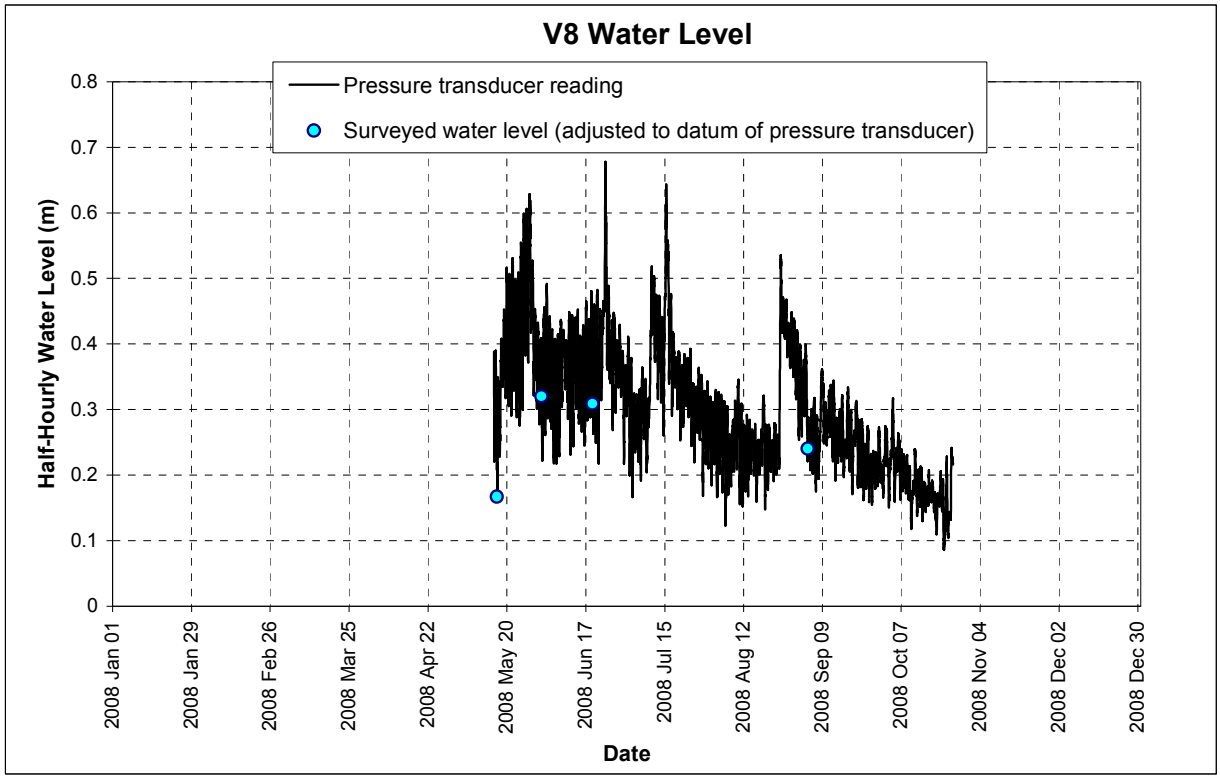
2.2.7 Continuous Flow Monitoring

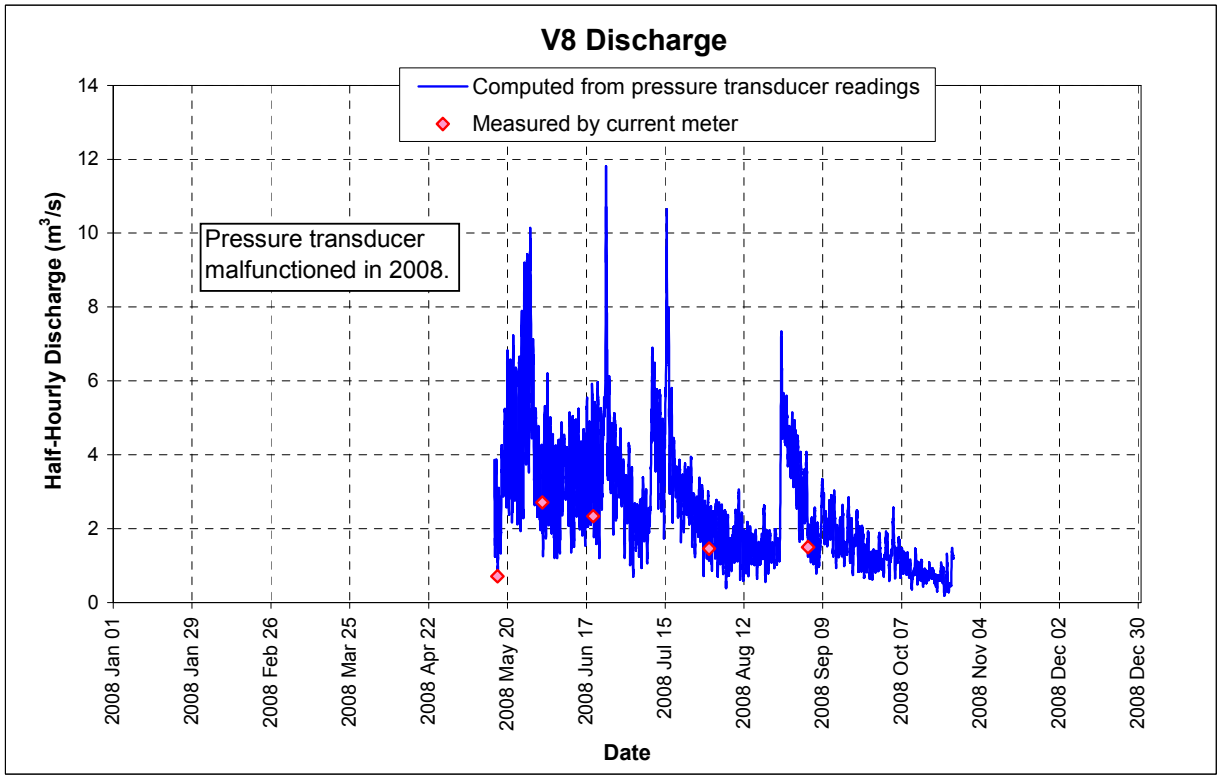
Continuous flow monitoring location V8 in lower Vangorda Creek is a requirement of the Water Licence (Schedule A, Part III). The monitoring location is adjacent to the Town of Faro between the town access road and the bridge to the town pumphouses. This is below the confluence of the West Fork and the Main Fork of Vangorda Creek. The water level has been monitored on a continuous basis using a pressure transducer and datalogger since 1996 excepting periods of malfunction. This flow record for 2008 was subject to an annual technical review by a hydrologist.

Review of the record indicates that the pressure transducer at this site seems to be malfunctioning. The overall shape of the hydrograph is representative, however, there seems to be an erroneous diurnal signal superimposed over the correct signal. It is recommended that a new pressure transducer be installed at this location in 2009.

Figure 2-13 illustrates the graphs of the 2008 water levels and flow rates at V8.

Figure 2-13. Preliminary 2008 Flow Record for Location V8, Lower Vangorda Creek





3. Water Quality Monitoring – Rose Creek Drainage

3.1 Overview of Water Quality Monitoring Program

Water quality is monitored regularly throughout the mine property as described in Part G and Schedule A of the Water Licence. The water quality monitoring program outlined in the Water Licence prescribes the sampling locations, sampling frequency and the minimum parameters to be analysed annually.

The monitoring program is carried out by staff employed at the mine site by the Interim Receiver. Various professional laboratories have been used to provide the sample analyses over the life of the project. Laboratories are selected on the basis of certification with the Canadian Association of Environmental Analytical Laboratories, service and other factors. In 2008, most of the water analyses for water were conducted by CanTest with the exception of cyanide, which was analysed by ALS Laboratory Group.

The monitoring program also makes extensive use of the unique capability for high-quality, on-site zinc analyses to provide immediate feedback to site managers regarding effluent quality. On-site analyses of effluent zinc concentrations are conducted on a daily, or more frequent basis, when treated effluent is being released.

Water sampling frequencies for Water Licence monitoring vary from weekly (for treated effluents) to twice per year (for groundwater). The majority of water samples are collected on a monthly or quarterly basis. Continuous flow monitoring via dataloggers is required at two locations in the Rose Creek drainage (R7 and X14). Other locations have various requirements for flow measurement.

Schedule A of the Water Licence, including the descriptions of the monitoring locations, sampling frequencies and minimum parameters, is provided in Appendix 1. UTM coordinates for the sampling locations have been previously provided to the Board and are provided in Appendix 2 for ease of reference. The monitoring locations are also illustrated on Figures 1-1, 1-2 and 1-3. Analytical data for 2008 is provided in Appendix 3 (surface water) and Appendix 4 (groundwater). Bioassay results are provided in Appendix 5.

Additional monitoring programs, outside the requirements of the Water licence, were completed by various consultants in 2008. As a part of these programs, sample frequency increased for a number of licence sites, including FDU, NF2, R1, R2, R3, R4, R5, R6, R7, W10, X2, X10 and X14. Water analyses for all additional samples were carried out by Maxxam Analytics, and in some cases ALS Laboratory Group, and as a result detection limits vary compared to those analyzed by Cantest. All additional sampling results for Water Licence stations are integrated into reporting, and are included in Appendix 3 and 4. The analytical data obtained from all sampling programs, both Water Licence requirements and others, is managed and maintained through an electronic database that is managed by AECOM. A brief review of the data is provided in the following sections.

3.2 Open Pits, Rock Dumps and Tailings

3.2.1 Main Pit

3.2.1.1 Main Pit

Water quality in the Faro Main Pit is monitored in the near surface zone at location X22B. In 2008, monthly samples were collected for the purpose of monitoring and assessment of pit water quality conditions, and to support management of the annual Faro pit-pumping program. Water quality at this location is generally demonstrative of buffered acid rock drainage with high levels of metals and sulphate at a neutral pH. This is as expected given the presence of mineralized rock dumps and pit walls in the drainage area and the inflow up until February 1998 of lime treated tailings slurry. A generally progressive increase in zinc (Zn) concentrations from 1998 to 2003 is consistent with anticipated trends related to the discontinuation of high pH water inflow from the tailings slurry. Zinc concentrations appear to be relatively consistent since 2004.

During 2008, sulphate concentrations at Station X22B were comparable to recent years (Figure 3-1), ranging from 527 mg/L to 641 mg/L, with an average concentration of 599.4 mg/L. The concentrations of total and dissolved zinc at location X22B ranged from 13.7 mg/L to 30.8 mg/L and from 12.2 mg/L to 28.3 mg/L, respectively, with average concentrations of 19.4 mg/L and 18.1 mg/L, respectively. Zinc concentrations at X22B in 2008 are within ranges typically observed at this site in recent years; however the maximum total zinc level was the highest it has been since 2000, at 30.8 mg/L in March (Figures 3-2).

In 2008, average total and dissolved cadmium concentrations were comparable with those observed in recent years (Figure 3-3). Total cadmium concentrations ranged from 0.0083 mg/L to 0.039 mg/L, with an average concentration of 0.015 mg/L, and dissolved cadmium concentrations ranged from 0.0071 mg/L to 0.032 mg/L, with an average concentration of 0.0138mg/L.

Total lead (Pb) concentrations remained at relatively low concentrations throughout 2008, ranging from 0.001 mg/L to 0.009 mg/L, with an average concentration of 0.0022 mg/L. Dissolved lead concentrations remained below the detection limit of <0.001 mg/L for all samples.

Figure 3-1. Sulphate at X22B

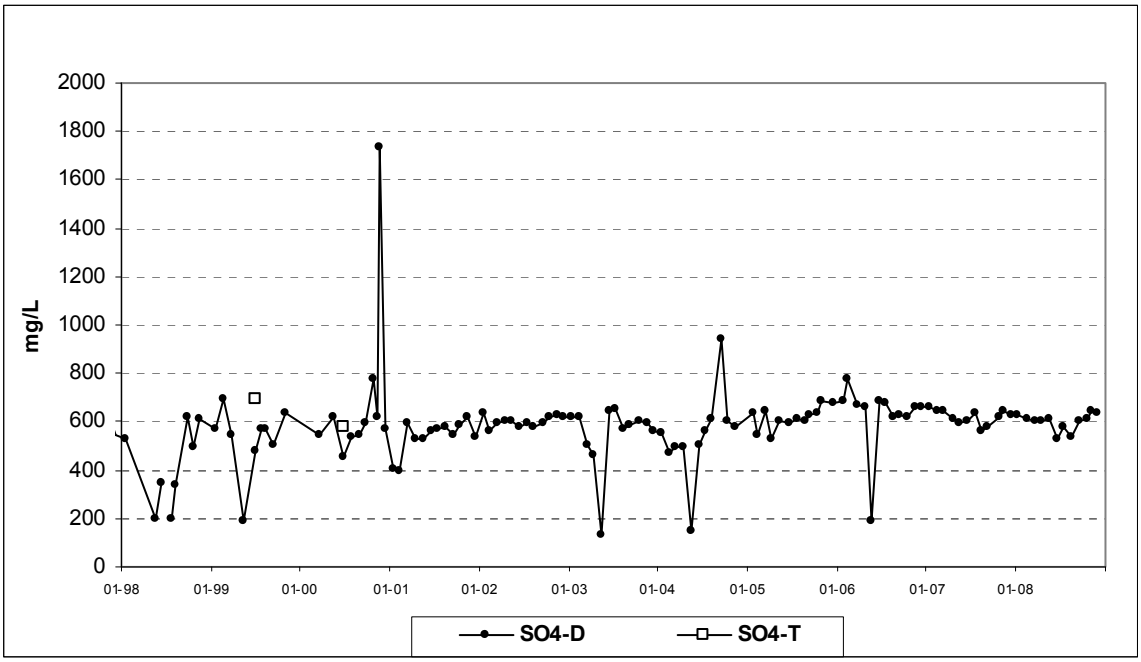


Figure 3-2. Zinc at X22B

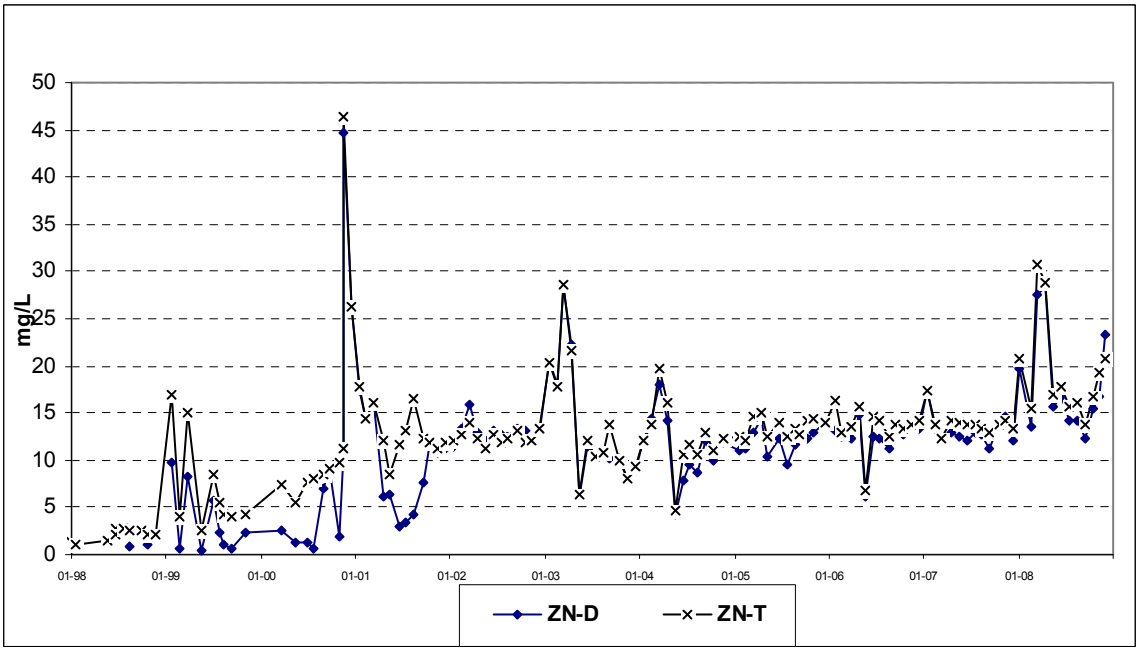
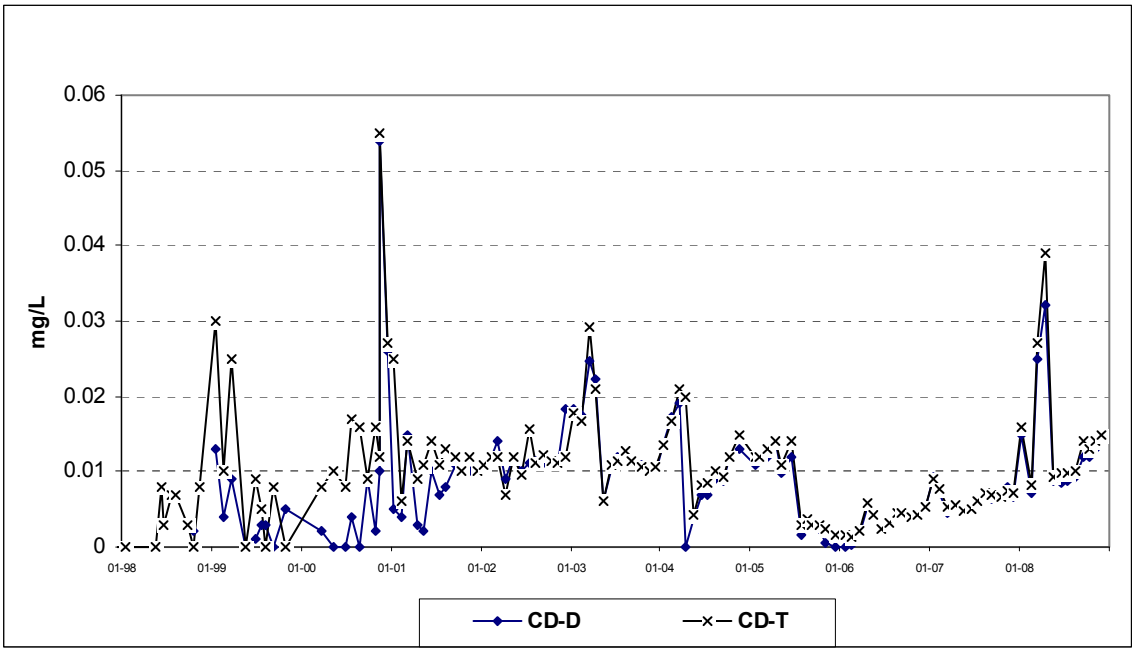


Figure 3-3. Cadmium at X22B



3.2.1.2 Miscellaneous Surface Seepages

Flow that collects in the Faro Creek channel above the Faro Valley rock dump (location FCO) was sampled in June and September of 2008. This water flows along the base of the Faro Valley rock dump and into the Main Pit. Sulphate concentrations were 30.4 mg/L and 55.5 mg/L. Zinc, copper, and cadmium concentrations were comparable to those observed in recent years.

Locations A25 and A30 are seeps into the Main Pit from the Faro Pit walls. Location A25 is located on the northwest wall and station A30 is located immediately below the toe of the Faro Valley rock dump on the north pit wall. In 2008, both stations were sampled in June and September. Water quality at station A30 is most likely impacted by acid rock drainage and metals leaching, as indicated by the elevated metal and sulphate concentrations and low pH observed at this site. Historical trends observed at station A30 typically demonstrate higher metals and sulphate concentrations during the spring (June) sampling event. This was the case in 2008, as cadmium, copper, lead, sulphate and zinc concentrations were all higher during the June sampling event. During the June and October sampling events, sulphate concentrations were 1410 mg/L and 768 mg/L, respectively, and total zinc concentrations were 127 mg/L and 74.8 mg/L, respectively.

Station A25 was also sampled in June and October of 2008. Metal and sulphate concentrations at this station are lower than those observed at station A30, with sulphate concentrations of 26 mg/L and 15.2 mg/L, and total zinc concentrations below the method detection limit (MDL) of <0.005. Seepage at this location was circum neutral during both sampling events. Concentrations of arsenic, cadmium, and copper have remained below MDL's since water quality monitoring began at this site in 2004.

In 2008, location SP5/6, a surface ditch into the Main Pit from the North East Dumps, was sampled in spring (June) and fall (September). Metal concentrations in June were comparable to those observed over the last several years, with total and dissolved zinc concentrations of 2.17 mg/L to 1.71 mg/L, respectively. Total and dissolved zinc levels during Fall sampling were slightly higher than in previous years with 8.49 mg/L and 6.43 mg/L respectively.

3.2.2 Zone II Pit

Water pumped from the Zone II Pit into the Main Pit is monitored at location X26 for water chemistry. Information at this location can identify changes in water chemistry that may be related to acceleration in the acid rock drainage process within the Zone II pit and also provides information on contaminant loading into the Main Pit.

Four monthly samples were collected in 2008 at location X26 during periods of active pumping (June to September). During this period, sulphate concentrations ranged from 2150 mg/L to 2670 mg/L. Although sulphate concentrations have increased progressively at this location between 2002 and 2005, concentrations observed in 2006, 2007 and 2008 were typically less than those observed in 2005. The highest sulphate concentration of any of the monitored inflows into the Main Pit continues to be location X26.

Total and dissolved zinc concentrations ranged from 54.3 mg/L to 87.4 mg/L and 43.7 mg/L to 81.8 mg/L, respectively, at location X26 in 2008. Zinc concentrations have typically stabilized since 2003 (Figure 3-5).

In 2008, cadmium and lead concentrations at X26 were comparable to those observed in recent years. Total and dissolved cadmium concentrations ranged from 0.015 mg/L to 0.022 mg/L, and 0.013 mg/L and 0.02 mg/L, respectively. Total and dissolved lead concentrations ranged from 0.036 mg/L to 0.083 mg/L, and from <0.001 to 0.013, respectively, with average concentrations 0.06 mg/L and 0.004 mg/L, respectively.

Figure 3-4. Sulphate at X26

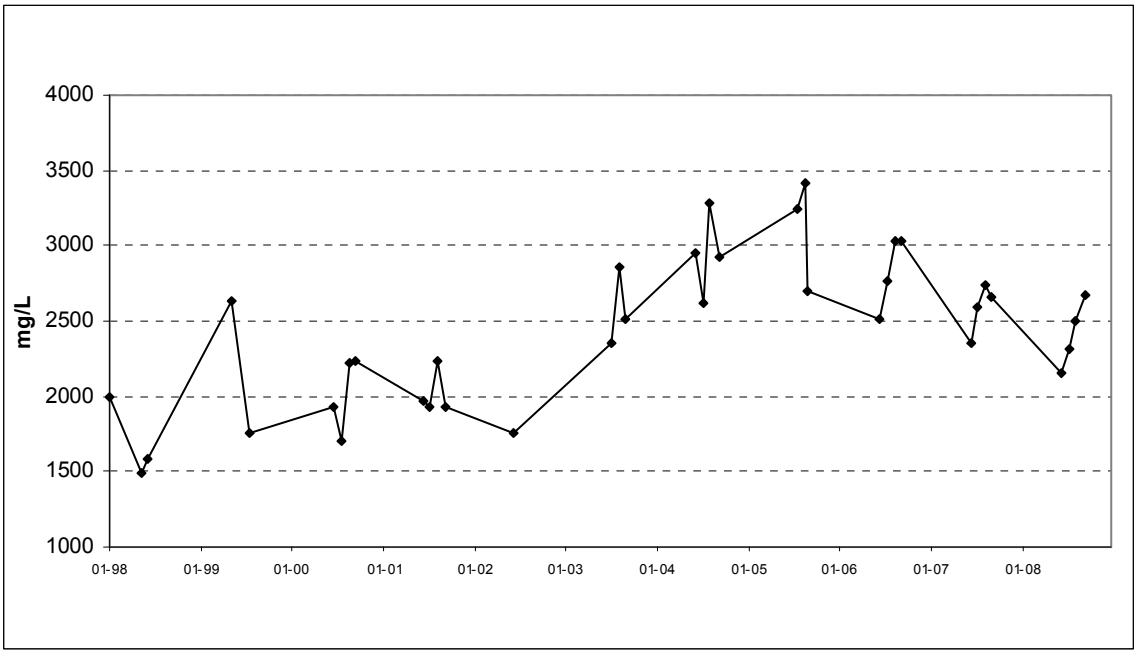
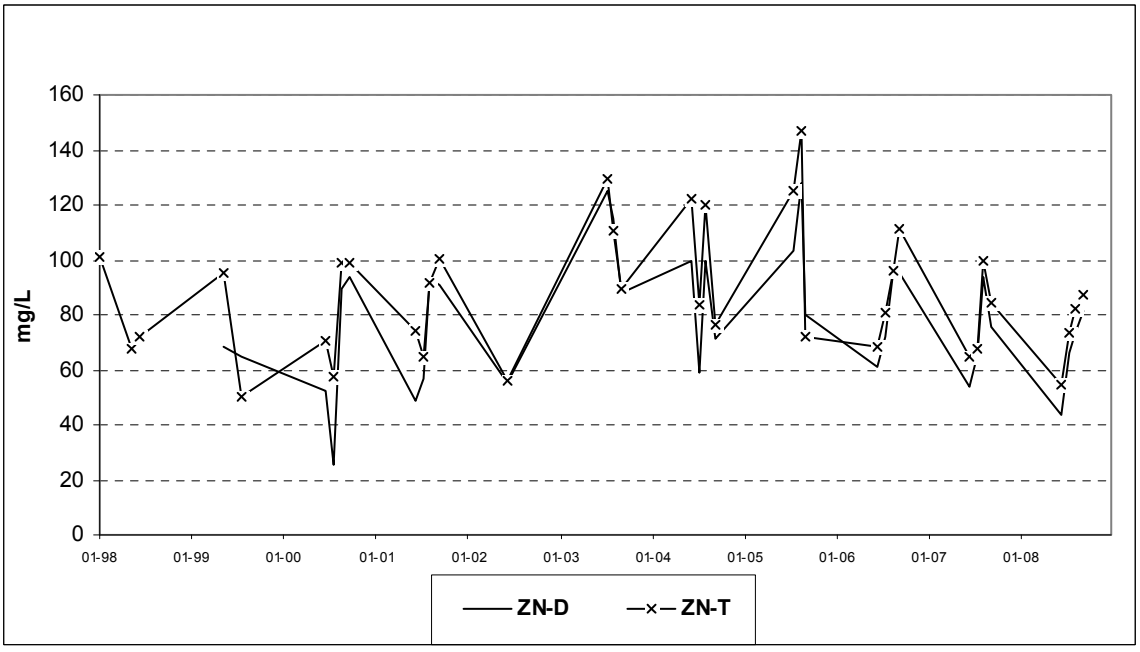


Figure 3-5. Zinc at X26



3.2.3 Rock Dumps

3.2.3.1 Old Faro Creek Channel

Surface seepage from the toe of the Main and Intermediate rock dump area is sampled at X23 located in the old Faro Creek channel. Water quality at this location is characterized by buffered acid rock drainage with elevated metals and sulphate at neutral pH. This water then flows through the Emergency Tailings Area (ETA). Various studies carried out during the past few years concluded that surface and groundwater flows through the Emergency Tailings Area (ETA) contribute a significant contaminant load to the downstream area (but still within the larger tailings capture system) and that portion of this contaminate loading was escaping collection leading to possible contaminate loading to the aquifer below the Rose Creek Tailings. In response to this issue, a collection and treatment system for the ETA water was installed during the fall and winter of 2006/2007.

Water from the ETA is collected in the collection sump and transported by pipeline to the Intermediate Pond. The water from the Intermediate Pond is then pumped using a floating barge system to the Mill Water Treatment System to be treated. The treated water then is conveyed to the Polishing Pond using the existing piping system and discharged to Rose Cree via siphon.

In 2008, 11 samples were collected monthly at location X23. No sample was obtained in April due to lack of flow through the weir. Sulphate concentrations have generally increased since sampling commenced in 1986; however, sulphate concentrations at station X23 were comparable to the previous year, averaging 5,951 mg/L (Figure 3-6).

Zinc concentrations at location X23 were slightly higher in 2008 than those observed at the site in recent years (Figure 3-7). Total and dissolved zinc concentrations ranged from 207 mg/L to 839 mg/L and 195 mg/L to 781 mg/L, respectively, with average concentrations of 547 mg/L and 496 mg/L.

Figure 3-6. Sulphate at X23

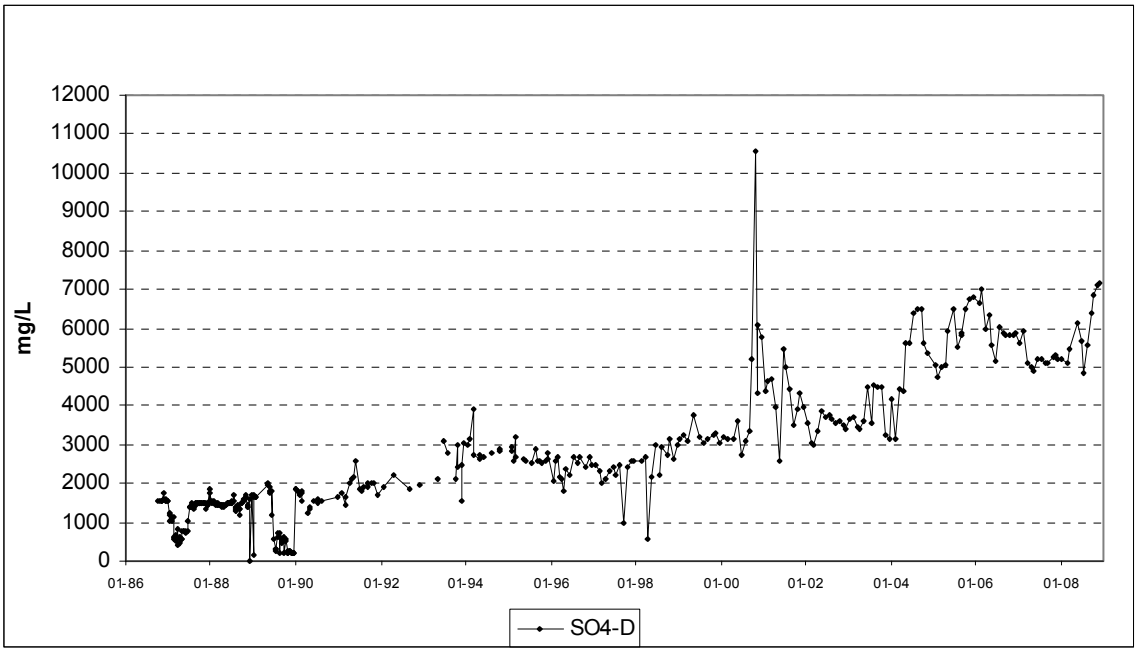
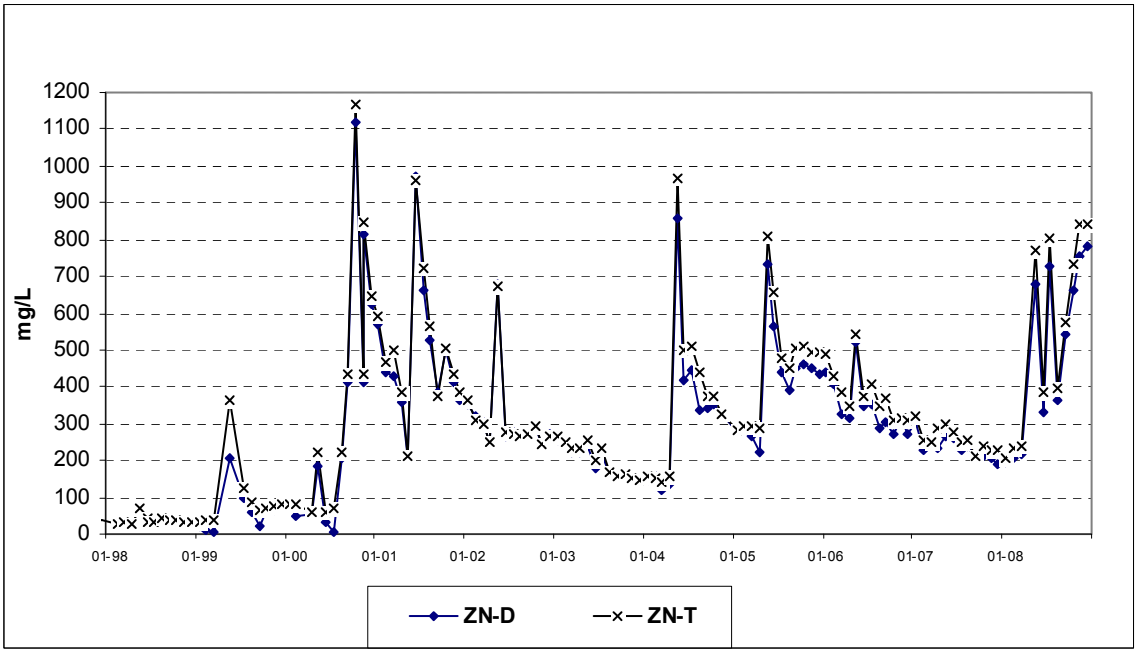


Figure 3-7. Zinc at X23

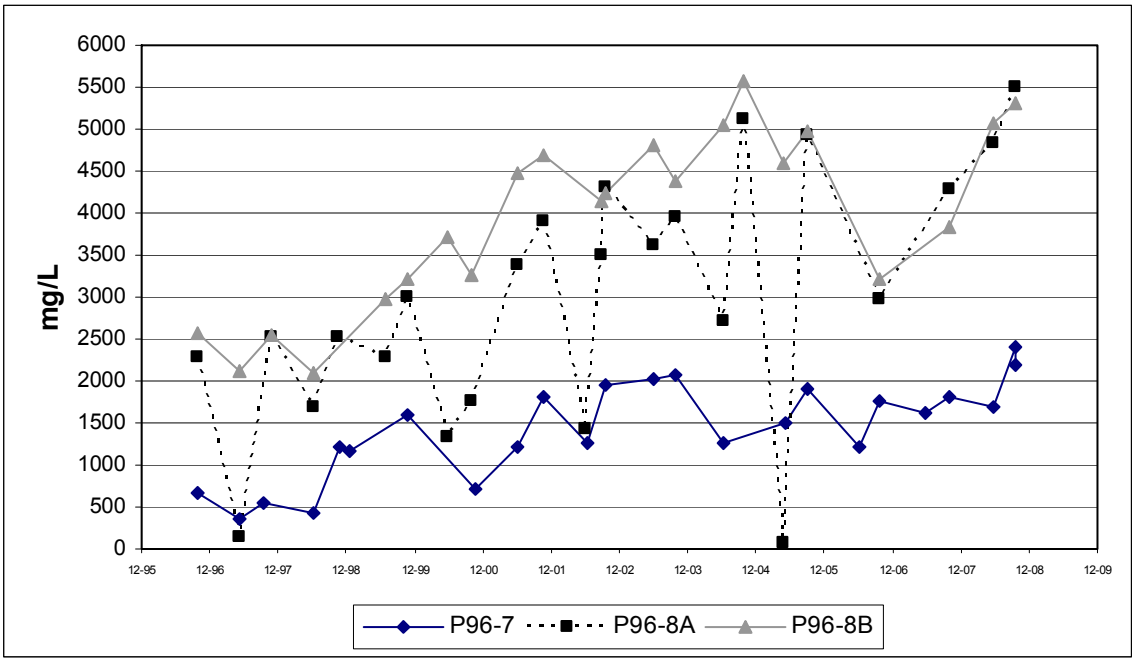


3.2.3.2 Groundwater: Main Rock Dumps

Adjacent to surface monitoring location X23, well P96-7 is located at the central toe of the Main Waste Dump and wells P96-8A/B are located in the Old Faro Creek Channel. All of these wells were sampled in Spring (May) and Fall (September) of 2008. Well P96-7 exhibited the lowest sulphate concentrations of the three sampling points, ranging from 1680 mg/L to 2400 mg/L. P96-8A had concentrations of 4840 mg/L and 5500 mg/L , and P96-8B had concentrations of 5060 mg/L and 5300 mg/L, respectively during the spring and fall sampling events.

In 2008, dissolved zinc concentrations at location P96-7 were comparable to previous years, ranging from below the detection limit (<0.005 mg/L) to 0.0072 mg/L. In wells P96-8A and P96-8B, total and dissolved zinc concentrations reported during the May and September sampling events were 168 and 267 mg/L, and 351 mg/L and 442 mg/L, respectively.

Figure 3-8. Sulphate at P96-7, P96-8A and P96-8B



3.2.3.3 Groundwater: Intermediate Rock Dumps

Wells S1A/B, S2A/B and S3 are located at the toe of the Intermediate Rock Dumps just below the Vangorda haul road. P96-6 is located at the toe just above the Vangorda Haul road. In 2008, all six sampling points were sampled twice, in May/June and November. S1A, S2B and S3 were sampled a third time in August.

Sulphate concentrations in the shallower wells S1A, S2A and S3 ranged from 4,600 mg/L to 6,100 mg/L whereas sulphate concentrations in deeper wells S1B and S2B ranged from 500 mg/L to 5,900 mg/L. In the shallower wells S1A, S2A, and S3, dissolved zinc concentrations ranged from 184 mg/L to 354 mg/L, whereas Zn concentrations in deeper wells S1B and S2B ranged from 0.053 mg/L to 375 mg/L. Zinc and

sulphate concentrations in shallower wells exhibit an overall increasing trend from about 2000 (Figures 3-9 and 3-10).

Sulphate and zinc concentrations at location P96-6 were 374mg/L and 700 mg/L, and 0.745 mg/L and 1.14 mg/L, respectively. Dissolved metals in groundwater at well P96-6 were all observed at low concentrations.

Figure 3-9. Sulphate Concentrations in Groundwater Wells S1A, S2A, and S3

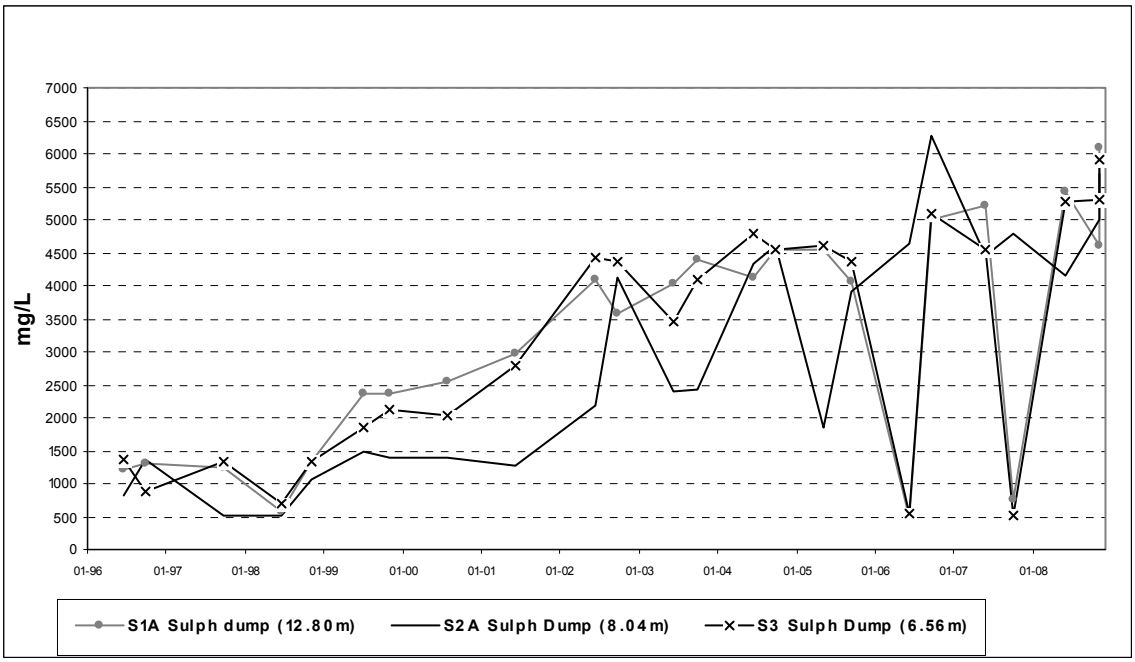
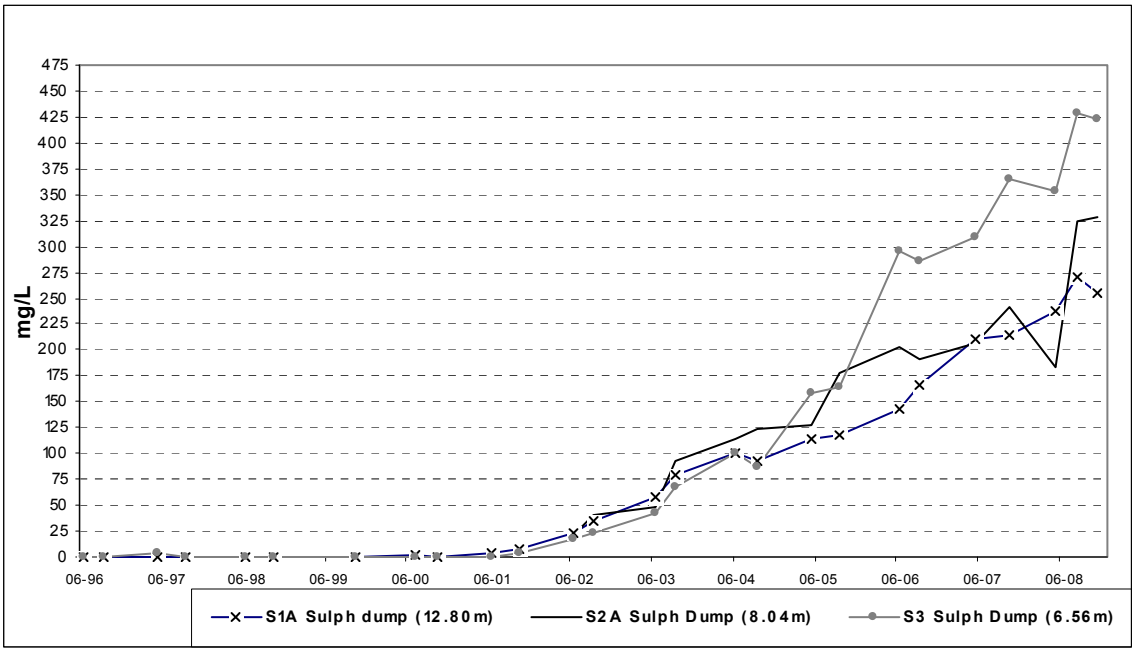


Figure 3-10. Zn in Groundwater Wells S1A, S2A and S3



3.2.3.4 Groundwater : Zone II Rock Dumps

Wells BH1, BH2 and BH4 are located at the base of the Zone II Rock Dumps. In 2008, all of the three locations were sampled in May and September. Sulphate concentrations at these sampling points ranged from 73.6 mg/L to 460 mg/L and Zn concentrations ranged from 1.09 mg/L to 21.6 mg/L. In 2008, the highest sulphate concentrations of the three wells were observed at BH4, and the highest zinc concentrations were observed at BH2.

3.2.3.5 Groundwater: Northeast Rock Dumps

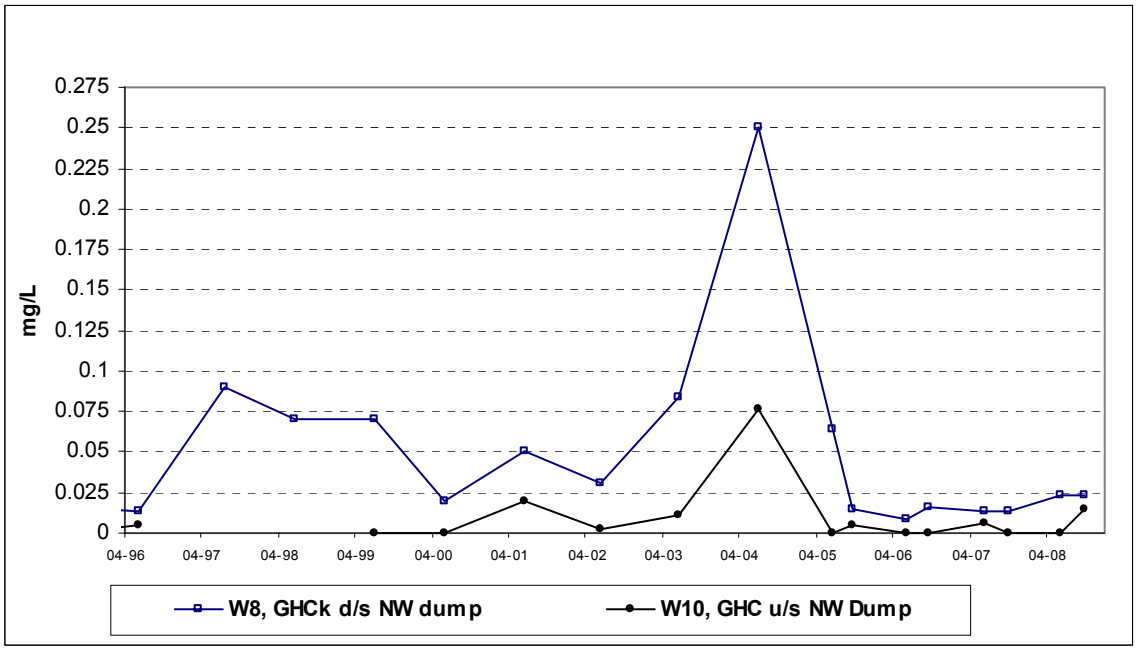
Wells BH12A/B, BH13A/B and BH14A/B are located at the base of the Zone II Rock Dumps. In 2008, locations BH12B and BH14A/B were sampled in May and September, and location BH13B was sampled September. BH12A and BH13A were dry during both sampling periods. Sulphate and zinc concentrations at wells BH12B and BH13B were consistent with concentrations previously observed at this site, ranging from 350 mg/L to 890 mg/L, and from 0.002 mg/L to 0.398 mg/L, respectively. Station BH14A/B had sulphate concentrations similar to those typically observed at this well, ranging from 1770 to 3200 mg/L Zinc concentrations were higher in 2008, compared to historical data during the fall sampling event, at 11.9 mg/L and 7.08 mg/L. Acidic seepage flow from the Northeast rock dump, observed during the September event, may be responsible for elevated zinc concentrations.

3.2.3.6 Miscellaneous Surface Seepages

Locations W10 and W8 are located in Upper Guardhouse Creek where it passes under the corner of the Northwest Rock Dump. Location W10 is immediately upstream of the rock dump and location W8 is immediately downstream. In 2008, W8 was sampled twice, in June and September, and W10 was sampled seven times from June to October. Sulphate concentrations at these locations remain relatively low at <0.5 mg/L to 6.56 mg/L. Total zinc (Zn) concentrations ranged from 0.0001 mg/L to 0.017 mg/L, which is consistent with previous years. On both sampling dates greater concentrations of total zinc were observed immediately downstream of the rock dump at location W8 (Figure 1-11).

Location W5 is located at the toe of the Northeast Rock Dump. This site was sampled in June and September during 2008. Total and dissolved zinc concentrations ranged from 2.32 to 2.76 mg/L and 1.99 to 2.31 mg/L, respectively. Sulphate concentrations were comparable to the previous year at 611 mg/L and 329 mg/L.

Figure 3-11. Zn at W10 and W8



Locations NE1 and NE2 are located at two small intermittent surface flows below the toe of the Northeast rock dumps. NE1 was sampled in June and September 2008; however, NE2 was sampled only in June, as low flow prevented sampling in September. The June and September total and dissolved zinc concentrations ranged from 0.006 mg/L to 0.008 mg/L and 0.007 mg/L to 0.009 mg/L for NE1, respectively. Total and dissolved zinc concentrations were below the detection limit (0.005 mg/L) for NE2 in September. Concentrations of both zinc and sulphate in 2008 are typical for these sites. Sulphate concentrations were 111 mg/L and 184 mg/L for NE1, and 903 mg/L for NE2.

3.2.4 Rose Creek Tailings Facility

3.2.4.1 Intermediate Pond

From approximately 1986 to 1992, the Intermediate Impoundment was used for tailings deposition. Then from 1992 to 1997, a cessation of tailings deposition into the Down Valley Tailings Facility occurred and there was a general increase in the concentration of zinc in water flowing through the Intermediate Pond. This trend is attributed to:

- Removal of a large inflow of alkalinity that previously entered the pond via the tailings slurry;
- Continued inflow of contaminated water from the rock dumps (location X23) and the plant site (location Guardhouse Creek - GHSCK); and
- Continued flushing of contaminants by run off over beached (exposed) tailings in the upstream portion of the Intermediate Impoundment.

In 1992, the Down Valley Water Treatment system was put into operation. This system included syphoning and treatment of water from the Intermediate Pond by addition of lime slurry in a mixing tank, followed by release of treated effluent into the Cross Valley Pond.

On a seasonal basis, the Intermediate Pond received inflow of treated water pumped from the Faro Main pit from 1998 to 2000. This periodic inflow of a relatively high volume of high pH water resulted in a general improvement in pond water quality. In 2001, the method for treatment of water pumped from the Faro Main pit was improved due to activation of a treatment system in the mill that utilized certain fixed equipment for lime treatment and settlement of sediments. From 2001 through 2005, bypassing the Intermediate Pond allowed for compliant effluent from the mill to be delivered into the Intermediate Pond spillway. This observed an apparent negative impact on water quality within the Intermediate Pond due to the removal of the periodic inflow of high pH (treated) water.

In 2006/2007, a water collection system (a sump) was installed at the Emergency Tailings Area (ETA) to reduce contaminate loading from the area into the underlying aquifer. Water collected in the sump is pumped directly to the Intermediate Pond. A pumping barge was installed at the Intermediate Pond for redirection of water requiring treatment to the Mill Water Treatment System. Treated effluent is then released into the Cross Valley Pond. Details of the Mill Water Treatment systems are discussed in Section 5. In 2007, the Down Valley Water Treatment system was remained in place on a stand-by basis, but was not used. In 2008, the Down Valley Treatment system was used (as described in more detail in the Water Use and Water Treatment sections of this report, Sections 2 and 5, respectively) and water was pumped from the Intermediate Pond to the Cross Valley Pond, in addition to pumping from the Intermediate Pond to the Mill Water Treatment System.

The water quality of the Intermediate Pond is monitored at Station X4 which in 2008 was taken directly from the pond. In 2008, samples were collected every month, according to Licence monitoring requirements during periods of outflow, as well as water quality monitoring when no outflow was occurring for site management purposes.

Sulphate concentrations at location X4 ranged from 475mg/L to 1060 mg/L over the year, with an average concentration of 798.5 mg/L for 2008. Sulphate concentrations remained relatively consistent from 1998 to 2003, followed by an increasing trend through 2004 and 2005 (Figure 3-12). Since 1998, sulphate concentrations at X4 demonstrate seasonal variability with low concentrations observed during the spring months.

Within the Intermediate Pond, the concentrations of total and dissolved zinc ranged from 3.62 mg/L to 34.4 mg/L and from 3.27 mg/L to 30.9 mg/L, respectively, with average concentrations of 20.1 mg/L and 18.2 mg/L, respectively. In 2008, zinc concentrations demonstrated similar seasonal variability to previous years, with slightly lower concentrations observed in the spring months (Figure 3-13).

Prior to 2002, iron concentrations at X4 ranged from <0.01 mg/L to 5.48 mg/L. Since 2002, Iron concentrations in the Intermediate Pond have followed a seasonal trend with maximum concentrations typically observed during winter months and minimum concentrations observed during summer months. In 2008, total iron concentrations were typically higher than those observed within the Intermediate Pond during the previous year, ranging from 2.92 mg/L to 35.5 mg/L, with an average concentration of 16.97 mg/L (Figure 3-15). Total aluminum concentrations were also elevated in 2008 in comparison to historical trends, with an average of 0.451 mg/L. Increases in iron and aluminum concentrations may be attributed to the direct discharge of water collected from the Emergency Tailings Area (via the sump) into the Intermediate Pond from May to October of 2008.

In 2008, the Intermediate Pond pH ranged from 3.2 to 7.2, with increased acidification observed during summer and fall months. This seasonal fluctuation in pH follows historical trends, however, pH values reported in fall 2007 and 2008 are typically lower (more acidic) than previous years. This decrease may be due to the continued acidification of the pond since the introduction of treated alkaline water from the Faro Pit was discontinued in 2001; the introduction of alkaline Mill Treatment sediments (sludge), via the ETA ditch, area was discontinued (Mill Treatment sludge is now deposited to the Original Tailings Impoundment); and/or the direct discharge to the Intermediate Pond of water collected from the ETA during the summer months of 2007 and 2008.

Figure 3-12. Sulphate at X4

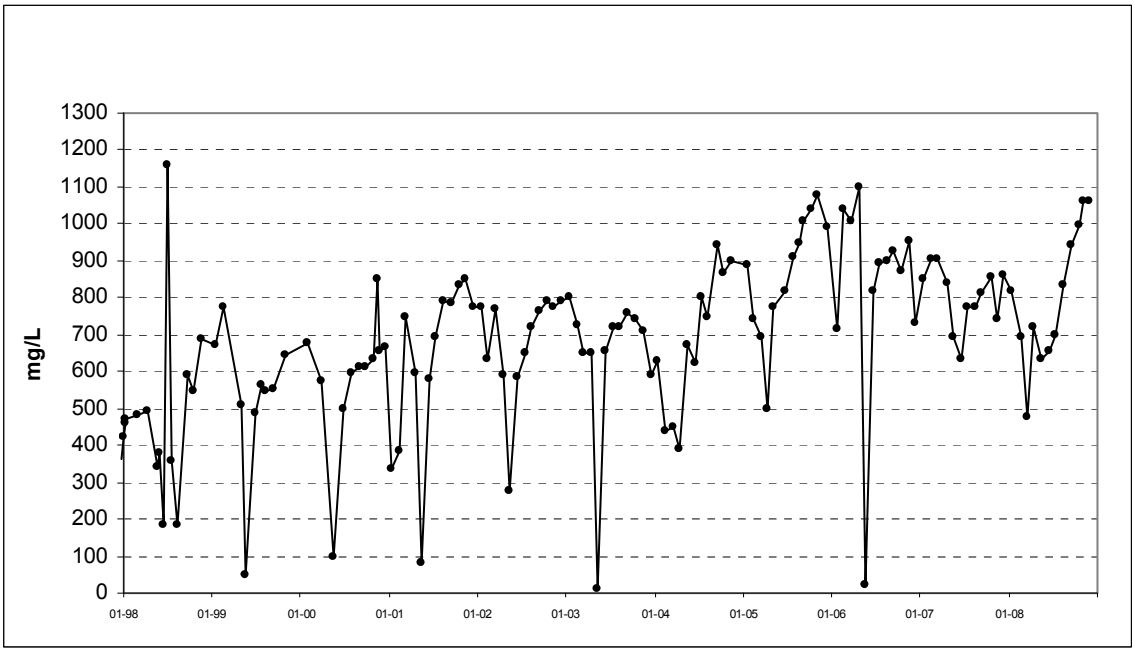


Figure 3-13. Zinc at X4

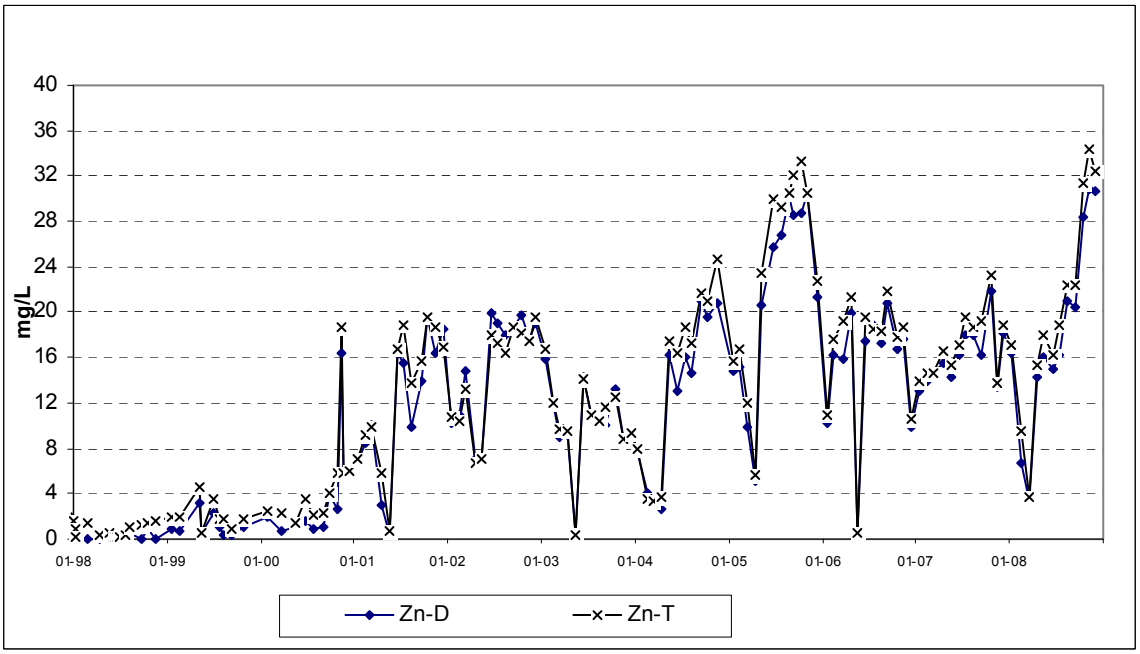


Figure 3-14. Iron at X4

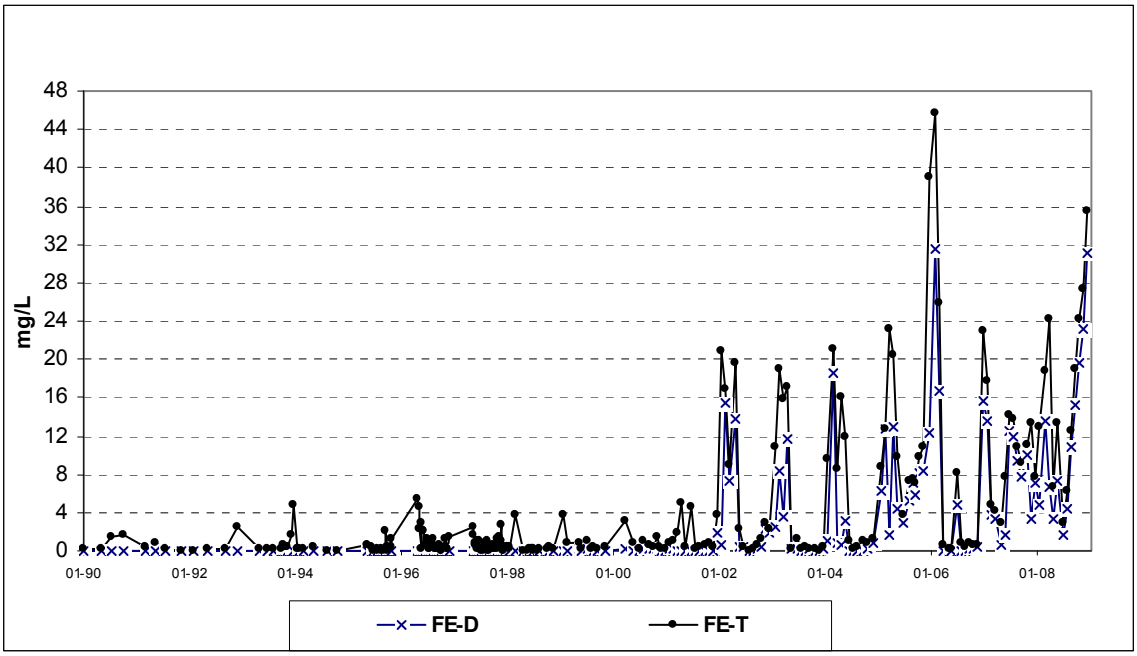
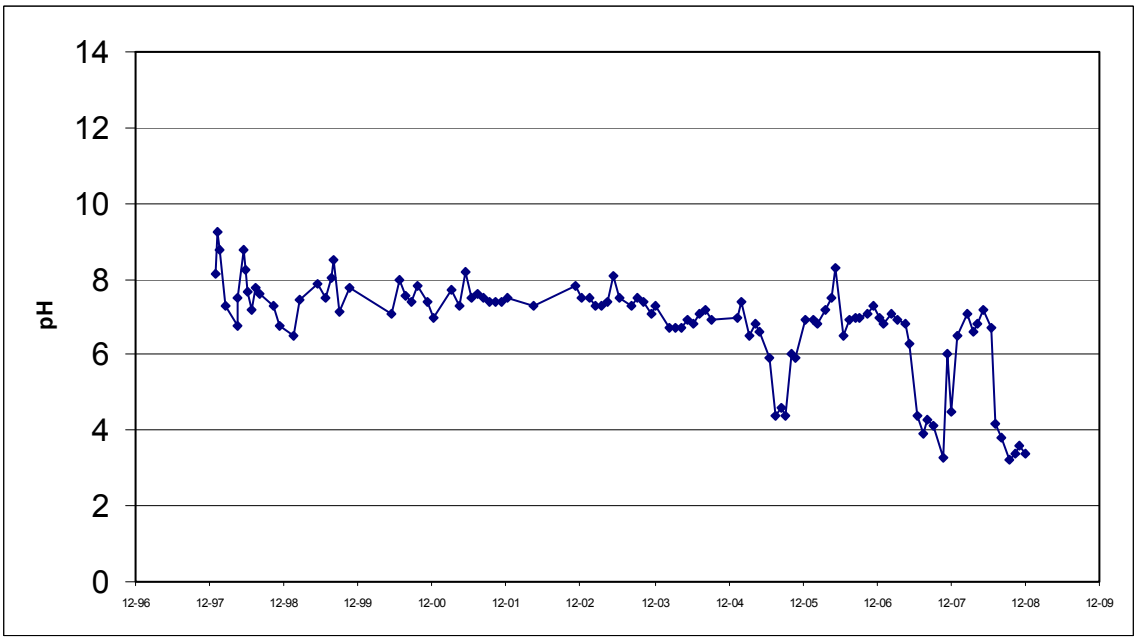


Figure 3-15. pH at X4



3.2.4.2 Groundwater

In 2008, groundwater wells in the Rose Creek Tailings Facility and the underlying native soils (i.e., the aquifer) were sampled three times, in August, October, and November. Additional sampling of certain wells was conducted in July and August as part of the Adaptive Management Plan (Section 9.8 and Appendix 10). The nested wells at location X24 (toe of the Intermediate Dam) were identified as requiring special investigation during 2007 to determine their reliability. In 2008, wells X24B and X24C were discontinued, as previous sampling attempts suggest these wells are compromised due to potential subsurface movement at this well location.

The groundwater monitoring wells located at the toe of the Intermediate Dam (Wells X24, X25, P01-03 and P01-04) report generally lower sulphate and zinc levels than those wells located upgradient in and under the tailings facility. In 2008, the sulphate concentrations at the toe of the Intermediate Dam ranged from 41 mg/L to 2200 mg/L and zinc concentrations ranged from 0.0002 mg/L to 0.0846 mg/L. Similar to previous years, sulphate concentrations on the north side of the valley continue to be higher than in the south and central areas of the valley.

3.2.4.3 Miscellaneous Surface Seepages

In 2008, location X7, a subsurface seep that emerges to surface just below the mine access road in the old Faro Creek channel, was sampled in spring and fall. The June and September samples reported sulphate concentrations of 7150 mg/L and 7810 mg/L. Total and dissolved zinc concentrations ranged from 356 mg/L to 455 mg/L and 314 mg/L to 405 mg/L, respectively. The pH was 5.9 and 5.7 for the two sampling dates. Sulphate, zinc, and pH concentrations were comparable to concentrations reported for these stations during previous sampling years.

Lower Guardhouse Creek receives runoff from some areas of the plant site and flows into the Intermediate Impoundment. In 2008, Lower Guard House Creek (GHSCR1 / GDHSECK) was sampled in June and September along the lower reaches, immediately upstream of the Intermediate Impoundment. Since 2001, sulphate concentrations have remained relatively consistent, at observed concentrations of 816 mg/L and 736 mg/L, in June and September respectively. Total and dissolved zinc concentrations ranged from 4.0 mg/L to 9.29 mg/L and 3.08 mg/L to 6.98 mg/L, respectively. This site reported circumneutral pH for both sampling events (8.1 and 7.4).

3.3 Water Quality Entering Rose Creek

3.3.1 Effluent Discharge

Location X5 samples the effluent discharged from the Cross Valley Pond as surface outflow. The Water Licence requires X5 to be sampled weekly when discharging and also requires a surface grab of the Cross Valley Pond to be sampled monthly when there is no discharge (X5P).

The Mill Water Treatment system was successfully operated in 2007 as described in Sections 5. The treatment system and the "polishing" action of the Cross Valley Pond were effective in maintaining compliance with the effluent discharge criteria for water released via location X5. The periods and volumes of effluent release are described in Section 2.

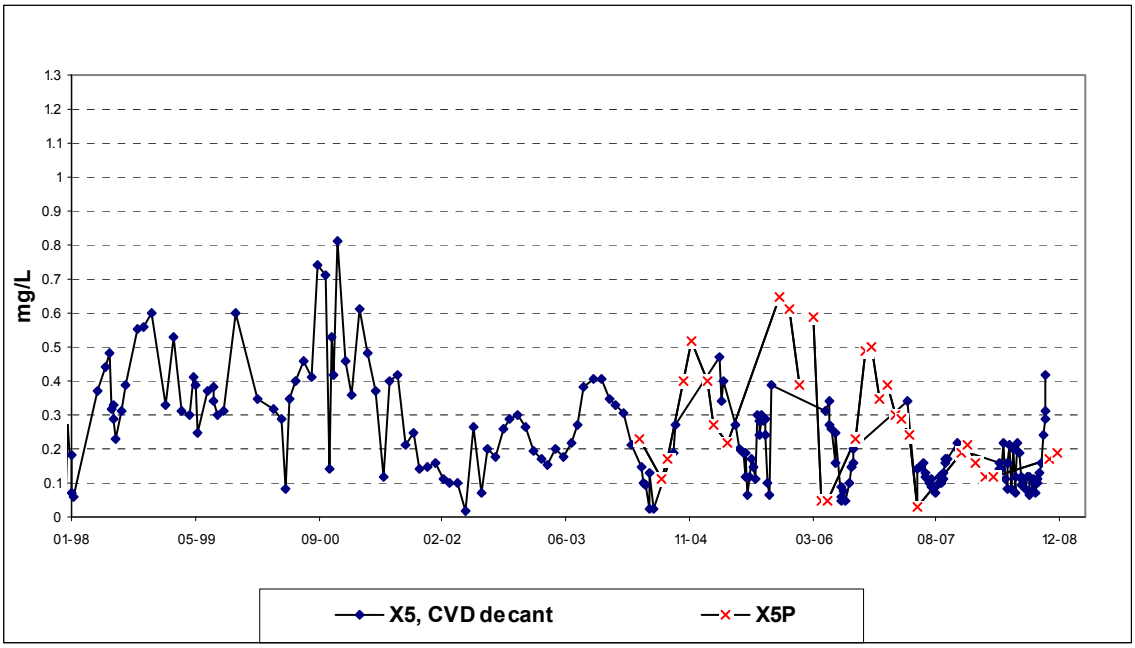
Total and dissolved zinc released to Rose Creek at location X5 during periods of discharge ranged from 0.067 mg/L to 0.42 mg/L and 0.023 mg/L to 0.35 mg/L, respectively (Figure 3-16). From 2001 to 2007, due to the implementation of the mill treatment system which significantly increased treatment efficiency compared to treatment methods employed prior to 2001, zinc concentrations have remained below the allowable discharge limits.

Licence discharge standards were also met for all other licenced parameters at location X5 in 2008, with total suspended solids and pH levels ranging from below the MDL (<1) to 3 mg/L, and 7.3 to 8.8, respectfully.

In addition to the chemical analyses at the external laboratory, frequent in-house analyses for total zinc were performed on-site to provide site management with an immediate indication of effluent quality. This was appropriate because site-specific experience has shown that total zinc is the critical parameter for achieving compliance. The in-house analyses utilized professional level atomic absorption (AA) equipment operated by trained assayers. In-house analyses for zinc were conducted on a routine daily or more frequent basis during periods of discharge in 2008. The individual results are available at the mine site and were available for review by Water Resources personnel during site visits.

In 2008, four samples were collected in March, June, September, and December at X5/X5P for acute lethality testing using rainbow trout (96-hour LC_{50}). All tests passed by >100%, with no mortalities. The March and December tests were conducted on water collected from the Cross Valley Pond, location X5P, as no water was being discharged at that time at location X5.

Figure 3-16. Zinc at X5/X5P



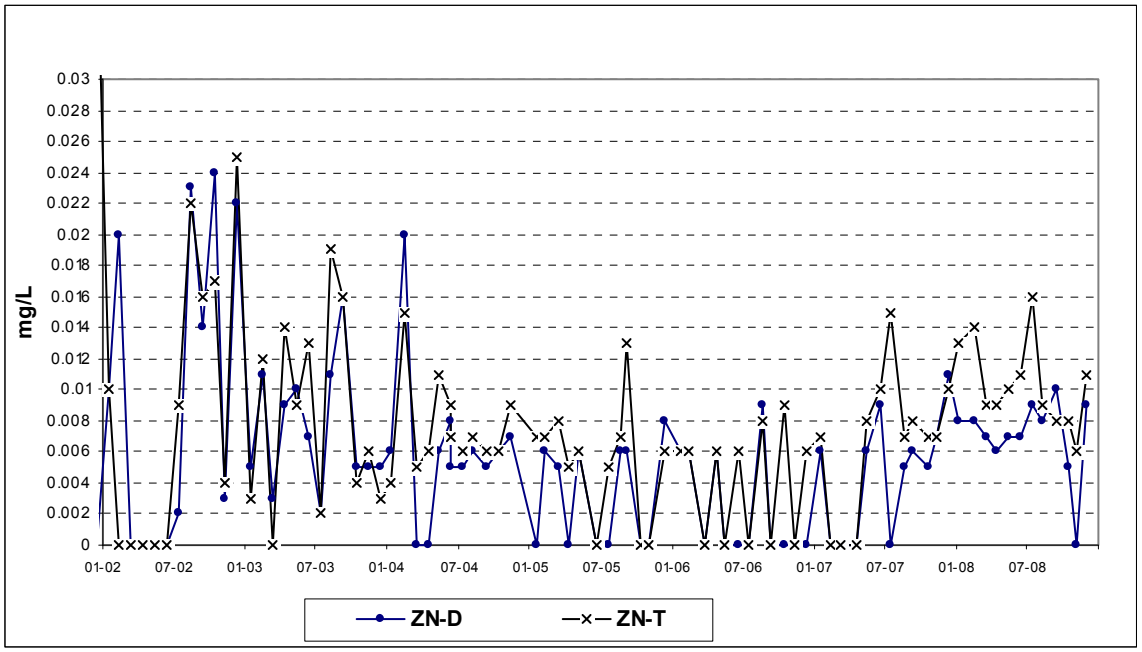
3.3.2 Cross Valley Dam Seepage

Seepage from the Cross Valley Dam is monitored just downgradient of the toe at location X13. There are three individual seepages that report to location X13, including X11, X12 and WEIR3. Location X11 is the primary seepage stream and collects seepage from the north abutment of the Cross Valley Dam and is suspected to also have collected some seepage from the Cross Valley Dam spillway during periods when there was overflow from the pond. Location X12 collects seepage from the south abutment of the Cross Valley dam. Location WEIR3 collects seepage from the central area between locations X11 and X12.

Flow information at these locations and the implications with regards to the geotechnical performance of the Cross Valley Dam are described in the accompanying geotechnical inspection report prepared by BGC Engineering Inc.

Twelve monthly samples of the Cross Valley Dam seepage discharge (X13) were collected and analysed in 2008. Water quality was within the maximum allowable discharge limits throughout the year, with TSS and ph levels ranging from 4 mg/L to 8 mg/L, and 7 to 7.5, respectfully. Total zinc concentrations ranged from 0.006 to 0.016 mg/L (Figure 3-17). During 2008, sulphate concentrations ranged from 825 mg/L to 965 mg/L, with an average concentration of 890 mg/L.

Figure 3-17. Zinc at X13



Routine quarterly bioassay samples for acute lethality testing using rainbow trout (96-hour LC_{50}) were collected in March, June, September and December of 2008 at location X13. All tests passed with no mortalities.

Locations X12, X11 and WEIR3 were sampled in March and August of 2008. Sulphate and zinc levels at X11 were slightly higher than typical for this site in 2008, with sulphate concentrations of 1280 mg/L and 1300 mg/L and total zinc concentrations of 0.008 mg/L and 0.009 mg/L. At location X12, March and August samples observed sulphate concentrations of 447mg/L and 450 mg/L, and total zinc concentrations below the method detection limit (<0.005 mg/L), similar to previous years. At WEIR3 sulphate concentrations were 718 mg/L during both sampling events, which were slightly higher than those recorded in the past 10 years. The total zinc concentration was below the detection limit in March and was observed at 0.008 mg/L in August. Similar to previous years, most other contaminant concentrations were below detection limit in the three Cross Valley Dam seepage locations.

3.3.3 Faro Creek Diversion

The Faro Creek Diversion passes clean water from the Old Faro Creek channel around the northeast side of the Main Pit and into the North Fork of Rose Creek. Location FDU, the upper portion of the Faro Creek Diversion, was sampled twice in the spring (May and June) and once in the fall (September) of 2008. Sulphate concentrations at this station remained very low in 2008, ranging from below the detection limit (<0.5 mg/L) to 1.77 mg/L. Total zinc levels were reported from below MDL (<0.005 m/L) to 0.0164 mg/L for all sampling events, and most other contaminant concentrations were below MDL's. Location FDL

represents the mid-section of the Faro Creek Diversion, which was sampled twice in 2008, in June and September. At this location in the diversion channel sulphate concentrations also remained very low with concentrations of 1.00 mg/L and 2.31 mg/L. June and September total zinc concentrations were 0.007 mg/L and 0.008 mg/L, respectively.

In 2008, monthly samples were collected in January and then from June to December at location FAROCR that is located at the outfall of the Faro Creek Diversion into the North Fork of Rose Creek. In 2008, concentrations of sulphate were relatively low, ranging from 2.08 mg/L to 5.86 mg/L and averaging 3.99 mg/L. Total and dissolved zinc concentrations were comparable to previous years, ranging from 0.008 mg/L to 0.01 mg/L and 0.009 mg/L and 0.039 mg/L, respectively, with average concentrations of 0.032 mg/L and 0.024 mg/L.

3.3.4 Groundwater

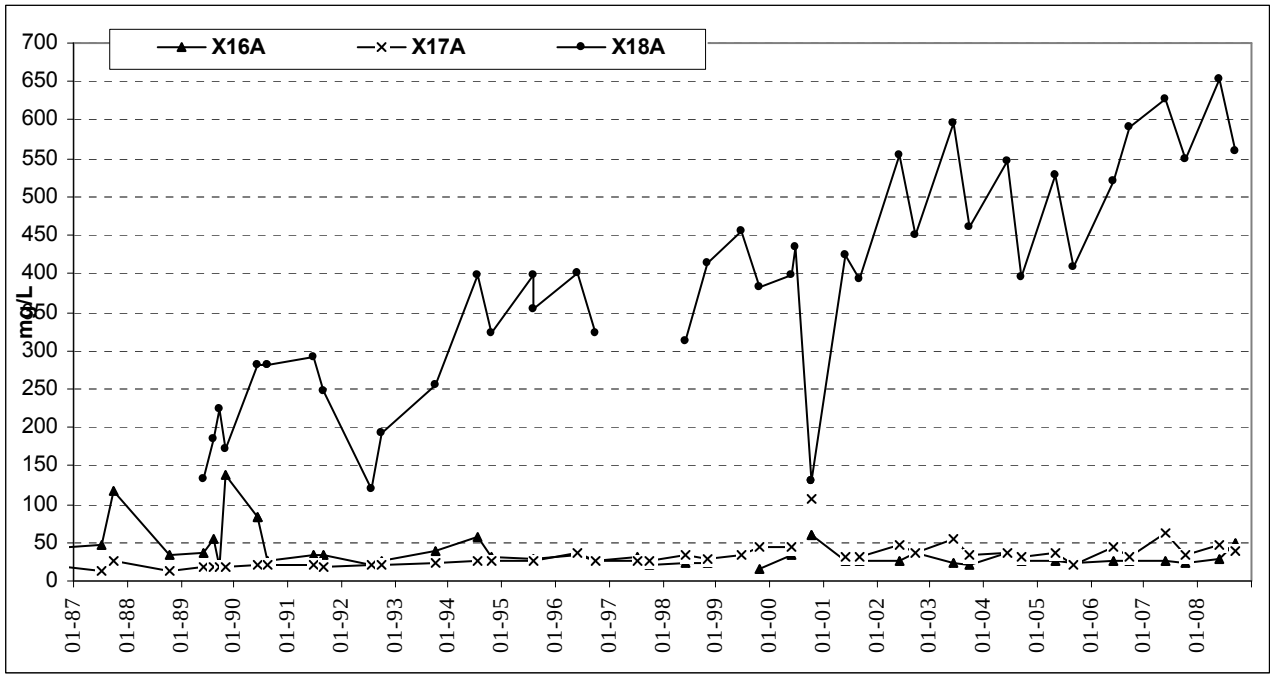
Groundwater quality is monitored below the Cross Valley Dam. A portion of the groundwater from the underlying aquifer is thought to discharge to the surface and enter Rose Creek in the general vicinity of Rose Creek sampling location X14, and some portion is thought to remain in the aquifer as groundwater flow. New information on this topic is being developed through the studies that are underway for development of the FCRP. However, the information is in a preliminary state and not available for reporting at this time.

The groundwater monitoring well locations X16A/B, X17A/B, X18A/B, P01-01A/B, P01-11A/B and P01-02A, downgradient of the Cross Valley Dam, were monitored twice in 2008, in May and September. Location P01-02B was sampled in May. Both sulphate and zinc concentrations observed in these wells generally fall within ranges typically observed at these locations. The ranges of sulphate and zinc in 2008 are listed in Table 3-1. Sulphate concentrations continue to decrease with increasing distance downgradient of the tailings facility. Sulphate concentrations on the north side of the valley (X18, P01-01) continue to be higher than in the south and central areas of the valley. This is illustrated for shallower wells X16A, X17A and X18A on Figure 3-18.

Table 3-1. Summary of Sulphate and Zinc Concentrations in Groundwater Downgradient of the Cross Valley Dam (2008)

Well	Max Sulphate (mg/L)	Min Sulphate (mg/L)	Max Dissolved Zinc (mg/L)	Min Dissolved Zinc (mg/L)
P01-11	1300	1280	<0.005	0.0036
X18A/B	654	180	0.0053	0.0008
X17A/B	183	39	0.0118	0.0002
P01-01 A/B	750	435	0.0064	0.0006
X16 A/B	49	25.8	0.0478	0.0006
P01-02 A/B	150	92.2	0.0057	0.0011

Figure 3-18. Sulphate at X16A, X17A, and X18A



3.4 Receiving and Background Water Quality

3.4.1 North Fork of Rose Creek

There are seven locations in the North Fork of Rose Creek that are monitored regularly: R7, R8, R9, R10, NF1, NF2, and X2. Location R7 is located upstream of the confluence with the Faro Creek diversion and is representative of background reference conditions in the North Fork area. Location R8 is located downstream of the confluence of the North Fork with the Faro Creek diversion and upstream of the Zone II pit area. Location R9 is located approximately adjacent to the area of the Zone II pit. Location R10 is located just downstream of the Zone II pit area. Locations NF1 and NF2 are located immediately upstream

and downstream, respectively, of the rock drain in the Vangorda haul road. Location X2 is located at the crossing of the mine access road downstream of the rock drain and the rock dumps. Monthly samples were collected at R8, R9 and R10 in 2008, while stations , and NF1 was sampled biannually (spring and fall). A total of 17, 16, and 12 samples were taken at stations R7, X2 and NF2, respectfully, over the course of the year.

Water quality at location R7 was representative of historic data, in 2008. Total zinc concentrations ranged from 0.0008 mg/L to 0.014 mg/L and sulphate ranged from below the method detection limit (<0.5 mg/L) to 10.4 mg/L. Throughout 2008, this sample location reported the majority of total metal concentrations below the MDL's.

Similar to previous years, comparing water quality at locations R7, R8, R9, R10 and X2 suggests that sulphate and zinc concentrations undergo a general increase along the North Fork from R7 to X2. Figures 3-19 and 3-20 illustrate this trend for sulphate and zinc, respectively. Along the North Rock Dump and the Zone II area, between R7 and R10, sulphate concentrations increase most notably during winter baseflow periods, similar to all years on record. Stations R10 and X2, show a more significant increase in sulphate along the Main/Intermediate Rock Dump area.

Figure 3-19. Sulphate at R7, R10, and X2

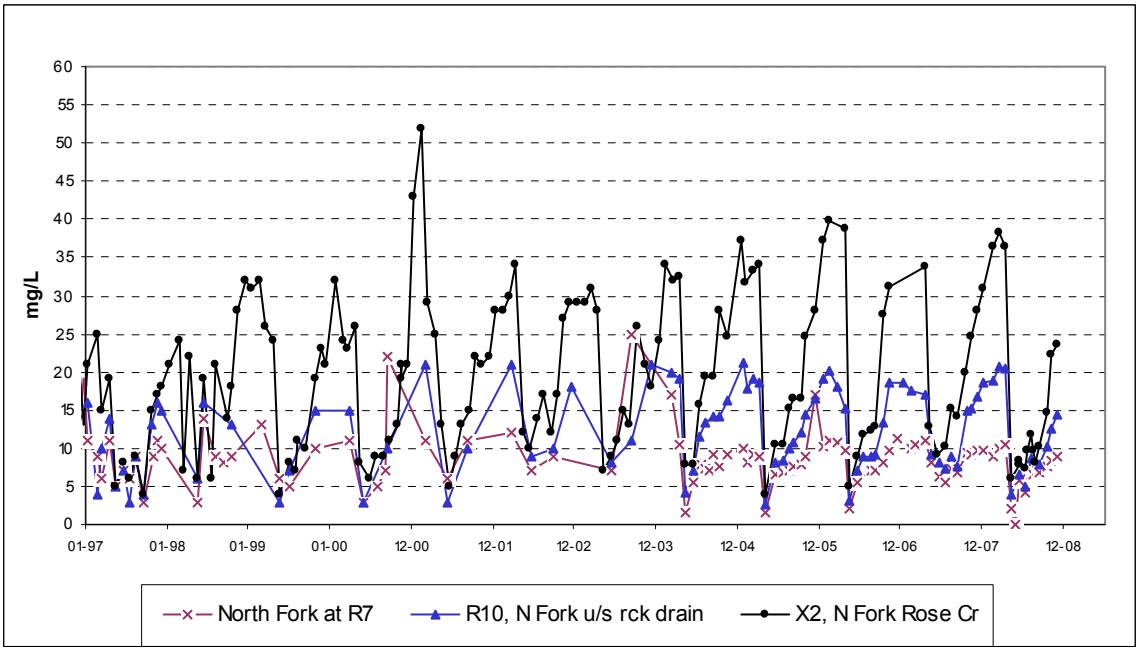
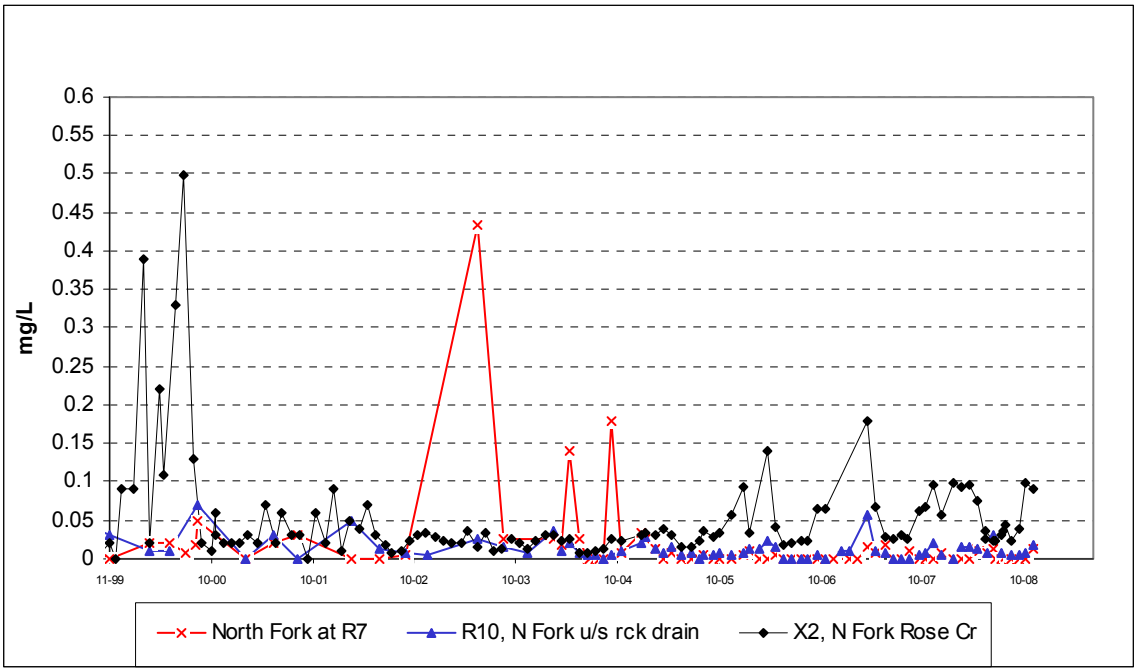


Figure 3-20. Zinc at R7, R10 and X2



3.4.2 South Fork of Rose Creek

Location Grum Corner (also know as "GCULV") is the South Fork of Rose Creek at the mine access road crossing. Location K8 is a tributary to the South Fork in the area of the former freshwater reservoir. In 2007, these locations were sampled on a monthly basis. Sulphate concentrations at these two sites remained low, ranging from 2.43 mg/L to 19.8 mg/L, in 2008. Total zinc concentrations ranged from below MDL (<0.005 mg/L) to 0.017 mg/L, and dissolved zinc concentrations ranged from below the MDL (<0.005 mg/L) to 0.007 mg/L.

Location R1 is located in the South Fork of Rose Creek below the previous freshwater reservoir area and upstream of the tailings impoundment area. This location was sampled 14 times in 2008. Over the course of the year, R1 observed sulphate concentrations ranging from 1.4 mg/L to 50 mg/L, with an average of 20.65 mg/L. Total and dissolved zinc concentrations ranged from below minimum detection limits (<0.0001 mg/L) to 0.0369, averaging 0.008 mg/L.

3.4.3 Rose Creek Diversion Channel

Rose Creek is monitored at the upstream (location X3) and downstream (location X10) extents of the constructed diversion channel that passes Rose Creek around the Rose Creek tailings facility. In 2008, 12 monthly samples were collected at X3 and a total of 22 samples were collected at X10.

Station X3 is located at the outflow of the pumphouse pond. Monitoring this water includes evaluating all flow from the South Fork of Rose Creek and a majority of the flow from the North Fork of Rose Creek via location X2. A small portion of the flow from the North Fork of Rose Creek bypasses the pumphouse pond during high flow events via a secondary diversion channel that was constructed in previous years. This “bypass” flow enters the Rose Creek diversion channel immediately downstream of the pumphouse pond. Location X10 is located near the downstream extent of the Rose Creek diversion channel adjacent to piezometer X16.

In 2008, sulphate concentrations at location X3 ranged from 7.45 mg/L to 36.4 mg/L, with an average concentration of 20.74 mg/L. Zinc concentrations at this site followed previously established trends, with maximum concentrations observed during the spring, followed by a decrease to lower concentrations by the next sampling event. In 2008, the average total and dissolved zinc concentrations at location X3 were 0.0435 mg/L and 0.0337 mg/L, respectively.

Total and dissolved zinc at location X10 ranged from below the MDL (<0.0001 mg/L) to 0.103 mg/L and 0.008 mg/L to 0.0946 mg/L, respectively. Sulphate concentrations remain within typical ranges of previous years, from below the detection limit (<0.5 mg/L) to 44.9 mg/L.

Locations X2, X3, and X10 generally follow the same trends in zinc and sulphate concentrations, with seasonal fluctuations of both zinc and sulphate and higher concentrations typically observed during winter months (Figures 3-23 and 3-24). All three locations reported maximum iron (Fe) concentrations during the month of May.

Figure 3-21. Sulphate at X2, X3, X10

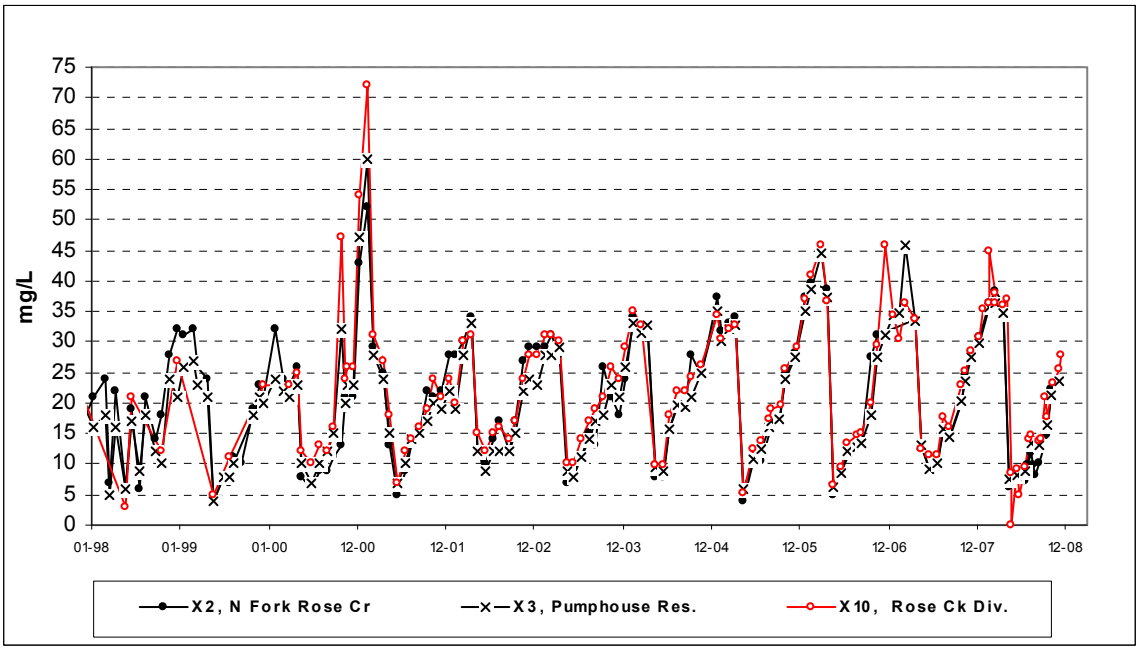
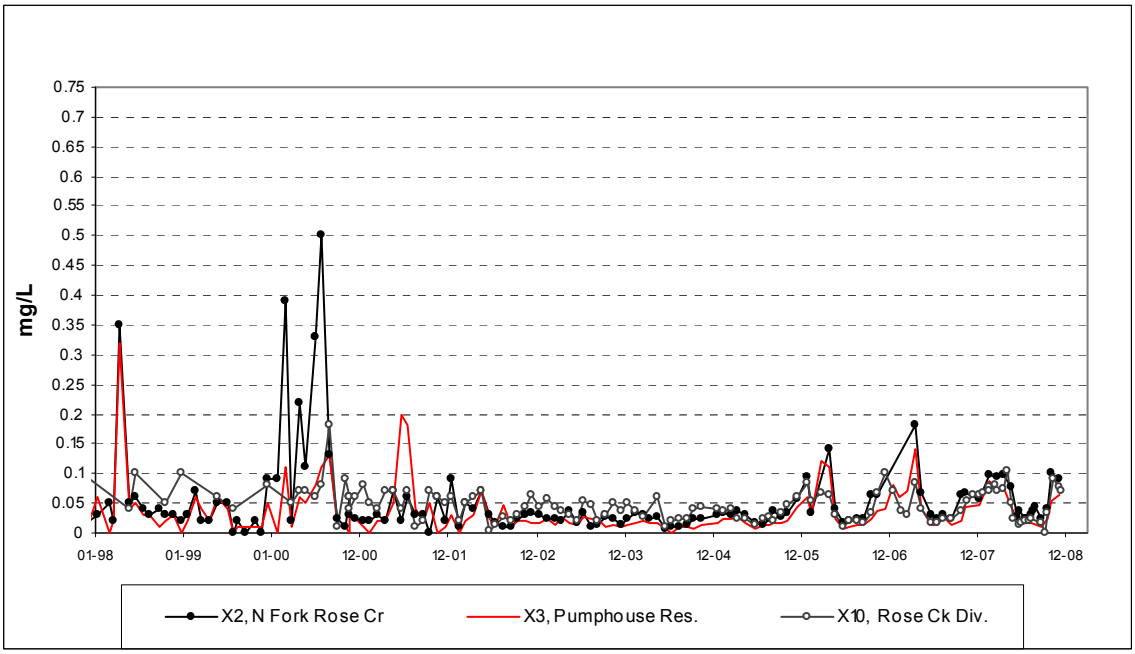


Figure 3-22. Zinc at X2, X3, and X10



3.4.4 Rose Creek Immediately Downstream of the Mine Area

Rose Creek immediately downstream of the confluence with effluent discharges (locations X5 and X13) is monitored at location X14. The Licence requires that X14 be sampled monthly or weekly when effluent is being released via location X5. A total of 69 samples, including additional samples not required by the terms of the licence, were collected in 2008. This station typically reports higher zinc and sulphate during periods of effluent discharge in comparison to sampling periods with no active discharge from the Cross Valley Pond. In 2008, the highest concentrations of sulphate and zinc were observed in April during a period of active discharge in low flow conditions, with concentrations of 504 mg/L and 0.13 mg/L, respectively.

In 2008, water quality at location X14 was similar to previously established trends. The average sulphate concentration was slightly lower than the previous year at 114.6 mg/L (Figure 3-25). Total and dissolved zinc concentrations averaged at 0.0443 mg/L and 0.0323 mg/L, respectively (Figure 3-26). Water chemistry at this location generally follows seasonal trends, with maximum concentrations typically observed during the spring. Maximum iron and lead concentrations of 0.91 mg/L and 0.006 mg/L, respectively, occurred at this site in May of 2008. Subsequent sampling at this location indicates metal concentrations returned to within typical ranges observed for this site by the next sampling event.

Figure 3-23. Sulphate at X14

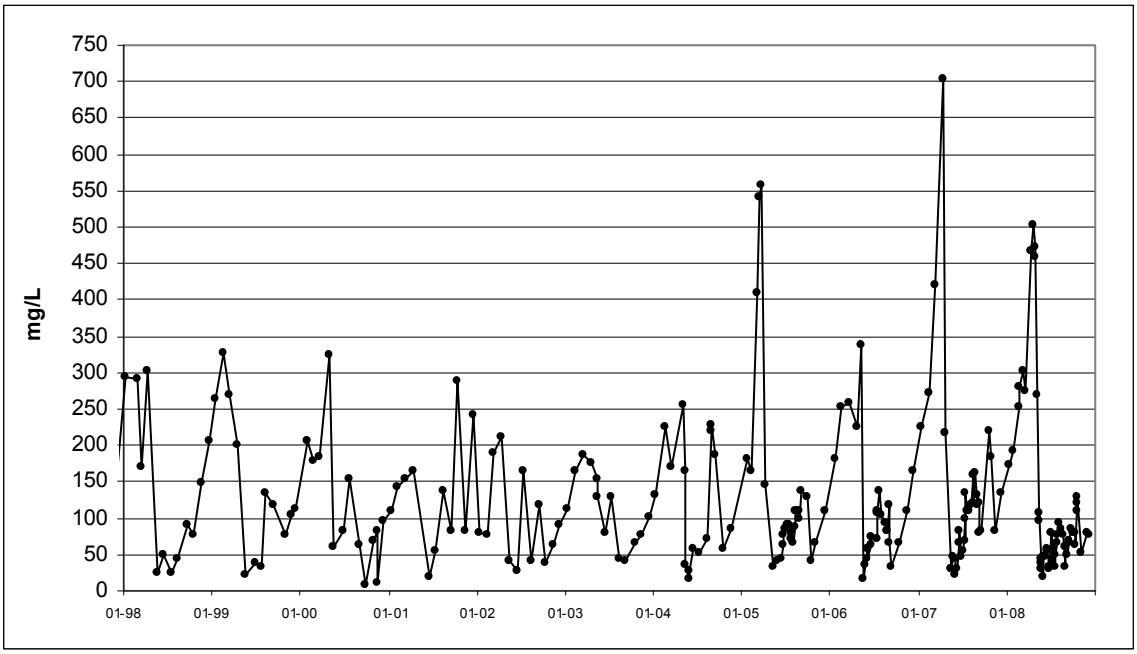
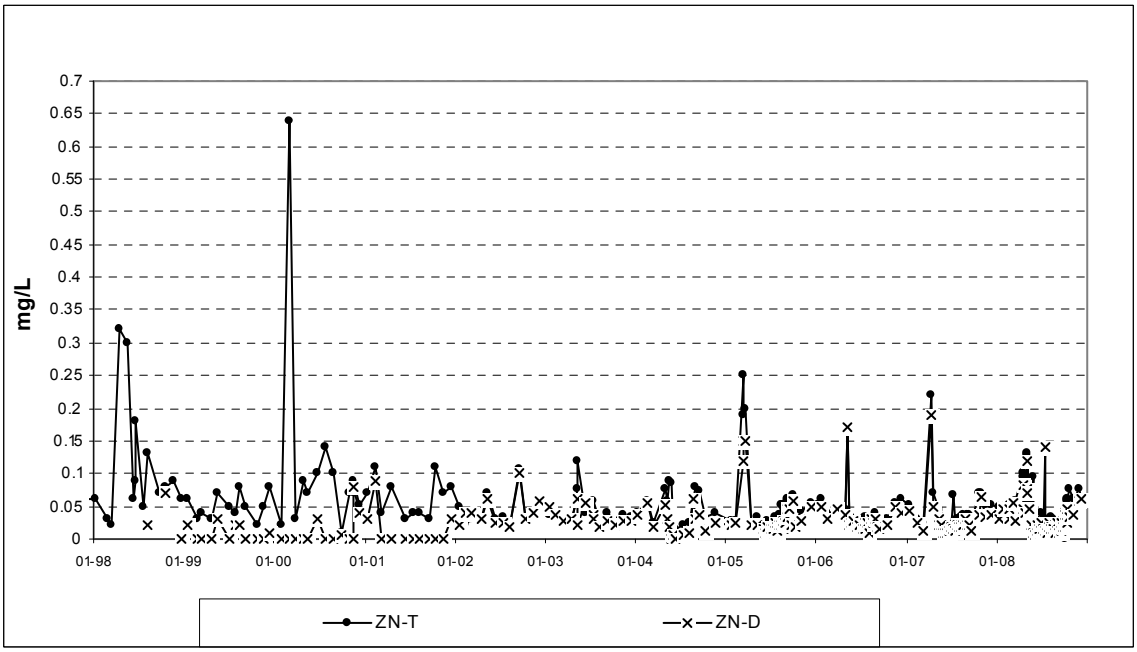


Figure 3-24. Zinc at X14



3.4.5 Rose Creek to Anvil Creek/Anvil Creek

Locations R2, R3, and R4 are sampled in Rose Creek, locations R5 and R6 are sampled in Anvil Creek at the confluence with Rose Creek, and location R11 is sampled at the mouth of Anvil Creek. In 2008, station R11 was sampled in the winter (March) and summer (August). All of the other sites were sampled on a more frequent basis, ranging from 4 to 14 samples over the course of the year.

R2 is located approximately 100 m downstream of location X14 in Rose Creek below the effluent-mixing zone. Notably, there are no significant inflows between the two locations. R3 is located in Rose Creek approximately mid-point between station R2 and the confluence with Anvil Creek. R4 is located approximately 26 km downstream of the tailings impoundments. R5 is located downstream of the confluence with Rose Creek. Station R6 is located within Anvil Creek, upstream of the confluence with Rose Creek. This station is representative of regional background conditions in the Anvil Creek area.

From 1996 to 2008, total zinc and sulphate concentrations have observed the following generally anticipated trends:

- concentrations are typically greatest at location R2 and typically decrease to downstream locations R3 and R4 due, presumably, to dilution;
- concentrations at R4 are typically greater than at R6 reflecting the signature of mine area runoff and effluent in Rose Creek;
- concentrations at R5 are typically between those at R4 and R6 reflecting the mixing of Rose and Anvil Creeks; and
- concentrations of sulphate increase along Anvil Creek from R5 to R11 (2004 to 2008 data only), although zinc does not follow a similar trend.

The trends described above are illustrated by 2008 data as listed in Table 3-2.

Table 3-2. Total Zinc and Sulphate Concentrations in Rose Creek 2008

Location	March Total Zinc	August Total Zinc	March Sulphate	August Sulphate
R2 (near mine)	0.046	0.025 – 0.0351	281	23 – 74.9
R3 (mid-Rose Ck)	0.0116 – 0.019	0.018	186	60.2
R4 (mouth Rose Ck)	<0.005 – 0.0065	0.015	132-142	54.6
R6 (Anvil Ck u/s Rose Ck)	0.0037 – <0.005	<0.005	21.4 – 21.7	18.8
R5 (Anvil Ck d/s Rose Ck)	<0.005	0.005	21.4	20.8
R11 (Mouth of Anvil Ck)	<0.005	0.007	53.7	32.6

All values expressed as mg/L.

Figure 3-25. Sulphate at R11, R2, R3, R4, R5, and R6

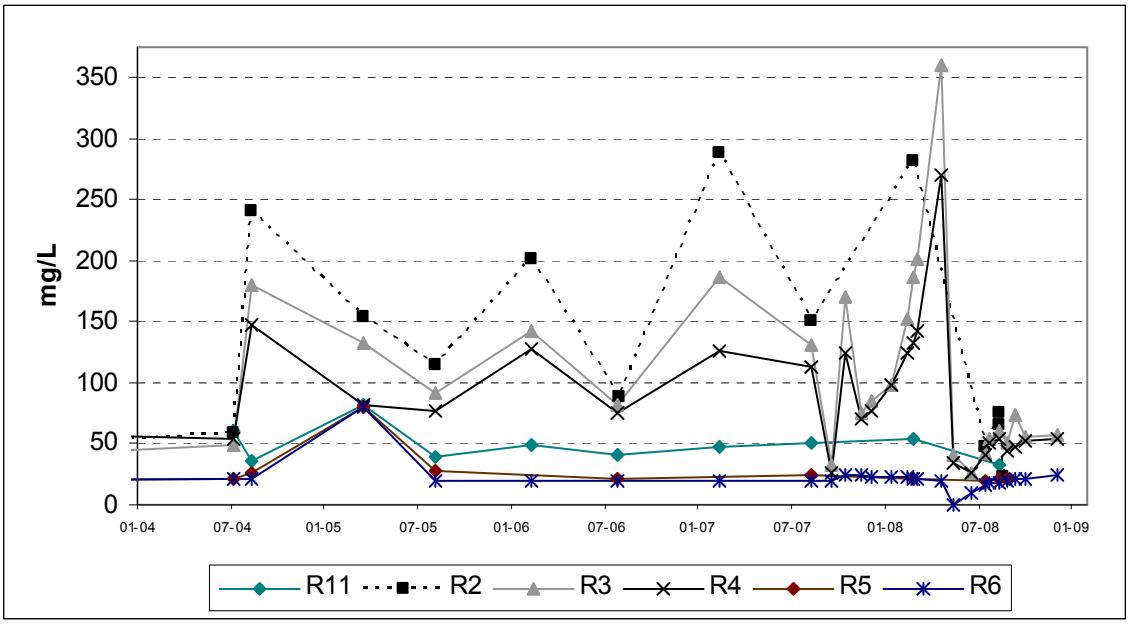
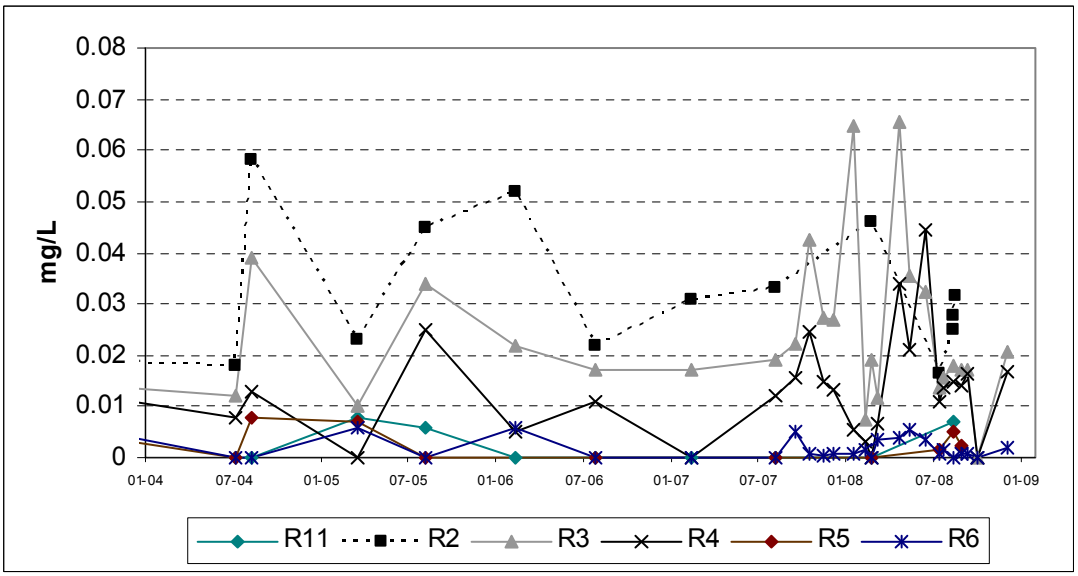


Figure 3-26. Zinc at R11, R2, R3, R4, R5, and R6



4. Water Quality Monitoring – Vangorda Creek Drainage

4.1 Overview of Water Quality Monitoring Program

Part G and Schedule A of the Water Licence describe the water quality monitoring program for the Vangorda Plateau mine site. The Water Licence provides the sampling locations, sampling frequencies and the minimum parameters to be analysed.

The monitoring program is carried out by staff employed at the mine site by the Interim Receiver. Various professional laboratories have been used to provide the sample analyses over the life of the project. Laboratories are selected on the basis of certification with the Canadian Association of Environmental Analytical Laboratories, service and other factors. In 2008, most of the water analyses were conducted by CanTest with the exception of cyanide, which was analysed by ALS Laboratory Group. The analytical data is managed through an electronic database that is managed by AECOM.

The monitoring program also makes extensive use of the unique capability for high-quality, on-site zinc analyses to provide immediate feedback to site managers regarding effluent quality. On-site analyses of effluent zinc concentrations are conducted on a daily, or more frequent, basis when treated effluent is being released.

Water sampling frequencies vary from weekly (for treated effluents) to twice per year (for groundwater). The majority of water samples are collected on a monthly or quarterly basis. Continuous flow monitoring via dataloggers is required at one location, in lower Vangorda Creek (location V8). Other locations have various requirements for flow measurement.

Schedule A of the Water Licence, including the descriptions of the monitoring locations, sampling frequencies and minimum parameters, is provided in Appendix 1. UTM coordinates for the sampling locations have been previously provided to the Board and are provided in Appendix 2 for ease of reference. The monitoring locations are also illustrated on Figures 1-1, 1-2 and 1-3. Analytical data for 2008 is provided in Appendix 6. Bioassay results are provided in Appendix 7. A brief review of the data is provided in the following sections.

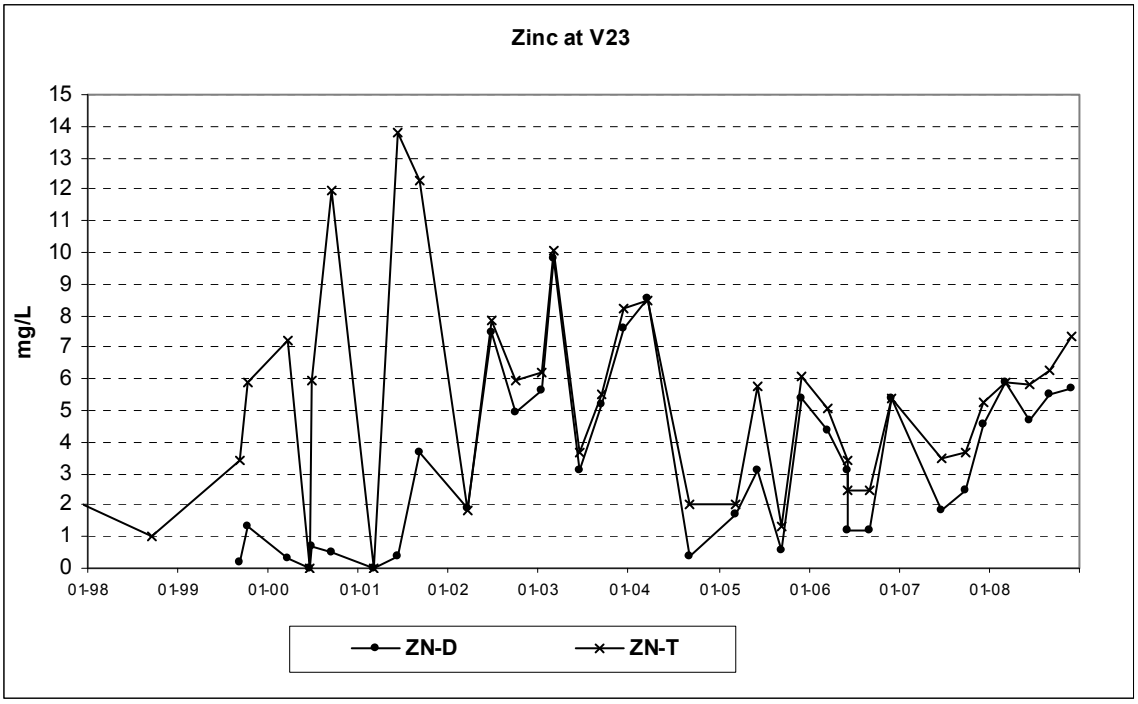
4.2 Open Pits and Rock Dumps

4.2.1 Grum Open Pit

Water quality in the Grum open pit is monitored at location V23 (pit pond). Location V23 has been routinely monitored since mine shut down (February 1998) and represents the accumulation of water in the pit in the absence of dewatering activities.

In 2008 samples were collected quarterly at location V23 in 2008, in March, June, September and December. The samples were collected as grab samples from the surface of the pit pond. The concentrations of total and dissolved zinc (Zn) ranged from 5.81 mg/L to 7.36 mg/L and from 4.66 mg/L to 5.9 mg/L, respectively, in 2008 (Figure 4-1).

Figure 4-1. Zinc at V23



In 2004, a pilot project of biological pit lake treatment using algae was implemented at the Grum Pit as part of ongoing studies for the development of the FCRP. Reductions in zinc concentrations observed during the first year of treatment prompted continuation of the treatment program. Zinc concentrations throughout 2008 are comparable to pre pit lake treatment implementation (2005), with seasonal trends defined by lower concentrations typically observed during the summer months.

The concentration of sulphate remained consistent with previous years, ranging from 324 mg/L to 494 mg/L. The pH remained neutral to slightly alkaline in 2008 ranging from 7.1 to 9.0.

4.2.2 Grum Rock Dump

4.2.2.1 Surface Seepage

Locations V14, V15 and V16 are surface seepages below the toe of the Grum rock dump along the north, central and south areas of the rock dump, respectively.

No samples were collected at location V14 in 2008. Location V14 was dry in June and September when sampling was conducted.

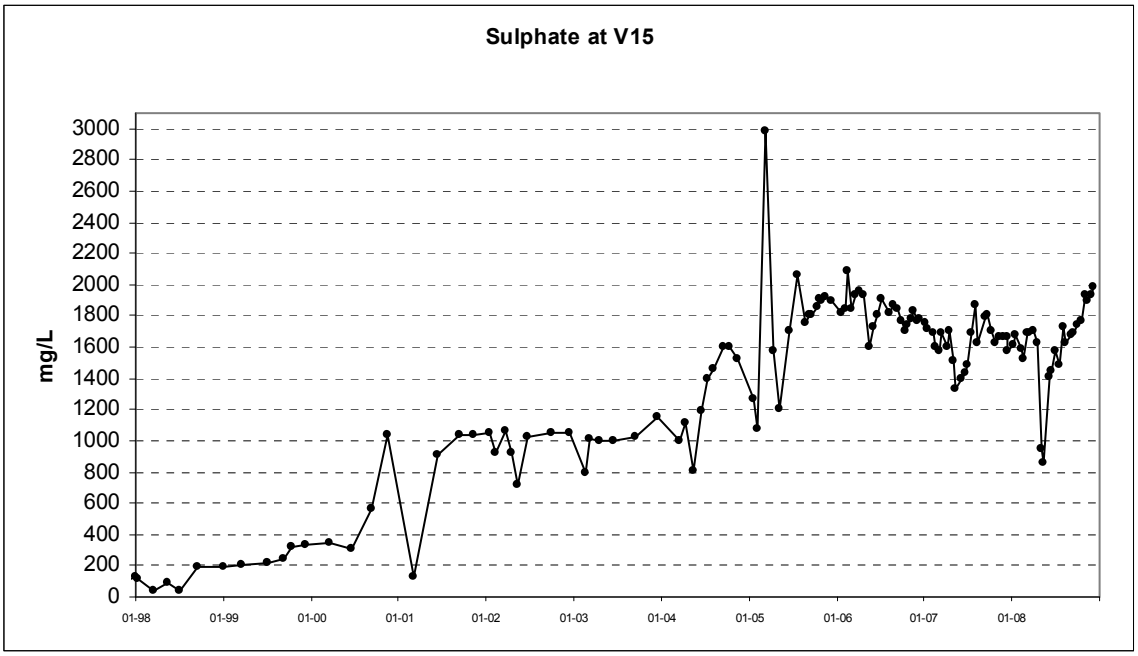
Two samples were collected at location V16 in June and September 2008. Location V16 exhibited neutral pH in 2008 at 7.5 and 7.6 in June and September, respectively. Sulphate concentrations were 2,060 mg/L and 2,220 mg/L. The sulphate record shows an increasing trend since 2001. There was neither a corresponding increase in the concentrations of total or dissolved zinc, nor a corresponding decrease in pH. The total Zn concentrations in 2008 were 0.02 mg/L and 0.01 mg/L.

Location V15 is located in a small draw, which naturally collects some surface flow below the rock dump including the area occupied by the sulphide cell. A sump collects flow and promotes settlement of suspended sediment. Flow from this location enters Grum Creek upstream of monitoring location V2.

Samples were collected twice per month at location V15 in 2008. Water pH was consistently circum neutral ranging from 6.7 to 7.8. The concentrations of total and dissolved zinc ranged from 0.27 mg/L to 1.79 mg/L and from 0.17 mg/L to 1.53 mg/L, respectively. Elevated zinc concentrations observed in 2007 prompted redirection of water from location V15 to V2A for preservation of downstream water quality at location V2. The Government of Yukon Water Resources Branch was notified of the action plan for water redirection prior to initiation. In August 2007, a small lined rip rap ditch was constructed and from that point on water flowed via gravity to V2A.

The concentration of sulphate ranged from 861 mg/L to 1,980 mg/L in 2008 at location V15. A general increasing trend is evident in sulphate concentrations from 1995 (beginning of sample record) to 2005, with a stabilizing trend observed between 2006 and 2008. The historical concentrations of sulphate at location V15 are illustrated on Figure 4-2.

Figure 4-2. Sulphate at V15



Water that is sampled at location V15 is a contributing flow to downstream location V2, which is a trigger location in the Adaptive Management Plan. This means that degraded water quality at location V15 would be detected prior to having a detrimental impact in Vangorda Creek. The Adaptive Management Plan is described in Section 9.8.

4.2.2.2 Groundwater Seepage

Groundwater wells P96-9A and P96-9B are nested in one drill hole in a bedrock valley that is at least 20 m deep near surface monitoring location V15. The groundwater wells allow monitoring of groundwater flow that is assumed to originate, in part, from the portion of the Grum rock dump that includes the sulphide cell. The deeper installation (P96-9B), which is screened over the interval from 16.5 to 18.0 m below surface, is inoperable due to presumed ground movement or collapse of the hole in 2002.

Piezometer P96-9A was sampled in May and September 2008. The concentrations of dissolved Zn were 0.0136 mg/L and 0.0158 mg/L and the concentrations of sulphate were 1,360 mg/L and 1,700 mg/L. An increasing trend in sulphate has been apparent since 2000, showing a seasonal trend with spring having lower sulphate concentrations.

Additional groundwater monitoring wells were installed in the area of Grum Creek and its tributaries in September 2004. These wells were installed as part of the investigations undertaken for the Adaptive Management Plan as described in Section 9.8.

4.2.3 Vangorda Open Pit

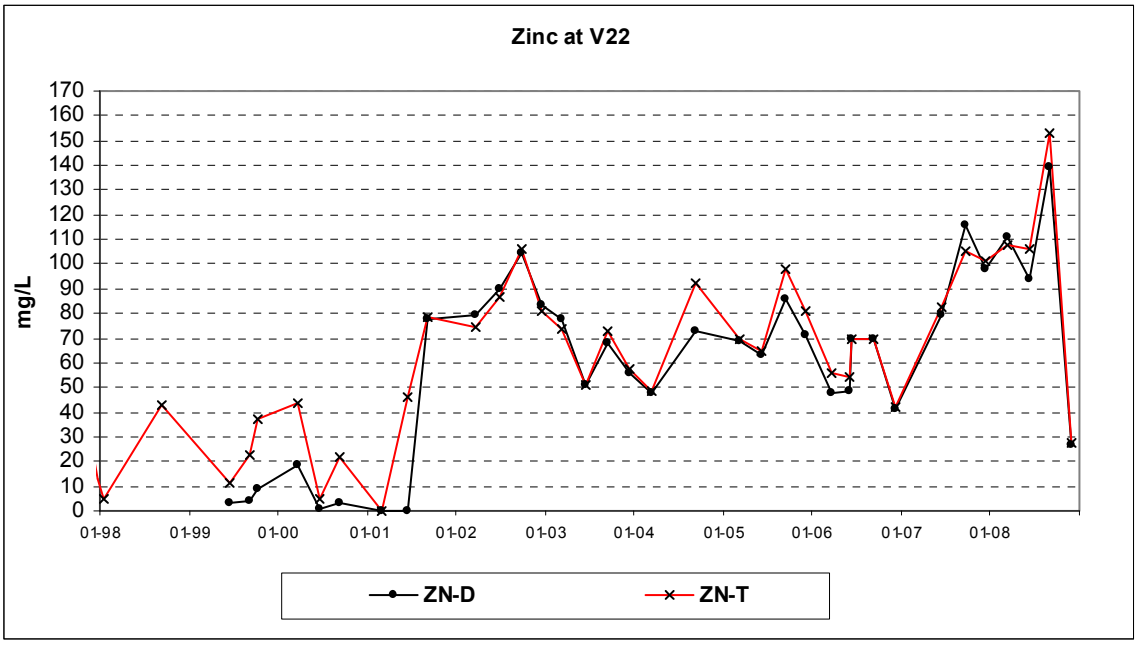
Vangorda Pit water is monitored at location V22. During the period of active mining (pre-1998) when pit dewatering was underway, location V22 was sampled at the outflow of the dewatering pipe. Following the suspension of mining activities (and dewatering) in February 1998, location V22 has been sampled in the pit pond. The water that has accumulated in Vangorda Pit since mine shut down has included natural inflows, water pumped periodically from Little Creek Dam and water pumped/siphoned periodically from the Sheep Pad Pond. From 2002 through 2005, a summer season water pumping and treatment program has been conducted to maintain the pit pond water level within the desired range. Pumping was not required in 2006, and 2007, due to the low level of drawdown achieved in 2005. In 2008, pumping of the Vangorda Pit took place from June 5 and August 20, with several shutdowns during the period.

Four samples were collected at location V22 in 2008, in March, June, September and December. These samples were collected as grab samples from the surface of the pit pond. The concentrations for total zinc ranged from 26.5 mg/L to 139 mg/L. The sharp increase in zinc in 2002 (Figure 4-3) may be related to maintenance and repairs to one of the freshwater diversions, the Northeast Interceptor Ditch, in 2001. This repair work substantially improved the efficiency of the ditch to pass clean water around the Vangorda pit to Shrimp Creek. It is possible that this work removed a relatively large inflow of clean water and resulted in the increased concentrations observed in the pit. Also, zinc concentrations were observed to increase with depth in a 2000 pit survey and it is possible that the variability of zinc concentrations in surface grab samples is related to seasonal effects such as pond turnover.

The concentrations of sulphate in 2008 ranged from 293 mg/L to 1,450 mg/L. The historical peak sulphate concentration was observed in September 2008. The pH was acidic to circum neutral in 2008 with a range of 3.0 to 6.5.

The water level in the Vangorda Pit is maintained below a defined maximum desired level to provide for emergency storage below the overflow elevation to accommodate unforeseen events. This is accomplished through a summer season water pumping and treatment program that was been undertaken from 2002 through 2005. Water is pumped from the Vangorda pit to the Grum/Vangorda water treatment plant and, after treatment and removal of metals, is released to Vangorda Creek via the Grum Interceptor Ditch to the Sheep Pad Pond and monitoring location V25BSP. The pumping and release of water is further described in the Water Treatment Plant Performance Review that is documented in Section 5 of this report.

Figure 4-3. Zinc at V22



4.2.4 Vangorda Rock Dump

4.2.4.1 Surface Seepage

Six transverse drains were constructed in 1994 that pass toe seepage from the Vangorda rock dump through the till containment berm that rings the dump. These six drains represent monitoring locations V28 through V33. Drain #1 (V28) is considered inoperable and is not part of the Water Licence monitoring schedule.

Drain #2 (V29) was dry in 2006, 2007, and 2008. Flow at this location has been intermittent in the past and 2004 & 2005 were the last two years sampled.

Drain #3 (V30) was sampled twice in 2008, in June and September. The concentrations of dissolved zinc were 655 mg/L and 564 mg/L, respectively. The concentrations of sulphate were 6,580 mg/L and 6,730 mg/L. The pH was circum neutral at 6.3 and 6.0 for the June and September for the sampling events, respectively. V30 was not sampled in 2007.

Drain #4 (V31) was sampled twice in 2008, in June and September. The concentrations of dissolved zinc were 470 mg/L and 2,260 mg/L, respectively. The concentrations of sulphate were 5,070 mg/L. and 20,300 mg/L. The pH was 4.5 and 6.0 in June and September, respectively. Flow at this location has been intermittent in the past, but has been consecutively sampled from 2005 to 2008. Concentrations of dissolved zinc and sulphate in September 2008 were comparable to the peak values seen in September 2005.

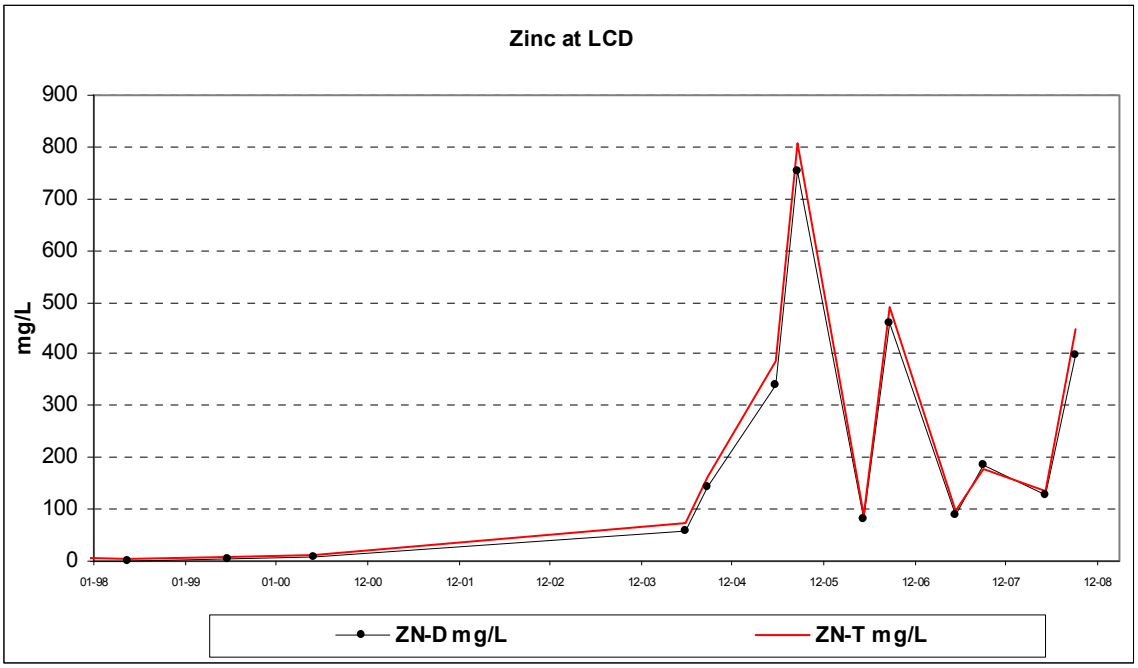
Drain #5 (V32) was sampled on two occasions in 2008, in June and September. Water quality at drain #5 continued to show high metal and sulphate concentrations at acidic pH. The concentrations of dissolved zinc were 12,500 mg/L and 7,380 mg/L and the concentrations of sulphate were 78,200 mg/L and 53,700 mg/L. The pH at drain #5 (V32) was acidic in June and September, at 2.7 and 3.7, respectively. Sulphate and zinc concentrations exhibit an increasing trend, while pH shows a decreasing trend. Concentrations of cadmium exhibit a similar pattern with a maximum concentration of 9.88 mg/L in 2008. The consistently poor water quality at V32 is attributed, in part, to the location of the drain in the (assumed) seepage path of the sulphide cell area of the Vangorda rock dump.

Drain #6 (V33) was sampled once in September 2008. Sulphate and zinc concentrations at drain #6 have increased over the previous year. The concentrations of sulphate and dissolved Zn in September 2008 were 87,900 mg/L and 8,280 mg/L, respectively. The pH was acidic, at 4.9 for the September sampling event. The consistently poor water quality at V33 is attributed, in part, to the location of the drain in the (assumed) seepage path of the sulphide cell area of the Vangorda rock dump.

Little Creek Dam (LCD) is the collection point for surface run off from the Vangorda rock dump, toe seepage from the Vangorda rock dump, local area run off from its catchment area and direct precipitation. Prior to the shut down of mining activities in February 1998, the Vangorda Pit was dewatered directly into Little Creek Dam and all water was pumped from Little Creek Dam to the water treatment plant for treatment and discharge. Since the mine shut down, water from Little Creek Dam has been pumped into the Vangorda pit. This has been required on a seasonal basis and has occurred once or twice per summer. The water that has accumulated in Little Creek Dam has been non-compliant for zinc and, therefore, has not been discharged into Vangorda Creek.

The pumping procedure has maintained an appropriate water elevation in Little Creek Dam such that the risk of release of non-compliant water was minimized. Little Creek Dam was previously sampled in 2000 and 2004 to 2007. LCD was sampled on two occasions in 2008, in June and September. The concentrations of sulphate were 1,140 mg/L and 3,150 mg/L, respectively. The concentrations of total zinc were 94.8 mg/L and 179 mg/L and the concentrations of dissolved zinc were 89.8 mg/L and 184 mg/L, respectively. pH was 6.7 and 5.6, respectively. The concentration of zinc (Figure 4-4) has decreased since the maximum concentration observed in September 2005, and shows a seasonal trend due to the effects of ice melt and snow melt during freshet.

Figure 4-4. Zinc at Little Creek Dam (LCD)



4.2.4.2 Groundwater Seepage

Monitoring wells GW94-01 through GW94-04 (monitoring locations V34 through V37) were installed in 1994 around the toe of the Vangorda rock dump to allow monitoring of groundwater seepage below the collector ditch. Each of these piezometers were sampled twice during 2008, in June and September. Piezometer GW94-05 (V38) is inoperable.

Groundwater quality in piezometers GW94-01 through GW94-04 continued, in 2008, to show low metal concentrations. The concentrations of dissolved zinc ranged from 0.0014 mg/L to 0.0365 mg/L in 2008. The concentrations of sulphate in piezometers GW94-01 to GW94-04 ranged from 68.8 mg/L to 1,160 mg/L in 2008. The concentrations of sulphate in piezometers GW94-02 and GW94-03 continued, in 2008, to be greater than in GW94-01 and GW94-04.

A series of piezometers (P94-01 through P94-04, V39 to V47) are installed in the till berm which surrounds the base of the rock dump and through which the transverse drains pass seepage water. No water quality monitoring has been performed since 1998.

Two additional monitoring piezometers were installed in 2001 around the toe of the Vangorda rock dump to allow monitoring of groundwater seepage below the collector ditch, P2001-02 and P2001-03. Piezometer P2001-02 is a nested well in one drill hole, P2001-02A and P2001-02B. Each of these piezometers was sampled twice during 2008, in June and September. P2001-03 was sampled once in June 2008.

Groundwater quality in piezometers P2001-02 and P2001-03 continued, in 2008, to show low metal concentrations and neutral pH. The concentrations of dissolved Zn ranged from <0.005 mg/L to 0.0086 mg/L. The concentrations of sulphate in piezometers wells P2001-02 and P2001-03 ranged from 150 mg/L to 330 mg/L in 2008.

4.3 Water Quality Entering Vangorda Creek

4.3.1 Sheep Pad Pond

Location V25BSP consists of all water that enters Vangorda Creek via the Sheep Pad Pond including water discharged from the water treatment plant/clarification pond and natural runoff. Location V25BSP is a licence discharge location and is a point of compliance for water entering Vangorda Creek from the Sheep Pad Pond. Sampling is undertaken weekly during periods of discharge from the water treatment plant and monthly at other times.

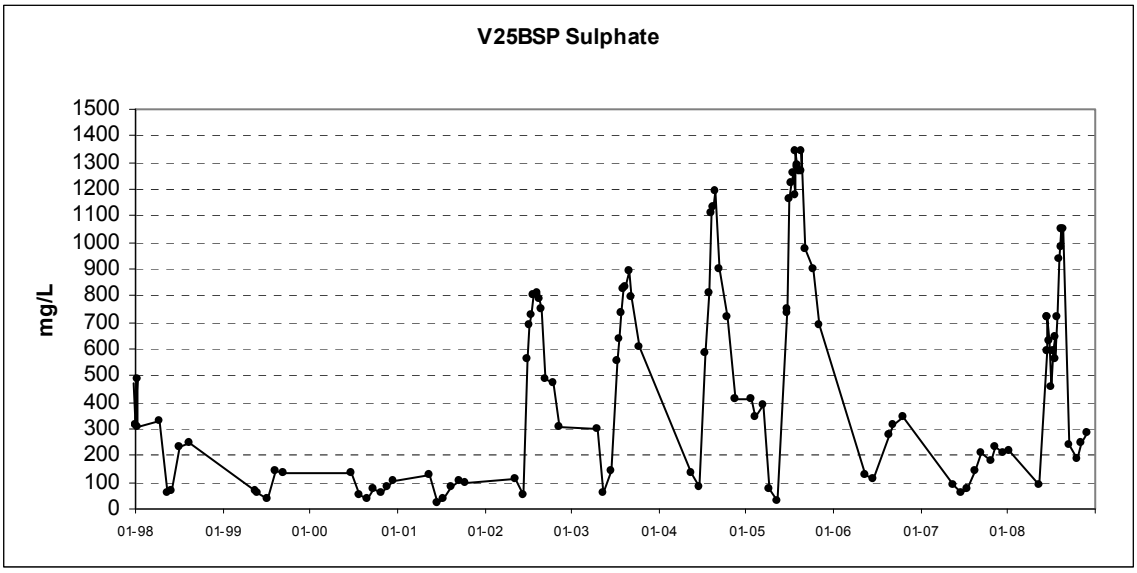
A total of 19 samples were collected at location V25BSP in 2008. Weekly samples were collected from June 10th to September 15th; additionally monthly samples were collected in January, May, October, November and December. The concentrations of total suspended solids at location V25BSP were below the maximum allowable discharge limit of 15 mg/L. Turbidity concentrations ranged from less than 0.1 to 13 NTU. The maximum allowable discharge limit for turbidity is 15 NTU and was not exceeded in 2008.

The concentrations of total and dissolved zinc ranged from 0.034 mg/L to 0.19 mg/L and from 0.01 mg/L to 0.15 mg/L, respectively, in 2008. All values were less than the discharge criteria of 0.5 mg/L. The highest zinc concentration occurred in August.

The concentrations of sulphate ranged from 86.4 mg/L to 1050 mg/L with peak concentration occurring during November. The peak concentration observed in August is below the maximum concentration seen in summer of 2005 (Figure 4-5).

Bioassay samples were collected at location V25BSP in June, September and December. All samples passed at 100% concentration over 96 hours with one mortality occurring in December.

Figure 4-5. Sulphate at V25BSP



4.3.2 Vangorda Pit Northwest Interceptor Ditch

Location V19 is the Vangorda Pit Northwest Interceptor Ditch, which drains into Vangorda Creek at the plunge pool. Two samples were collected at location V19 in 2008, in June and September. The pH was circum neutral for location V19, at 8.4 and 7.5. Sulphate concentrations of 2.41 mg/L and 3.60 mg/L were reported at this station for the two sampling events. Total zinc concentrations ranged from non-detectable concentrations (<0.005 mg/L) to 0.013 mg/L.

4.3.3 Grum Creek

Location V2 is in Grum Creek upstream of entry into Vangorda Creek. The changes to the water management system implemented during 1995 and 1996 diverted a large portion of the Grum Creek catchment area into the Sheep Pad Pond and this, in combination with the interception of shallow groundwater by the Grum open pit, reduced the flow in Grum Creek substantially from its original (i.e. pre-mine) levels.

The changes to the water management system implemented during 1995 and 1996 also allowed the diversion of a portion of the remaining Grum Creek water into the Moose pond where the water is observed to seep into the ground. This diversion was put into place as part of the mitigation plan for reducing suspended sediment loadings entering Vangorda Creek via Grum Creek and remained in place through 2008. The diverted Grum Creek water is sampled at location V2A prior to entry into the Moose Pond.

4.3.3.1 Location V2

Location V2 was sampled 21 times in 2008 including once in January, four times in June and twice per month in February, May, July, August, September, October, November and December. The concentration of total suspended solids at location V2 ranged from less than 1 mg/L to 115 mg/L in 2008 and exceeded the maximum allowable discharge limit of 15 mg/L in July. The pH ranged from 7.5 to 8.3. The Turbidity levels ranged from 0.12 to 51 mg/L and exceeded the maximum allowable discharge limit of 15 NTU in July. The elevated turbidity and total suspended solids levels observed in July are attributed to a heavy rain fall event that increased run-off into V2.

The concentrations of total and dissolved zinc at location V2 in 2008 ranged from 0.006 mg/L to 0.2 mg/L and from < 0.005 mg/L to 0.053 mg/L, respectively (Figure 4-6).

The concentrations of sulphate at location V2 in 2008 ranged from 519 mg/L to 870 mg/L (Figure 4-7). An increasing trend in the concentration of sulphate at V2 is evident from 1989 (beginning of sample record) through 2005, with a sharp increase observed between 2000 and 2005. Sulphate concentrations appear to have stabilized over the last three years. There has not been a corresponding increase in the concentrations of total or dissolved Zn. This trend in sulphate is consistent with upstream location V15 (Section 4.2.2). The sulphate concentrations are higher at location V15, which is reasonable given that it is a smaller flow closer to the suspected source, the Grum rock dump.

The increasing trend in sulphate concentrations at location V2 triggered the Adaptive Management Plan, when it became effective in 2004. The investigations that have been undertaken are described in Section 9.8.

Bioassay samples were collected at location V2 in June, September and December. All samples passed at 100% concentration over 96 hours with one mortality occurring in June.

Figure 4-6. Grum Creek (V2) Total and Dissolved Zinc (mg/L)

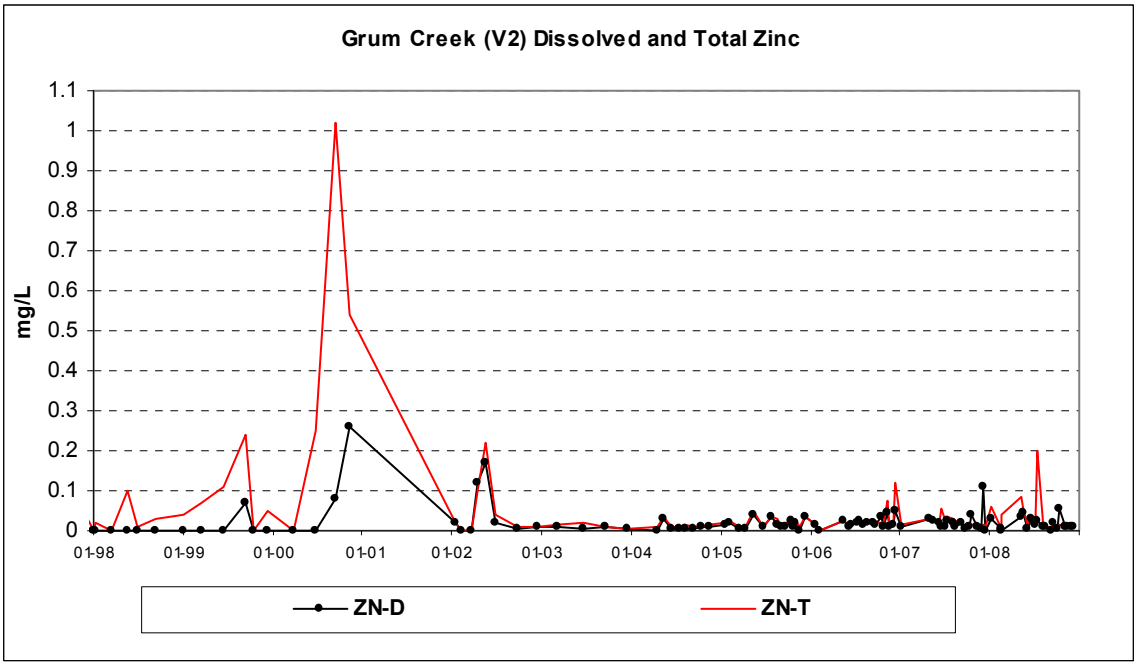
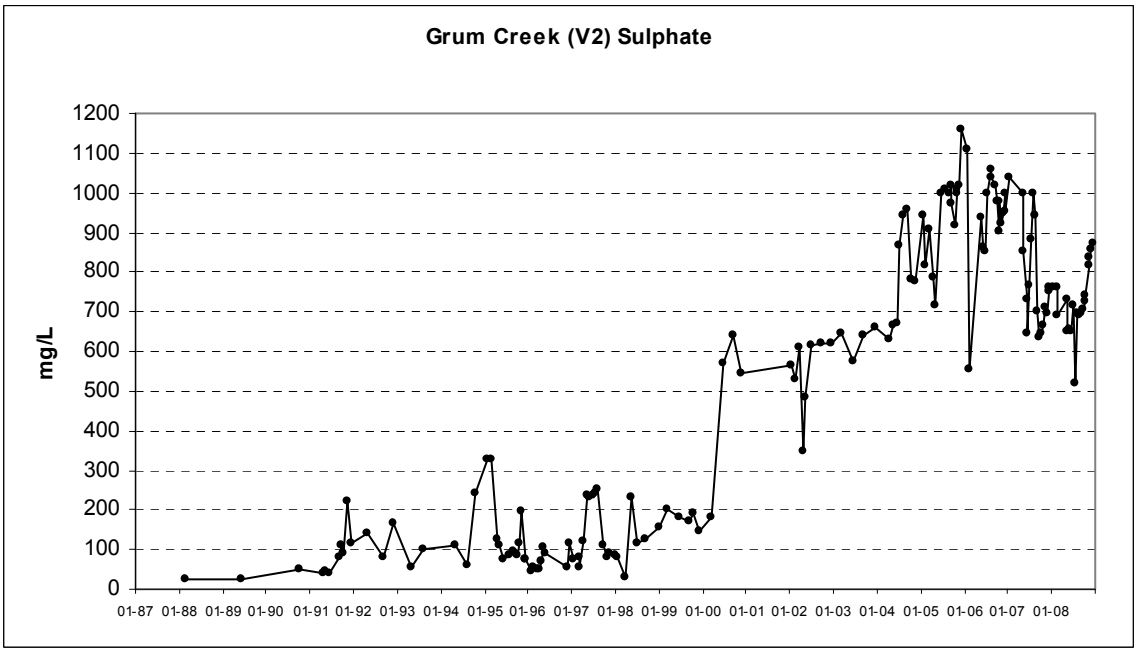


Figure 4-7. Grum Creek (V2) Sulphate



4.3.3.2 Location V2A

Location V2A was sampled twice per month in May, June, July, August, September, October, November, and December 2008. Prior to around 2001, water quality entering the Moose Pond via location V2A was similar to that observed at location V2 in Grum Creek. Since about 2001, this trend has not been observed. Higher concentrations of Zn are observed entering the Moose Pond via location V2A than are present in Grum Creek at location V2. This has been attributed to the collection and diversion of a seep from the toe of the Grum rock dump into the Moose Pond. Presently, this water is managed by enabling it to go to ground in the Moose Pond while undertaking additional data collection and investigations.

Throughout 2008, water was collected from location V15, and conveyed to location V2A as described in Section 4.2.2.1. This redirection of water was prompted by elevated zinc concentration observed at location V15 in efforts to preserved downstream water quality.

The concentrations of total and dissolved zinc at location V2A ranged from 0.03 mg/L to 2.82 mg/L and from 0.013 mg/L to 1.71 mg/L, respectively. Total zinc concentrations spiked in 2008 from 2007 levels with peak concentrations observed in spring (June) followed by lower winter concentrations (Figure 4-8). The concentrations of sulphate at location V2A ranged from 609 mg/L to 1,230 mg/L in 2008, showing an increasing trend since 1998 (Figure 4-9).

Figure 4-8. V2A Total and Dissolved Zinc (mg/L)

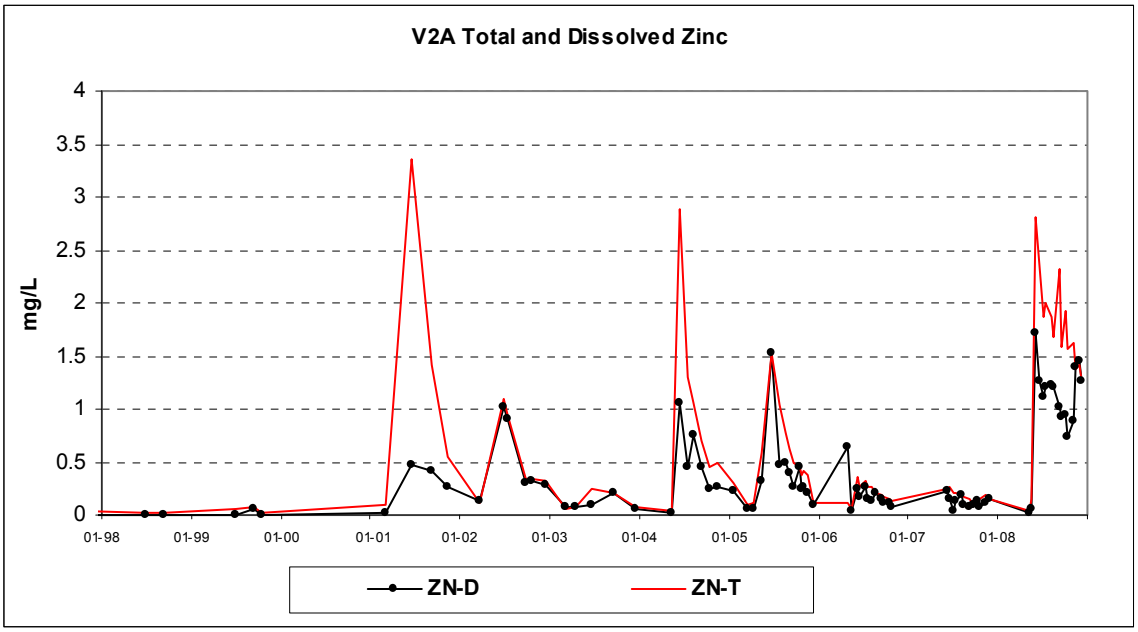
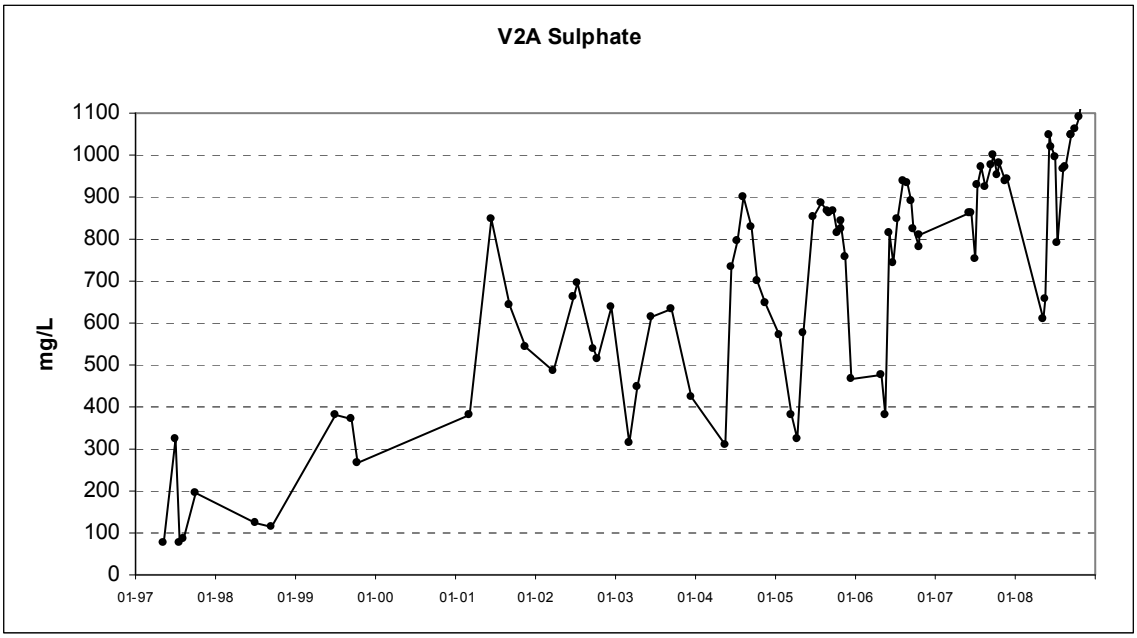


Figure 4-9. V2A Sulphate (mg/L)



4.3.4 AEX Creek

Location V17A is sampled at a small stream that crosses the Vangorda haul road containing natural run off from the slopes north of the Grum pit as well as surface run off from the north side of the Ore Transfer Pad. This stream then passes into AEX Creek.

Two samples were collected at location V17A in 2008, in June and September. The concentrations of sulphate were 18.0 mg/L and 49.8 mg/L, consistent with previous data. The concentrations of total zinc were 0.029 mg/L and 0.1 mg/L. These concentrations are consistent with those observed since mine shut down in 1998

Location V6A is AEX Creek immediately upstream of its entry into the West Fork of Vangorda Creek. This water includes the tributary sampled at location V17A. Location V6A was sampled fourteen times in 2008, once in January, February, April, May, July, October and twice in March, June, September and December. The concentrations of sulphate were 14.0 mg/L and 79.2 mg/L. The concentrations of total zinc ranged from 0.001 mg/L and 0.375 mg/L and dissolved zinc were 0.0133 mg/L and 0.317 mg/L. The peak zinc concentration seen in May 2008 is an order of magnitude higher than any other value on record and is suspected of being elevated due to a TSS value of 87 mg/L. Total zinc concentrations have returned to lower historical concentrations since the peak zinc concentration seen in May 2008.

4.4 Receiving and Background Water Quality

4.4.1 Shrimp Creek

Location V20 is near the downstream end of the Vangorda northeast interceptor ditch, which passes clean run off water that would originally have flowed directly into Vangorda Creek around the east and south sides of the Vangorda pit and rock dump area. This diverted water then enters Shrimp Creek. Flow at location V20 has, historically, been intermittent and an investigation conducted in 2002 identified the cause of this poor performance as ditch leakage into Vangorda pit. In response to this, physical maintenance work was performed to the ditch in the summer of 2002, which resulted in the effective diversion of water around the Vangorda pit, per the original intent for the ditch.

Two samples were collected at location V20 in June and September 2008. The concentrations of zinc and sulphate at location V20 remained at low levels in 2008, consistent with previous data. Total zinc concentrations in the month of June and September were 0.007 mg/L and <0.005 mg/L, respectively. The concentrations of sulphate were 4.82 mg/L and 6.68 mg/L.

Location V4 is Shrimp Creek upstream of the confluence with the Main Fork of Vangorda Creek. This location provides reference information regarding water quality in the Shrimp Creek area and includes inflows from the upstream tributary sampled at location V20.

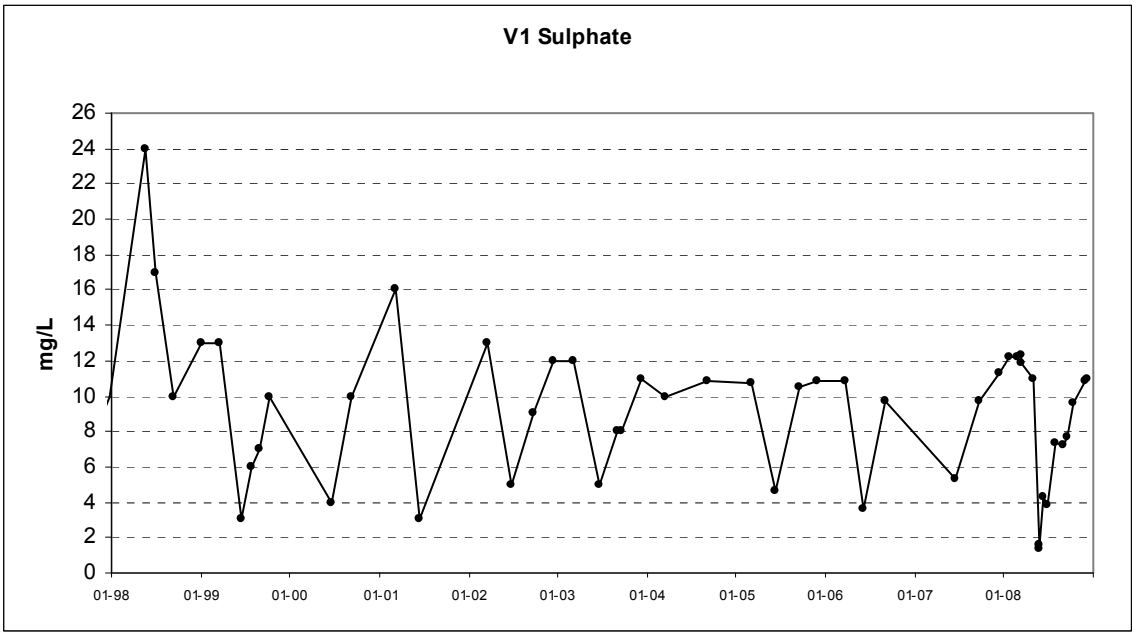
Location V4 was sampled twelve times in 2008 including once per month in January, February, March, April, May, July, August, September, October, December and twice in June. Total and dissolved zinc concentrations ranged from <0.0001 to 0.0062 mg/L, respectively. Sulphate concentrations ranged from 3.4 mg/L to 79.6 mg/L. These sulphate concentrations are generally consistent with historical data.

4.4.2 Upper Vangorda Creek

“Upper” Vangorda Creek is the primary receiving water for mine site discharges and is sampled upstream of mine activities at V1, and locally downstream of mine activities at V27, just above the confluence with Shrimp Creek (access to V27 is limited by safety concerns, especially during the winter and spring freshet). There is no known fish habitat in “upper” Vangorda Creek due to downstream impasses near the town of Faro.

Location V1 is the Main Fork of Vangorda Creek immediately upstream of mine activities. This location provides background reference information for Vangorda Creek upstream of the mine site. Location V1 was sampled fifteen times in 2008, once in January, February, April, July, October and twice in March, May, June, September, and December. During 2008, sulphate concentrations ranged from 1.4 mg/L to 12.3 mg/L, and total zinc concentrations ranged from < 0.0001 mg/L to 0.0166 mg/L. Zinc concentrations in 2008 are similar those previously recorded at this site. Sulphate concentrations are also similar to historical concentrations, including a seasonal sulphate trend, with slightly higher concentrations observed during winter months (Figure 4-10).

Figure 4-10. Sulphate at V1



Location V27 is the Main Fork of Vangorda Creek upstream of the confluence with Shrimp Creek and provides information regarding effects of the mine facilities on Vangorda Creek. All surface water from the Grum rock dump, the Grum Interceptor Ditch/Sheep Pad Pond, and the Vangorda Northeast Interceptor Ditch reports to location V27 via Grum Creek or the Vangorda Creek plunge pool. Extremely steep terrain creates unsafe access to this sampling location, as previously noted, at some times of the year (particularly winter and spring freshet) and water sampling is conducted accordingly, with maximum recognition of worker safety.

In 2008, location V27 was sampled in January, February, March, April, May twice in June, July, August, September, October and December. The concentrations of total zinc for the sampling events ranged from <0.001 mg/L to 0.138 mg/L. Sulphate concentrations ranged from 47 mg/L to 249 mg/L. These concentrations are elevated in comparison with previous data, likely due to elevated (compliant) sulphate concentrations observed from Sheep Pad Pond at V25BSP, as previously noted (Section 4.3.1). It is expected that sulphate concentrations would be higher in years when the Vangorda Treatment Plant is in operation. While historic records at V25BSP show elevated sulphate during periods when the Vangorda Treatment plant was in operation, historic records at V27 do not. This is likely because V27 was historically sampled only two times per year, in May and September, i.e. not during the main periods of discharge from the Vangorda Treatment Plant.

4.4.3 Lower Vangorda Creek

The West Fork of Vangorda Creek represents natural run off and some mine site drainage originating from location V6A in AEX Creek, the Vangorda haul road and a small portion of the Grum rock dump. Water quality in the West Fork of Vangorda Creek is monitored at location V5.

The Main Fork of Vangorda Creek represents natural run off including Shrimp Creek via location V4, drainage from the mine site via location V27 plus a relatively large area of natural runoff below the mine site. Water quality in the Main Fork of Vangorda Creek is monitored at location VGMAIN.

"Lower" Vangorda Creek is the juvenile fish rearing habitat in the first 1 to 2 km above the Pelly River and downstream of the confluence of the West and Main Forks. Water quality in lower Vangorda Creek is monitored at location V8.

Water quality information that was collected in 2008 for each of locations V5, VGMAIN and V8 is described in the following sections and recent data for total suspended solids, total zinc and sulphate is illustrated on Figures 4-11, 4-12 and 4-13, respectively. Additional information regarding water quality in Lower Vangorda Creek in a longer-term context is described in Section 4.4.4.

4.4.3.1 West Fork

Location V5 is the West Fork of Vangorda Creek just upstream of the confluence with the Main Fork. Location V5 receives drainage from AEX Creek (location V6A) and, thereby, potential influences from surface drainage from the north portion of the Ore Transfer Pad. Both AEX Creek and the West Fork of Vangorda Creek receive run off from the Vangorda ore haul road and the mine access road. Road maintenance activities such as re-surfacing or application of dust suppression products or spills could potentially affect water quality at V5. There is a small portion of the Grum rock dump that drains into the West Fork of Vangorda Creek between AEX Creek and location V5. This portion of the Grum rock dump does not include any part of the sulphide cell.

Nine samples were collected at location V5 throughout 2008. Total suspended solids (TSS) concentrations are similar to those recorded in recent years, ranging from 6 mg/L to 191 mg/L. In 2008, TSS concentrations continued to follow a previously established seasonal trend with maximum annual concentrations observed during spring peak flow conditions. The source of the sediment flushed into the creek during freshet originated from "non-mine" areas such as the landslide area and the old ski hill area.

Total and dissolved zinc concentrations at location V5 ranged from 0.006 mg/L to 0.039 mg/L and from <0.005 to 0.039 mg/L, consistent with recent years.

In 2008, concentrations of sulphate and hardness at location V5 continued to exhibit a general seasonal trend with greater concentrations associated with winter months, when surface run off is at a minimum. This trend is attributed to the presence in the West Fork catchment area of certain rock types that influence surface run off and groundwater discharge to surface. Sulphate and hardness concentrations were

consistent with recent years, ranging from 33.8 mg/L to 132 mg/L and from 144 mg/L to 369 mg/L $CaCO_3$, respectively.

4.4.3.2 Main Fork

Location VGMAIN is located in the Main Fork of Vangorda Creek immediately upstream of the confluence with the West Fork. This location provides important information regarding the relative impacts of the Main and West Forks on the fish-rearing habitat in lower Vangorda Creek. Although Licence location V27 is also in the Main Fork, location V27 is over 6 km upstream of the fish rearing habitat and it is difficult to apply water chemistry data from location V27 in an analysis of lower Vangorda Creek because of the potential for numerous and unquantified impacts on the Main Fork downstream of location V27.

Monthly samples were collected from January to December at location VGMAIN in 2008. Total suspended solids concentrations typically remained <1 mg/L throughout 2008, with a peak concentration of 3 mg/L during freshet, less than observed TSS at location V5 in the West Fork.

In 2008, the concentrations of total and dissolved zinc at location VGMAIN ranged from less than 0.005 mg/L to 0.041 mg/L and from less than 0.005 mg/L to 0.024 mg/L, respectively, which were within the ranges observed in recent years.

In 2008, peak concentrations of sulphate and hardness were observed during winter months, during periods of low flow. These trends are similar to those observed in 2004. Sulphate and hardness concentrations at location VGMAIN ranged from 56.7 mg/L to 180 mg/L and from 142 mg/L to 367 mg/L $CaCO_3$, respectively, in 2008.

4.4.3.3 Lower Vangorda Creek

Location V8 is in lower Vangorda Creek downstream of the confluence of the West Fork (location V5) and the Main Fork (location VGMAIN). Twelve monthly samples were collected at this station in 2008.

Total suspended solid concentrations at this site ranged from less than 1 mg/L to 120 mg/L in 2008, with the highest concentrations recorded in May, corresponding to freshet conditions (Figure 4-11).

In 2008, total and dissolved zinc concentrations at location V8 ranged from 0.011 mg/L to 0.0412 mg/L and 0.005 mg/L to 0.033 mg/L, respectively. These concentrations are consistent within the ranges typically observed at this site in recent years (Figure 4-12).

Similar to upstream locations V5 and VGMAIN, sulphate and hardness concentrations at location V8 increased in the winter months of 2008, during periods of low flow and minimal surface runoff. Sulphate and hardness concentrations at location V8 ranged from 23mg/L to 168 mg/L and from 88.8 mg/L to 398 mg/L $CaCO_3$, respectively, in 2008 (Figure 4-13).

Figure 4-11. Lower Vangorda Creek (V5, VGMAIN, V8) Total Suspended Solids

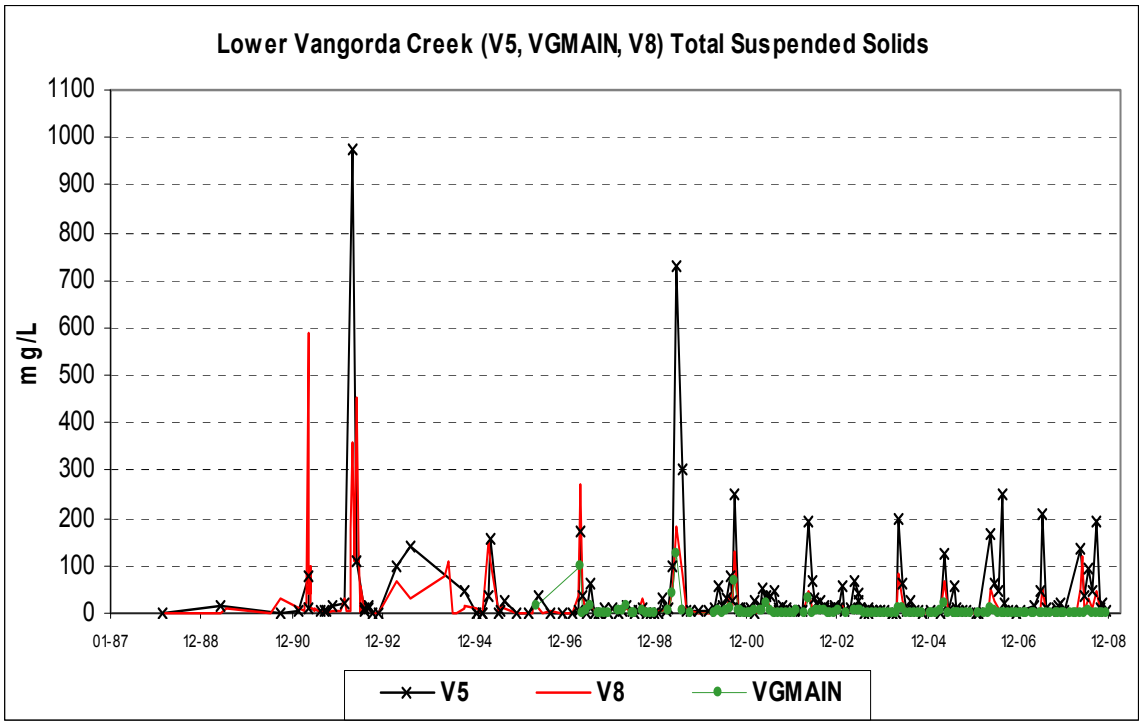


Figure 4-12. Lower Vangorda Creek (V5, VGMAIN, V8) Total Zinc

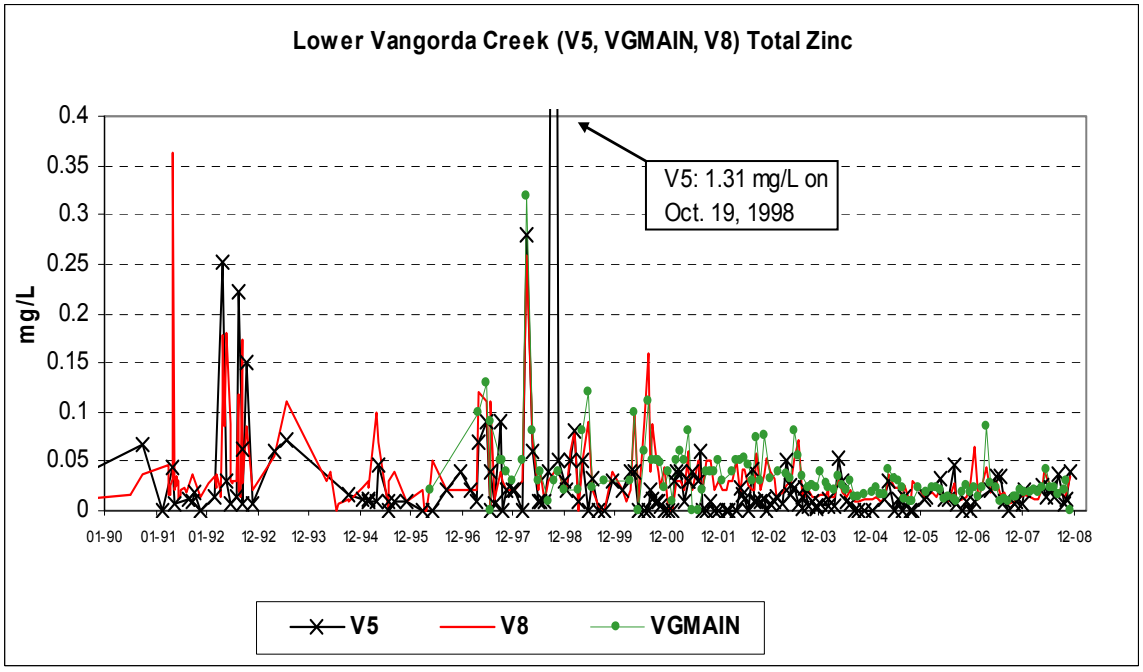
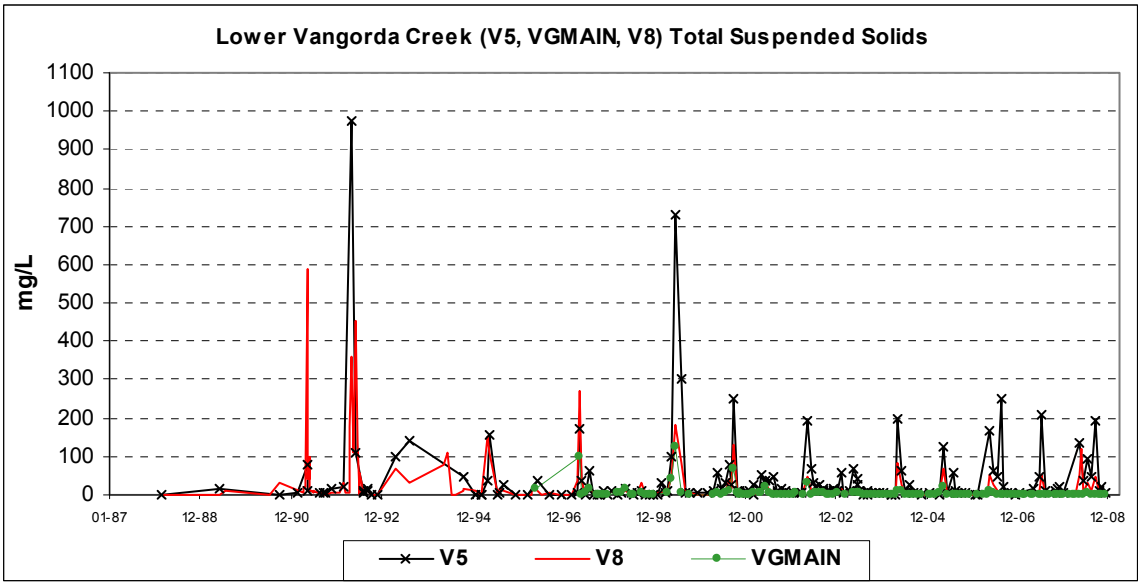


Figure 4-13. Lower Vangorda Creek (V5, VGMAIN, V8) Sulphate



4.4.4 Long Term Trends In Lower Vangorda Creek

The long-term trends in water quality in lower Vangorda Creek (location V8) from 1988 to 2008 indicate that mining activities on the Vangorda Plateau have had an observable influence on concentrations of total suspended solids, total zinc, total lead and ammonia in lower Vangorda Creek. It is also evident that water quality in the West Fork has a significant effect on water quality in the fish-rearing habitat, particularly in terms of total suspended solids and sulphate. The information also confirms that there are significant concentrations of suspended sediments that can enter Vangorda Creek downstream of the mine site that are not related to mine activities.

Concentrations of sulphate, total suspended solids and total zinc at locations V5 and V8 (for which the monitoring records extend back to 1988) are illustrated on Figures 4-14, 4-15 and 4-16, respectively, for the period from 1988 to 2008.

4.4.4.1 1988 to 1990

During the period from 1988 to 1990 (3 years), there was a relatively small amount of work done in overburden stripping for the Grum Open Pit. Although relatively few water samples were collected during this period, water quality at location V8 could be taken as representative of conditions largely unaffected by mine operations. This is evident through relatively low concentrations of total suspended solids, total zinc, ammonia, total lead and arsenic, although the concentration of total zinc was recorded at, or just greater than, the federal recommended guideline for the protection of freshwater aquatic life (CCME) on two occasions. The average concentration of total suspended solids during this period was 12 mg/L with a peak value of 30 mg/L. The average and peak concentrations of total zinc were 0.02 mg/L and 0.04 mg/L, respectively.

4.4.4.2 1991 to 1992

During 1991 and 1992, a substantial overburden stripping program was carried out on the Vangorda Plateau, mining was performed in the Vangorda Open Pit and the Vangorda ore haul road was constructed. The mining activity is reflected in the water quality in lower Vangorda Creek. The concentrations of total suspended solids, total zinc, total lead and ammonia all show an increase in average and peak values during this period. The average concentration of total suspended solids during this period was 62 mg/L with a peak value of 590 mg/L. The average and peak concentrations of total zinc were 0.06 mg/L and 0.36 mg/L, respectively.

4.4.4.3 1993 to 1994

During 1993 and 1994, no mining operations were performed on the Vangorda Plateau. Although fewer water samples were collected during this period than during the previous operating period, reduced levels of total suspended solids and total zinc were observed in lower Vangorda Creek. The apparently reduced levels were generally greater than those observed during the period preceding mine activities (1988 to 1990). The average concentration of total suspended solids during 1993 and 1994 was 40 mg/L with a peak value of 112 mg/L. The average and peak concentrations of total zinc were 0.03 mg/L and 0.11 mg/L, respectively.

4.4.4.4 1995 to 1997

During 1995, 1996 and 1997, mining activities on the Vangorda Plateau were resumed including discharge of treated effluent from the water treatment plant. Even in light of the resumption of mine operations, water chemistry in lower Vangorda Creek during this period did not show a return to the chemistry observed during the previous period of mine operations on the Vangorda Plateau (1991 and 1992). The concentrations of total suspended solids, total zinc, total lead, ammonia and arsenic observed from 1995 through 1997 remained similar to those observed during the shut down period of 1993 and 1994 with the exception of a peak concentration of total suspended solids. During the period from 1995 to 1997, the average concentration of total suspended solids was 29 mg/L with a peak value of 271 mg/L. The average and peak concentrations of total zinc were 0.04 mg/L and 0.12 mg/L, respectively.

4.4.4.5 1998 to 2008

During the period from 1998 to 2008, mining activities were terminated. There was no discharge of effluent from the water treatment plant until the summer of 2002. Water quality in lower Vangorda Creek (V8) from 1998 to 2008 was generally consistent with the two preceding periods (mine shut down in 1993/1994 and mine operation from 1995 to 1997) although some isolated high peak concentrations of total suspended solids, total zinc and total arsenic were observed. During the period from 1998 to 2008, the average concentration of total suspended solids was 24 mg/L with a peak value of 731 mg/L. The average and peak concentrations of total zinc were 0.025 mg/L and 0.28 mg/L, respectively.

Sulphate concentrations show the influence of re-activation of the Grum/Vangorda Water Treatment Plant in 2002 through annual summer peaks that correspond to periods of effluent release. The general seasonal trend of higher concentrations in the low-flow, winter season also continues.

Figure 4-14. V5 and V8 Long Term Sulphate

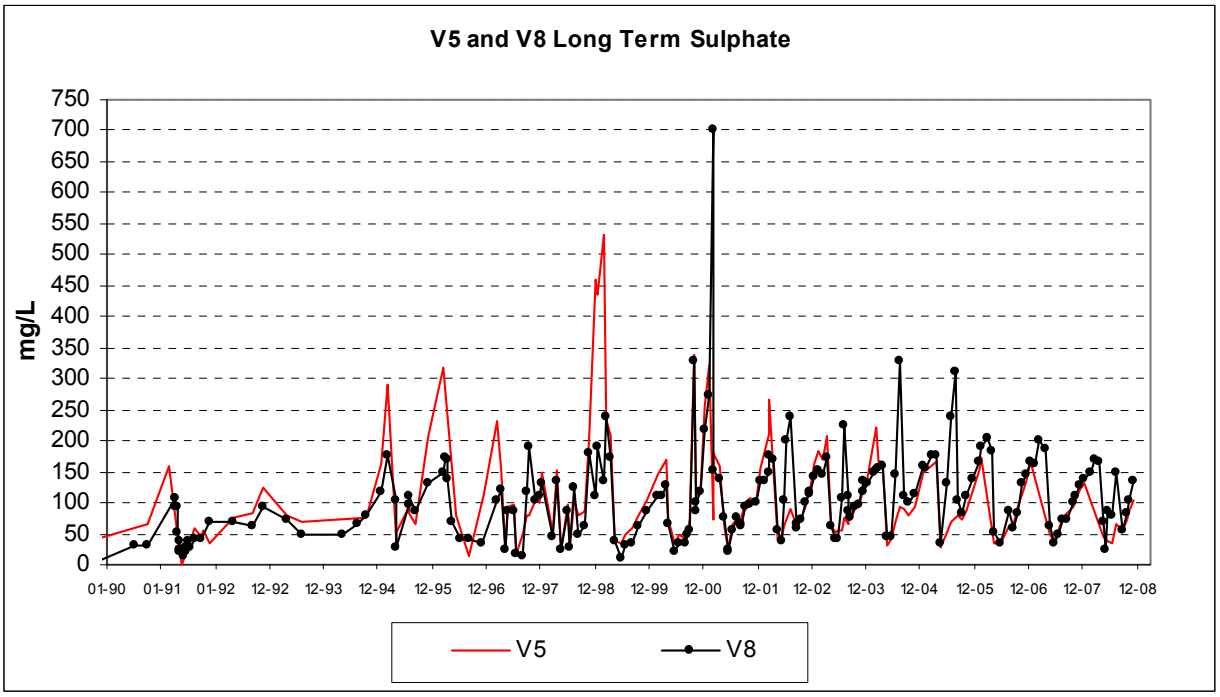


Figure 4-15. V5 and V8 Long Term Suspended Solids Trends

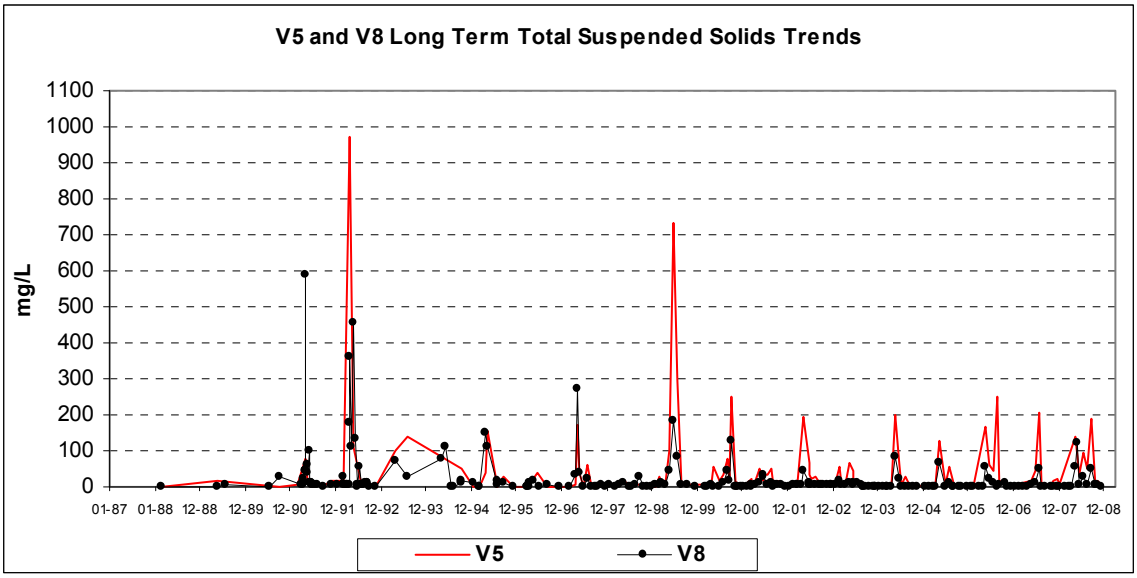
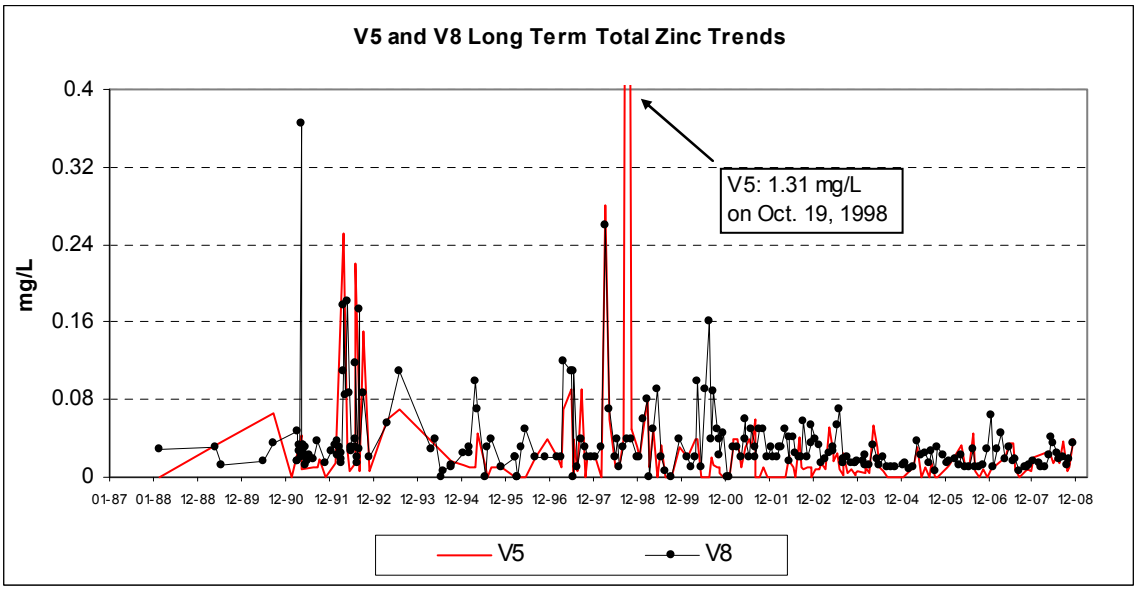


Figure 4-16. V5 and V8 Long Term Zinc Trends



5. Water Treatment Plant Performance

5.1 Introduction

5.1.1 Overview of Water Treatment Strategy

Providing adequate treatment for mine water that can not be released directly to the receiving environment is one of the fundamental purposes of the care and maintenance activities that are regulated under the Water Licence. The Water Licence specifies the maximum allowable concentrations of contaminants in any water released to the receiving environment.

Heavy metals, most notably zinc, which are mobilized into water from tailings, rock piles and open pit walls, are the primary contaminants of concern and the focus for water treatment. Water treatment for removal of heavy metals has been accomplished at three locations:

1. Grum/Vangorda Water Treatment Plant; (*Treats water from the Vangorda pit*)
2. Mill Water Treatment System; [*Treats water from pumped from the Faro Main pit (i.e. Faro Pit) and Intermediate pond*]; and
3. Down Valley Water Treatment System. [*Treats water siphoned from the Intermediate Pond of the Rose Creek Tailings Facility*]

Water that is treated through the Mill and Down Valley water treatment systems is combined in the Cross Valley Pond prior to discharge into Rose Creek as a single effluent stream (location X5). Water that is treated through the Grum/Vangorda water treatment plant is released into Vangorda Creek via the Grum Interceptor Ditch (location V25BSP).

All three treatment systems reduce metal concentrations in water through pH-modification with lime followed by settlement of treatment sediments, either with or without the aid of flocculants. pH “normalization” after treatment is through natural atmospheric processes.

The water treatment systems are operated in a coordinated manner during the summer season. Each system is operated to reduce water levels in the source ponds to the point where treatment is not required until the subsequent summer season. This seasonal process has been undertaken since 1998 and will be required until such time in the future when the FCRP may reduce or eliminate some treatment requirements. Improvements to the general process and to the treatment systems have been implemented annually and will continue to be implemented as opportunities are identified. In the case of the Vangorda pit, the water level was lowered sufficiently in 2005 that pumping was not required in 2006 and 2007.

In 2007, water from the Intermediate Pond and emergency tailings area was pumped directly to the Mill water treatment system such that use of the Down Valley system was not required. The benefits to this approach lie primarily in taking full advantage of the efficiencies that have been established in the Mill system and minimizing the sediments (sludge) that are deposited in the Cross Valley Pond, when the Down Valley system is operated.

The Down Valley system is a portable system that does not provide the high level of controlled lime conditioning, flocculation and settlement that is provided in the Mill. As a result, the lime usage in the Down Valley system is very high and the confidence, although acceptable, is not as high as for the Mill system.

Also, the Down Valley system generates a large volume of treatment sediments that accumulate in the Cross Valley Pond. The sediments are effectively contained and subsequently removed from an inflow area that has been constructed in recent years. However, removal of the sediments is an on-going cost and resourcing issue and has, in the past, created water quality issues in the Cross Valley Pond. Use of the Down Valley system, when limited to situations where the additional capacity is required to manage Intermediate Pond water levels, reduce the introduction of these sediments to the Cross Valley Pond associated water quality issues and related operational costs.

The Down Valley system remained in place on a standby status in 2007 and was not required. In 2008, both the Down Valley system and the Intermediate Pond barge system were used to manage water levels in the Intermediate Pond.

Various studies carried out of the past few years concluded that surface and groundwater flows through the Emergency Tailings Area (ETA) contribute a significant contaminant load to the downstream area and that a portion of this contaminate loading was escaping collection leading to possible contaminate loading to the aquifer below the Rose Creek Tailings. In response to this issue, a collection and treatment system for the ETA water was installed during the fall and winter of 2006/2007. This resulted in the delivery in increased volumes of poor quality water to the Intermediate Pond in 2007, without losses to groundwater. Key components of this system include the following:

- Dual sump water collection system with cut-off trench below the ETA;
- Gravity-feed pipeline from ETA to the Intermediate Pond;
- Barge mounted vertical turbine pump at the intermediate Pond;
- Pipeline from Intermediate Pond to Mill Water Treatment System;
- Tie-in of High Density Conditioner and additional lime conditioning cells;
- Installation of new lime distribution pumps and pipes; and
- Other various piping and instrumentation in the mill.

Water from the ETA is collected in the collection sump and transported by pipeline to the Intermediate Pond. The water from the Intermediate Pond is then pumped using the floating barge system to the Mill Water Treatment System to be treated. The treated water then is conveyed to the Polishing Pond using the existing piping system and discharged to Rose Creek via the siphon.

5.1.2 Coordinated Operating Procedures

The treatment systems are operated in a coordinated manner through one management system. There are a number of coordinated procedures that enhance the efficiency of the process as a whole as described below.

5.1.2.1 Personnel and Safety

Each treatment system is operated by one or two 24-hour dedicated operators to ensure that lime mixing and other activities proceed smoothly. A dedicated 2-man crew is present for 12-hour day and night shifts at the Grum/Vangorda Water Treatment Plant. One operator is present at each of the Mill and Down Valley systems linked to the security guardhouse via radio and with routine safety checks. A site foreman and site manager is on call at all times.

On weekdays, an extended work crew is present that includes electrical and mechanical maintenance personnel, equipment operations and a site foreman. This extended crew completes routine maintenance and any required repairs related to the treatment systems and other related facilities. The maintenance personnel (electrical and mechanical) service all of the treatment systems and schedule time and parts ordering in a coordinated manner.

The operators maintain a logbook at each location of activities and pH readings related to operation of the treatment system and related facilities. The logbooks are reviewed as part of the annual performance review.

A centralized first aid/security attendant is present on-site at all times when one of the treatment systems is operating (i.e., 24-hours/day). The attendant is located in the Faro guardhouse and linked to each of the treatment locations via radio and scheduled safety checks.

The process is managed by the site manager who oversees all of the treatment systems and ensures that activities are carried out in a coordinated and efficient manner.

All of the activities related to water treatment are carried out according to comprehensive site-wide contingency, emergency response and safety plans. Safety plans are managed in a coordinated manner that is consistent for each treatment system.

5.1.2.2 Water Quality Sampling

Water Treatment Plant (WTP) operators record manual pH readings at key locations within the treatment systems on a routine basis. This provides a frequent check on the installed pH probes that, in some cases, control the automated lime-addition circuitry.

Water samples for in-house use are also collected at key locations within the treatment systems on a routine basis, typically several times per day. These samples are analysed in-house each morning for total zinc. This verifies compliance and serves as a management control tool for operating the systems.

The analytical procedures for the on-site analyses have been established and in practice since 1998 and use professional grade AA (atomic absorption) equipment operated by trained and experienced assayers utilizing standard procedures to provide high quality analyses of total zinc. A logbook of zinc analyses is maintained by the assayers at the mine site. The logbook is available for review by Water Resources personnel during their site visits.

Finally, water samples are collected for external analyses on a weekly schedule when treated water is being released, as required by the Water Licence. The external analyses provide final verification of compliance and also serve as a calibration check on the in-house assay procedures (in-house testing occurs more frequently than once per week). Quarterly acute lethality tests (LC_{50} bioassays) are required for effluents.

5.1.2.3 Treatment Chemicals

Lime and flocculant are ordered in bulk to provide for all three systems. This allows for better pricing for purchase and transportation of lime. The Grum/Vangorda Water Treatment Plant requires pulverized lime since there is no grinding mill and coarse lime typically plugs the lime mixing system. The Down Valley treatment system is not considered to be sensitive to pulverized versus coarse lime.

5.1.2.4 Clean Water Diversions

The diversion of clean water around the mine developments is an important component of the water treatment systems for two primary reasons.

1. Most importantly, a higher level of environmental protection is provided by minimizing the amount of clean water that may become contaminated. Even though this water would receive treatment to meet the effluent discharge criteria, the levels of zinc and, possibly, other contaminants released would likely be greater than the initial background levels.
2. Secondly, extra costs would be incurred to treat an increased volume of contaminated water. These extra costs would come from increased lime consumption, increased manpower, increased electrical power and increased operating costs.

Each of the water treatment systems has associated clean water diversions, which are described in subsequent sections for each treatment system.

5.1.2.5 Contaminated Water Collection

The collection of water that requires treatment is an important aspect of the water management systems in that collection prevents contamination of the receiving water. To a large degree, the water that requires treatment on the Anvil Mine property naturally collects in the various ponds from which the influent into each treatment system is drawn.

There are also several important contaminated water collection systems that are described in subsequent sections for each treatment system.

5.2 Mill Water Treatment System

5.2.1 Overview

The Faro Pit pumping/treatment program has become established as an annual seasonal (summer) program. The program uses a water pumping system that was initially installed in 1997 to provide recycle water to the mill (an estimated minimum 95%) prior to mine shut down in February 1998. Since the mine shut down, the system has been used exclusively to pump water from the Faro Pit for treatment and release to Rose Creek. This program maintains the in-pit water level within the pre-determined "safe" range that protects against an inadvertent release of contaminated water.

The water pumping system is made up of the following primary components:

1. Three electric pumps mounted on a floating barge in the pit, rated at 5,000 USgpm, are each providing Faro Pit water to the mill (only one or occasionally two pumps are utilized for effluent discharge). In March 2008, a new barge pump, rated at the same capacity as the existing pumps, was ordered and delivered to the site. The pump can be installed in the spring of 2009, before start up of the water treatment system;
2. 760 mm (30") sclair pipeline from the barge to the mill with flexible sections near the barge to prevent damage to the pipeline that might otherwise result from vertical movement of the barge; and
3. Overhead powerline from the substation adjacent to the mill to the pumping barge. A new line was installed in 2005 that provides the electricity required for the pumps in a more efficient and safe manner.

From 1997 through 2001, water pumped from the Faro pit was mixed with lime slurry in an open mix box at the mill and allowed to flow to the Intermediate Impoundment for settlement of lime sediments. This was an inefficient use of lime but provided for pre-treatment of a dominant inflow into the Intermediate Pond such that the requirement for treatment at the outflow of the Intermediate Pond was reduced compared to what would otherwise have been required. That is, pre-treatment of the Faro pit water provided a large inflow of high-pH water into the Intermediate Pond.

In 1997 and 1998, outflow from the Intermediate Pond (location X4) became compliant with the Water Licence (<0.5 mg/L zinc) following approximately 4 to 6 weeks of inflow of pre-treated water from the Faro Pit. As a result, lime treatment of the outflow was discontinued for the remainder of those pumping/treatment programs. The lag-time was anticipated given the need for displacement of non-compliant water that was in the pond initially. In 1999, 2000 and 2001, the concentration of zinc in the Intermediate Pond effluent (location X4) was reduced but not to the licence limit and, therefore, treatment of the effluent in the outflow spillway was continued for the duration of the pumping/treatment program.

This manner of treatment was an inefficient use of lime and created risk at the Intermediate Dam by having the pond water constantly at the full supply level. The risk was related to both the physical stability of the dam and to the lack of any emergency freeboard to contain and hold high or unexpected flow events. Therefore, to mitigate these risks and to provide for a more efficient treatment process, part of the mill was

"retrofitted" in 2001 to serve as a water treatment system. This included both activation of existing equipment and installation of new equipment. Further refinements and optimizations have been implemented since 2001.

The general objective for the mill treatment system is to remove zinc from the Faro Pit water such that the effluent is compliant with the Water Licence (0.5 mg/L total zinc) at a flow rate that is high enough to treat the required annual volume of water in the summer season. Compliant effluent can be discharged either into the Cross Valley Pond or into Rose Creek via the Cross Valley Dam outflow spillway (location X5). In the event of an upset condition in the plant that results in temporarily non-compliant effluent, the plant water can be released into the Intermediate Pond. Treatment sediments are temporarily stored in the plant, and periodically removed from the system and stored in a containment area located on the Original (First) Tailings Impoundment.

The clarity and quality of the influent water (from the Faro pit) has, to date, been acceptable for reagent mixing and there has been no need for a freshwater supply for this purpose.

The Mill Water Treatment System (Mill WTS) was constructed and debugged in 2001 and has been successfully operated since 2002. As outlined previously, starting in 2007, water from the ETA is collected in the collection sump and transported by pipeline to the Intermediate Pond. The water from the Intermediate Pond is then pumped using the floating barge system to the Mill WTS to be mixed with the Faro Pit water for a total flow of approximately 5,000 USgpm to the Mill WTS at a ratio of approximately 75% Faro Pit water and 25% Intermediate Pond water, on average in 2008.

The ETA/Intermediate Pond water pumping system consists of the following primary components:

1. Concrete sump and 350 mm (14 inch) pipeline installed along the Down Valley access road and out into the wet zone of the Intermediate Pond;
2. Two pumps installed in the sump for conveyance of water to the Intermediate Pond: a 54. HP Flyte pump and a 30 HP Flyte pump, both with a 100 mm (4 inch) discharge;
3. Barge mounted vertical turbine 450 HP pump at the intermediate Pond: 14" Worthington EMM 4-stage bowl assembly pump, rated at 2,200 USgpm, at a total dynamic head of 30 ft at 750 rpm. The pump is powered by a 3300 CAT diesel generator, driven by a Johnson H250 gear box.

To enable the Mill Water Treatment System to handle the poorer water quality coming from the Intermediate Pond, the system was modified utilizing the Mill's high intensity conditioners and an additional lime conditioning cell (i.e. flotation units). Water was pumped from the Intermediate Pond into two high intensity conditioners. Operational monitoring identified that the agitators were too aggressive in breaking down the flocs and as a result hindered settlement. In response, the agitators were subsequently shutdown allowing the conditioning tanks to operate as an extension of the intermediate pipeline within the mill, where the water was directed to the head-end of the mill circuit for pH adjustment by the addition of lime.

The mill treatment system includes the following primary components:

1. New 600 mm (24-inch) influent pipeline from the Faro Pit;

2. Existing lime handling, storage and mixing system;
3. Lime conditioning in two sets of flotation cells operated in parallel with automated control on lime addition;
4. New 600 mm (24-inch) pipeline to settlement tanks;
5. Two settlement tanks (previous thickener and clarifier) operated in series or in parallel with optional lime and flocculant addition;
6. New instrumentation and control systems;
7. New flocculant mixing and distribution system;
8. Sediment storage tank (previous clarifier);
9. New 600 mm (24-inch) effluent pipeline with optional discharge into the Cross Valley Pond or the Cross Valley Dam outflow spillway;
10. Treatment sediment removal and storage system (installed 2005); and
11. High Intensity conditioners and additional lime conditioning cells (2007).

The new system provides many benefits over the previous treatment methods that include:

- Reduction in lime consumption (and resultant cost savings);
- Increased confidence in achieving objectives;
- Improved control on operating parameters including automated controls;
- Incorporation of contingency/emergency procedures;
- Reduction in deposition of treatment sediments in Cross Valley Pond (when the Down Valley Treatment system is not used);
- Productive use of existing infrastructure;
- Elimination of sole reliance on the Down Valley System to treat water from the Intermediate Pond.
- Reduction in loading to groundwater from flow from the ETA; and
- Improvement of water quality in the Cross Valley Pond.

5.2.2 Clean Water Diversions

Clean water is diverted around the Faro Pit to as great a degree as practical through the Faro Creek Diversion and the Faro Valley Interceptor Ditch. Additionally, in 2005 water diversions above the northwest area of the Faro Pit were upgraded, to improve the diversion of clean water away from the pit and into the catchment area of the North Wall Interceptor Ditch.

5.2.2.1 Faro Creek Diversion

The Faro Creek Diversion collects water from the original Faro Creek channel upstream of the Faro Pit and diverts the water around the northeast side of the Faro Pit and into the North Fork of Rose Creek. Some flow in the old Faro Creek drainage area cannot be collected by gravity into the Faro Creek Diversion and continues to flow directly into the Faro Pit. During historical mine operations, this excess flow was pumped around the pit perimeter at times.

Important maintenance work was performed on sections of the diversion channel in 2002 and 2003 that is considered to have substantially reduced leakage from the channel into the Faro Pit. The work consisted of

bottom grading, excavation of a pilot channel for low winter flows and placement of a geomembrane liner and rip rap erosion protection in select locations. Follow-up work has also been completed since 2003 that includes maintenance of roadside ditches and grading of the road surface away from weaker areas of the pit wall. Site management staff noted a reduction in pit inflows following the 2002/03 work.
BGC undertook an investigation of the Faro Creek Diversion in 2008, and have included their investigation report as an appendix (Appendix I) to the 2008 Annual Geotechnical Evaluation and Instrument Review, by BGC, submitted under separate cover (in 2 Volumes) along with the Annual Environmental Report.

5.2.2.2 Faro Valley Interceptor Ditch

Runoff from the hillsides north and northwest of the Faro Valley Rock Dump is intercepted by the Faro Valley Interceptor Ditch and directed into the Faro Creek Diversion. The ditch is a simple excavation into the native surficial soil and rock.

Important maintenance work has been performed on the ditch from 2002 through 2005 that substantially restored its effectiveness in passing clean runoff water to the Faro Creek Diversion. The work consisted primarily of bottom grading and excavation of slumped and eroded sections of the ditch.

These improvements to the Faro Valley Interceptor Ditch also contribute to the improvements and benefits described for the Faro Creek Diversion.

5.2.3 Contaminated Water Collection

Contaminated water is collected in the backfilled Zone II Pit. This water is runoff and seepage through the various rock dumps that lie within the catchment area of the Zone II Pit. Water accumulates in the pit and is pumped into the Faro Pit at the south end. Pumping is typically required on an occasional basis through the summer season only.

As of 2007, contaminated water from the ETA, Old Faro Creek, Lower Guardhouse Creek and Intermediate Pond area collected in the Intermediate Pond was also pumped to the Mill WTS.

5.2.4 2008 Operations

5.2.4.1 Water Quantities

An estimated 3.16 million m^3 was treated through the Mill in 2008: 2.27 million m^3 from the Faro Main Pit and 0.89 million m^3 from the Intermediate Pond. There was a total of 158 pumping days to the Mill WTS from April 17 to September 21, inclusive of occasional brief shut downs for maintenance. Details on the Faro Pit water balance for 2008 are presented in Section 2.1.3.

5.2.4.2 Lime Usage

A total of 417 tonnes (460 short tons) of lime was utilized in 2008 in the mill with a lime usage rate of 0.13 g/L. Lime usage has been reported in the Annual Environmental Reports since 2004 as listed in Table

5-1. A total of 200 tonnes (220 short tons) of lime was utilized in 2008 in the Down Valley with a lime usage rate of 0.18 g/L (see Section 5.3.4.1).

Table 5-1. Summary of Faro Mill Lime Usage

Year	Mill Est. Lime Usage (g/L)
2004	0.12
2005	0.11
2006	0.16
2007	0.29
2008	0.13

Table 5-1 shows that Mill WTS lime usage was lower in 2008 than 2007, and this was due to the incorporation of the treatment of water from the Intermediate Pond (and ETA) though the Down Valley System. Lime usage, in total on the Faro side, is further discussed in Section 5.3.4.1.

5.2.4.3 Water Quality

To monitor the treatment performance of the Mill WTS, water samples of the (treated) Mill WTS outflow were routinely collected and analysed in-house each morning for total zinc. This verified compliance and served as a management control tool for plant operations. Water samples were collected more frequently and at additional locations as required to manage the system. The Water Licence does not regulate the quality of water within the Mill WTS.

Water Treatment Plant (WTP) operators recorded manual pH readings at the outflow of the Mill WTS at least twice per day as a check on the automated pH monitoring probes. Records of pH levels were recorded in a log until May 11, 2008 and the recorded pH readings ranged from 9.98 to 10.96. Manual checks were recorded more frequently and at additional locations as required to manage the system.

Water that was treated in the Mill WTS was not discharged directly to Rose Creek in 2008. The water was released into the northeast corner of the Cross Valley Pond, using an inflow area that had been prepared for this purpose in early 2005. The inflow area provides a discharge/stilling well (vertical culvert pipe) to dissipate the energy of the incoming water and a (rock) bermed settlement area to contain solids and to further still the water prior to flowing into the pond.

This practice replaced the previous practice of releasing the Mill WTS effluent into the Intermediate Dam spillway where it would then mix with water syphoned from the Intermediate Pond as it flowed into the Cross Valley Pond. This system was implemented to provide the following advantages:

- the reduction of flows in the spillway reduces the risk of water “short-circuiting” from the inflow spillway to the outflow syphons;
- the energy dissipation structures provide for good settlement and containment of any residual solids in the (treated) mill water;
- improved containment of solids facilitates more effective removal of those solids from the pond; and

- improved containment of solids reduces the risk that metals might be remobilized within the pond as a result of wave action.

Site management's observations in 2008 confirmed that this practice continued to work well and successfully provided the anticipated benefits.

The water released from the Cross Valley Pond (location X5) is the final effluent discharged to Rose Creek and includes water treated in the Mill from both the Faro Pit and the Intermediate Pond as well as water syphoned (with treatment) from the Intermediate Pond. Water quality for the final effluent (location X5) is described in Section 3.3. The intake of the effluent discharge syphon was suspended on a floating raft that maintained a consistent depth of water over the intake. This ensured that effluent was discharged from the near-surface zone of the pond, as desired.

5.2.4.4 Treatment Sediments

Treatment sediments from the Mill were deposited to the Intermediate Pond of the Rose Creek Tailings Facility from 2001 to 2004. This was accomplished by periodically flushing the sediment storage tank in the Mill into the pipeline that passes across the emergency tailings to below the mine access road and then through the ETA ditch.

A sediment management study was completed by SRK Consulting and submitted to the Water Board in 2004 as required under Part F, Item 51 of the Water Licence. The study recommended that sediments from the Mill be deposited within a containment berm on the Original (First) Tailings Impoundment. This location is already disturbed by mining development (tailings) and provides an adequately large working space. The 2004 sediment study provided an estimated annual sediment production rate of 4,400 m^3/month for the mill, based largely on data from the 2003 operating season.

The disposal area and a gravity-operated pipeline from the Mill were constructed during winter 2004/05 to take advantage of frozen conditions on the tailings for construction of a containment berm. The containment berm was constructed by excavation of tailings (cut and fill) to a size estimated to contain treatment sediments for several years of operation.

The disposal of treatment sediments (sludge) to this area began in 2006 and continued to be successfully utilized in 2008. Due to the volume of sludge being produced in 2008, the containment cell was expanded in 2008 to provide future additional room. In the fall of 2008, bulking up of the sludge in the containment area was initiated to make room for the 2009 water treatment season.

5.2.4.5 2008 Operating Issues

The largest operating issue in 2008 was associated with the pipeline freezing. Due to lower than expected cold temperatures in April, the discharge line from the Mill split for 21 m (70 feet) and needed to be replaced. There were several other delays associated with the cold temperatures and various pipelines freezing throughout a one week period following start up. By April 23, the circuits had settled down and water was treated as planned.

In response to flow measurements on the Faro pipe line in June, it was noted that pumping rates were lower than anticipated (under 3,000 gpm) and the mill circuit was at its maximum capacity. In response, it was found that the two 90 degree elbows were restricting the discharge out to the Mill WTS. The Mill WTS was shut down for one day and a long sweeping pipe was installed in place of the 90 degree elbows. The flows then increased to near design capacity of 5,000 USgpm.

In addition to the items noted above, the operator's log book describes minor maintenance issues that were not of the type that affected the overall performance of the system. The issues were all managed to prevent any negative effect on the treatment system.

Some general maintenance issues that were addressed in 2008 included the following:

- Ongoing maintenance and repair of the Intermediate Barge pumping system; and
- Ongoing problems with the gearbox oil cooling system of the Intermediate Barge which ultimately resulted for the system being shutdown for the year in August with the system being pulled for the required repairs prior to the 2009 season.

5.2.4.6 Comments for 2009 Operations

The performance of the Mill WTS as regards to water quality and mechanical availability has continued to be excellent. There is no reason to anticipate any major mechanical issues beyond some generally anticipated "start-up" issues that can be managed by careful monitoring and management of the system as it is brought on-line.

The operators maintain a detailed log book of activities and pH readings. The on-site laboratory provides daily zinc assays for management of the system. The site manager maintains a monthly status report that also documents unusual events or repairs. These practices should continue and be expanded as necessary to provide the same level of control and reporting.

5.3 Down Valley Water Treatment System

5.3.1 Overview

The Intermediate Impoundment was used for tailings deposition from 1986 to 1992. Following the cessation of tailings deposition in 1992 and until 1997, there was a general increase in the concentration of zinc in water flowing through the Intermediate Pond. This was the anticipated trend attributed to:

- The removal of a large inflow of alkalinity that previously entered the pond via the tailings slurry;
- The continued inflow of contaminated rock dump seepage water via location X23; and
- The continued flushing of contaminants by run off over beached (exposed) tailings in the upstream portion of the Intermediate Impoundment.

Water treatment at the outflow of the Intermediate Pond (the "Down Valley Water Treatment System") was started in 1992 to ensure that surface outflow from the Cross Valley Pond met the allowable discharge limits. Water treatment has continued, on an as-required basis, since that time. The methods employed for the treatment have involved raising the pH of the Intermediate Pond effluent with lime or sodium hydroxide and subsequently utilizing the Cross Valley Pond for settlement of the treatment sediments. The pH modification has been accomplished at various times by:

- Hauling lime slurry mixed in the Mill to a gravity feed tank for addition into the outflow spillway;
- Delivering lime slurry mixed in the Mill to the outflow spillway via an overland pipeline;
- Hauling lime slurry mixed in the Grum/Vangorda Water Treatment Plant to the south abutment of the dam for addition into a syphon line;
- Adding sodium hydroxide into a syphon line at the south abutment;
- Inflow into the upstream end of the Intermediate Pond of water pumped from the Faro Pit that was pre-treated with lime at the Mill in conjunction with supplemental treatment with lime slurry delivered to the outflow spillway; and
- Mixing of lime slurry at the Intermediate Dam outflow spillway and addition into overflow or syphoned outflow entering the Cross Valley Pond.

From late 1997 through 2001 (the second to last bullet above), water flowing from the Intermediate Pond was treated with lime slurry delivered to the outflow spillway via either an overland pipeline or tanker truck to a stationary tank (~10,000 gal) with gravity feed into the spillway. This was an inefficient use of lime and an awkward and labour intensive system. The overland pipeline was prone to breaks, sanding up and freezing. Haulage via tanker truck required numerous trips and near-continuous attendance at the gravity drain tank/valve. Settlement of lime in either the overland pipeline or the stationary tank was also problematic as regards to sanding of pipes and valves and inefficient use of lime. Additionally, this approach produced a large build up of sediment at the base of the spillway due to inefficient lime mixing and general over-addition of lime.

In 2002, the manner of treatment at the Intermediate Dam outflow spillway was upgraded with the installation of a treatment system that mixes lime slurry from dry lime for direct addition into the contaminated water. Water is syphoned from the Intermediate Pond into a mixing tank where the lime slurry is added. Water from the mixing tank then flows into the Cross Valley Pond for settlement of treatment sediments. Refinements and improvements to this system have been implemented since 2002 and the system continued to be effectively used through 2006 and again in 2008.

The system consists of the following primary components:

- 350 mm (14-inch) syphon line from the Intermediate Pond to the water mixing box;
- dry lime hopper with capacity of approximately 3 tons;
- portable water pump and associated pipeline to provide lime mix water (from the Cross Valley Pond);
- lime feed pump and pipeline from lime tank to water mixing box;
- pipeline from the water mixing box to the Cross Valley Pond;
- portable diesel generator; and
- portable office for operator use.

In 2007 water from the Intermediate Pond was pumped to the Mill for treatment eliminating the need for the Down Valley Water Treatment System (WTS) for that year. In 2008, both the Down Valley system and the Intermediate Pond barge system were used to manage water levels in the Intermediate Pond.

5.3.2 Clean Water Diversions

Clean water is diverted around the Intermediate Pond to as great a degree as practical through the North Wall Interceptor Ditch and the Rose Creek Diversion Channel.

5.3.2.1 North Wall Interceptor Ditch

The North Wall Interceptor Ditch intercepts clean runoff from the north side of the Rose Creek Valley and diverts it around the north abutment of the Cross Valley Dam.

The North Wall Interceptor Ditch is an open ditch excavated in a variety of materials, ranging from silty sand and gravel till to coarse sand and gravel alluvium and bedrock. The ditch has performed reasonably well although erosion and sedimentation have caused partial blocking of this ditch at times. Periodic maintenance and repairs have been completed as required. In 2005, water diversions above the north area of the Faro Main Pit were upgraded, which improved the diversion of clean water away from the pit and into the catchment area of the North Wall Interceptor Ditch.

5.3.2.2 Rose Creek Diversion Channel

The Rose Creek Diversion Canal passes Rose Creek water around the Rose Creek Tailings Facility. The Diversion was developed in two stages, referred to as the Upper and Lower Diversions. The Upper Diversion was constructed in 1974 in conjunction with the development of the Second Tailings Impoundment. The Lower Diversion is an extension of the Upper Diversion. It was constructed in 1980-81 in conjunction with the development of the Intermediate Impoundment.

Water from both the South and North Forks of Rose Creek enters the upper section of the Rose Creek Diversion Channel. The upper section is a predominantly straight channel that includes a number of drop weirs in addition to riprap for erosion protection.

The lower section passes water along the south side of the Intermediate Impoundment and returns flow into the natural Rose Creek Channel downstream of the Cross Valley Dam. The lower section includes a series of boulder-lined drop structures and a sharp corner at the downstream end. The lower section is constrained by natural slopes on the south side and by a till dyke on the north side. The crest of the diversion dam, which diverts the flow from the upper section into the lower section, was constructed approximately 1 m lower than the crest of the adjacent diversion canal dyke, and armoured with riprap. This was done to ensure that any flows in excess of the design flow overtop the diversion dam at that location into the Intermediate Impoundment. In 2004, the containment dyke (roadway) along portions of the lower section was rebuilt to restore the freeboard necessary to safely pass the design (1:500 years) flood.

The channel is prone to ice build up over the winter and clearing of ice has been required on occasion. Visual inspection and instrumentation have been used to monitor the condition of the canal. Repairs to the backslope and dyke crest have been completed to maintain conformance with design parameters.

5.3.3 Contaminated Water Collection

Prior to 2007, contaminated water flowed to the Intermediate Pond by gravity drainage via (lower) Guardhouse Creek, the old Faro Creek channel and across exposed tailings. Lower Guardhouse Creek is a small portion of the original catchment of Guardhouse Creek that receives some of the runoff from the mill area. The old Faro Creek channel is the drainage path for seepage from the rock dumps and millsite areas. These channels are relatively short and lie completely within the Intermediate Pond catchment area such that little maintenance is required. Maintenance work is this area has focused on maintaining culverts at road crossings.

Changes implemented in 2007 included the capture of contaminated water from the Faro rock piles (location X23) and the emergency tailings area. This is described in Section 5.1.2. This water passes directly to the Intermediate Pond via a gravity flow pipe, thereby eliminating seepage losses to the aquifer. Any water not captured by this system continues to flow to the Intermediate Pond via the Old Faro Creek channel. Water from the Intermediate Pond is then pumped directly to the Mill WTS.

5.3.4 2008 Operations

An estimated 1,134,000 m^3 was treated through the Down Valley WTS in 2008. There were a total of 75 operating days over two periods: 36 in the spring (April to early June) and 39 in late summer/early fall (late August to October). In September, in response to a slow draw down due to increased inflows into the Intermediate Pond, a portable pumping system was installed in the spillway and used until month end to further reduce the water level during rainy periods.

The water level in the Intermediate Pond at year-end was 0.07 m lower than that at the beginning of the year. The storage volume created is adequate to contain the anticipated inflows until the scheduled restart of dewatering in 2009.

5.3.4.1 Lime Usage

As outlined in Table 5-2, a total of 200 tonnes (220 short tons) of lime was utilized in 2008 in the Down Valley with a lime usage rate of 0.18 g/L. Lime usage has been reported in these Annual Environmental Reports since 2004 as listed in Table 5-2.

Table 5-2. Summary of Mill and Down Valley Lime Usage

Year	Mill Est. Lime Usage (g/L)	Down Valley Est. Lime Usage (g/L)	Total Lime Usage (g/L)
2004	0.12	0.26	0.38
2005	0.11	0.34	0.45
2006	0.16	0.48	0.64
2007	0.29	0.00	0.29
2008	0.13	0.18	0.31

Table 5-2 shows that lime usage in the Down Valley System was lower in 2008 than previous years when the system was utilized, likely due to more efficient use of lime. Overall, the total lime usage on the Faro side is down when compared to the previous year when the Down Valley System was being used.

5.3.4.2 Water Quality

Water that is treated in the Down Valley WTS is not discharged directly to Rose Creek. The lime treated water is released into the north side of the Cross Valley Pond, using a new inflow area that had been prepared for this purpose in early 2005. The inflow area provides a discharge/stilling well (vertical culvert pipe) to dissipate the energy of the incoming water and a (rock) bermed settlement area to contain solids and to further still the water prior to flowing into the pond.

To monitor the performance of the Down Valley WTS, routine manual pH measurements in the mixing box (where mixed lime is added into the water syphoned from the Intermediate Pond) are recorded in a logbook on an hourly basis. The target pH is generally 10.8 to 11.0. The pH readings through 2008 indicated that this was achieved with very few upsets. The target pH is substantially higher than for the other treatment systems because of the lower level of lime conditioning and absence of flocculation.

The water released from the Cross Valley Pond (location X5) is the final effluent discharged to Rose Creek and includes water treated in the Mill WTS from both the Faro Pit and the Intermediate Pond as well as water syphoned (with treatment) from the Intermediate Pond. Water quality for the final effluent (location X5) is described in Section 3.3. The intake of the effluent discharge syphon was suspended on a floating raft that maintained a consistent depth of water over the intake. This ensured that effluent was discharged from the near-surface zone of the pond, as desired.

5.3.4.3 Treatment Sediments

In 2002, a large quantity of treatment sediments had accumulated in the Cross Valley Pond at the base of the inflow spillway. The sediments were negatively affecting water quality in the Cross Valley Pond through resuspension on windy days. A large portion of the sediments (that portion that was accessible) was removed in 2002 to the Faro Pit to restore the efficiency of the Cross Valley Pond for settlement of treatment sediments.

A sediment management study was completed by SRK Consulting and submitted to the Water Board in 2004 as required under Part F, Item 51 of the Water Licence. The study recommended that sediments from the

Down Valley WTS be deposited within a containment berm on the Original Impoundment. This location is already disturbed by mining development (tailings) and provides an adequately large working space. The 2004 sediment study provided an estimated annual sediment production rate of 1,400 m^3/month for the Down Valley WTS, based largely on data from the 2003 operating season.

The disposal area, including gravity-feed pipeline from the Mill, was constructed during winter 2004/05 to take advantage of frozen conditions on the tailings for construction of a containment berm. The containment berm was constructed by excavation of tailings (cut and fill) to a size estimated to contain sediment from several years of operation of the Mill and Down Valley water treatment systems.

During 2008, a vacuum truck system was used to enhance the sediment recovery process from the Cross Valley Pond. The vacuum truck was used to recover sediment from the pond inflow area and deposited the sediment to the tailings containment cell. In addition, sludge removal was carried out by transferring the outer sludge to the sump utilizing the vacuum truck and using the excavator to place the sludge from the sump into flats to dry out and freeze for removal via dump truck. In 2008, approximately 4,500 m^3 was transferred from the Cross Valley Pond to the containment area.

5.3.4.4 Comments for 2008 Operations

The operator's log book describes minor maintenance issues that were not of the type that affected the overall performance of the system. The issues were all managed to prevent any negative effect on the treatment system.

5.4 Grum/Vangorda Water Treatment System

5.4.1 Overview

The Grum/Vangorda Water Treatment Plant ("WTP") is a conventional lime treatment plant that was constructed in 1990. The WTP was successfully utilized during mine operations at the Vangorda Plateau mine site (1990 through 1997) to treat water pumped from the Grum and Vangorda Pits. The WTP was closed when mine operations were suspended in early 1998 and was reactivated in 2002.

The need for reactivation of the WTP stemmed from the level of water in the Vangorda Pit. In early 2002, the water level had reached the maximum desired elevation and, therefore, the water level needed to be drawn down to maintain adequate emergency storage capacity. In a memo prepared by Gartner Lee Limited (now AECOM) dated February 13, 2001, the maximum desired water elevation was suggested to be 1091.8 m. This memo brings hydrologic data forward from the 1996 Integrated Comprehensive Abandonment Plan that provided a rationale an elevation of 1091.8 m, approximately 30.7 m below the assumed overflow elevation out of the pit.

From 2002 through 2005, the WTP was operated during the summer season, fundamentally as it had been during mine operations (pre-1998) although some mechanical and electrical upgrades were installed. Water was pumped to the WTP from the Vangorda Pit on a seasonal summer basis to draw the pit water level

down so that it remained below the recommended maximum elevation. Since water from Little Creek Dam is incorporated into the Vangorda Pit, there was no other water at the Vangorda Plateau mine site that required treatment through the WTP.

In 2007, as in 2006, the WTP was not operated because a sufficiently large volume of water from the Vangorda pit had been treated in 2005 such that the pit did not require pumping in 2006 and 2007. In 2008 the WTP operated from June 5 to August 20 with several shutdowns during the pumping period.

The WTP was designed by Cominco Engineering Services Limited (CESL) and constructed in 1990. The process is a "conventional" lime treatment system that was designed to treat 2,000 USgpm (454 m^3/hr) at the water influent quality predicted for mine operations. The primary components of the treatment system are as follows:

- Lime storage silo (*Capacity of approximately 40 tons);*
- Freshwater supply for reagent mixing (*Was initially groundwater and changed to clean surface water for 2002);*
- Lime mixing system (*Does not include any grinding or heat-controlled slaking);*
- Lime addition system (*Can be managed manually or by automated pH control circuitry);*
- Dual lime conditioning tanks [*Provides total 14 minutes strong mixing at maximum design flow (2,000 USgpm/454 m^3/hr)*];
- Flocculant mixing system (*Can be managed manually or by automated control circuitry);*
- Flocculant addition system (*Can be managed manually or by automated control circuitry);*
- Flocculant agitation tank [*Provides 2 minutes light mixing at maximum design flow (2,000 USgpm/454 m^3/hr)*];
- Clarification pond influent pipe (*Was initially underground and changed to above ground for 2002); and*
- Clarification pond [*Provides design 36 hours retention time at maximum design flow (2,000 USgpm/454 m^3/hr*)].

When the plant was reactivated in 2002, there was some uncertainty regarding the flow rate that could be achieved, given that the influent water quality was substantially poorer than it had been during mine operations. However, four years of performance data (2002 to 2005) have demonstrated that the initially designed flow rate of 2,000 USgpm (454 m^3/hr) remains valid.

5.4.2 Changes from Previous Operations

For the current water pumping and treatment systems there are several substantial changes as compared to previous operations (i.e. pre-1998). The most significant of those are summarized as follows:

Influent Water Quality: The general quality of the current influent is substantially poorer than pre-1988 due to the source of the water. Prior to 1998, the source of influent was a combination of water from the Vangorda Pit/Little Creek Dam and the Grum Pit, whereas the single source of influent since reactivation of the plant has been the Vangorda Pit, which has historically (and currently) contained poorer quality water than Grum Pit. For example, the average concentration of total zinc in the WTP influent through 1996 and

1997 was 18.6 mg/L as compared to the concentration of total zinc in the Vangorda Pit in 2005, which ranged from 65 mg/L to 98 mg/L.

Pumping System: The current pumping system was installed in 2001 in preparation for reactivation of the WTP. The system is an overland system from the Vangorda Pit that replaces the previously utilized buried pipeline from Little Creek Dam. The new system reduces the risk of environmental contamination due to pipeline breaks by providing for visual inspection of the pipeline and, specifically, by eliminating the buried haul road crossing where the pipeline of raw WTP influent lay directly atop the culvert passing clean Vangorda Creek water in the opposite direction. Additionally, the new system is capable of delivering 2,000 USgpm (454 m^3/hr) to the WTP whereas the previous system could deliver an estimated 1,200 USgpm (272 m^3/hr), which was acceptable at that time given that WTP influent was also sourced from the Grum Pit. The new system includes an automatic shut-off for emergency conditions such as a break in the pipe.

WTP Operators: Dedicated operator attention has been provided since reactivation of the plant. During previous operations, the WTP was operated by the pit dewatering crew, who also had numerous other duties around the mine site (related primarily to dewatering the pits). Since reactivation, a dedicated crew of two persons, operator and supervisor, have been fully dedicated to operating the system on a 24-hour basis. Additionally, a site foreman is dedicated to managing the WTP operating crews and other maintenance activities required for successful operation of the WTP.

2001 Preparatory Work: A large portion of the preparatory work for reactivation of the WTP was completed in 2001, in anticipation of the need for operation in 2002. This work can be summarized as follows:

- design and installation of an overland pipeline from the Vangorda Pit to the Grum/Vangorda Water Treatment Plant;
- installation of an overhead powerline to the pumping station in the Vangorda Pit;
- design, construction and installation of a barge with primary pump station in the Vangorda Pit;
- design and installation of a booster pump station at the top of the pit perimeter;
- excavation of treatment sediments from the clarification pond to the Vangorda Pit;
- cleaning of sloughed soil and placement of rip rap in the Grum Interceptor Ditch;
- placement of a rip rap apron at the inflow to the Sheep Pad Pond;
- mechanical and electrical checks and maintenance in the Water Treatment Plant;
- installation of a new inlet pipe and header into the Clarification Pond;
- modifications to the freshwater supply pond for supply of reagent mix water; and
- in-pit field testing of lime treatment of Vangorda Pit water.

5.4.3 Clean Water Diversions

Clean water is diverted around the Vangorda Pit to as great a degree as practical via the following systems:

5.4.3.1 Vangorda Creek Diversion Flume

The Vangorda Creek Diversion Flume is a 2.4 m diameter half-culvert placed in a rock cut channel on the upper benches of the north wall of the pit. The upper reach of the channel is cut into native soils beyond the

pit wall. The flume passes the substantial flow of Vangorda Creek around the pit to its natural channel below the mine haul road. The flume was constructed in 1991 and has experienced localized failures and damage due to soil slumping, rock falls and large flow events.

Substantial restorative and repair work has been completed from 2002 to 2006 that has resulted in the general restoration of a continuous positive grade, reduction in risks of rock falls, reduction in risk of overtopping, and a general improvement in the physical condition and stability of the flume sections. In 2005, an emergency overflow channel was excavated at the headworks dam that would allow extreme flood flows to pass directly into the Vangorda Pit, thereby reducing the risks of overtopping and damage to the flume.

5.4.3.2 Northeast Interceptor Ditch

The Northeast Interceptor Ditch is an open ditch excavated into the native soils with plastic liners in certain locations, where water has been observed, in the past, to seep into the ground and resurface into the Vangorda Pit. Important maintenance work was performed on this ditch in 2001, which substantially restored its effectiveness in diverting clean water around the pit northeast area of the pit to Shrimp Creek.

The maintenance work is thought to have caused, at least in part, positive effects in the Vangorda Pit. Specifically, the reduction of clean water seeping into the pit is thought to have caused, at least in part, the sharp increase in zinc concentration that was observed in 2002 (Section 4.2.3). This positive effect is also likely related to the interception of clean water from the Old Vangorda Creek channel beginning in 2002.

5.4.3.3 Northwest Interceptor Ditch

The Northwest Interceptor Ditch is an open ditch excavated into the native soils and surficial bedrock above the Vangorda Creek Diversion Flume at the top of the northwest wall of the Vangorda Pit. This ditch passes clean water around the northwest area of the pit to Vangorda Creek.

Important maintenance was performed on this ditch in 2003, which restored some ditch efficiency although the nature of the ground in the area allows for some continued leakage into the Vangorda Creek Diversion Flume and the Vangorda Pit.

5.4.3.4 Old Vangorda Creek Channel

Natural runoff water collects in the old Vangorda Creek channel immediately above the Vangorda Pit. There is a small catchment area that lies below the Vangorda Creek Diversion Flume. Without intervention, this clean water flows into the Vangorda Pit and becomes contaminated by flushing contaminants from the pit walls. Since 2002, this water has been pumped into the Vangorda Creek Diversion Flume during the summer season from a natural depression in the old Vangorda Creek channel. This is a reactivation of a procedure that was previously utilized during mine operations.

The interception and diversion of this water is thought to have caused, at least in part, positive effects in the Vangorda Pit. Specifically, the reduction of clean water entering the Pit is thought to have caused, at least in

part, the sharp increase in zinc concentration that was observed in 2002 (Section 4.2.3). This positive effect is also likely related to the maintenance work completed at the Northeast Interceptor Ditch in 2001.

5.4.4 Contaminated Water Collection

Contaminated water is actively collected from two locations related to the WTP.

5.4.4.1 Vangorda Rock Dump Seepage Collector Ditch

Runoff and seepage water from the Vangorda rock dump is contaminated with metals and requires treatment before it can be released to Vangorda Creek. An open ditch around the toe of the rock dump intercepts runoff and seepage water that would otherwise enter Vangorda Creek directly. The ditch directs water into Little Creek Dam Pond where it becomes incorporated into the treatment system.

5.4.4.2 Little Creek Dam

Little Creek Dam is a water retention dam that forms Little Creek Dam Pond. The water retained behind Little Creek Dam originates from the Vangorda rock dump seepage collector ditch and from direct runoff and seepage from the Vangorda rock dump.

This water is pumped into the Vangorda pit as required where it is incorporated into the treatment system. Pumping has typically been required on one or two occasions during the summer.

5.4.5 2008 Operations

5.4.5.1 WTP Start Up

The Clarification Pond was drained of water at the end of the last treatment season (2005). Sediments that accumulated in the pond from the 2005 treatment season remained in the pond through 2006 and 2007. In 2007, in preparation for the 2008 treatment season, an estimated 4,000 m^3 of treatment sediments were transferred to the containment cell in the Grum Overburden Dump.

The start up phase for the Vangorda WTP at the beginning of the 2008 treatment season followed the established procedure of filling the Clarification Pond with treated water (90% full) for final testing. At this time the WTP is placed on hold, pending verification from the external laboratory that the pond water is compliant.

In 2008, start up pumping took place in May. Water quality samples were sent to the external laboratory and compliance was confirmed (including LC_{50} bioassay). The Vangorda WTP was restarted and effluent release began on June 5.

5.4.5.2 Water Quantities

An estimated 788,416 m^3 (at an average pumping rate of 2,283 USgpm or 12,432 m^3/day) was treated through the WTP in 2008 from June 5 to August 20. The water level in the Vangorda Pit ended the year at an elevation of 1089.07 m asl, which was 0.9 m lower than the start of the year.

5.4.5.3 Lime Usage

As outlined in Table 5-3, a total of 218 tonnes (240 short tons) of lime was utilized in 2008 in the WTP with a lime usage rate of 0.28 g/L. Lime usage has been reported in these Annual Environmental Reports since 2002 as listed in Table 5-3.

Table 5-3. Summary of Vangorda WTP Lime Usage

Year	Vangorda WTP Lime usage (g/L)
2002	0.18
2003	0.19
2004	0.26
2005	0.21
2008	0.28

Table 5-3 shows that lime usage in the WTP was higher in 2008 than previous years when the system was utilized. This is primarily due to the significantly lower pH (<2.5) in the pit water and higher metal loading in the treatment plant influent in 2008.

5.4.5.4 Water Qualities

Location V25BSP represents the prime compliance point as being representative of effluent entering Vangorda Creek. Weekly water samples were collected at location V25BSP, as required by the Water Licence, during discharge and analysed at the external laboratory. The data are described Section 4.3.1 and listed in Appendix 6.

Additionally, pH readings were routinely recorded by the operators on a twice-per shift schedule at the following locations:

- Discharge from Clarification Pond (location V25);
- Grum Interceptor Ditch lower culvert (entrance to the Sheep Pad Pond); and
- Grum Interceptor Ditch below Sheep Pad Pond (Location V25BSP).

The pH readings that were collected by the Vangorda WTP operators confirm that the Vangorda WTP was operating effectively (Table 5-4). The pH readings also document that effluent pH generally decreased along the length of the Grum Interceptor Ditch/Sheep Pad Pond, as anticipated, due to dilution and exposure to the atmosphere.

Table 5-4. Summary of Grum/Vangorda WTP Operational pH Readings

Location	pH Range
V25 (Clarification Pond)	7.3 – 9.4
Entrance to Sheep Pad Pond	7.4 – 8.6
V25BSP	7.3 – 8.5

Water samples were collected generally at the time of manual pH checks by the Vangorda WTP operators. These samples were analyzed in-house for total zinc. This verified compliance and served as a management control tool for the operations.

Vangorda WTP operators recorded manual pH readings at key locations within the treatment circuit on a 2-hour basis. This provides a frequent check on the installed pH probes that control the automated lime-addition circuitry. The pH probes were calibrated regularly by the instrument technician/electrician.

5.4.5.5 Treatment Sediments

At the end of the 2003 treatment season, treatment sediments from both the 2002 and 2003 treatment season had accumulated in the Clarification Pond. A study on sediment management options was completed by SRK Consulting and submitted to the Water Board in 2004 as required under Part F, Item 51 of the Water Licence. The study recommended that sediments be deposited on-land within a containment berm on the Grum Overburden Dump. This location is near the WTP, is already disturbed by mining development and provides an adequately large working space.

The initial disposal cell was prepared in April 2004. A containment berm was constructed using the till overburden to a height of approximately 0.5 m enclosing an area of approximately 30 m X 30 m (900 m^2). Sediment was excavated from the Clarification Pond to the disposal area in April and May 2004 which filled the cell. A snow fence was installed around the perimeter of the storage cell to discourage wildlife from entering the area. A new cell was constructed in September 2004. The treatment sediments produced during the 2004 treatment season were excavated from the Clarification Pond to the disposal area in December 2004. This filled the new cell to approximately 90%.

In 2005, to provide for the additional storage of treatment sediments, an additional cell was constructed and filled to capacity by the end of February 2005. The containment cell was then extended in 2006. Sediments that accumulated in the pond from the 2005 treatment season remained in the pond through 2006 and 2007. In 2007, in preparation for the 2008 treatment season, an estimated 4,000 m^3 of treatment sediments were transferred to the containment cell in the Grum Overburden Dump.

During the 2008 treatment season, sludge was removed from the Vangorda Clarification Pond using the vacuum truck. In June, the crest of the Clarification Pond was graded and compacted, as per recommendations from SRK Consulting. At the end of the treatment season in August, removal of sludge was carried out utilizing the vacuum truck with approximately 40 loads of sludge was removed with the remaining sludge needing to be excavated and transferred using the conventional backhoe and truck operation. This was scheduled to be carried out in October.

In September 2008, due to ongoing precipitation at the site, pumping of excess water collecting in the clarification pond was discharged back to the Vangorda Pit. In October, twenty loads of rock were hauled and placed inside the pond for equipment access. Sludge was excavated and trucked to the containment cell although progress was slow due to the consistency of the sludge. Due to above normal temperatures in November, the Vangorda Clarification Pond sludge removal was put on hold until material stiffens for transport by conventional dump trucks. In total, by year end, 419 half truck loads or approximately 1,900 m^3 of treatment sediments were removed from the pond and transferred to the containment cell. The sediment removal and transfer was completed by February 2009.

5.4.5.6 Comments on 2008 Operations and Recommendations for 2009

During the operating season, operating issues were encountered with the Vangorda Water Treatment Pumping and Delivery System. The Vangorda booster pump failed and was replaced on July 8, 2008 and the system was put back on-line July 9, 2008. Inspection of the pump showed that the fifth and sixth stages of the pump had failed. It was also identified that excessive wear of several components was occurring on an accelerated basis and the cause was believed to be due to the low pH (< 2.5) in the pit water along with scale buildup in the pipeline. During the balance of the month, the system was shut down on several occasions due to the ongoing component failures related to the low pH, having a direct impact on the equipment. Parts replaced on the system included a drain line at the barge, check valves for the gland lines, and a drain line for the booster pump used for low flow control to the water treatment plant. In response to ongoing equipment failure, the Vangorda water treatment system was shut down on August 21, 2008. The booster pump was also worn out and the header pipes on the booster pump were worn and leaking.

Due to the heavy rainfalls that occurred during the operating season and numerous shutdowns caused by the failure of the equipment, the low water level target was not achieved for the Vangorda Pit this operating season. Initially, a target level had been set, which if it had been met, it would not be necessary for the site operator to do any pumping during the 2009 operating season, similar to what was achieved in 2005. A water level was reached in the pit that provided sufficient freeboard to allow the water level to be within the operating range by spring 2009. However, pumping and water treatment will have to start up in the spring of 2009. A detailed inspection of the pumps, valves, pipe, and barge, determined that major refurbishment of the delivery system for the Vangorda WTP operation was required prior to the spring start up in 2009.

As a result of the inspection, recommendations were prepared by site management in October 2008. It was recommended that stainless steel pumps should be purchased, including a spare pump in case of a breakdown, along with replacement of portions of the steel pipeline system and including the various valves within the system. The barge was found to be in acceptable condition.

It was decided by the Federal and Yukon Governments that the delivery system for the water treatment operation be replaced as required. Deloitte & Touche Inc. was authorized to order the necessary pumps, components and piping for delivery to the site prior to March 2009. This would then allow for installation in time for the spring start-up of the Vangorda water treatment system.

Additional issues related to the Vangorda WTP are documented in the WTP operator's log book. These issues were all managed to prevent any negative effect on the treatment system and included the following:

- A leak had developed on the booster station check valve and the WTP system was shutdown for five days while the valve was being shipped.
- Due to higher than normal zinc readings at the Clarification Pond, the discharged rate (pumping rate) was reduced to just under 2,000 gpm. The zinc readings then improved.
- A lime mixing motor that had failed was replaced.
- In response to sediment migrating into the Vangorda discharge line, additional floats and curtains were installed to prevent finer particles from discharging from the Clarification Pond and was found to provide effective mitigation.
- In response to build-up of sediments behind the Sheep Pad Pond weir, the material was excavated in October to prevent high TSS level during spring runoff events.

6. Biological Monitoring

6.1 Benthic Invertebrates

The biological monitoring program as described in Schedule 'B' of the Water Licence requires that the established program for monitoring benthic invertebrates be carried out in alternating years in the Rose Creek and the Vangorda Creek drainage systems. In 2008, the program was conducted in the Rose Creek drainage by Laberge Environmental Services of Whitehorse at locations identified in Schedule B of the Water Licence. A detailed report discussing the results of the benthic invertebrate sampling program, and also concurrent water quality sampling, can be found in Appendix 8. A summary of the report findings follows.

Water levels were very high when benthic samplers were installed and even greater when they were retrieved. Hydrographs, as previously noted in Section 2, show that discharge peaked at X14 (Rose Creek downstream of tailings) and R7 (North Fork of Rose Creek) in mid-summer, rather than at freshet, and that very high flows were documented at both sites in June and in August due to severe rainfalls.

Five sampling stations in Rose Creek, identified as stations R1, R2, R3, R4, and R7, and two stations on Anvil Creek, identified as R5 and R6 were sampled for benthic invertebrates (a figure with the locations of the sample sites is included in Appendix 8). Sampling was conducted using artificial substrate samplers, which were installed in the stream from July 21 to 23, 2008. The samplers were left to colonize for a period of five (R1 and R2) or six (R3 to R7) weeks. The samplers were then removed, and the invertebrates removed for identification.

The phyla Diptera was dominant or co-dominant at sites R1, R2, R3, R5, R6 and R7, ranging from 32% of the population at site R6, to 81% of the population at R1. The order Plecoptera was dominant at site R4, co-dominant at site R6, and sub-dominant at sites R1, R5 and R7. The order Ephemeroptera was co-dominant at site R4, and sub-dominant at sites R2, R3 and R6. The insect orders Ephemeroptera, Plecoptera and Trichoptera (EPT) are noted as being sensitive to most types of pollution, and their presence indicates favourable water and sediment conditions. Between 15% (R1) and 72% (R4) of communities were EPT members.

Populations decreased at site R1, increased at sites R2, R3 and R7 and remained relatively stable at the remaining sites, as compared to previous sampling. Taxonomic richness remained similar at all sites. All sites possessed several pollution sensitive species, indicating low impacts from mining related activities.

6.2 Stream Sediments

The Water Licence requires that stream sediment sampling for metals concentrations be carried out in conjunction with benthic invertebrate sampling. Laberge Environmental Services collected sediment samples in conjunction with their field visits to collect samplers on August 25th, 2008 (R1 and R2) and on

September 4, 2008 (R3 to R7). A detailed report discussing the findings of the stream sediment sampling is provided in Appendix 8.

Table 6-1, taken from the report, provides a summary of the average values (average of triplicate samples) of sediment samples collected in 2008:

Table 6-1. Concentrations of Arsenic, Cadmium, Copper, Lead, Mercury and Zinc in the Sediment

Site #	Station Description	Arsenic (µg/L)	Cadmium (µg/L)	Copper (µg/L)	Lead (µg/L)	Mercury (µg/L)	Zinc (µg/L)
R-7	North Fork of Rose Creek	5.23	0.23	12.8	10	<0.05	56
R-2	Rose Creek d/s tailings ponds	**18.37**	**0.76**	**47.3**	**160**	0.15	**369**
R-3	Rose Creek midway between R2 and R4	**16.77**	**0.68**	**49.2**	**202**	0.17	**424**
R-4	Rose Creek just u/s of Anvil Creek	**10.63**	0.37	26.4	**64**	0.06	**184**
R-6	Anvil Creek just u/s of Rose Creek	**6.70**	0.57	23.7	10	<0.05	80
R-5	Anvil Creek just d/s of Rose Creek	**10.93**	**0.83**	34.1	19	<0.05	**154**
ISQG		5.9	0.6	35.7	35.0	0.2	123
PEL		17.0	3.5	197.0	91.3	0.4886	315
Note:	ISQG = Interim freshwater Sediment Quality guideline, in **bold** where exceeded.						
	PEL = Probable Effects Level (>50% of adverse effects occur above this level), shaded and in **bold** where exceeded.						

The highest concentrations of most of the examined metals (arsenic, cadmium, copper, mercury, lead and zinc) in the stream sediments occurred at R2 or at R3, (excluding R1, since results from this site in 2008 were suspected of being unrepresentative of Rose Creek sediment quality at R1 due to adjustments made in sampling location to obtain a sediment sample at this high velocity section of Rose Creek). The PEL (probable effects limit) for arsenic, lead and zinc was exceeded at R2. The PEL for lead and zinc was also exceeded at R3. The Interim freshwater Sediment Quality guideline (ISQG) was exceeded for arsenic and cadmium at several of the other sites, but concentrations were generally well below the PEL. The lowest concentration of each metal was documented at the background site, R7.

6.3 Fish

The Water Licence required that an Aquatic Life Sampling and Testing Program be developed and submitted. The plan was submitted April 30, 2004. In accordance with the plan, fish sampling was completed in August 2008 for the fifth consecutive year of field investigations, by White Mountain Environmental Consulting of Whitehorse. The complete 2008 report, prepared by White Mountain Consulting, is included in Appendix 9.

Fish sampling sites include R1, R2, and R4, on Rose Creek, R6A on Anvil Creek, and V8 and B1, on Vangorda Creek and Blind Creek, respectively. (A figure with sampling sites marked is included in Appendix 9.) Each site consists of a 100 m stretch of stream. Fish habitat characteristics including velocity, channel configuration, bank stability, temperature, cover and riparian vegetation were recorded at each site.

Sampling methods consisted mainly of electrofishing. Gee type minnow trapping, as well as beach seining and angling, were also used to a lesser extent.

Most sites had consistent speciation with previous years. The most notable change was that juvenile Chinook salmon were much less common in 2008 at Blind Creek and Vangorda Creek than in previous years; a single juvenile Chinook salmon was captured at R4 and this fish was absent from all other sites. This was expected since the number of adult Chinook in the Yukon system are low. The number and size of slimy sculpin continues to decrease at R1, likely a function of the displaced sculpin after the dewatering of the freshwater reservoir.

Sampling resulted in slimy sculpin and Arctic grayling being captured at all sites, burbot being captured at 2 sites (R2 and V8), juvenile Chinook salmon being captured at 3 sites (R4, B1 and V8), and one round whitefish captured at site V8. Arctic grayling and slimy sculpin from each site were collected for observations and measurements, and tissue samples submitted for metals testing.

Metals concentrations in Arctic grayling were found to be similar in 2008 as in 2007, with the exception of a slight increase in zinc levels at all sites. In slimy sculpin, trends vary depending on the metal. With regard to lead, levels have remained steady since 2006; however manganese levels dropped at site R2 during 2008 but increased at R6 and V8 in comparison to 2007. Zinc levels in sculpin remained steady at most sites but did show an increase at V8 during 2008 sampling.

7. Physical Stability Monitoring

7.1 Follow up to 2007 Dam Safety Review

The field work for the dam safety review of the Cross Valley, Intermediate and Little Creek dams, which was required under Part G, Item 70 of the Water Licence, was performed in July 2007 by Klohn Crippen Berger. The review report was finalised in 2008 and submitted to the Water Board in August, 2008.

The following provides a listing of maintenance, inspection and/or surveillance activities undertaken in 2008 in relation to dam safety, in accordance with Part G, Item 71 of the Water Licence:

- The Operation and Maintenance Surveillance Manual for the dams and structures on the Anvil property was updated in 2008 in response to recommendations presented by Klohn Crippen Berger in their preliminary report of the Dam Safety Review and in conjunction with BGC.
- The Emergency Response Plan for the Anvil property was updated in 2008 in response to recommendations presented by Klohn Crippen Berger in their preliminary report of the Dam Safety Review and in conjunction with BGC.
- Little Creek dam water levels were pumped down in August 2008 and it is not anticipated that further pumping will be needed until the spring of 2009.
- Further information concerning dams monitoring and results is included in the 2008 Annual Inspection Reports by BGC and SRK, which are submitted along with this report under separate cover.

7.2 Faro Mine Site

The geotechnical monitoring program required under Part G, Item 66 of the Water Licence was performed in 2008 by BGC Engineering Inc. (BGC). The full report prepared by BGC, "*2008 Annual Geotechnical Evaluation and Instrument Review – Various Facilities at Faro Mine, Yukon*", accompanies this report under separate cover (in 2 volumes).

The geotechnical instrumentation installed in and around the North Fork of Rose Creek Flow Through Causeway, K8 Creek Rock Drain, Rose Creek Diversion Canal, the Secondary Tailings Dam, Intermediate Dam, and the Cross Valley Dam and the Faro Creek Diversion was monitored by site personnel. The raw data and an interpretation of the data are included in the BGC report (Part G, Items 66 and 67 of the Water Licence).

BGC staff undertook two inspections (May and September) of various facilities. The inspections looked at the geotechnical performance and stability of the following structures:

- Cross Valley Dam and emergency spillway;
- Intermediate Dam and emergency spillway;
- Rose Creek Diversion Channel, including the Canal Dike, the Spoil Piles and the Back Slope;

- North Fork Rose Creek Flow-Through Causeway ("North Fork Rock Drain");
- Selected portions of the Faro Waste Rock Dumps;
- Secondary tailings impoundment;
- Faro Creek Diversion and East Wall of the Faro Pit; and
- K8 Creek Rock Drain.

The annual inspection does not include the Fresh Water Supply Dam as it has in the past. The dam was breached in 2003 and inspection of the breach and channel works constructed during the breach is reported by BGC under a separate water licence and separate report.

Additional relevant studies are discussed in the BGC report, including:

- the 2007 Dam Safety Review (Klohn, 2008);
- the Faro Pit Slope Stability Report (Golder, 2008) which is appended to the BGC report, and
- BGC investigation report on the Faro Creek Diversion (also appended to the BGC report).

BGC presented their observations, conclusions and recommendations resulting from the field inspection and interpretation of instrumentation data in their report. BGC noted that, in general, the structures appeared in good condition and the instruments appeared in good working order. Specific maintenance requirements are listed on a structure by structure basis and in summary memos provided in an appendix. BGC recommended that visual monitoring and reading of instrumentation be continued and instrumentation data conveyed immediately for review. Protocols for anomalous readings were updated in 2008 in the Operations, Maintenance and Surveillance (OMS) Manual and Emergency Response Plan (ERP).

7.3 Vangorda Plateau Mine Site

The annual geotechnical/physical monitoring program that is required under Part G, Item 66 of the Water Licence was performed, in 2008, by SRK Consulting (Canada) Inc. ("SRK"), who have conducted all of these inspections in the past. The full report, *"2008 Annual Inspection – Waste and Water Management Facilities, Vangorda Mine, Yukon*", prepared by SRK accompanies this report under separate cover.

The geotechnical instrumentation installed in and around the Vangorda rock dump and Little Creek Dam was monitored by site personnel. The raw data and an interpretation of the data are included in the SRK report (Part G, Item 66 of the Water Licence).

SRK conducted a site inspection on August 6 to 8, 2008. The inspection looked at the geotechnical performance and stability of the following structures:

- Vangorda Waste Rock Containment Facility, including the seepage collection system;
- Little Creek Dam;
- Vangorda Creek Diversion;
- Sludge (Clarification) Pond Embankments at the Water Treatment Plant;
- Grum Settling Pond (which provides the freshwater supply for the Water Treatment Plant);
- V-15 Seepage Collection System;

- Grum Interceptor Ditch;
- Sheep Pad Sediment Ponds below the Overburden Stockpile; and
- Lower slopes of the Grum rock dump.

SRK presented their observations, conclusions and recommendations resulting from the field inspection and interpretation of instrumentation data in their report. The physical structures that were inspected appeared to be functioning acceptably well, and some maintenance work was recommended.

8. Maintenance Activities

8.1 General

Some maintenance tasks are routine activities that are performed by on-site personnel on a routine basis. These may include:

- Mechanical maintenance of light and heavy equipment;
- Road and culvert maintenance as needed, including seasonal snow removal;
- Minor repairs and cleaning of debris and ice from ditches;
- Road grading and general road maintenance to maintain safe access;
- Repairs and maintenance of electrical instrumentation;
- Replacement and maintenance of flow monitoring weirs;
- Repairs, maintenance and where required, replacement of power systems;
- Repairs and maintenance of communications systems;
- Maintenance of Anvil Range-owned houses in Faro;
- Cold weather patrols of facilities to ensure functionality;
- Updating inventory control;
- First Aid and Safety Training, including Advanced First Aid, Industrial Safety, Rigging and Hoisting, Transport of Dangerous Goods, Workplace Hazardous Materials Information System (WHMIS), Confined Space, Bear Safety and Water Safety;
- Management provisions for a safe workplace; and
- Other routine activities.

These routine activities are not described further in this report. However, a number of more substantive maintenance tasks were undertaken in 2008 that are described below. All of these tasks were completed in consultation with the Water Inspector and with input, as appropriate, from the Interim Receiver, the Faro Project Management Team and technical consultants. These tasks were completed using mine-owned equipment and employee operators or First Nations contractors, wherever possible.

8.2 Site Operating Manuals

Updates to a number of the site operating manuals were completed. These included:

- Emergency Response Manual (ERM) and the Operations, Maintenance and Surveillance Manual (OMS) were updated in 2008; Recommendations from the 2007 Dam Safety Review were incorporated into these manuals, including:
  - Updating the original design information (some of which was dated 1981) to represent current conditions;
  - Update contact information, including site personnel, consultants and contractors;
  - Updating the inventory of response plan resources on-site in the event of a dam emergency;

- Work on the Fire Protection Manual was started in 2008, and it is expected that this manual will be completed in 2009;
- Notifications of Hazards Downstream of Waste Dumps was completed in 2008, along with the purchase and installation of oxygen monitors in sheds located on waste dumps;
- Lab Manual was completed in March 2008;
- Electrical Procedures Manual was updated in 2008;
- Waste Oil Manual was updated in 2008;
- Emergency Tailings Area Manual was reviewed and updated in November 2008 – there were no significant changes to the manual;
- Confined Spaces Manual was reviewed in 2008 – there were no significant changes to the manual; (note that this manual was updated in 2007 to include modifications to take into consideration the findings of the investigation into the Sullivan Mine accident, where oxygen was depleted in a confined space at the toe of a waste rock dump);
- The Site Emergency Response Plan (ERP) and the OMS Manuals were reviewed and updated in November 2008;
- Employee Health and Safety Manual was reviewed in 2008 – there were no significant changes to the manual;
- Water Treatment Operation Manuals were updated in November 2008 to reflect current operating procedures, including the Mill, Vangorda, Down Valley Treatment and Intermediate pumping, along with electrical system documentation for the site; and
- Communications Systems Maintenance Procedures Manual was reviewed in 2008; updating of the manual is required, due to communications system work completed in the fall of 2008;

Specifically related to the Employee Health and Safety Manual two key modifications were made in 2007. The employee blood lead testing process was updated to ensure compliance with all regulatory requirements. This included changes in the units for reporting blood lead levels from micromole/litre (µmole/L) to microgram/100 mL (µgram/100 mL) to be consistent with the limits stipulated in the Yukon Occupational Health and Safety Act. All employees were found to be within the acceptable limits (using the corrected units) in 2008.

8.3 Permitting

Two permits were acquired for the site in 2008: a Solid Waste Permit and a Special Waste Permit. Both permits will expire in December 2010.

The Solid Waste Permit authorizes the handling, disposal and storage of general wastes at the site, including wood and debris.

The Special Waste Permit was issued by the Yukon Government – Environment for the handling of waste oil, and spent batteries and includes a provision for the hauling of special wastes. New signage and a procedures document were developed in accordance with the special waste permit. Signs were posted near the waste oil burners in 2008.

8.4 Rip Rap Rock

No new rocks were extracted from quarries for rip rap production in 2008. Rip rap placed in 2008 were taken from storage piles developed previous to 2008 (obtained from the rock quarry on the west side of the Grum rock dump). In 2008, rip rap was placed at various locations including:

- 500 m^3 moved for storage at the upper portion of the Faro Creek Diversion for emergency purposes;
- X5 discharge channel (rip rap was extended) to prevent erosion;
- Just below the Northwall Interceptor culvert (rip rap was also extended)
- Cross valley discharge siphon;
- Little Creek Dam, where erosion gullies that had formed along the dam were repaired;
- Little Creek Dam berm, which was extended to channel run-off water into various rip rap channels;
- On the downstream slope of the Faro Creek Diversion, which was re-sloped in two areas and buttressed with rock; and where rip rap channels were installed to direct any drainage below the toe of the slope. The channel where blockage had occurred was widened and additional rock placed to stabilize the embankment;
- Erosion gullies, formed at the breach area of the freshwater supply dam, which were armoured with rip rap and a swale was excavated at the toe of the dam and armoured with rip rap to provide drainage away from the breach areas;
- For miscellaneous rock work and ditching along with grader work that was performed throughout August in response to the poor weather conditions;
- Vangorda clarification pond, where twenty loads of rock were hauled and placed inside the pond for equipment access in preparation for sludge removal from the pond;
- In the Grum Interceptor Ditch to re-armour sections of the ditch (approximately 300 m^3 of rip rap);
- Sections of Little Creek Dam, which were re-armoured with 50 m^3 or rip rap; and
- S-wells area, for well installations.

8.5 Waste Oil

A waste oil burning permit was issued in 2005 that allows for the burning of waste oil generated on-site in the approved incinerator. A waste oil separator was on-site at this time. Waste oil was subsequently tested according to the terms of the permit and burned for heating in the maintenance building that is utilized in the winter season. An estimated 300 L/day was being consumed.

In 2006, two new enviro-tanks were installed and all used oil was transferred from the old tanks to the new tanks. The old tanks were disassembled. New piping was installed directly from the new tanks to the burner. Improvements were made to the incinerator in 2006 to improve fire-protection and reduce filter clogging.

In 2007, filtering of waste oil continued on a regular basis for utilization in the waste oil heaters on site. Approximately 10,000 L of waste oil was used in 2007. Residual filter sludge and glycol are stored on site

pending their final disposal. Application for the renewal of the Special Waste Permit was submitted to the Department of Environment prior to the deadline of Dec. 31, 2007.

As previously noted, the special waste permit was renewed in 2008 and filtering and burning of waste oil continued. In 2008, approximately 15,093 L of waste oil was used.

At month end waste oil inventory for October increased to 25,240 litres due to the collection and filtering of the summer collection of oil through equipment servicing. The year end inventory for waste oil was 21,110 litres.

Residual filter sludge and glycol continue to be stored on site, pending a final disposal site.

8.6 Fuel Storage

Fuel was stored on site in approved above ground storage tanks. The fuel storage capacity on site includes:

- Two diesel storage tanks with a combined capacity of 140,000 L;
- One regular gas storage tank with a capacity of 60,000 L;
- Two waste oil storage tanks, with a capacity of 36,000 L;

Since fuel was not available in the Town of Faro, the Interim Receiver and Town of Faro met in February to discuss implications for staff. Concerns were also expressed to the Yukon Government.

In April, Anvil Range applied for and received a vendors permit for fuel, to enable dispensing of fuel for employee use only. The fuel program is intended for travel to and from the site, to a maximum of 50 L per week.

8.7 Lime Storage

Lime handling procedures and the use of personal protective equipment (PPE) were discussed as part of a safety meeting held on July 22, 2008.

The lime consumption by area in 2008, as of September 2008, was:

- Vangorda water treatment: 240 metric tons
- Faro Mill: 460 metric tons
- Down Valley: 220 metric tons

There remains 10 metric tons in the Faro mill silo, in addition to a winter emergency stock of 120 metric tons in containers.

8.8 Waste Rock Dump Safety

As previously noted, the Confined Spaces Manual was revised in 2007 to include modifications to take into consideration the findings of the investigation into the Sullivan Mine accident, where oxygen was depleted in a confined space at the toe of a waste rock dump. In follow up to possible oxygen depletion issues, new hand-held portable oxygen sensors were acquired for use at the waste dumps to monitor for oxygen deficit. Warning signs were posted on sheds located on waste rock dumps indicating potential oxygen deficit.

8.9 Emergency Tailings Area

In 2006, work was initiated to provide for better control of the highly contaminated water that passes through the emergency tailings area. This water includes seepage from the toe of the Faro rock piles at location X23. The intent is to reduce seepage losses of contaminated water to the Rose Creek valley aquifer by piping this water directly to the Intermediate Pond and providing the means to pump this water directly to the Mill water treatment system, if desired.

Investigations and designs were completed through the summer of 2006 and construction took place from the fall 2006 through early winter of 2007. The system was put into operation on May 22, 2007. In 2008, the collection boxes were in operation from May 12 to October 22, 2008 and water was pumped to the wet zone of the Intermediate Pond. Frequent (several times per month) cleaning of the boxes was required due to fines build up in June and due to fines build up due to precipitation events in August.

While it was expected that equipment for additional water capture would be installed at the ETA in 2008, due to wet ground conditions, the installation was prevented, and this remains to be undertaken.

8.10 Faro Creek Diversion Channel

On May 16, 2007, a seepage event initiated at the toe of the upper section of the Faro Creek Diversion with significant seepage discharge being observed occurring from the toe of the diversion roadway embankment. Mine staff immediately undertook a number of measures to mitigate the seepage including:

- Removal of an ice blockage from the channel which reduced the water level and subsequently reduced the toe seepage volume;
- Conducted some salt/conductivity tracer tests to locate the seepage inlet point which indicated that the seepage occurred adjacent to upper end of the GCL liner;
- Placed and compacted some fine-grained soil into the channel bottom at the seepage inlet location; and
- Installed a diversion culvert to bypass the seepage point.

In September 2007, BGC returned to site to oversee the repair work to the Faro Creek Diversion Channel. The repair work consisted of:

- Excavation of dike fill in the vicinity of the previously identified void;
- Replacement of the dike fill with compacted granular fill;
- Replacement of any weak/soft substrate within the channel section;
- Placement of a bituminous geomembrane liner (BGL) within the channel section; and
- Placement of appropriate channel rip rap over the liner.

A complete summary of this remediation was presented in an appendix to the 2007 Annual Environmental Report

In 2008, minor sloughs were repaired along the Faro Creek Diversion along with rip rap placed in seepage channels along the road to prevent further erosion on the down stream slopes of the access road.

Fifty loads of rip rap (500 m^3) were stock piled at the Faro Creek Diversion for emergency repair purposes if needed, as previously noted.

In May 2008, repairs were made to the back slope of the Faro Creek Diversion where a slide had partially blocked the flow through the diversion in 2007. The bank was cut back and a small bench established. Geo-textile and rock was hauled in place to stabilize the bank. No further work could be completed to the back slope due to thawing conditions causing unstable ground for the backhoe to work from.

BGC again returned to the site in 2008, for two visits, as previously noted in Section 7.2. Work undertaken, in September, in connection with the Faro Creek Diversion is discussed in detail in the "2008 Annual Geotechnical Evaluation and Instrumentation Review", submitted under separate cover along with this report.

BGC note that in general, the repairs made to the Faro Creek Diversion in 2007 appear to have been effective, as the diversion performed in a satisfactory manner in 2008.

A test pitting program was developed in 2008 in order to better understand the behaviour of the Faro Creek Diversion and the test pitting findings are included as an appendix in the "2008 Annual Geotechnical Evaluation and Instrumentation Review".

In the review, it is noted that there is still a high potential for another significant seepage or failure event to occur due to the poor soil and foundation conditions. The report recommends relocation of the creek within a three year period given the nature of the ground conditions and seepage occurring along the road.

In September 2008, a 200mm road surface material was applied to the access road along the west side of the Faro Creek Diversion and the road was graded to fill in any depressions and prevent water from ponding on the surface of the road.

Ice was building up in October in the Faro Creek Diversion and required excavation for a proper freeze up.

8.11 Faro Site Miscellaneous Tasks

Various other maintenance tasks were completed at the Faro site as follows:

- The tailings spray system was completed and calibrated for applying the dust suppression to the tailings facility; however, due to wet weather conditions, spraying of the tailings was put on hold (this is discussed in more detail in the AMP Annual Report in Appendix 10 and a Dust Control report is included as an appendix to the AMP Annual Report).
- All remaining equipment intended for sale was removed from the mill without incident.
- In June, the crest of the Cross Valley dam was regraded.
- Anvil's grader was utilized in September for a 3 day period to patch and grade the main access road. YTG responded and graded the main road during the week of September 22nd.
- In response to sloughing of fine granular material from the downstream face of the Intermediate dam, excessive material that had formed at the toe of the dam was removed to prevent blockage of the seepage blanket.
- In October, the berm above the North Fork Rock drain was backfilled to prevent eroding of the downstream face, as per BGC's recommendations.
- Road culverts were checked in October and the thaw pipes charged with glycol for de-icing if required.
- All creeks and diversion were monitored on a daily basis for ice build up during very cold weather periods.
- A windmill that had blown over and was damaged at the repeater station and was repaired in November.
- The removal of sludge from the Down Valley area was completed in December with an estimated volume of 4,500 m^3 being hauled based on truck load count to the sludge containment cell (vacuum truck and haul truck combined). The area was graded and it is recommended dry lime be spread throughout the flat areas prior to start up in 2009.
- Site operations were shutdown end of day December 18, 2008. During the shutdown, the mine site was inspected daily. Employees returned to work on January 5th, 2009.

8.12 Vangorda Creek Diversion Flume

During the operating season, rock was removed from the Vangorda flume and the trash racks cleaned of debris. Throughout the months of November and December, the flume was monitored as the ice cover formed.

8.13 Vangorda Site Miscellaneous Tasks

Various other maintenance tasks were completed at the Vangorda Plateau site as follows:

- Pumping from Sheep Pad Ponds in April to make room for the start of freshet and provide sufficient settling time.

- Redirection of water from location V15 to V2A via pumping throughout 2007 and 2008 for the preservation of downstream water quality due to elevated zinc concentrations observed at location V15. The Government of Yukon Water Resources Branch was notified of the action plan for water redirection prior to initiation.
- Slough in wall of Vangorda WTP Clarification Pond was repaired.
- Vangorda Waste Dump erosion gullies were re-graded.
- Approximately 300 m^3 of rip rap was placed in the Grum Interceptor Ditch to re-armour sections of the ditch.
- Sections of Little Creek Dam were re-armoured with 50 m^3 or rip rap.
- Ongoing biological treatment of the water in Grum Pit.
- Perk tests performed at the Vangorda cover location by SRK (week of August 4th)
- Test plot established on the Grum till dump for a vegetation test September 18 by EDI. The grader was utilized to turn over soil for planting with work completed same day. An additional test was performed by EDI September 29 with an area 25m x 250m worked.
- Removal of instrumentation on the Vangorda Cover trials occurred September 29, by SRK.
- Plastic culverts removed from Vangorda waste dump collection ditch to allow for better drainage into Little Creek Dam. In October 2008, material that had sloughed into the V15 drainage ditch was removed and the backslope repaired in a temporary manner which included placement of geo-textile and rip rap (October).
- A seeding test plot was prepared by EDI on the Grum till dump on October 6th. A small area was worked/planted utilizing the grader on the side slope of the dump. Upon further review, a test plot was established on the top of the till dump and the D9 utilized.
- Lysimiter equipment was removed from the Vangorda test plots on October 3rd by SRK and repair work completed on the berms as requested.
- In preparation for sludge removal from the Vangorda clarification pond, a pump was set up to continue to decant water as it built up within the pond.
- The Vangorda collection sump below the flume was pumped on a daily basis due to ongoing recharge into the sump. A gas pump was utilized due to no power available to the Vangorda side of the property.
- Sludge was removed from the polishing pond, with transfer of the sludge to the containment area utilizing the vacuum truck and the excavator.
- Bulking sludge from the Vangorda clarification pond continued throughout December with a total of 419 half truck loads of material removed by the end of 2008.
- Due to build-up of sediments behind the weir at V25 BSP in October, the material was removed utilizing the excavator to prevent elevated TSS next spring during freshet.
- To improve access into V2 water sample location, vegetation was removed for the snowmobiles to be used to access the site.
- A total of 27 lengths of 12” steel pipe was removed from the Vangorda pump system and brought to the Faro side of the property for use as road culverts for the 2” pipeline to be installed at the S-Wells. Twenty inch HDPE pipe was cut in half in preparation for the installation of the 2” pipe to be installed on the downstream slope of the North Fork rock drain face.

8.14 Other Activities – Anvil Range Mining Complex

Several other site maintenance activities were undertaken in 2008 that are not requirements of the Water Licence but are of general interest. These included:

- Sale and removal from the site of various mill equipment and machinery;
- A scrap steel program (funded by DIAND and managed by the Interim Receiver) that continued the cutting of heavy steel for off-site recycle; and
- Major technical studies and field programs, [managed by the Interim Receiver on behalf of the Faro Project Management Team (FPMT) related to development of the Faro Closure and Reclamation Plan (FCRP)], including extensive drill programs.
- Several site visits occurred in connection with the upcoming transition of agencies responsible for Care and Maintenance, including:
  - February 20: site managers hosted Stephen Mead (YG) and representatives of Denison Environmental at the Anvil Range Complex;
  - In July, a representative from the Interim Receiver met with site staff and others to provide information concerning the transition. A press conference was held on July 29, 2008 to announce that Denison Environmental will take over many of the Interim Receivers responsibilities as of March 1, 2009;
- Well topographic survey completed by YES and attended on-site by Gartner Lee Limited (AECOM); while the well survey took place in August and did not include the new wells installed in the fall of 2008 the new well co-ordinates were documented by SRK;
- The Global Star phone system was removed and replaced with a cellular telephone service, with work completed by Total North. Tuning antennas along, repairing all grounds, and all phone and Ethernet cables were labelled and wiring diagrams supplied

9. Studies and Plans

9.1 Overview

There are a number of studies and plans that are required under Parts A and F of the Water Licence. The concepts for these studies and plans were generally initiated through the Environmental Assessment and regulatory review process that led to their inclusion into the Water Licence. The studies and plans have various timelines, as summarized in Table 9-1. A brief description of the status of each of the studies and plans that are listed in the Water Licence is provided in Table 9-1 with additional discussion following.

Table 9-1. Summary of Studies and Plans

Study or Plan	Submittal Date	Status
A.16, Contingency Plans.	30 days after effective date of Water Licence.	Complete.
F.49, Terrestrial Effects Study.	December 31, 2005.	Complete.
F.50, Town of Faro Water Supply Study.	2005 Annual Report (by February 28, 2006).	Complete. Appended in 2007 Annual Report
F.51, Water Treatment Sludge Management Study.	June 30, 2004.	Complete.
F.52, Grum Pit Water Management Plan.	June 30, 2004.	Complete.
F.53, Aquatic Life Sampling and Testing Program.	April 30, 2004.	Complete. Annual Report Appended.
F.54, Adaptive Management Plan.	June 30, 2004.	Complete. Annual Report Appended.
F.55, Comprehensive Risk Assessment	Updated annually in the annual report.	Annual Update Below.
F.56, Rose Creek Tailings Facility Water Management Plan	March 31, 2005.	Complete.
F.57, Plan for the Management of Oxide Fines	July 30, 2004 or 90 days prior to work	Complete.
F.58, Final Closure and Reclamation Plan	February 2009.	Underway by FMCPO. (Refer to Section 9.12)

9.2 Contingency Plans

Part A, Item 16 of the Water Licence requires that Contingency Plans be submitted to the Board by 30 days after the effective date of the Water Licence. The Contingency Plans are to address fuel spills, pipeline breaks, loss of electrical power, pump failure, loss of road access to the site, and loss of communications to the site. The plans are also to include a communication plan that "addresses how communities and downstream water users will be notified of accidents, malfunctions and spills at the site". The plans were completed and were submitted to the Board on time.

The plans are to be kept current and revisions are to be submitted to the Water Board within 10 days of revision. The plan was reviewed in 2008 and no revisions to the initial submission were necessary.

9.3 Terrestrial Effects Study

Part F, Item 49 of the Water Licence describes a Terrestrial Effects Study that is to be completed and submitted to the Board by December 31, 2005. The study was completed according to the description provided to the Board in the Water Licence Renewal Application. A project report containing substantive information that had undergone technical review and discussion with the First Nations was submitted to the Board on time.

Because of the complex scheduling of various aspects of the project, not all technical results were available at December 31, 2005. Written updates on the project were provided to the Board in December 2005 and June 2006. A final submission was provided on September 29, 2006. That submission consisted of 2 reports and concluded that "Given the results of the HHERA (Human Health Risk Assessment), there is no need for short-term mitigation to ensure animals and people are adequately protected from risks while the Final Closure and Reclamation Plan is being developed". A copy of the cover letter from the September 2006 submission was provided in the 2006 Annual Environmental Report (Appendix 10).

9.4 Town of Faro Water Supply Study

Part F, Item 50 of the Water Licence describes a study to "determine the relationship between water flowing in Vangorda Creek and water obtained from the Town of Faro water supply wells and to assess the potential for contamination from Vangorda creek to enter the wells". The results of the study were submitted to the Board as part of the annual report for the year 2005, as required.

The study recommended that follow-up monitoring be conducted 2006 and a report on that monitoring program was provided to the Yukon Water Board as part of the Annual Environmental Report for 2006. The 2006 report recommended investigation of the source of elevated nitrate and chloride concentrations detected in water quality samples from Lower Vangorda Creek. A sampling and analytical program was conducted in 2007 to address this recommendation as well as assess the need for future studies and monitoring efforts. The focused monitoring program was carried out at four locations along Vangorda Creek during the months of June and October.

The following findings and conclusions were presented in a 2007 report, taking into consideration the previous studies reported in the 2006 report.

- Water is being recharged to the Town of Faro water supply aquifer by Vangorda Creek. Year-round the wells receive varying portions of their water from Vangorda Creek and the Pelly River.
- Surface water quality in Vangorda Creek is generally very good when compared to Drinking Water Quality Guidelines.
- Elevated chloride levels detected in lower Vangorda Creek, relative to Pelly River, are not related to mining-related sources. Chloride concentrations detected in lower Vangorda Creek are well below Canadian Drinking Water Quality guidelines.

- Elevated levels of nitrate concentrations in Vangorda Creek, relative to Pelly River, may be related to mining-related activities and land uses. Nitrate concentrations observed downstream of the mine site pose minimal risks to the Town of Faro water supply.
- The Town of Faro water supply is of very good quality, including low metal concentrations, as compared to Canadian Drinking Water Quality Guidelines.
- The potential influence of Vangorda Creek on the Town of Faro water supply has been adequately investigated, as a condition of Anvil Range water license QZ03-059.

A copy of the 2007 Town of Faro Water Wells Report was provided in the 2007 Annual Environmental Report (Appendix 11). There are no further requirements for submissions under this plan.

9.5 Water Treatment Sludge Management Study

Part F, Item 51 of the Water Licence requires that a water treatment sludge management plan be submitted to the Board by June 30, 2004. This plan was completed and was submitted to the Board on time.

There are no further requirements for submissions under this plan.

9.6 Grum Pit Water Management Plan

Part F, Item 52 of the Water Licence requires that a water management plan for the Grum pit be submitted to the Board by June 30, 2004. This plan was completed and was submitted to the Board on time.

There are no further requirements for submissions under this plan.

9.7 Aquatic Life Sampling and Testing Program

Part F, Item 53 of the Water Licence requires that a plan for an aquatic life sampling and testing program be submitted to the Board by April 30, 2004. This plan was completed and was submitted to the Board on time.

There are no further requirements for submissions under this plan. The sampling and testing work that is described in the plan was carried out in 2007 and is reported herein, in Section 6.3.and Appendix 9.

9.8 Adaptive Management Plan

Part F, Item 54 of the Water Licence requires that an adaptive management plan for the facilities authorized by the Water Licence be submitted to the Board by June 30, 2004. This plan was completed and was submitted to the Board on time.

The Plan provides for the submission of an annual review of the program each year. The annual review for 2008, as prepared by Gartner Lee Limited, is provided in Appendix 10. The Summary of that report is repeated below for ease of reference.

Excerpted Summary from Appendix 10:

The Water Licence for the Anvil Range Mine (QZ03-059) provided primarily for the continuation of environmental care and maintenance activities to the end of 2008, when a Final Closure and Reclamation Plan was scheduled to be in place. In addition to water and facilities that will receive active management, there are other waters and facilities on the mine site that are recognized as representing potential environmental risks but which do not require immediate intervention. Long term management of these waters and facilities will be addressed in the Final Closure and Reclamation Plan. However, a short term management strategy is required to monitor for potential degradation of conditions to the point where active intervention might be necessary prior to the end of February 2009 and to provide a framework for ensuring that appropriate management actions are implemented.

Such a strategy is provided for in the Water Licence through the Adaptive Management Plan ("AMP"). A conceptual AMP was developed and reviewed by parties to the Environmental Assessment and Water Licencing processes through 2002 and 2003. The Water Licence then required that a detailed AMP Implementation Protocol be developed that follows from the conceptual plan. The AMP Implementation Protocol was filed with the Water Board in June 2004. The Implementation Protocol also requires that an annual review of the AMP program be undertaken. The annual review provides a mechanism whereby any necessary or beneficial modifications to the AMP program can be identified and proposed to the Water Board on a regular basis.

Eight AMP "events" were developed through the Environmental Assessment and Water Licence Renewal processes. These events represent possible future environmental conditions that would require a management response, if they were to occur.

The eight events are as follows with a summary for 2008 activities:

1. Degraded Groundwater Quality in Rose Creek Valley Aquifer;
   One new trigger activated in 2008 for increasing concentrations of sulphate at X25A/B.
   New triggers at P03-09-2, P03-09-5 and P03-09-9 and p08-03-03 for increasing concentrations of sulphate.
2. Degraded Water Quality in Vangorda Creek Downstream of the Mine Facilities;
   One trigger activated in 2008 for sulphate. Data analysis demonstrated that this was due to the elevated sulphate concentrations during a period of discharge of compliant effluent.
3. Degraded Water Quality in Rose Creek Downstream of the Mine Facilities;
   One trigger activated in 2008 for sulphate. Data analysis demonstrated that this was due to the elevated sulphate concentrations during winter low flow period, consistent with historical trends, particularly during periods of discharge of compliant effluent during low flow conditions.
4. Degraded Seepage Quality from the Grum Rock Dump;

No new triggers at V2 in 2008. The 2008 monitoring results suggest that zinc concentrations have stabilized around 1 mg/L. The transfer of water from station V15 to station V2A was implemented in 2007, via Grum Creek diversion as a proactive intervention and has been seen to be successful.

5. Degraded Water Quality in the North Fork of Rose Creek;
   No new triggers in 2008. Ongoing concern over increasing concentrations in this area, particularly zinc during the winter low flow period, prompted a detail site investigation, design and implementation of a remedial intervention system to collect and route contaminated shallow groundwater to Faro Pit.
6. Water level in Grum Pit Reaches Maximum Desired Elevation;
   No triggers activated in 2008.
7. Disruption of Fannin Sheep Migration Through the Mine Site; and
   No triggers activated in 2008.
8. Wind Dispersed Tailings Result in Adverse Effects in the Terrestrial Environment.
   No triggers activated in 2008. Ongoing concerns with respect to dusting from the tailings resulted in the development of a Tailings Dust Control Program using Soil Cement. Wet conditions on site resulted in this program being delayed until 2009.

Other than the specific recommendations listed above, the AMP program functioned in 2008 as intended and no other changes should be made.

9.9 Comprehensive Risk Assessment

Part F, Item 55 of the Water Licence requires that the Comprehensive Risk Assessment that was submitted as part of the Water Licence Application be updated annually and submitted to the Board as part of the annual report (i.e., by February 28 of the following year).

The following update to the Comprehensive Risk Assessment has been prepared by the Interim Receiver.

The Interim Receiver's planning and financial year runs from April 1 to March 31 and is aligned with the fiscal year of the Federal Government. As a result, this update to the Comprehensive Risk Assessment (CRA) refers to the fiscal year timeframe as work in this area is aligned with this reporting period.

In 2001, funding was approved by DIAND to initiate the development of a CRA for the entire Anvil Range mine complex with the objective of providing a framework for prioritizing and managing environmental issues over the next five years. The basis of the need for this assessment was that historically, the annual planning process for care and maintenance activities focused on short-term compliance and management issues. It was recognized however, by the Interim Receiver, that a proactive, risk-based perspective was essential in managing environmental issues on this property. This would involve the ability to identify and address issues that may not present an immediate concern with respect to non-compliance but that have the potential to develop into serious problems if left unaddressed.

The risk assessment process continues to form part of the Interim Receiver's management approach. It has proven particularly helpful in identifying priorities related to care and maintenance activities, and

investigations required to address information gaps. It has also been useful as a tool to communicate those priorities to mine site management and DIAND.

In 2001, the first CRA was completed. The process utilized well-defined risk assessment methodology and involved the prioritization of the site elements that posed a risk to human health and the environment. At that time, a total of 106 key elements, grouped in categories (i.e., dams, diversions, ponds, dumps, tailings, water, infrastructure, buildings and yards) were identified and ranked according to their risk profile. Participation in the process included outside engineering consultants who were familiar with the site through many years of site assessment and inspection activities. There was also significant input from DIAND Water Resources (Whitehorse personnel) and Anvil Range Mine management, as well as Deloitte & Touche personnel with expertise in this area. The process involved extensive efforts to define and understand the risks at the mine with considerable input and discussion amongst the participants.

The CRA process is dynamic, and requires regular updating and evaluation to ensure that it is relevant, and addresses issues in order of highest priority. CRA updates are conducted annually and involve a review of each risk element to reassess controls, and the studies and activities that were conducted over the previous year. The review process can result in changes to the risk classifications assigned to the risk elements. The results of the annual review process are integrated into the prioritization and planning process for each fiscal year.

As such, the 2001 CRA was reviewed and updated to reflect the 2002-2003, 2003-2004, 2004-2005, 2005-2006, and 2006-2007 Care and Maintenance Activities as well as the results of numerous special projects completed during the timeframe. A major part of the 2004-2005 review was to re-align the existing rankings with the new Indian and Northern Affairs Canada (INAC) – Northern Affairs Contaminated Site Program Risk Matrix. Re-alignment required an adjustment in terminology and risk categories; however, the overall methodology for annual assessment remained the same.

The process was also conducted for the 2007-2008 operating field season. As a result a number of additional studies were completed, the following being of particular importance.

- Further engineering and investigation including cross-tailings flood routing and evaluation of a possible Intermediate Dam spillway constructed to meet Probable Maximum Flood conditions.
- Carrying out an upgrade of the proactive intervention system installed in 2006-2007 relating to the Grum waste rock contaminated seeps to reduce the risk of contamination occurring at Vangorda Creek (relates to Event 4 of the AMP triggered events).
- Continued ARD monitoring and laboratory studies, including spring and fall seeps surveys which have been ongoing since the 2002-03 operating year.
- Continued dump water wells investigations, including monitoring installed instrumentation. This program has been ongoing since 2003-2004.
- Overall site water balance investigation. This work includes an update of the preliminary model that was prepared in 2002-2003.
- Monitoring tailings and Vangorda Waste Dump cover trials, including the design and installation of a waste rock lysimeter.
- Continuation of the bioremediation field program relating to the Grum Pit.

- Continuation of seepage investigations with particular emphasis relating to the ETA Seeps contaminant loading. It was determined that the loading can be significantly reduced through a collection and piping system of the ETA contaminated seeps to the Intermediate Pond for treatment in the Faro Mill Water Treatment operation. Construction of the system was carried out during the fall and winter of 2006 with a successful start-up and operation of the system during the summer of 2007.
- Ongoing program to re-evaluation the rate of regression of the Faro Pit wall on an annual basis to reassess the life expectancy of the Faro Creek Diversion located near the pit wall.
- Continuation of the tailing ground water studies including monitoring of wells that have been installed since the 2002-2003 operating year.
- Investigation of the partial failure of the Faro Creek Diversion, including a risk assessment workshop. Repairs were carried out to restore the diversion, and it was recommended that the diversion be relocated in the next two to three years.
- Completion of the monitoring program relating to the Town of Faro drinking water investigation that was carried out over the past 3 year period. It was concluded that drinking water is not being negatively impacted.
- Continuation of the scrap steel recovery program to remove significant quantities of scrap steel from the property and transport offsite for recycling.

In July 2008, the CRA was updated to reflect the 2007-08 care and maintenance activities as well as the information gained through the numerous studies undertaken. As a result of the above, the risk classification of a number of elements was impacted. Specifically, as illustrated in the Table 9-2 as well as in the attached Summary Risk Assessment Classification Matrix (Figure 9-1), when compared against the 2001 Risk Assessment results, significant changes, in terms of number of elements, were observed in the “High”, “Moderately High”, and “Moderate” risk categories, which experienced a 38%, 4% and 23% decrease in the number of elements, respectively. This shift impacted the “Low” risk category, which is the combined “Low” and “Lowest Risk” categories from the original CRA framework, as evidenced by an increase of 56% in the number of elements in these categories.

The Emergency Tailings Area was the only risk element ranked as a “Very High” risk after the 2005-2006 CRA process. With the installation of an engineered capture system in the fall/winter 2006, the likelihood and cost consequence for this element were reduced, resulting in a reduction to a “High” risk rating. Retired elements include the North Fork Rose Creek Diversion Fresh Water Reservoir, Copper Sulphate Plant Pond, Fresh Water Supply Dam (FWSD) Access Road, Copper Sulphate Plant, Bulk Explosives Plant, and Grum Miscellaneous Buildings & Yards.

In September, representatives of Deloitte and Touche Inc. met with representatives from the Faro Project Management Team, Denison Environmental Services, and members from the Technical Advisory Team. A two day workshop was conducted with the responsibility of managing the CRA being transferred to the Faro Project Management Team, as part of the overall transition program.

Table 9-2. Summary of Changes in Risk Classification

Number of elements in category	2001 Risk Assessment	2002-03 Update	2003-04 Update	INAC Risk Matrix	2004-05 Update	2005-06 Update	2006-07 Update	2007-08 Update	% Change from 2001
Highest Risk	1	1	0	**Very High**	3	1	0	0	100% Decrease
High	29	16	15	**High**	18	21	21	18	37.9% Decrease
Moderately High	25	28	26	**Moderately High**	19	18	17	24	4.0% Decrease
Moderate	26	26	21	**Moderate**	18	18	20	20	23.1% Decrease
Low	25	34	38	**Low**	43	43	43	39	56.0% Increase
Lowest Risk	0	1	2						
Element no longer exists or poses no risk	N/A	N/A	5	**Elements Retired Since 2001, and No Longer Pose a Risk**	7	8	8	8	
TOTAL	**106**	**106**	**107**		**108**	**109**	**109**	**109**	

Figure 9-1. Summary Risk Assessment Classification Matrix - July 2008 Update (reflecting the 2007-2008 Care and Maintenance activities and investigations)

Likelihood of the Event	Consequence Severity: Low	Minor	Moderate	Major	Critical
Almost Certain	IV.1; IV.6;	IV.7; IV.12; VI.3; VII.22;	IV.4; VI.8;		
Likely	IV.5;	III.4; VII.23; VIII.4;	III.13; IV.2; IV.3; IV.8; IV.9; VII.21; VIII.11; VIII.16;	II.1;	
Possible	II.9; VII.13;	IV.11; V.4; V.9; VII.10; VII.14; VII.24; VIII.15;	II.7; II.8; III.5; V.7;	I.3; III.1; III.9; III.10; V.5; VIII.2; VIII.3; VIII.6; VIII.18;	I.2; V.1; V.2; V.3; VI.1; VI.2;
Unlikely	I.10; II.4; II.5; II.10; III.7; III.14; V.6; VII.2; VII.3; VII.6; VII.7; VII.8; VII.15; VIII.5;	I.1; I.6; I.8; I.11; III.8; III.15; V.8; VII.1; VII.4; VII.16; VII.18; VIII.17;	I.4; I.7; II.2; III.2; III.12; VII.5; VII.19;	VI.5; VI.6; VI.7; VII.25; VIII.1; VIII.7; VIII.8;	I.12;
Very Unlikely	I.9; II.6; VII.9; VII.20;	I.5; III.11; IV.10; VII.12; VII.17; VIII.13;	VIII.12;		
		II.3; III.3; III.6; VI.4; VII.11; VIII.9; VIII.10; VIII.14;			

Note: Likelihood and consequence categories reflect the realignment to INAC risk

Risk Ranking Legend:		**Changes in 2007/08 Review (Completed July 08)**
Very High	**Black**	Risk ranking did not change
High	**Blue**	Risk ranking changed due to 2007/08 care and maintenance activities
Moderately High	**Green**	Risk ranking changed due to the overall consequence cost
Moderate	**Purple**	Risk ranking changed due to the review of legal consequences
Low	**Brown**	Risk ranking changed due to the review of likelihood ratings
Element Retired	**Turquoise**	Risk ranking changed due to the addition/modification of an event

9.10 Rose Creek Tailings Facility Water Management Plan

Part F, Item 56 of the Water Licence describes a water management plan for the Rose Creek Tailings Facility that is to be completed and submitted to the Board by March 31, 2005. This plan was completed and was submitted to the Board on time.

There are no further requirements for submissions under this plan.

9.11 Plan for the Management of Oxide Fines

Part F, Item 57 of the Water Licence requires that a long term plan for the management of oxide fines be submitted to the Board by July 30, 2004 or no later than 90 days prior to the proposed implementation date, whichever comes first. This plan was completed and was submitted to the Board on time.

The Plan provides for the submission of a design report to the Water Board at least 90 days prior to the commencement of work.

9.12 Final Closure and Reclamation Plan

Water Use Licence QZ03-059 was issued to Deloitte and Touche Inc. in its appointed capacity as Interim Receiver of Anvil Range Mining Corporation in March 2004. Clause 58 of the licence required the Licensee to submit a final closure and reclamation plan by December 31, 2006.

The Interim Receiver submitted an application to amend Clause 58 of the licence, to extend the date for filing of the final closure and reclamation plan from December 31, 2006 to February 28, 2009.

Amendment #1 to Water Use Licence QZ03-059 was released in December 2006 and Clause 58 was amended as proposed by the Licensee. A final closure and reclamation plan was to be submitted to the Board by February 28, 2009. An additional condition was added to Clause 58, which is as follows:

> "Beginning June 30, 2007, and every three months thereafter, the Licensee shall submit to the Board a report regarding the status of key activities related to the development of the final closure and reclamation plan. The report will address those activities that are identified in the document entitled 'Targets for Development of Faro Mine Closure and Remediation Plan' which is included in water use register QZ06-075 as part of exhibit 1.2.5."

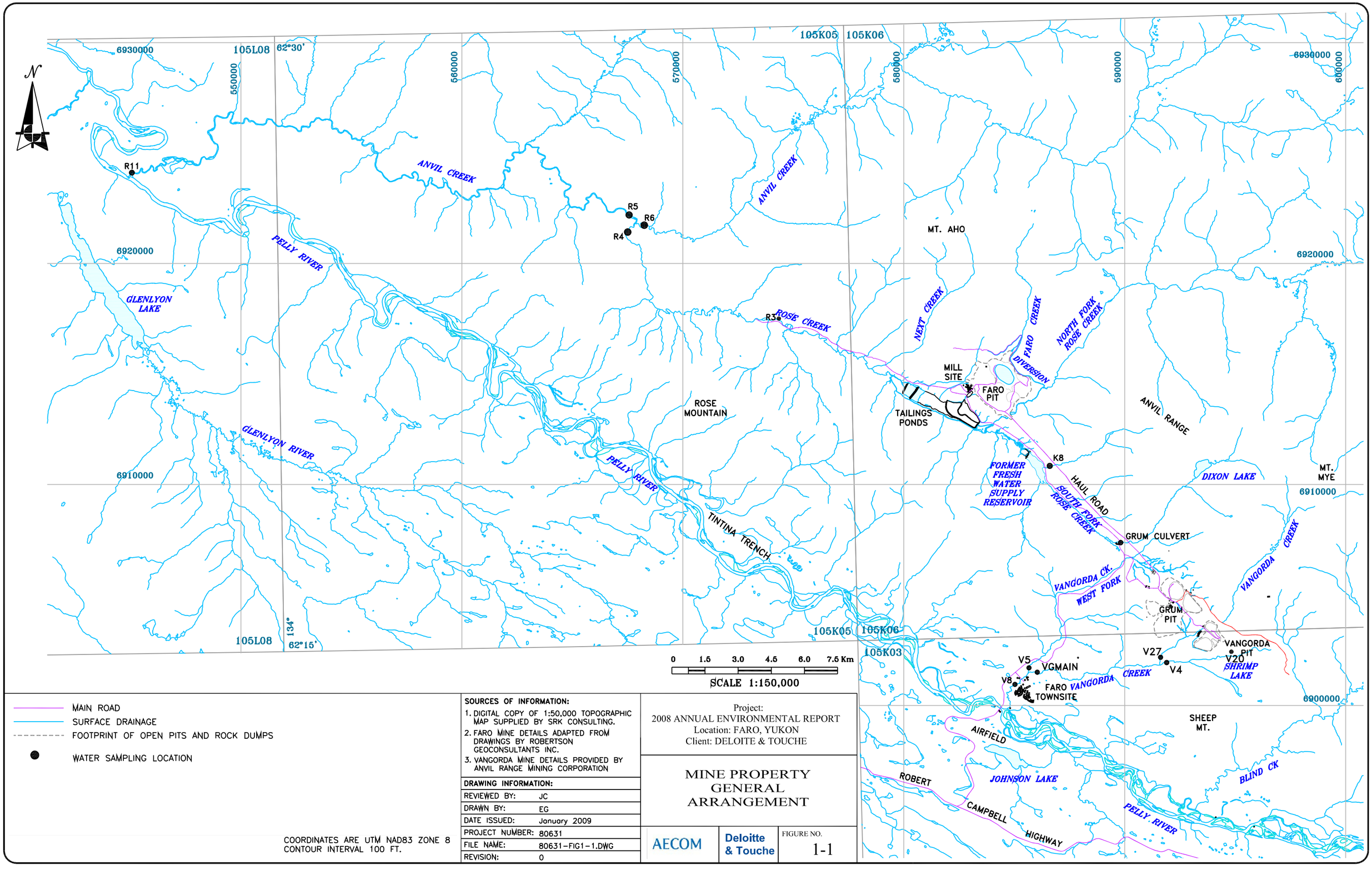
In the Interim Receiver's application to amend Clause 58, a letter signed by representatives from the Governments of Canada and the Yukon was included, and attached to their letter was the above referenced chart which sets out the remaining activities and associated timelines which the Governments plan to meet so that a final closure and reclamation plan can be submitted by February 28, 2009.

The Interim Receiver has submitted to the Board on a quarterly basis a letter updating the Board on the status of the closure planning process. Each quarter, Deloitte and Touche Inc. have received from Mr. Stephen Mead, Director, Assessment and Abandoned Mines, Energy, Mines and Resources, Yukon Government, a letter and attached thereto an updated activities schedule. As noted in Mr. Mead's December 19, 2008 letter, an agreement in principle on a preferred closure option has been reached by the Faro Project Oversight Committee. It is the Governments' intention to meet the February 28, 2009 deadline through the submission of a conceptual level closure plan, supported by full technical details no later than the end of July 2009.

9.13 Community Liaison Committee

The Community Liaison Committee is a voluntary continuation of the Technical Advisory Committee that was a requirement of the previous water licence. The Interim Receiver arranges for an annual summer meeting and site tour in Faro and distributes other information of interest throughout the year. A stakeholder communications meeting relating to Care and Maintenance activities at Faro was held on August 20, 2008 and included a site tour of the mine. Attendees included interested stakeholders.

Figures



MAIN ROAD
SURFACE DRAINAGE
FOOTPRINT OF OPEN PITS AND ROCK DUMPS
WATER SAMPLING LOCATION

COORDINATES ARE UTM NAD83 ZONE 8
CONTOUR INTERVAL 100 FT.

SOURCES OF INFORMATION:

1. DIGITAL COPY OF 1:50,000 TOPOGRAPHIC MAP SUPPLIED BY SRK CONSULTING.
2. FARO MINE DETAILS ADAPTED FROM DRAWINGS BY ROBERTSON GEOCONSULTANTS INC.
3. VANGORDA MINE DETAILS PROVIDED BY ANVIL RANGE MINING CORPORATION

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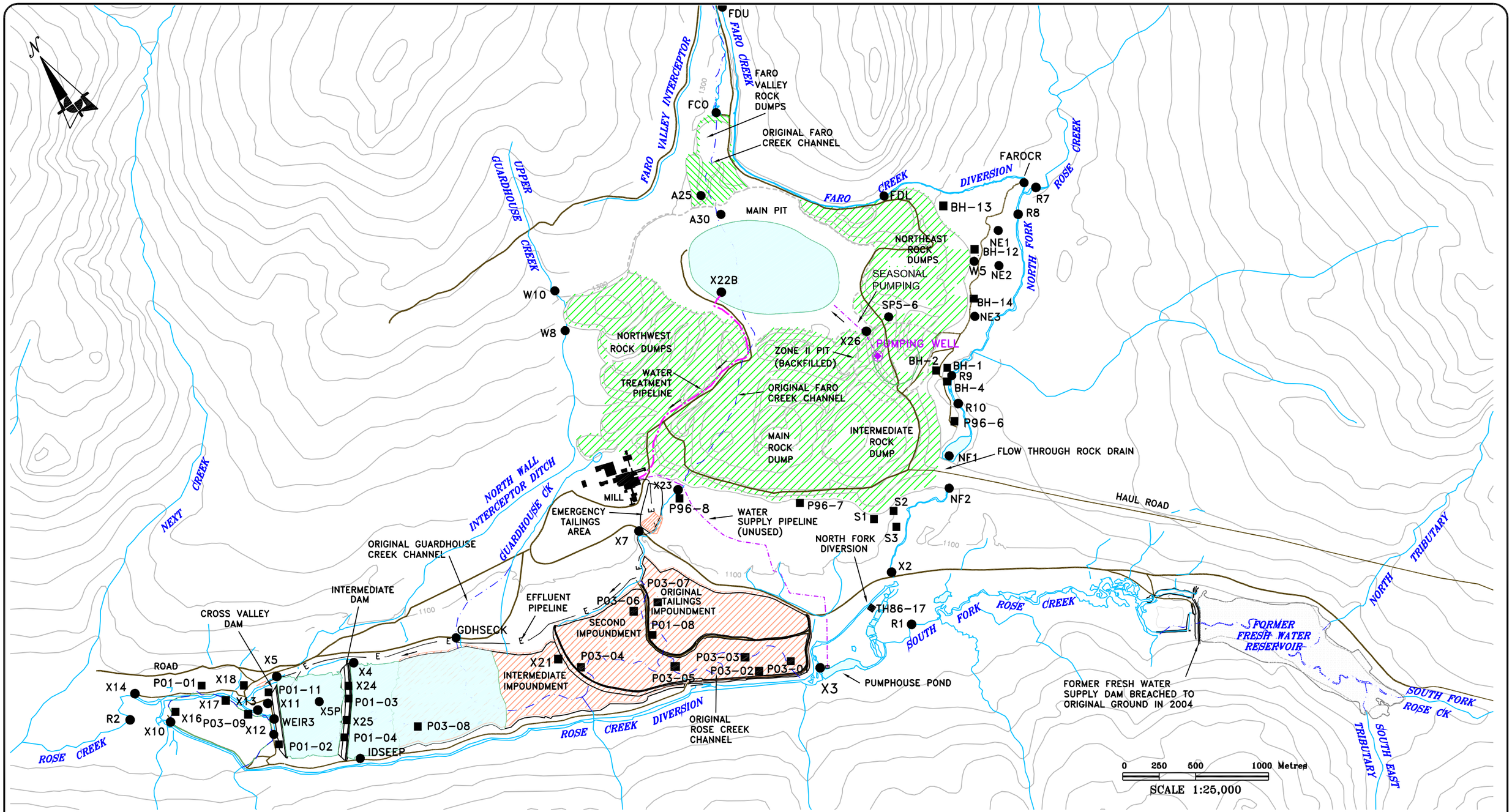
REVISION:	0

Project:
2008 ANNUAL ENVIRONMENTAL REPORT
Location: FARO, YUKON
Client: DELOITE & TOUCHE

MINE PROPERTY GENERAL ARRANGEMENT

AECOM | Deloitte & Touche | FIGURE NO. 1-1



LEGEND:

- ROADS
- EXISTING SURFACE DRAINAGE
- PRE-MINE DRAINAGE
- E — EFFLUENT PIPELINE
- PIPELINE
- WATER TREATMENT PIPELINE
- SURFACE WATER
- WASTE DUMPS
- TAILINGS IMPOUNDMENT
- GROUNDWATER SAMPLING LOCATION
- SURFACE WATER SAMPLING LOCATION

SOURCES OF INFORMATION:

1. DIGITAL COPY OF 1:50,000 TOPOGRAPHIC MAP SUPPLIED BY SRK CONSULTING.
2. MAP COORDINATES ARE UTM NAD83 ZONE 8; CONTOUR INTERVAL 100 FT.
3. FARO MINE DETAILS ADAPTED FROM DRAWINGS BY ROBERTSON GEOCONSULTANTS INC.

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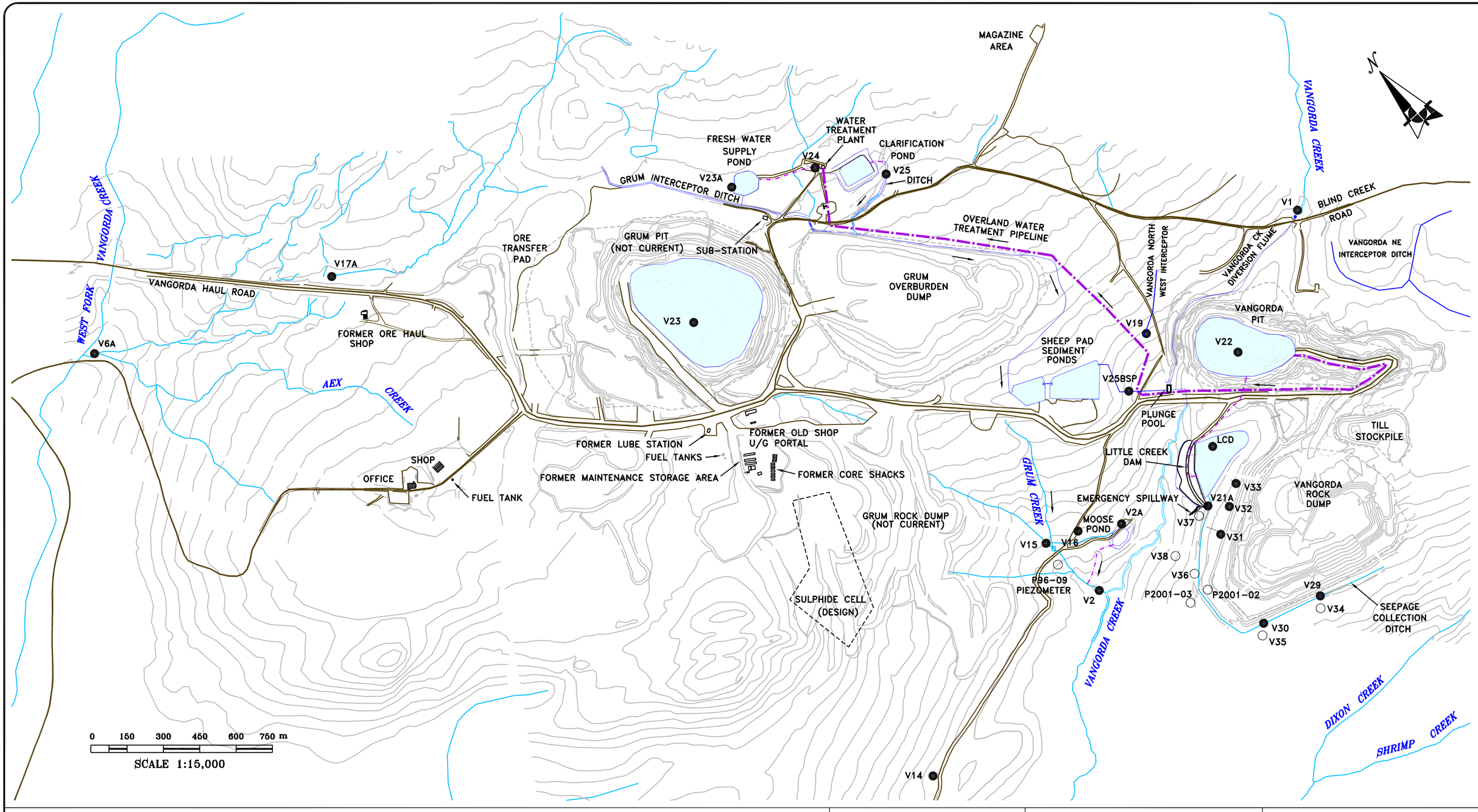
2008 ANNUAL ENVIRONMENTAL REPORT

FARO MINE SITE GENERAL ARRANGEMENT

AECOM | Deloitte & Touche

FIGURE NO. 1-2



LEGEND:

- ROADS
- EXISTING SURFACE DRAINAGE
- PRE-MINE DRAINAGE
- E EFFLUENT PIPELINE
- PIPELINE
- WATER TREATMENT PIPELINE
- SURFACE WATER
- GROUND WATER SAMPLING LOCATION
- SURFACE WATER SAMPLING LOCATION

DRAIN #2 = V29
DRAIN #3 = V30
DRAIN #4 = V31
DRAIN #5 = V32
DRAIN #6 = V33

GROUNDWATER WELLS = V34 TO V38

SOURCES OF INFORMATION:

1. DIGITAL COPY OF 1:50,000 TOPOGRAPHIC MAP SUPPLIED BY SRK CONSULTING.
2. FARO MINE DETAILS ADAPTED FROM DRAWINGS BY ROBERTSON GEOCONSULTANTS INC.

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2008 ANNUAL ENVIRONMENTAL REPORT

VANGORDA PLATEAU MINE SITE GENERAL ARRANGEMENT

AECOM | Deloitte & Touche

FIGURE NO. 1-3

Appendix 1

Schedule A of Water Licence QZ03-059

SCHEDULE A, PART I
MONITORING STATIONS

Faro Mine Site:

Station	Location
X2	North Fork of Rose Creek at access road
X3	Pumphouse pond
X4	Intermediate pond at spillway
X5	Cross Valley pond surface outflow
X5P	Cross Valley pond at spillway
X11	Cross Valley Dam North Seep
X12	Cross Valley Dam South Seep
Weir 3	Cross Valley Dam Central Seep
X13	Cross Valley Dam Combined Seepage
X14	Rose Creek after mixing downstream of the diversion canal confluence
X22b	Faro Main Pit at Pumping Barge
X23	Old Faro Creek channel near the toe of the main (southwest) rock dumps.
X26	Faro Zone II Pit Pumped Discharge
R1	South Fork Rose Creek upstream of pumphouse pond
R2	Rose Creek downstream of mixing zone
R3	Rose Creek mid length
R4	Rose Creek just above Anvil Creek
R5	Anvil Creek just below the confluence of Rose Creek
R6	Anvil Creek immediately upstream of Rose Creek
Faro Cr	Outlet of Faro Creek Diversion
R7	North Fork of Rose Creek upstream of the confluence with the Faro Creek Diversion
R8	North Fork of Rose Creek, 100 m downstream of confluence with Faro Creek Diversion
R9	North Fork of Rose Creek, adjacent to Zone 2 Rock Dumps
R10	North Fork of Rose Creek, downstream of Zone 2 Rock Dumps and 100 metres downstream of R9
X16	Downstream of Rose Creek Tailings Facility
X17	Downstream of Rose Creek Tailings Facility
X18	Downstream of Rose Creek Tailings Facility
X21-96	Rose Creek Tailings Facility
X24-96	Rose Creek Tailings Facility
X25-96	Rose Creek Tailings Facility
P01-01 to 11	Rose Creek Tailings Facility
TH86-26	Upstream of Rose Creek Tailings Facility
BH1	Zone 2 Rock Dumps
BH2	Zone 2 Rock Dumps
BH4	Zone 2 Rock Dumps
BH12	Northeast Rock Dumps
BH13	Northeast Rock Dumps
BH14	Northeast Rock Dumps
P96-6	Main/Intermediate Rock Dumps
P96-7	Main/Intermediate Rock Dumps

Faro Mine Site (continued):

Station	Location
P96-8	Main/Intermediate Rock Dumps
S1	Main/Intermediate Rock Dumps
S2	Main/Intermediate Rock Dumps
S3	Main/Intermediate Rock Dumps
FDU	Faro Creek Diversion, upstream end
FDL	Faro Creek Diversion
FCO	Old Faro Creek, upstream of Faro Valley Dump
A30	Flow to Main Pit from Faro Valley Dump
A25	Main Pit, northwest wall
SP5/6	Internal Surface Flow on Faro Rock Dump
NE1	North Seep to North Fork from Northeast Dumps
NE1	Central Seep to North Fork from Northeast Dumps
NE1	South Seep to North Fork from Northeast Dumps
NF1	Upstream side of rock drain
NF2	Downstream side of rock drain
W5	East Dump
W8	Upper Guardhouse Creek downstream of Northwest Dump
W10	Upper Guardhouse Creek upstream of Northwest Dump
GDHSECK	Guardhouse Creek at Intermediate Pond
IDSEEP	Intermediate Dam toe seep, south side
X7	Seep downstream of emergency tailings area
K8	Tributary of Rose Creek upstream of the site of the freshwater dam
Grum Corner	Tributary of Rose Creek upstream of the site of the freshwater dam
Anvil Cr	Anvil Creek above the confluence with the Pelly River

Vangorda Mine Site:

Station	Location
V1	Vangorda Creek upstream of Vangorda Pit
V2	Grum Creek upstream of confluence with Vangorda Creek
V2A	Grum Creek upstream of confluence with Moose Pond
V4	Shrimp Creek upstream of confluence with Vangorda Creek
V5	West Fork of Vangorda Creek at gravel pit
V6A	AEX Creek
VG Main	Main Stem of Vangorda Creek
V8	Lower Vangorda Creek at the footbridge
V14	Grum Rock Dump at North toe seep
V15	Grum Rock Dump at central toe seep
V16	Grum Rock Dump at South toe seep
V17A	Creek from Grum ore transfer pad
V19	Vangorda Pit northwest diversion ditch
V20	Vangorda Pit, northeast diversion ditch
LCD	Little Creek Dam Pond at old pumphouse
V22	Vangorda Pit at pumping barge

Vangorda Mine Site (continued):

Station	Location
V23	Grum Pit at Haul Road
V24	Influent to water treatment plant
V25	Effluent from clarification pond
V25BSP	Grum Interceptor Ditch below Sheep Pad Pond
V27	Main Stem of Vangorda Creek upstream of Shrimp Creek
V29	Vangorda Dump drain #2
V30	Vangorda Dump drain #3
V31	Vangorda Dump drain #4
V32	Vangorda Dump drain #5
V33	Vangorda Dump drain #6
V37	Vangorda Rock Dump, GW94-01
V38	Vangorda Rock Dump, GW94-02
V39	Vangorda Rock Dump, GW94-03
V40	Vangorda Rock Dump, GW94-04
P96-9	Grum Rock Dump
P01-01 to 03	Vangorda Rock Dump

SCHEDULE A, PART II
MONITORING SCHEDULE LEGEND

Frequency:

C = Continuously
WD = Weekly when discharging
MD = Monthly when discharging
M = Monthly
SF = Spring and Fall
SSF = Spring, Summer and Fall
WS = Winter and Summer
Q = Quarterly

Parameters:

ICP-T = ICP Total Metals including all metals listed in the effluent quality standards specified in Part C of this licence.

ICP-D = ICP Dissolved Metals including all metals listed in the effluent quality standards specified in Part C of this licence.

Other = field pH, field temperature, field conductivity, total suspended solids, sulphate (SO_4), ammonia (as N). For groundwater samples, "Other" also includes purge volume, purge rate, purge time and sampling time.

SCHEDULE A, PART III
MONITORING SCHEDULE
(FARO MINE SITE)

	Parameter				
Station	**ICP-T**	**ICP-D**	**Other**	**Hardness**	**Flow/Level**
X2	M	M	M	M	M
X3	M	M	M	M	-
X4	M	M	M	-	M
X5	WD	WD	WD	WD	WD
X5P	M	M	M	-	M
X11	WS	WS	WS	-	W
X12	WS	WS	WS	-	W
Weir 3	WS	WS	WS	-	W
X13	M	M	M	M	W
X14	WD/M	WD/M	WD/M	WD/M	C
X22B	M	M	M	-	M
X23	M	M	M	-	M
X26	MD	MD	MD	-	M
R1	WS	WS	WS	WS	WS
R3	WS	WS	WS	WS	WS
R4	WS	WS	WS	WS	WS
R5	WS	WS	WS	WS	WS
R6	WS	WS	WS	WS	WS
Faro Cr	M	M	M	-	-
R7	M	M	M	-	C
R8	M	M	M	-	-
R9	M	M	M	-	-
R10	M	M	M	-	-
X16	-	SF	SF	-	SF
X17	-	SF	SF	-	SF
X18	-	SF	SF	-	SF
X21-96	-	SF	SF	-	SF
X24-96	-	SF	SF	-	SF
X25-96	-	SF	SF	-	SF
P01-01to 11	-	SF	SF	-	SF
TH86-26	-	SF	SF	-	SF
BH1	-	SF	SF	-	SF
BH2	-	SF	SF	-	SF
BH4	-	SF	SF	-	SF
BH12	-	SF	SF	-	SF
BH13	-	SF	SF	-	SF
BH14	-	SF	SF	-	SF

	Parameter				
Station	**ICP-T**	**ICP-D**	**Other**	**Hardness**	**Flow/Level**
P96-6	-	SF	SF	-	SF
P96-7	-	SF	SF	-	SF
P96-8	-	SF	SF	-	SF
S1	-	SF	SF	-	SF
S2	-	SF	SF	-	SF
S3	-	SF	SF	-	SF
FDU	SF	SF	SF	-	SF
FDL	SF	SF	SF	-	SF
FCO	SF	SF	SF	-	SF
A30	SF	SF	SF	-	SF
A25	SF	SF	SF	-	SF
SP5/6	SF	SF	SF	-	SF
NE1	SF	SF	SF	-	SF
NE2	SF	SF	SF	-	SF
NE3	SF	SF	SF	-	SF
NF1	SF	SF	SF	-	SF
NF2	SF	SF	SF	-	SF
W5	SF	SF	SF	-	SF
W8	SF	SF	SF	-	SF
W10	SF	SF	SF	-	SF
GDHSECK	SF	SF	SF	-	SF
IDSEEP	SF	SF	SF	-	SF
X7	SF	SF	SF	-	SF
K8	M	M	M	M	-
Grum Corner	M	M	M	M	-
Anvil Cr	WS	WS	WS	-	-

SCHEDULE A, PART IV
MONIORING SCHEDULE
(VANGORDA MINE SITE)

	Parameter				
Station	**ICP-T**	**ICP-D**	**Other**	**Hardness**	**Flow/Level**
V1	Q	Q	Q	Q	Q
V2	M	M	M	M	M
V2A	M	M	M	-	M
V4	SSF	SSF	SSF	SSF	-
V5	M	M	M	M	Q
V6A	Q	Q	Q	Q	Q
VGMain	M	M	M	M	-
V8	M	M	M	M	C
V14	SF	SF	SF	-	SF
V15	M	M	M	-	M
V16	SF	SF	SF	-	SF
V17A	SF	SF	SF	-	SF
V19	SF	SF	SF	-	SF
V20	SF	SF	SF	-	SF
LCD	SF	SF	SF	-	M
V22	Q	Q	Q	-	M
V23	Q	Q	Q	-	M
V24	WD	WD	WD	-	WD
V25	WD	WD	WD	-	WD
V25BSP	WD/M	WD/M	WD/M	WD/M	WD/M
V27	SSF	SSF	SSF	SSF	-
V29	-	SF	SF	-	SF
V30	-	SF	SF	-	SF
V31	-	SF	SF	-	SF
V32	-	SF	SF	-	SF
V33	-	SF	SF	-	SF
V37	-	SF	SF	-	SF
V38	-	SF	SF	-	SF
V39	-	SF	SF	-	SF
V40	-	SF	SF	-	SF
P96-9	-	SF	SF	-	SF
P01-01 to 03	-	SF	SF	-	SF

Waypoint List

Map Name : 59_16_321relief.ecw
Map File : C:\OziExplorer\Index Maps\Mine site waypoints.map

Datum : NAD27 Canada

Waypoint File : C:\OziExplorer\OziExplorer\Mine site waypoints\Water Sample Sites.wpt

2/14/05 7:59:56 AM

Num	Name	Zone	Easting	Northing	Alt(m)	Description
1	A 25	8V	584126	6915446	1289	Water Sample Site - Spring & Fall
2	A 30	8V	584654	6915329	1240	Water Sample Site - Spring & Fall
3	ANVIL CRK	8V	545325	6923988	616	Water Sample Site - Winter & Summer
4	F C O	8V	585012	6915863	1290	Water Sample Site - Spring & Fall
5	F C U	8V	585485	6916579	1320	Water Sample Site - Spring & Fall
6	F D L	8V	585585	6914758	1287	Water Sample Site - Spring & Fall
7	FARO CRK	8V	586497	6914212	1119	Water Sample site - Monthly
8	FWSB 1	8V	587247	6909192	1144	Water Sample Site - Twice A Month (April - August)
9	FWSB 5	8V	585462	6911218	1087	Water Sample Site - Twice A Month (April - August)
10	GDHSECK	8V	581791	6913866	1067	Water Sample Site - Spring & Fall
11	GRUMCORNER	8V	589930	6907213	1221	Water Sample Site - Monthly
12	ID SEEP	8V	580400	6913775	1037	Water Sample Site - Spring & Fall
13	K 8	8V	586426	6910560	1119	Water Sample Site - Monthly
14	L C D	8V	593369	6902955	1106	Water Sample Site - Spring & Fall
15	NE 1	8V	586120	6914184	1152	Water Sample Site - Spring & Fall
16	NE 2	8V	585940	6913991	1146	Water Sample Site - Spring & Fall
17	NF 1	8V	584950	6913020	1100	Water Sample Site - Spring & Fall
18	NF 2	8V	584849	6912854	1094	Water Sample Site - Spring & Fall
19	R 02	8V	579350	6914862	1017	Water Sample Site - (Laberge Environmental)
20	R 03	8V	575473	6916623	979	Water Sample Site - Winter & Summer
21	R 04	8V	567948	6921614	922	Water Sample Site - Winter & Summer
22	R 05	8V	568061	6921757	923	Water Sample Site - Winter & Summer
23	R 06	8V	568016	6921619	928	Water Sample Site - Winter & Summer
24	R 07	8V	586515	6914190	1120	Water Sample Site - Monthly
25	R 08	8V	586422	6914219	1121	Water Sample Site - Monthly
26	R 09	8V	585301	6913468	1099	Water Sample Site - Monthly
27	R 10	8V	585232	6913301	1098	Water Sample Site - Monthly
28	R O1	8V	584129	6912224	1074	Water Sample Site - Winter & Summer
29	SP 5-6	8V	585121	6914057	1185	Water Sample Site - Spring & Fall
30	V 01	8V	594573	6903551	1175	Water Sample Site - Quarterly
31	V 02	8V	592893	6902976	1083	Water Sample Site - Monthly, Quarterly Bio-assay
32	V 02A	8V	593138	6903085	1106	Water Sample Site - Monthly
33	V 04	8V	591784	6901660	962	Water Sample Site - Spring, Summer & Fall
34	V 05	8V	586251	6901938	787	Water Sample Site - Monthly
35	V 06A	8V	590534	6906425	1210	Water Sample Site - Quarterly
36	V 08	8V	584904	6900415	666	Water Sample Site - Monthly
37	V 14	8V	592731	6903176	1106	Water Sample Site - Spring & Fall
38	V 15	8V	592766	6903178	1103	Water Sample Site - Monthly
39	V 16	8V	592858	6903187	1105	Water Sample Site - Spring & Fall
40	V 17A	8V	591379	6906059	1285	Water Sample Site - Spring & Fall
41	V 19	8V	594725	6903038	1175	Water Sample Site - Spring & Fall
42	V 20	8V	594919	6902425	1170	Water Sample Site - Spring & Fall
43	V 22	8V	594182	6903143	1130	Water Sample Site - Quarterly
44	V 23	8V	592334	6904879	1188	Water Sample Site - Quarterly
45	V 24	8V	593235	6905011	1308	Water Sample Site - Weekly When Discharging
46	V 25	8V	593425	6904811	1300	Water Sample Site - Weekly When Discharging
47	V 25BSP	8V	593579	6903471	1153	Water Sample Site - Daily, Weekly When Discharging, Mont

Waypoint List continued .....

Num	Name	Zone	Easting	Northing	Alt(m)	Description
48	V 27	8V	591745	6901915	953	Water Sample Site - Spring, Summer & Fall
49	V 29	8V	593582	6902323	1118	Water Sample Site - Spring & Fall
50	V 30	8V	593328	6902395	1120	Water Sample Site - Spring & Fall
51	V 31	8V	593430	6902799	1122	Water Sample Site - Spring & Fall
52	V 32	8V	593545	6902857	1116	Water Sample Site - Spring & Fall
53	V 33	8V	593633	6902903	1119	Water Sample Site - Spring & Fall
54	VG MAIN	8V	585790	6901334	726	Water Sample Site - Monthly
55	W 05	8V	585772	6914062	1165	Water Sample Site - Spring & Fall
56	W 08	8V	583368	6915344	1289	Water Sample Site - Spring & Fall
57	W 10	8V	583402	6915400	1290	Water Sample Site - Spring & Fall
58	WEIR 3	8V	580127	6914199	1014	Water Sample Site - Winter & Summer
59	X 02	8V	584193	6912601	1074	Water Sample Site - Monthly
60	X 03	8V	583418	6912325	1061	Water Sample site - Monthly
61	X 04	8V	580604	6914328	1040	Water Sample Site - Monthly
62	X 05	8V	580088	6914450	1048	Water Sample Site -Daily, Weekly When Discharging, Month
63	X 07	8V	582929	6913807	1104	Water Sample Site - Spring & Fall
64	X 10	8V	579526	6914679	1018	Water Sample Site - Monthly
65	X 11	8V	580118	6914268	1018	Water Sample Site - Winter & Summer
66	X 12	8V	580096	6914099	1017	Water Sample Site - Winter & Summer
67	X 13	8V	580087	6914260	1017	Water Sample Site - Monthly, Quarterly Bio-assay
68	X 14	8V	579460	6914896	1015	Water Sample Site - Weekly When Discharging, Monthly
69	X 22B	8V	584320	6914832	1157	Water Sample Site - Monthly
70	X 23	8V	583343	6913898	1114	Water Sample Site - Monthly
71	X 26	8V	584990	6914105	1156	Water Sample site - Monthly

Map Feature Waypoints

Appendix 2

UTM Coordinates for Surface Water Sampling Locations

Appendix 3
2008 Surface Water Quality Data
Rose Creek Drainage

Table 1. Surface Water Routine Parameters

Station	Date	ALK-T mg/L	COND-L µS/cm	HARD mg/L	NH3 mg/L	PH-F pH unit	SO4 mg/L	TEMP-F °C	TSS mg/L
A25	02-Jun-08		366	211	< 0.01	7.6	26	4.6	< 1
A25	30-Sep-08		318	188	0.03	6.4	15.2	5.8	< 1
A30	02-Jun-08		2300	659	0.03	3.6	1410	7.7	< 1
A30	30-Sep-08		1340	467	0.05	3.3	768	2.7	18
FAROCR	08-Jan-08		95	38	< 0.01	8	5.86	0.2	< 1
FAROCR	15-May-08		53	26	0.04	8.6	4.97	1.5	9
FAROCR	17-Jun-08		28	15	0.01	7.9	2.08	8.8	< 1
FAROCR	15-Jul-08		34	20	0.02	7.7	3.75	6.4	172
FAROCR	12-Aug-08		51	24	< 0.01	7.8	2.99	7.6	< 1
FAROCR	15-Sep-08		38	16	0.03	7.3	3.26	6.5	2
FAROCR	15-Oct-08		48	18	0.02	7.7	3.35	2	< 1
FAROCR	04-Nov-08		57	26	< 0.01	7.5	5.26	0.1	< 1
FAROCR	02-Dec-08		68	32	0.01	7.9	4.4	0.6	< 1
FAROCR	MEAN		52.44	23.89	0.02	7.82	3.99	3.74	21
FAROCR	MINIMUM		28	15	< 0.01	7.3	2.08	0.1	< 1
FAROCR	MAXIMUM		95	38	0.04	8.6	5.86	8.8	172
FAROCR	N > DL		9	9	6	9	9	9	3
FAROCR	Median		51	24	0.01	7.8	3.75	2	1
FCO	02-Jun-08		161	79	< 0.01	7.8	30.4	9	4
FCO	30-Sep-08		160	70	0.04	5.5	55.5	2.2	5
FDL	02-Jun-08		15	6	0.01	8.2	1	5.5	1
FDL	29-Sep-08		33	12	0.03	8.1	2.31	3.4	< 1
FDU	24-May-08	1.9		7.1	0.03		< 0.5		82
FDU	02-Jun-08		14	5	< 0.01	8.5	0.81	4.8	< 1
FDU	29-Sep-08		30	10	0.04	7.2	1.77	3	1
FDU	MEAN	1.9	22	7.4	0.0	7.9	1.0	3.9	28
FDU	MINIMUM	1.9	14	5	< 0.01	7.2	< 0.5	3	< 1
FDU	MAXIMUM	1.9	30	10	0.04	8.5	1.77	4.8	82
FDU	N > DL	1	2	3	2	2	2	2	2
FDU	Median	1.9	22	7.1	0.03	7.85	0.81	3.9	1
GCULV	07-Jan-08	42.1	104	45	0.02	8.3	6.15	1.2	< 1
GCULV	18-Feb-08	54.4	116	52	0.01	7.8	5.23	1.4	< 1
GCULV	17-Mar-08	60.2	119	55	0.01	7.9	5.98	0.4	< 1
GCULV	14-Apr-08	55.4	123	54	0.03	8	6.38	1.6	< 1
GCULV	14-May-08	18.8	61	23	< 0.01	8.5	8.43	2	4
GCULV	16-Jun-08	12.9	33	19	< 0.01	8.4	3.38	6.4	1
GCULV	14-Jul-08		42	15	< 0.01	8.1	3.95	9.4	2
GCULV	11-Aug-08	26	51	22	0.01	8.5	4.65	10.4	< 1
GCULV	15-Sep-08	21.2	47	19	0.02	8.3	5.43	5.5	< 1
GCULV	15-Oct-08	25.9	58	23	< 0.01	7.9	5.78	2	< 1
GCULV	03-Nov-08	25.1	63	30	0.02	8	6.06	1.2	< 1
GCULV	01-Dec-08	31.2	78	40	< 0.01	8.4	6.4	0	< 1
GCULV	MEAN	33.93	74.58	33.08	0.01	8.18	5.65	3.46	1.33
GCULV	MINIMUM	12.9	33	15	< 0.01	7.8	3.38	0	< 1
GCULV	MAXIMUM	60.2	123	55	0.03	8.5	8.43	10.4	4
GCULV	N > DL	11	12	12	7	12	12	12	3
GCULV	Median	26	62	26.5	0.01	8.2	5.88	1.8	1
GHSCR1	01-Jun-08		1670	910	0.02	8.1	816	4	< 1
GHSCR1	29-Sep-08		1370	922	0.04	7.4	736	2.9	2
K8	07-Jan-08	55.7	143	59	0.01	8.1	12.4	0.4	< 1

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Station	Date	ALK-T mg/L	COND-L µS/cm	HARD mg/L	NH3 mg/L	PH-F pH unit	SO4 mg/L	TEMP-F °C	TSS mg/L
K8	18-Feb-08	71.9	161	65	0.01	7.8	12	1.3	< 1
K8	17-Mar-08	77.3	162	76	0.02	7.8	13.5	0.3	< 1
K8	14-Apr-08	70.1	165	86	0.02	8	13.8	1.1	< 1
K8	14-May-08	44.3	146	69	< 0.01	8.4	19.8	1.7	< 1
K8	16-Jun-08	17.8	38	18	< 0.01	8.4	2.43	4.9	< 1
K8	14-Jul-08		54	23	0.01	8	4.14	8.1	3
K8	11-Aug-08	48.5	95	43	0.02	8.2	8.2	7.9	< 1
K8	15-Sep-08	33.8	76	33	0.03	8.2	7.68	5	< 1
K8	15-Oct-08	47.5	105	47	< 0.01	7.8	10.3	1.9	< 1
K8	03-Nov-08	47.7	122	62	0.02	7.9	12.1	1	< 1
K8	01-Dec-08	52.3	140	78	< 0.01	8.4	13.1	0.1	< 1
K8	MEAN	51.54	117.25	54.92	0.02	8.08	10.79	2.81	1.17
K8	MINIMUM	17.8	38	18	< 0.01	7.8	2.43	0.1	< 1
K8	MAXIMUM	77.3	165	86	0.03	8.4	19.8	8.1	3
K8	N > DL	11	12	12	8	12	12	12	1
K8	Median	48.5	131	60.5	0.01	8.05	12.05	1.5	1
NE1	02-Jun-08		336	186	< 0.01	7.9	111	7.8	< 1
NE1	30-Sep-08		531	301	0.04	7.5	184	2.6	1
NE2	02-Jun-08		2020	1380	0.01	8.4	903	2.1	< 1
NF1	02-Jun-08		72	34	< 0.01	8	4.89	5.1	1
NF1	30-Sep-08		139	75	0.04	7.4	8.83	2.6	9
NF2	24-Jan-08	120	280	146	< 0.005	7.45	20.3		< 1
NF2	21-Feb-08	140	300	149	< 0.005	6.9	23.9	-0.5	< 1
NF2	11-Mar-08	140	300	150	< 0.005	7.3	21.6	-0.5	< 1
NF2	29-Apr-08	120	280	136	< 0.005	7.43	20	-0.5	2
NF2	22-May-08	25	58	30.8	< 0.005	7.39	< 0.5	0	11
NF2	02-Jun-08		70	33	0.01	8	4.7	7.4	3
NF2	25-Jun-08	35	88	40.6	< 0.005	7.12	3.8	5.5	5
NF2	29-Jul-08	69	160	74.5	< 0.005	7.62	8.7	6.3	1
NF2	17-Sep-08	63	140	69.3	< 0.005	6.85	8.8	3.5	< 1
NF2	30-Sep-08		146	78	0.04	7.6	9.65	3.1	< 1
NF2	07-Oct-08	77	170	81.2	< 0.005	7.1	13	-0.01	4
NF2	11-Dec-08	16	240	14.6	< 0.005		1.5	0.3	1
NF2	MEAN	80.5	169.1	83.6	0.0083333	7.34	11.37	2.24	2.67
NF2	MINIMUM	16	37	14.6	< 0.005	6.85	< 0.5	-0.5	< 1
NF2	MAXIMUM	140	300	150	0.04	8	23.9	7.4	11
NF2	N > DL	10	12	12	2	11	11	11	7
NF2	Median	73	153	76.25	0.005	7.39	9.225	0.3	1
R1	23-Jan-08	170	420	248	0.096	7.51	50		3
R1	21-Feb-08	130	300	141	0.058	7.8	33.6	-0.5	3
R1	03-Mar-08	127	292	146	0.04	7.1	30.7	0.9	< 1
R1	11-Mar-08	130	300	146	0.071	6.37	30.2	-0.5	10
R1	29-Apr-08	83	220	105	0.018	6.69	28	-0.5	2
R1	22-May-08	43	100	53.6	< 0.005	7.5	1.4	1.5	28
R1	24-Jun-08	24	71	32.3	0.009	6.94	6		150
R1	22-Jul-08	56		63.8	< 0.01		9.4		1
R1	29-Jul-08	70	180	82.5	< 0.005	8.15	14	10.8	3
R1	19-Aug-08	91.7	170	84	< 0.01	7.8	14.3	8.9	2
R1	25-Aug-08	44	100	51.2	< 0.005		8.1		18
R1	17-Sep-08	74	180	83.7	< 0.005		16	5	3

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Station	Date	ALK-T mg/L	COND-L µS/cm	HARD mg/L	NH3 mg/L	PH-F pH unit	SO4 mg/L	TEMP-F °C	TSS mg/L
R1	08-Oct-08	88	210	100	< 0.005		20	-1	5
R1	10-Dec-08	110	250	132	0.036		24	0.3	1
R1	MEAN	88.6	214.8	104.9	0.027	7.3	20.4	2.5	16.4
R1	MINIMUM	24	71	32.3	< 0.005	6.37	1.4	-1	< 1
R1	MAXIMUM	170	420	248	0.096	8.15	50	10.8	150
R1	N > DL	14	13	14	7	9	14	10	13
R1	Median	85.5	210	92	0.01	7.5	18	0.6	3
R2	03-Mar-08	188	831	452	0.14	7.2	281	2.6	1
R2	21-Jul-08	71		110	0.01		48		2
R2	19-Aug-08	112	316	156	0.06	7.8	74.9	10.1	< 1
R2	20-Aug-08	97		166	0.05		66		< 1
R2	25-Aug-08	59	170	82.2	< 0.005		23		45
R2	MEAN	105.4	439	193.24	0.053	7.5	98.58	6.35	10
R2	MINIMUM	59	170	82.2	< 0.005	7.2	23	2.6	< 1
R2	MAXIMUM	188	831	452	0.14	7.8	281	10.1	45
R2	N > DL	5	3	5	4	2	5	2	3
R2	Median	97	316	156	0.05	7.50	66.00	6.35	1
R3	23-Jan-08	140	460	254	< 0.005		98.4	-0.5	4
R3	20-Feb-08	170	610	301	0.019	7.2	152	-0.5	< 1
R3	04-Mar-08	170	648	346	0.06	7.7	186	0.6	< 1
R3	13-Mar-08	160	600	311	0.028	6.4	201	-0.5	< 1
R3	28-Apr-08	160	920	495	0.099	7.82	360	-0.5	2
R3	21-May-08	39	160	79.9	< 0.005	7.25	41	2	25
R3	24-Jun-08	35	140	58.6	0.012	6.92	27	5.5	59
R3	22-Jul-08	70		107	0.03		43		1
R3	29-Jul-08	90	300	136	0.017	7.58	54	6.1	< 1
R3	19-Aug-08	113	290	147	0.02	7.7	60.2	8.6	< 1
R3	04-Sep-08	80	290	142	0.03		50		1
R3	17-Sep-08	87	290	134	0.019	7.56	73	3.5	4
R3	08-Oct-08	100	310	149	0.011	8.6	56	-1	1
R3	10-Dec-08	130	360	190	0.006	7.36	58	0.4	1
R3	MEAN	110.3	413.7	203.6	0.026	7.34	104.3	2.0	7.4
R3	MINIMUM	35	140	58.6	< 0.005	6	27	-1	< 1
R3	MAXIMUM	170	920	495	0.099	8.6	360	8.6	59
R3	N > DL	14	13	14	12	12	14	12	9
R3	Median	106.5	310	148	0.019	7.46	59.1	0.5	1
R4	23-Jan-08	140	470	261	< 0.005		97.5		< 1
R4	20-Feb-08	160	540	262	< 0.005	7.4	125	-0.5	< 1
R4	04-Mar-08	159	536	300	< 0.01	7.7	132	0.7	< 1
R4	13-Mar-08	150	530	276	< 0.005	6.43	142	-0.5	< 1
R4	28-Apr-08	140	780	400	0.021	7.28	270	-0.5	< 1
R4	21-May-08	40	160	78	< 0.005	7.34	34	3	22
R4	24-Jun-08	35	130	60.6	< 0.005	7.18	26	5	71
R4	22-Jul-08	72		110	< 0.01		41		5
R4	29-Jul-08	89	290	136	0.006	8.14	50	5.6	2
R4	19-Aug-08	113	279	142	0.02	7.7	54.6	8.4	< 1
R4	04-Sep-08	81	280	135	0.03		44		4
R4	17-Sep-08	86	280	133	0.015	7.42	48	3.5	2
R4	08-Oct-08	100	310	142	< 0.005		52	-1	1
R4	10-Dec-08	130	360	190	0.026	7.42	54	0.5	1

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Station	Date	ALK-T mg/L	COND-L µS/cm	HARD mg/L	NH3 mg/L	PH-F pH unit	SO4 mg/L	TEMP-F °C	TSS mg/L
R4	MEAN	106.8	380.4	187.5	0.012	7.4	83.6	2.2	8.1
R4	MINIMUM	35	130	60.6	< 0.005	6.43	26	-1	< 1
R4	MAXIMUM	160	780	400	0.03	8.14	270	8.4	71
R4	N > DL	14	13	14	6	10	14	11	8
R4	Median	106.5	310	142	0.008	7.41	53	0.7	1
R5	04-Mar-08	156	321	209	< 0.01	8	21.4	0.1	< 1
R5	22-Jul-08	97		116	< 0.01		20		5
R5	19-Aug-08	148	261	141	0.01	8	20.8	8.1	< 1
R5	04-Sep-08	110	260	131	0.04		22		4
R5	MEAN	127.75	280.7	149.25	0.0175	8	21.05	4.1	2.75
R5	MINIMUM	97	260	116	< 0.01	8	20	0.1	< 1
R5	MAXIMUM	156	321	209	0.04	8	22	8.1	5
R5	N > DL	4	3	4	2	2	4	2	2
R5	Median	129	261	136	0.01	8	21.1	4.1	2.5
R6	23-Jan-08	140	320	167	< 0.005	6.8	23.3	-0.5	< 1
R6	20-Feb-08	150	330	159	< 0.005	7.6	23	-0.5	1
R6	04-Mar-08	159	323	186	< 0.01	7.8	21.4	0.6	< 1
R6	13-Mar-08	150	310	167	< 0.005	6.43	21.7	-0.5	< 1
R6	28-Apr-08	130	290	147	< 0.005	7.96	20	-0.5	1
R6	21-May-08	49	110	60.3	< 0.005	7.91	< 0.5	3	20
R6	24-Jun-08	68	160	75.2	< 0.005	7.44	10	4.5	27
R6	22-Jul-08	99		115	< 0.01		17		5
R6	29-Jul-08	120	260	124	< 0.005	8.34	18	5.3	2
R6	19-Aug-08	151	258	146	0.01	8	18.8	8.5	1
R6	04-Sep-08	110	260	129	< 0.01		19		3
R6	17-Sep-08	120	250	128	< 0.005	7.79	21	3	2
R6	08-Oct-08	130	280	144	< 0.005	8.35	21	-1	< 1
R6	10-Dec-08	150	310	172	< 0.005	7.38	24	0.3	3
R6	MEAN	123.3	266.2	137.1	0.006	7.7	18.5	1.9	4.9
R6	MINIMUM	49	110	60.3	< 0.005	6.43	< 0.5	-1	< 1
R6	MAXIMUM	159	330	186	< 0.01	8.35	24	8.5	27
R6	N > DL	14	13	14	1	12	13	12	10
R6	Median	130	280	145	0.005	7.795	20.5	0.45	1.5
R7	08-Jan-08		251	119	0.01	7.9	9.67	0.3	< 1
R7	19-Feb-08		269	132	0.01	8.1	8.99	1	< 1
R7	18-Mar-08		268	139	< 0.01	7.5	9.94	2.9	< 1
R7	14-Apr-08		259	141	0.02	7.7	10.4	1.4	< 1
R7	15-May-08		72	40	0.03	8.8	2.2	1.3	3
R7	25-May-08	17		25.2	0.15		< 0.5		33
R7	17-Jun-08		106	69	0.02	8.2	5.76	6.8	4
R7	15-Jul-08		93	47	< 0.01	7.8	4.18	6.6	43
R7	22-Jul-08	58		63.6	< 0.01		6.9		3
R7	12-Aug-08		147	76	0.01	7.6	6.52	7.7	< 1
R7	21-Aug-08	78		80.1	< 0.01		6.6		< 1
R7	04-Sep-08	62	150	70.3	0.04		7.2		2
R7	04-Sep-08	68	150	69.7			7.1		4
R7	15-Sep-08		138	58	0.02	7.3	6.76	5.6	1
R7	15-Oct-08		170	79	0.02	7.6	7.72	1.9	< 1
R7	04-Nov-08		187	99	0.02	8.2	8.48	1.3	< 1
R7	02-Dec-08		218	116	0.02	7.8	8.96	1.2	3

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Station	Date	ALK-T mg/L	COND-L µS/cm	HARD mg/L	NH3 mg/L	PH-F pH unit	SO4 mg/L	TEMP-F °C	TSS mg/L
R7	MEAN	56.6	177	83.76	0.03	7.88	6.93	3.17	6.12
R7	MINIMUM	17	72	25.2	< 0.01	7.3	< 0.5	0.3	< 1
R7	MAXIMUM	78	269	141	0.15	8.8	10.4	7.7	43
R7	N > DL	5	14	17	12	12	16	12	9
R7	Median	62	160	76	0.02	7.8	7.1	1.65	1
R8	08-Jan-08		246	120	< 0.01	7.9	9.55	0.5	< 1
R8	19-Feb-08		267	159	0.03	8	9.1	0.9	< 1
R8	18-Mar-08		266	138	0.01	7.6	9.84	2.3	< 1
R8	14-Apr-08		256	132	0.02	7.8	10.3	0.7	< 1
R8	15-May-08		76	38	0.03	8.7	2.41	1.2	4
R8	17-Jun-08		94	45	< 0.01	8	5.17	7.1	3
R8	15-Jul-08		79	41	0.01	7.7	4.02	6.4	69
R8	12-Aug-08		136	70	0.01	7.5	6.13	7.4	< 1
R8	15-Sep-08		122	67	0.03	7.3	6.15	5.8	2
R8	15-Oct-08		153	74	0.02	7.6	7.05	1.6	< 1
R8	04-Nov-08		177	90	< 0.01	7.7	8.08	0.3	1
R8	02-Dec-08		207	123	0.05	7.9	8.62	0.1	1
R8	MEAN		173.25	91.42	0.02	7.81	7.20	2.86	7.17
R8	MINIMUM		76	38	< 0.01	7.3	2.41	0.1	< 1
R8	MAXIMUM		267	159	0.05	8.7	10.3	7.4	69
R8	N > DL		12	12	9	12	12	12	6
R8	Median		165	82	0.015	7.75	7.565	1.4	1
R9	08-Jan-08		270	128	< 0.01	8	18.4	0.2	< 1
R9	19-Feb-08		296	142	0.02	8.1	18.6	1.1	< 1
R9	18-Mar-08		292	152	0.01	7.4	19.9	2.4	< 1
R9	14-Apr-08		303	150	0.03	7.7	20.1	0.4	< 1
R9	15-May-08		80	41	0.02	8.4	3.59	1.4	3
R9	17-Jun-08		102	60	0.01	7.9	6.61	7.2	2
R9	15-Jul-08		85	43	0.01	7.5	4.86	7.1	68
R9	12-Aug-08		149	77	0.01	7.5	8.73	7.2	< 1
R9	15-Sep-08		132	65	0.03	7.4	7.85	6.1	4
R9	15-Oct-08		177	85	< 0.01	7.5	11.5	1.1	< 1
R9	04-Nov-08		194	99	< 0.01	7.7	12.5	0.9	< 1
R9	02-Dec-08		226	137	0.11	7.8	14.1	0.8	< 1
R9	MEAN		192.17	98.25	0.02	7.74	12.23	2.99	7.08
R9	MINIMUM		80	41	< 0.01	7.4	3.59	0.2	< 1
R9	MAXIMUM		303	152	0.11	8.4	20.1	7.2	68
R9	N > DL		12	12	9	12	12	12	4
R9	Median		185.5	92	0.01	7.7	12	1.25	1
R10	08-Jan-08		272	120	0.02	8	18.5	0.2	< 1
R10	19-Feb-08		297	140	0.01	8	18.8	1	< 1
R10	18-Mar-08		297	154	0.02	7.4	20.6	2.7	3
R10	14-Apr-08		279	150	0.03	7.6	20.5	0.2	< 1
R10	15-May-08		81	43	0.02	8.3	3.88	1.4	4
R10	17-Jun-08		102	59	< 0.01	7.9	6.64	7.1	2
R10	15-Jul-08		87	43	0.01	7.5	5.08	7	73
R10	12-Aug-08		148	76	< 0.01	7.5	8.64	7.3	< 1
R10	15-Sep-08		132	64	0.04	7.4	7.87	5.9	2
R10	15-Oct-08		168	78	< 0.01	7.5	10.1	1	< 1

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Station	Date	ALK-T mg/L	COND-L µS/cm	HARD mg/L	NH3 mg/L	PH-F pH unit	SO4 mg/L	TEMP-F °C	TSS mg/L
R10	04-Nov-08		194	104	< 0.01	7.6	12.5	0.9	< 1
R10	02-Dec-08		227	123	0.02	7.7	14.3	0.7	2
R10	MEAN		190.33	96.17	0.0175	7.7	12.28	2.95	7.67
R10	MINIMUM		81	43	< 0.01	7.4	3.88	0.2	< 1
R10	MAXIMUM		297	154	0.04	8.3	20.6	7.3	73
R10	N > DL		12	12	8	12	12	12	6
R10	Median		181	91	0.015	7.6	11.3	1.2	1.5
R11	04-Mar-08	151	378	190	< 0.01	7.8	53.7	0.3	< 1
R11	19-Aug-08	118	244	133	0.02	7.7	32.6	9.2	4
SP5-6	02-Jun-08		1070	749	< 0.01	7.5	461	7.7	< 1
SP5-6	29-Sep-08		2050	1180	0.03	7.6	938	4	7
W5	02-Jun-08		1360	809	< 0.01	7.6	611	4	5
W5	30-Sep-08		872	554	0.04	7.2	329	2.4	3
W8	01-Jun-08		54	25	0.02	7.7	2.99	5.6	< 1
W8	29-Sep-08		105	52	0.02	7	6.56	4.2	1
W10	21-May-08	17	43	23.1	< 0.005	7.08	< 0.5	0	3
W10	01-Jun-08		54	24	< 0.01	7.6	2.97	5.1	< 1
W10	24-Jun-08	34	82	36.7	< 0.005	7.46	1.1		2
W10	30-Jul-08	49	110	44.9	< 0.005	7.41	3.3	3.8	< 1
W10	17-Sep-08	45	94	45	< 0.005	7.14	3.9	3.5	< 1
W10	29-Sep-08		95	49	0.04	7.1	3.96	3	2
W10	08-Oct-08	48	100	45.4	< 0.005		4.8	-0.05	< 1
W10	MEAN	38.6	82.57	38.30	0.01	7.30	2.93	2.56	1.57
W10	MINIMUM	17	43	23.1	< 0.005	7.08	< 0.5	-0.05	< 1
W10	MAXIMUM	49	110	49	0.04	7.6	4.8	5.1	3
W10	N > DL	5	7	7	1	6	6	6	3
W10	Median	45	94	44.9	0.005	7.275	3.3	3.25	1
WEIR3	03-Mar-08	294	1830	929	0.65	6.8	718	2.6	4
WEIR3	19-Aug-08	344	1690	930	0.61	7	718	9.3	2
X2	07-Jan-08		297	119	0.01	7.5	30.9	0.1	< 1
X2	18-Feb-08		339	168	< 0.01	7.2	36.4	1.3	< 1
X2	17-Mar-08		328	151	< 0.01	7.4	38.2	0.4	< 1
X2	14-Apr-08		317	162	0.03	7.5	36.3	1.8	< 1
X2	14-May-08		80	41	0.03	8.4	6.12	1.3	2
X2	12-Jun-08		99.7	48.5	< 0.02		7.92		
X2	16-Jun-08		105	68	< 0.01	7.8	8.35	5.8	4
X2	14-Jul-08		110	54	0.12	7.8	7.3	7.9	< 1
X2	22-Jul-08	55		63.9	< 0.01		9.7		2
X2	11-Aug-08		151	78	0.01	7.9	11.7	8.3	< 1
X2	19-Aug-08	76		80.2	< 0.01		9.7		5
X2	25-Aug-08	44	110	53.2	< 0.005		8.1		30
X2	15-Sep-08		138	68	0.02	8	10.1	5.3	< 1
X2	15-Oct-08		180	85	0.05	7.6	14.6	1.6	< 1
X2	03-Nov-08		211	116	0.01	7.7	22.2	1.1	< 1
X2	01-Dec-08		247	139	0.03	8.2	23.7	0.2	3
X2	MEAN	58.33	193.76	93.43	0.02	7.75	17.58	2.93	3.67
X2	MINIMUM	44	80	41	< 0.005	7.2	6.12	0.1	< 1
X2	MAXIMUM	76	339	168	0.12	8.4	38.2	8.3	30

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Station	Date	ALK-T mg/L	COND-L µS/cm	HARD mg/L	NH3 mg/L	PH-F pH unit	SO4 mg/L	TEMP-F °C	TSS mg/L
X2	N > DL	3	14	16	9	12	16	12	6
X2	Median	55	165.5	79.1	0.01	7.75	10.9	1.45	1
X3	07-Jan-08		295	138	0.03	7.6	29.9	0.2	< 1
X3	18-Feb-08		338	169	0.02	7.3	35.6	1.2	< 1
X3	17-Mar-08		323	146	0.02	7.3	36.4	0.3	< 1
X3	14-Apr-08		314	160	0.04	7.4	34.7	1.1	< 1
X3	14-May-08		86	42	0.02	8.3	7.45	1.4	10
X3	16-Jun-08		100	52	< 0.01	8	8.06	6.7	3
X3	14-Jul-08		125	62	0.03	8	8.95	8.3	3
X3	11-Aug-08		160	85	0.02	8.1	13.4	9.3	< 1
X3	15-Sep-08		156	76	0.03	8	13.2	5.5	1
X3	15-Oct-08		195	92	0.04	7.7	16.3	1.8	< 1
X3	03-Nov-08		215	116	0.02	7.9	21.4	1	< 1
X3	01-Dec-08		250	146	0.04	8.1	23.5	0.1	< 1
X3	MEAN		213.08	107.00	0.03	7.81	20.74	3.08	2.08
X3	MINIMUM		86	42	< 0.01	7.3	7.45	0.1	< 1
X3	MAXIMUM		338	169	0.04	8.3	36.4	9.3	10
X3	N > DL		12	12	11	12	12	12	4
X3	Median		205	104	0.025	7.95	18.85	1.3	1
X4	08-Jan-08		1330	708	0.19	6.5	816	0.2	14
X4	19-Feb-08		1300	656	0.18	7.1	693	1.4	16
X4	18-Mar-08		1000	490	0.18	6.6	475	0.8	10
X4	15-Apr-08		1210	653	0.17	6.8	719	2	6
X4	15-May-08		1120	564	0.13	7.2	632	4	10
X4	16-Jun-08		1080	563	0.11	6.7	658	13	2
X4	14-Jul-08		1250	677	0.13	4.2	698	15.1	2
X4	11-Aug-08		1330	708	0.12	3.8	835	15	4
X4	15-Sep-08		1800	710	0.13	3.2	941	9.7	8
X4	15-Oct-08		1890	760	0.15	3.4	996	2.4	5
X4	04-Nov-08		2010	906	0.15	3.6	1060	1.5	2
X4	01-Dec-08		1960	987	0.21	3.4	1060	0.2	7
X4	MEAN		1440	698.5	0.15	5.21	798.58	5.44	7.17
X4	MINIMUM		1000	490	0.11	3.2	475	0.2	2
X4	MAXIMUM		2010	987	0.21	7.2	1060	15.1	16
X4	N > DL		12	12	12	12	12	12	12
X4	Median		1315	692.5	0.15	5.35	767.5	2.2	6.5
X5	14-Apr-08	230	1770	865	0.68	7.4	756	2.5	< 1
X5	15-Apr-08	236	1820	905	0.71	7.4	767	2.7	< 1
X5	22-Apr-08	219	1860	942	0.7	7.3	856	3.5	2
X5	29-Apr-08	152	1770	933	0.57	7.6	832	5.5	< 1
X5	06-May-08	105	1400	771	0.57	7.8	718	3.9	1
X5	13-May-08	86.3	1460	700	0.57	8.7	710	5.3	< 1
X5	15-May-08	92.2	1490	629	0.52	8.8	689	5.4	< 1
X5	20-May-08	90.9	1360	717	0.52	8.1	622	6.6	< 1
X5	27-May-08	96.5	1280	704	0.52	7.3	1	10	< 1
X5	03-Jun-08	53.4	1110	620	0.44	7.9	577	13.1	< 1
X5	10-Jun-08	97.9	1300	745	0.6	7.5	674	10.4	1
X5	16-Jun-08	56.3	1100	616	0.63	8.6	603	11.8	< 1

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X5	17-Jun-08	69.6	1150	648	0.56	7.6	630	12.8	< 1
X5	24-Jun-08	168	1820	962	0.77	7.3	879	12	< 1
X5	01-Jul-08	121	1460	876	0.72	7.3	741	12.6	< 1
X5	08-Jul-08	126	1370	795	0.81	7.3	756	13.1	< 1
X5	14-Jul-08	151	1600	869	0.76	7.5	739	13.5	< 1
X5	16-Jul-08	139	1390	841	0.79	7.3	736	13.3	< 1
X5	22-Jul-08	125	1360	778	0.82	7.4	744	12.9	< 1
X5	31-Jul-08	121	1320	707	0.78	7.7	714	11.6	< 1
X5	05-Aug-08	159	1820	886	0.77	7.5	819	14	< 1
X5	11-Aug-08	175	1590	857	0.65	7.5	839	14.4	< 1
X5	12-Aug-08	111	1280	754	0.67	7.6	692	14	2
X5	19-Aug-08	126	1320	796	0.82	7.7	709	13.1	1
X5	28-Aug-08	122	1340	782	0.75	7.3	712	11.3	< 1
X5	02-Sep-08	136	1400	803	0.73	7.6	753	11	2
X5	03-Sep-08					7.8		11.8	
X5	09-Sep-08	98	1240	737	0.68	8.2	680	10.6	2
X5	15-Sep-08	97.6	1320	708	0.67	7.7	717	8.7	< 1
X5	16-Sep-08	101	1340	700	0.7	7.4	720	8.3	< 1
X5	23-Sep-08	98.9	1380	743	0.6	7.5	755	6	< 1
X5	30-Sep-08	113	1690	897	0.58	7.3	811	5.5	< 1
X5	07-Oct-08	67.3	1830	930	0.66	7.8	828	4.1	1
X5	14-Oct-08	194	2120	953	0.57	7.8	911	3.7	< 1
X5	15-Oct-08	189	1960	981	0.57	7.4	884	3.6	3
X5	21-Oct-08	253	2140	1170	0.6	7.5	1030	5.2	1
X5	MEAN	130.76857	1513.1429	809.14286	0.6588571	7.65	731.54286	9.1055556	1.1714286
X5	MINIMUM	53.4	1100	616	0.44	7.3	1	2.5	< 1
X5	MAXIMUM	253	2140	1170	0.82	8.8	1030	14.4	3
X5	N > DL	35	35	35	35	36	35	36	10
X5	Median	121	1400	795	0.67	7.5	739	10.5	1
X5P	08-Jan-08	217	1770	891	0.77	7.4	772	0.1	< 1
X5P	19-Feb-08	273	1770	870	0.69	7.3	676	2	1
X5P	18-Mar-08	286	1660	794	0.63	7.1	660	0.9	< 1
X5P	04-Nov-08	122	1760	1020	0.58	7.4	835	1.5	< 1
X5P	01-Dec-08	176	1720	888	0.77	7.4	739	2	< 1
X5P	03-Dec-08					7.6		1.1	
X5P	MEAN	214.8	1736	892.6	0.688	7.37	736.40	1.27	1
X5P	MINIMUM	122	1660	794	0.58	7.1	660	0.1	< 1
X5P	MAXIMUM	286	1770	1020	0.77	7.6	835	2	< 1
X5P	N > DL	5	5	5	5	6	5	6	1
X5P	Median	217	1760	888	0.69	7.4	739	1.3	1
X7	01-Jun-08		11500	3900	0.99	5.9	7150	4.6	72
X7	29-Sep-08		13000	3730	1.14	5.7	7810	4.3	133
X10	08-Jan-08	115	307	151	0.03	7.6	30.9	1.1	< 1
X10	24-Jan-08	130	310	164	< 0.005	7.5	35.3		< 1
X10	19-Feb-08	153	353	181	0.02	7.5	36.4	2.2	< 1
X10	20-Feb-08	160	370	181	< 0.005	7.16	44.9	-0.5	< 1
X10	11-Mar-08	140	330	176	< 0.005	6.36	38	-0.5	< 1
X10	18-Mar-08	155	333	152	0.01	7.6	36.4	2.4	< 1

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X10	15-Apr-08	138	333	172	0.03	7.8	35.9	2.6	< 1
X10	29-Apr-08	120	300	151	< 0.005	7.84	37	-0.5	1
X10	15-May-08	37.8	106	53	0.04	8.6	8.41	2.3	5
X10	22-May-08	38	100	46.2	< 0.005	7.67	< 0.5	2	8
X10	16-Jun-08	47.3	118	53	< 0.01	7.7	9.24	8	< 1
X10	24-Jun-08	28	78	35.2	< 0.005	7.13	5		27
X10	14-Jul-08	73.1	138	73	0.03	8.1	9.58	9.2	1
X10	30-Jul-08	80	190	92.6	< 0.005	8.46	14	6.9	< 1
X10	11-Aug-08	75.9	181	94	0.03	8.4	14.7	10.6	< 1
X10	15-Sep-08	85.9	171	86	0.04	8	13.8	6.3	1
X10	18-Sep-08	78	180	90.9	< 0.005	7.48	14	4.5	2
X10	07-Oct-08	95	220	107	< 0.005	8.15	21	-1	2
X10	15-Oct-08	107	214	103	< 0.01	7.9	17.6	3.2	< 1
X10	04-Nov-08	95.1	235	130	0.02	7.4	23.1	2.1	5
X10	01-Dec-08	108	264	156	0.04	7.8	25.6	1.1	< 1
X10	10-Dec-08	120	270	144	< 0.005		28	0.4	1
X10	MEAN	99.1	231.9	117.81364	0.0163636	7.72	22.7	3.12	3.0
X10	MINIMUM	28	78	35.2	< 0.005	6.36	< 0.5	-1	< 1
X10	MAXIMUM	160	370	181	0.04	8.6	44.9	10.6	27
X10	N > DL	22	22	22	10	21	21	20	10
X10	Median	101.05	227.5	118.5	0.01	7.7	22.05	2.25	1
X11	03-Mar-08	327	2760	1420	0.7	7	1280	3.6	8
X11	19-Aug-08	393	2820	1530	0.72	7	1300	9.1	6
X12	03-Mar-08	230	1210	691	0.01	7	477	0.9	4
X12	19-Aug-08	284	1130	684	0.01	7.3	450	10.6	< 1
X13	08-Jan-08	257	1900	1000	0.57	7.3	825	2.5	4
X13	19-Feb-08	306	2060	1170	0.83	7.1	832	3.4	7
X13	18-Mar-08	328	2090	1160	0.58	7	890	3.3	6
X13	15-Apr-08	297	2160	1190	0.68	7.3	957	4.7	5
X13	15-May-08	259	2180	1210	0.67	7.5	856	6.2	4
X13	16-Jun-08	276	2010	1200	0.56	7.2	937	9.1	4
X13	14-Jul-08	347	1930	1130	0.61	7	850	8.1	4
X13	11-Aug-08	278	1910	879	0.42	7.1	862	9.8	5
X13	02-Sep-08					7		7	
X13	15-Sep-08	331	2000	1140	0.67	7.2	933	6.1	6
X13	15-Oct-08	349	1940	971	0.58	7.4	838	4.5	6
X13	04-Nov-08	296	1970	723	0.43	7.1	964	3.9	6
X13	01-Dec-08	297	2170	1280	0.75	7.1	965	2.2	8
X13	03-Dec-08					7.3		2.4	
X13	MEAN	301.75	2026.67	1087.75	0.61	7.19	892.42	5.23	5.42
X13	MINIMUM	257	1900	723	0.42	7	825	2.2	4
X13	MAXIMUM	349	2180	1280	0.83	7.5	965	9.8	8
X13	N > DL	12	12	12	12	14	12	14	12
X13	Median	297	2005	1150	0.595	7.15	876	4.6	5.5
X14	08-Jan-08	141	606	299	0.09	7.7	172	0.4	< 1
X14	24-Jan-08	160	660	364	0.097	7.5	191		1
X14	19-Feb-08	194	813	406	0.16	7.6	254	2	3
X14	20-Feb-08	200	840	422	0.128	7.3	279	0	2

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X14	11-Mar-08	190	800	437	0.138	6.36	303	0.5	1
X14	18-Mar-08	204	797	399	0.15	7.5	275	1.3	1
X14	14-Apr-08	197	1130	619	0.38	7.5	466	3.5	12
X14	15-Apr-08	204	1150	607	0.37	7.7	467	2.8	8
X14	22-Apr-08	205	1190	613	0.37	7.6	504	4	3
X14	29-Apr-08	142	1080	570	0.3	7.9	472	5.8	4
X14	29-Apr-08	170	1100	563	0.241	7.6	460	2	7
X14	06-May-08	89.8	699	343	0.21	7.9	269	3	6
X14	13-May-08	45.7	299	145	0.07	8.6	97.2	3.3	9
X14	15-May-08	50.2	330	160	0.09	8.5	108	3.5	7
X14	20-May-08	34.5	166	80	0.04	8.4	39.5	4.3	7
X14	22-May-08	39	180	80.4	0.006	7.5	44	1	13
X14	26-May-08	28		72.4	0.05		30		32
X14	26-May-08	29		55.3	0.14		26		33
X14	27-May-08	27	105	52	0.02	8.3	19.5	6.5	6
X14	03-Jun-08	40.9	186	88	0.03	8.3	45.9	7.4	< 1
X14	10-Jun-08	50.4	208	103	0.04	8.3	47.6	6	4
X14	16-Jun-08	54.3	235	114	0.04	8	56.1	8.5	2
X14	17-Jun-08	52.2	223	102	0.05	7.9	56.8	10.7	< 1
X14	24-Jun-08	34.6	137	61	0.03	8.3	30.4	8.6	29
X14	24-Jun-08	34	160	65.4	0.012	7.1	33		26
X14	01-Jul-08	63.6	289	143	0.07	8	78.3	10.3	1
X14	08-Jul-08	83	257	119	0.03	8.4	59	10	< 1
X14	14-Jul-08	81	217	104	0.03	7.9	40.7	9.5	2
X14	16-Jul-08	59.8	172	95	0.03	7.9	33.6	9	9
X14	22-Jul-08	80.9	237	128	0.05	7.8	48.2	8.4	< 1
X14	30-Jul-08	89	330	157	0.034	7.95	66	7	1
X14	31-Jul-08	106	315	139	0.07	8.1	76.6	8.1	< 1
X14	05-Aug-08	108	348	178	0.09	8	93.8	10.7	1
X14	11-Aug-08	91.9	336	171	0.07	8	86.3	11	< 1
X14	12-Aug-08	109	337	172	0.09	7.9	82.8	10.9	< 1
X14	19-Aug-08	112	318	168	0.06	7.9	75.9	9.9	2
X14	28-Aug-08	82.2	206	116	0.04	7.7	34	7	3
X14	02-Sep-08	99.5	275	138	0.05	8	60.1	7.3	1
X14	09-Sep-08	85.9	231	116	0.05	8.1	49.8	7.7	3
X14	15-Sep-08	91.9	291	145	0.07	7.8	68	6.4	1
X14	16-Sep-08	91.1	291	138	0.06	7.3	66.8	5.5	1
X14	18-Sep-08	84	310	154	0.036	7.31	69	4.5	1
X14	23-Sep-08	89.7	328	161	0.06	7.8	84.3	2.8	< 1
X14	30-Sep-08	89.5	322	160	0.08	7.7	79.8	3.4	< 1
X14	07-Oct-08	48.8	350	171	0.07	8.2	79.7	3.1	3
X14	07-Oct-08	100	340	160	0.019	7.2	64	-0.05	3
X14	14-Oct-08	129	441	204	0.08	8.1	122	2.5	1
X14	15-Oct-08	121	419	202	0.09	7.8	111	2.5	1
X14	21-Oct-08	138	473	220	0.07	7.8	130	3.2	4
X14	04-Nov-08	105	305	158	0.03	7.5	51.2	1.8	< 1
X14	01-Dec-08	121	390	236	0.05	7.9	79	0.3	< 1
X14	10-Dec-08	130	420	221	0.032		77	0.2	2

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X14	MEAN	100.1	432.8	213.4	0.092	7.82	129.1	5.17	5.15
X14	MINIMUM	27	105	52	0.006	6.36	19.5	-0.05	< 1
X14	MAXIMUM	205	1190	619	0.38	8.6	504	11	33
X14	N > DL	52	50	52	52	49	52	48	40
X14	Median	90.45	325	159	0.065	7.9	76.8	4.4	2
X22B	07-Jan-08		1200	591	1.07	7.2	627	0.3	< 1
X22B	18-Feb-08		1230	604	1.42	6.8	613	1.9	< 1
X22B	17-Mar-08		1150	605	0.74	6.9	606	1.6	1
X22B	15-Apr-08		1110	646	0.58	7	605	2.1	< 1
X22B	14-May-08		1160	634	1.41	7.2	608	5	< 1
X22B	16-Jun-08		1160	667	0.42	7.2	527	8.3	< 1
X22B	14-Jul-08		1160	642	1.16	7.2	575	13.5	< 1
X22B	12-Aug-08		1100	616	0.99	7.4	540	13.4	< 1
X22B	15-Sep-08		1150	601	1.1	7	605	10.1	1
X22B	15-Oct-08		1220	594	1.05	7.5	608	5.4	< 1
X22B	04-Nov-08		1230	705	1.15	6.5	641	1.4	< 1
X22B	02-Dec-08		1240	788	1.24	7.4	638	0	< 1
X22B	MEAN		1175.83	641.08	1.03	7.11	599.42	5.25	1
X22B	MINIMUM		1100	591	0.42	6.5	527	0	< 1
X22B	MAXIMUM		1240	788	1.42	7.5	641	13.5	< 1
X22B	N > DL		12	12	12	12	12	12	2
X22B	Median		1160	625	1.085	7.2	607	3.55	1
X23	08-Jan-08		10400	4470	0.94	7.1	5180	1.8	38
X23	19-Feb-08		10900	4780	0.9	7	5090	1.8	31
X23	18-Mar-08		10400	5050	0.82	6.9	5460	3.1	48
X23	14-May-08		11600	3950	0.74	6.1	6140	5.6	162
X23	17-Jun-08		12000	4820	0.83	6.6	5670	11.1	153
X23	15-Jul-08		10600	1900	0.27	3.2	4830	8.4	374
X23	12-Aug-08		10700	5070	1.06	6.4	5540	8	165
X23	15-Sep-08		11000	5250	0.87	6.4	6400	9.5	262
X23	15-Oct-08		11400	5280	0.75	6.2	6870	3.9	248
X23	04-Nov-08		12300	6010	0.95	6.5	7120	0.2	158
X23	02-Dec-08		12100	5890	1.12	6.6	7160	0.8	205
X23	MEAN		11218.2	4770.0	0.8	6.3	5950.9	4.9	167.6
X23	MINIMUM		10400	1900	0.27	3.2	4830	0.2	31
X23	MAXIMUM		12300	6010	1.12	7.1	7160	11.1	374
X23	N > DL		11	11	11	11	11	11	11
X23	Median		11000	5050	0.87	6.5	5670	3.9	162
X26	16-Jun-08		4130	2460	0.94	6.5	2150	5	11
X26	15-Jul-08		4730	2700	1.13	6.3	2320	5.8	17
X26	12-Aug-08		4690	2640	1.15	6.5	2500	7.7	42
X26	15-Sep-08		4700	2620	1.36	6.2	2670	4.3	85
X26	MEAN		4562.5	2605	1.145	6.375	2410	5.7	38.75
X26	MINIMUM		4130	2460	0.94	6.2	2150	4.3	11
X26	MAXIMUM		4730	2700	1.36	6.5	2670	7.7	85
X26	N > DL		4	4	4	4	4	4	4
X26	Median		4695	2630	1.14	6.4	2410	5.4	29.5

Appendix 3
2008 Surface Water Quality Data
Rose Creek Drainage

Table 1. Surface Water Routine Parameters

Station	Date	ALK-T mg/L	COND-L µS/cm	HARD mg/L	NH3 mg/L	PH-F pH unit	SO4 mg/L	TEMP-F °C	TSS mg/L

Note:
Statistics only generated where there are more than 2 values in a data set

average	*average of values, including values less than detection limit as set to DL value if it is the DL value will be shown without the < symbol*
minimum	*lowest value and will be least DL value if these are present in the data set*
maximum	*highest vale*
N > DL	*number of values measured that are above detection limits*
median	*the median value of the data set - if it is a DL value will be shown without the < symbol*

Detection Limit values used as the DL value in statistics contrasts with conversion to 0 for charts

Appendix 3

2008 Surface Water Quality Data – Rose Creek Drainage

Appendix 3
2008 Surface Water Quality Data
Rose Creek Drainage

Table 2. Surface Water Total Metals

Station	Date	AG-T mg/L	AL-T mg/L	AS-T mg/L	BA-T mg/L	BE-T mg/L	BI-T mg/L	B-T mg/L	CA-T mg/L	CD-T mg/L	CO-T mg/L	CR-T mg/L	CU-T mg/L	FE-T mg/L	HG-T mg/L	K-T mg/L	LI-T mg/L	MG-T mg/L	MN-T mg/L	MO-T mg/L	NA-T mg/L	NI-T mg/L	PB-T mg/L	P-T mg/L	SB-T mg/L	SE-T mg/L	SI-T mg/L	SN-T mg/L	SR-T mg/L	TE-T mg/L	TH-T mg/L	TI-T mg/L	TL-T mg/L	U-T mg/L	V-T mg/L	ZN-T mg/L	ZR-T mg/L
A25	02-Jun-08	< 0.00025	< 0.005	< 0.001	0.06	< 0.001	< 0.001	< 0.05	56	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	2.1	0.008	17.2	< 0.001	0.0006	3.14	< 0.001	0.001	< 0.15	< 0.001	< 0.001	1.8	< 0.001	0.61	< 0.001	< 0.0005	< 0.001	0.0001	0.0013	< 0.001	< 0.005	< 0.01
A25	30-Sep-08	< 0.00025	< 0.005	< 0.001	0.076	< 0.001	< 0.001	< 0.05	50.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	2.1	0.009	15.2	< 0.001	0.0008	2.87	< 0.001	< 0.001	< 0.15	< 0.001	0.001	2.5	< 0.001	0.55	< 0.001	< 0.0005	< 0.001	0.0001	0.0012	< 0.001	< 0.005	< 0.01
A30	02-Jun-08	0.0019	26	< 0.001	0.009	0.006	< 0.001	< 0.05	47.3	0.166	0.3	0.014	2.44	34.3	< 0.00002	1.5	0.044	131	7.9	0.0009	3.16	0.27	1.03	< 0.15	< 0.001	0.002	9.2	< 0.001	0.23	< 0.001	0.0086	< 0.001	0.0004	0.018	< 0.001	127	< 0.01
A30	30-Sep-08	0.0014	14.5	< 0.001	0.013	0.006	< 0.001	< 0.05	48.8	0.108	0.24	0.007	1.61	5.83	< 0.00002	1.4	0.04	83.7	5.53	< 0.0005	4.3	0.2	0.92	< 0.15	< 0.001	0.002	11.5	< 0.001	0.25	< 0.001	0.0026	0.001	0.0004	0.013	< 0.001	74.8	< 0.01
FAROCR	08-Jan-08	< 0.00025	0.018	< 0.001	0.028	< 0.001	< 0.001	< 0.05	11	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.5	0.002	2.57	< 0.001	0.0007	2.13	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6	< 0.001	0.05	< 0.001	< 0.0005	< 0.001	0.0001	0.0007	< 0.001	0.008	< 0.01
FAROCR	15-May-08	< 0.00025	0.61	< 0.001	0.037	< 0.001	< 0.001	< 0.05	7.64	0.0002	< 0.001	< 0.001	0.01	0.8	< 0.00002	1.1	0.003	1.79	0.017	< 0.0005	1.43	0.005	0.02	< 0.15	< 0.001	< 0.001	4.8	< 0.001	0.039	< 0.001	< 0.0005	0.022	0.0001	0.0006	0.001	0.056	< 0.01
FAROCR	17-Jun-08	< 0.00025	0.15	< 0.001	0.016	< 0.001	< 0.001	< 0.05	4.36	< 0.0002	< 0.001	< 0.001	0.003	0.07	< 0.00002	0.4	< 0.001	1.04	0.003	< 0.0005	1.8	0.001	0.004	< 0.15	< 0.001	< 0.001	6.9	< 0.001	0.023	< 0.001	< 0.0005	0.002	0.0001	< 0.0005	< 0.001	0.025	< 0.01
FAROCR	15-Jul-08	< 0.00025	3.01	0.001	0.057	< 0.001	< 0.001	< 0.05	4.78	0.0002	0.003	0.007	0.015	4.09	< 0.00002	1	0.011	2.06	0.093	< 0.0005	1.38	0.013	0.076	0.2	< 0.001	< 0.001	10.1	< 0.001	0.027	< 0.001	< 0.0005	0.12	0.0001	0.0007	0.007	0.1	< 0.01
FAROCR	12-Aug-08	< 0.00025	0.13	< 0.001	0.02	< 0.001	< 0.001	< 0.05	6.54	< 0.0002	< 0.001	< 0.001	0.002	0.06	< 0.00002	0.3	0.005	1.82	0.004	< 0.0005	2.01	0.001	0.003	< 0.15	< 0.001	< 0.001	13.6	< 0.001	0.034	< 0.001	< 0.0005	0.002	0.0001	0.0005	< 0.001	0.019	< 0.01
FAROCR	15-Sep-08	< 0.00025	0.16	< 0.001	0.017	< 0.001	< 0.001	< 0.05	4.51	< 0.0002	< 0.001	< 0.001	0.002	0.19	< 0.00002	0.2	0.002	1.07	0.004	< 0.0005	1.61	< 0.001	0.003	< 0.15	< 0.001	< 0.001	6.3	< 0.001	0.031	< 0.001	< 0.0005	0.004	0.0001	< 0.0005	< 0.001	0.011	< 0.01
FAROCR	15-Oct-08	< 0.00025	0.063	< 0.001	0.016	< 0.001	< 0.001	< 0.05	5.47	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	0.2	0.002	1.15	0.001	< 0.0005	1.44	< 0.001	0.002	< 0.15	< 0.001	< 0.001	6.7	< 0.001	0.029	< 0.001	< 0.0005	0.001	0.0001	< 0.0005	< 0.001	0.01	< 0.01
FAROCR	04-Nov-08	0.0004	0.096	< 0.001	0.021	< 0.001	< 0.001	< 0.05	7.33	0.0002	< 0.001	< 0.001	0.003	0.08	< 0.00002	0.3	0.002	1.89	0.004	< 0.0005	2.13	< 0.001	0.003	< 0.15	< 0.001	< 0.001	7.1	< 0.001	0.038	< 0.001	< 0.0005	< 0.001	0.0001	0.0005	< 0.001	0.05	< 0.01
FAROCR	02-Dec-08	< 0.00025	0.042	< 0.001	0.022	< 0.001	< 0.001	< 0.05	9.58	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.4	0.002	1.89	0.001	0.0006	2.25	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	8	< 0.001	0.042	< 0.001	< 0.0005	< 0.001	0.0001	0.0006	< 0.001	0.013	< 0.01
FAROCR	MEAN	0.000266667	0.4754	0.001	0.026	0.001	0.001	0.05	6.80	0.0002	0.00122	0.00167	0.00422	0.60	0.00002	0.49	0.003	1.70	0.014	0.000533	1.79778	0.002778	0.0125556	0.15556	0.001	0.001	7.72222	0.001	0.0347778	0.001	0.0005	0.01711	0.0001	0.000567	0.0016667	0.0324444	0.01
FAROCR	MINIMUM	< 0.00025	0.018	< 0.001	0.016	< 0.001	< 0.001	< 0.05	4.36	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.2	< 0.001	1.04	< 0.001	< 0.0005	1.38	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.8	< 0.001	0.023	< 0.001	< 0.0005	< 0.001	0.0001	< 0.0005	< 0.001	0.008	< 0.01
FAROCR	MAXIMUM	0.0004	3.01	< 0.001	0.057	< 0.001	< 0.001	< 0.05	11	< 0.0002	0.003	0.007	0.015	4.09	< 0.00002	1.1	0.011	2.57	0.093	0.0007	2.25	0.013	0.076	0.2	< 0.001	< 0.001	13.6	< 0.001	0.05	< 0.001	< 0.0005	0.12	0.0001	0.0007	0.007	0.1	< 0.01
FAROCR	N > DL	1	9	1	9	0	0	0	9	3	1	1	7	6	0	9	8	9	8	2	9	4	7	1	0	0	9	0	9	0	0	6	0	6	2	9	0
FAROCR	Median	0.00025	0.13	0.001	0.021	0.001	0.001	0.05	6.54	0.0002	0.001	0.001	0.002	0.07	0.00002	0.4	0.002	1.82	0.004	0.0005	1.8	0.001	0.003	0.15	0.001	0.001	6.9	0.001	0.034	0.001	0.0005	0.002	0.0001	0.0005	0.001	0.019	0.01
FCO	02-Jun-08	< 0.00025	0.3	< 0.001	0.027	< 0.001	< 0.001	< 0.05	24.7	0.001	0.002	< 0.001	0.02	0.33	< 0.00002	0.9	0.002	4.18	0.081	< 0.0005	2.33	0.005	0.005	< 0.15	< 0.001	< 0.001	5.5	< 0.001	0.077	< 0.001	< 0.0005	0.006	0.0001	< 0.0005	< 0.001	0.77	< 0.01
FCO	30-Sep-08	< 0.00025	1.26	< 0.001	0.041	< 0.001	< 0.001	< 0.05	18.6	0.0043	0.008	< 0.001	0.13	0.99	< 0.00002	0.6	0.006	5.71	0.16	< 0.0005	2.58	0.015	0.003	< 0.15	< 0.001	< 0.001	8	< 0.001	0.08	< 0.001	< 0.0005	0.001	0.0001	0.0005	< 0.001	2.95	< 0.01
FDL	02-Jun-08	< 0.00025	0.18	< 0.001	0.01	< 0.001	< 0.001	< 0.05	1.73	< 0.0002	< 0.001	< 0.001	0.001	0.12	< 0.00002	0.4	< 0.001	0.39	0.004	< 0.0005	1.07	< 0.001	0.004	< 0.15	< 0.001	< 0.001	3.9	< 0.001	0.011	< 0.001	< 0.0005	0.003	0.0001	< 0.0005	< 0.001	0.007	< 0.01
FDL	29-Sep-08	< 0.00025	0.095	< 0.001	0.017	< 0.001	< 0.001	< 0.05	3.52	< 0.0002	< 0.001	< 0.001	< 0.001	0.08	< 0.00002	0.2	0.001	0.79	0.004	< 0.0005	1.72	< 0.001	0.002	< 0.15	< 0.001	0.001	6.7	< 0.001	0.023	< 0.001	< 0.0005	0.002	0.0001	< 0.0005	< 0.001	0.008	< 0.01
FDU	24-May-08	0.000014	0.385	0.00047	0.0255	0.00009	0.000021	< 0.05	2.15	0.000099	0.00046	0.0004	0.00268	0.75		0.8		0.42	0.0558	< 0.00005	0.69	0.00084	0.00425		0.00004	0.00004		< 0.00001	0.0148			0.0084	0.00001	0.000596	0.0009	0.0164	0.0003
FDU	02-Jun-08	< 0.00025	0.16	< 0.001	0.009	< 0.001	< 0.001	< 0.05	1.58	< 0.0002	< 0.001	< 0.001	0.001	0.09	< 0.00002	0.4	< 0.001	0.36	0.005	< 0.0005	1.11	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.8	< 0.001	0.01	< 0.001	< 0.0005	0.002	0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
FDU	29-Sep-08	< 0.00025	0.078	< 0.001	0.013	< 0.001	< 0.001	< 0.05	2.9	< 0.0002	< 0.001	< 0.001	< 0.001	0.06	< 0.00002	0.1	0.001	0.64	0.002	< 0.0005	1.69	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.8	< 0.001	0.021	< 0.001	< 0.0005	0.001	0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
FDU	MEAN	0.00017	0.20767	0.00082	0.01583	0.00070	0.00067	0.05	2.21	0.00017	0.00082	0.0008	0.00156	0.3	0.00002	0.43333	0.001	0.47333	0.0209333	0.00035	1.16333	0.000947	0.0020833	0.15	0.00068	0.00068	5.3	0.00067	0.0152667	0.001	0.0005	0.0038	7.1E-05	0.000532	0.0009667	0.0088	0.0067667
FDU	MINIMUM	0.000014	0.078	0.00047	0.009	0.00009	0.000021	< 0.05	1.58	9.9E-05	0.00047	0.0004	< 0.001	0.06	< 0.00002	0.1	< 0.001	0.36	0.002	< 0.00005	0.69	0.00084	< 0.001	< 0.15	0.00004	0.00004	3.8	< 0.00001	0.01	< 0.001	< 0.0005	0.001	1.2E-05	< 0.0005	0.0009	< 0.005	0.0003
FDU	MAXIMUM	< 0.00025	0.385	< 0.001	0.0255	< 0.001	< 0.001	< 0.05	2.9	< 0.0002	< 0.001	< 0.001	0.00268	0.75	< 0.00002	0.8	< 0.001	0.64	0.0558	< 0.0005	1.69	< 0.001	0.00425	< 0.15	< 0.001	< 0.001	6.8	< 0.001	0.021	< 0.001	< 0.0005	0.0084	0.0001	0.000596	< 0.001	0.0164	< 0.01
FDU	N > DL	1	3	1	3	1	1	0	3	1	1	1	2	3	0	3	1	3	3	0	3	1	1	0	1	0	2	0	3	0	0	3	1	1	1	1	1
FDU	Median	0.00025	0.16	0.001	0.013	0.001	0.001	0.05	2.15	0.0002	0.001	0.001	0.001	0.09	2E-05	0.4	0.001	0.42	0.005	0.0005	1.11	0.001	0.001	0.15	0.001	0.001	5.3	0.001	0.0148	0.001	0.0005	0.002	0.0001	0.0005	0.001	0.005	0.01
GCULV	07-Jan-08	< 0.00025	0.011	< 0.001	0.036	< 0.001	< 0.001	< 0.05	13.6	< 0.0002	< 0.001	< 0.001	< 0.001	0.06	< 0.00002	0.5	< 0.001	2.55	0.006	0.0006	2.05	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4	< 0.001	0.071	< 0.001	< 0.0005	< 0.001	0.0001	0.001	< 0.001	0.011	< 0.01
GCULV	18-Feb-08	< 0.00025	0.022	< 0.001	0.043	< 0.001	< 0.001	< 0.05	15.9	< 0.0002	< 0.001	0.001	< 0.001	0.08	< 0.00002	0.4	0.001	2.9	0.004	0.0006	2.65	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5	< 0.001	0.086	< 0.001	< 0.0005	< 0.001	0.0001	0.0009	0.003	< 0.005	< 0.01
GCULV	17-Mar-08	< 0.00025	0.013	< 0.001	0.046	< 0.001	< 0.001	< 0.05	16.1	< 0.0002	< 0.001	< 0.001	< 0.001	0.06	< 0.00002	0.6	0.001	3.48	0.001	0.0006	2.87	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.5	< 0.001	0.082	< 0.001	< 0.0005	< 0.001	0.0001	0.0017	< 0.001	< 0.005	< 0.01
GCULV	14-Apr-08	< 0.00025	0.006	< 0.001	0.047	< 0.001	< 0.001	< 0.05	16.4	< 0.0002	< 0.001	< 0.001	< 0.001	0.06	< 0.00002	0.6	0.002	3.27	0.001	0.0008	2.82	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.6	< 0.001	0.093	< 0.001	< 0.0005	< 0.001	0.0001	0.0018	< 0.001	0.005	< 0.01
GCULV	14-May-08	< 0.00025	0.069	< 0.001	0.027	< 0.001	< 0.001	< 0.05	7.46	< 0.0002	< 0.001	< 0.001	< 0.001	0.44	< 0.00002	0.8	< 0.001	1.12	0.039	< 0.0005	1.75	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.1	< 0.001	0.048	< 0.001	< 0.0005	0.002	0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
GCULV	16-Jun-08	< 0.00025	0.067	< 0.001	0.018	< 0.001	< 0.001	< 0.05	5.95	< 0.0002	< 0.001	< 0.001	< 0.001	0.13	< 0.00002	0.5	< 0.001	0.94	0.009	< 0.0005	1.52	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4	< 0.001	0.035	< 0.001	< 0.0005	0.002	0.0001	< 0.0005	< 0.001	0.005	< 0.01
GCULV	14-Jul-08	< 0.00025	0.026	< 0.001	0.014	< 0.001	< 0.001	< 0.05	4.75	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.2	< 0.001	0.74	< 0.001	< 0.0005	1.01	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.1	< 0.001	0.029	< 0.001	< 0.0005	0.001	0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
GCULV	11-Aug-08	< 0.00025	0.054	< 0.001	0.025	< 0.001	< 0.001	< 0.05	6.69	< 0.0002	< 0.001	< 0.001	< 0.001	0.1	< 0.00002	0.3	0.001	1.28	0.007	< 0.0005	1.51	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.9	< 0.001	0.04	< 0.001	< 0.0005	0.001	0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
GCULV	15-Sep-08	< 0.00025	0.028	< 0.001	0.019	< 0.001	< 0.001	< 0.05	6.19	< 0.0002	< 0.001	< 0.001	< 0.001	0.11	< 0.00002	0.3	< 0.001	0.97	0.007	< 0.0005	1.32	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.6	< 0.001	0.046	< 0.001	< 0.0005	< 0.001	0.0001	0.0005	< 0.001	< 0.005	< 0.01
GCULV	15-Oct-08	< 0.00025	0.021	< 0.001	0.021	< 0.001	< 0.001	< 0.05	7.3	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.3	< 0.001	1.03	0.004	< 0.0005	1.27	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4	< 0.001	0.043	< 0.001	< 0.0005	< 0.001	0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
GCULV	03-Nov-08	0.0005	0.043	< 0.001	0.028	< 0.001	< 0.001	< 0.05	9.36	0.0003	< 0.001	< 0.001	< 0.001	0.08	< 0.00002	0.4	< 0.001	1.67	0.008	< 0.0005	1.98	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.053	< 0.001	< 0.0005	< 0.001	0.0001	0.0006	< 0.001	< 0.005	< 0.01
GCULV	01-Dec-08	< 0.00025	0.023	< 0.001	0.034	< 0.001	< 0.001	< 0.05	13	< 0.0002	< 0.001	< 0.001	0.031	< 0.05	< 0.00002	0.5	< 0.001	1.87	0.005	< 0.0005	2.1	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.7	< 0.001	0.062	< 0.001	< 0.0005	< 0.001	0.0001	0.0008	< 0.001	0.008	< 0.01
GCULV	MEAN	0.00027	0.032	0.001	0.030	0.001	0.001	0.05	10.225	0.0002	0.001	0.001	0.0035	0.1058333	0.00002	0.45	0.00108	1.81833	0.0076667	0.00055	1.90417	0.001	0.001	0.15	0.001	0.001	4.6	0.001	0.0573333	0.001	0.0005	0.00117	0.0001	0.000817	0.001	0.006	0.01
GCULV	MINIMUM	< 0.00025	0.006	< 0.001	0.014	< 0.001	< 0.001	< 0.05	4.75	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.2	< 0.001	0.74	< 0.001	< 0.0005	1.01	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.1	< 0.001	0.029	< 0.001	< 0.0005	< 0.001	0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
GCULV	MAXIMUM	0.0005	0.069	< 0.001	0.047	< 0.001	< 0.001	< 0.05	16.4	0.0003	< 0.001	< 0.001	0.031	0.44	< 0.00002	0.8	0.002	3.48	0.039	0.0008	2.87	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.9	< 0.001	0.093	< 0.001	< 0.0005	0.002	0.0001	0.0018	0.003	0.011	< 0.01
GCULV	N > DL	1	12	0	12	0	0	0	12	1	0	1	1	9	0	12	4	12	11	4	12	0	0	0	0	0	12	0	12	0	0	4	1	7	1	4	0
GCULV	Median	0.00025	0.0245	0.001	0.0275	0.001	0.001	0.05	8.41	0.0002	0.001	0.001	0.001	0.07	0.00002	0.45	0.001	1.475	0.0055	0.0005	1.865	0.001	0.001	0.15	0.001	0.001	4.35	0.001	0.0505	0.001	0.0005	0.001	0.0001	0.00055	0.001	0.005	0.01
GHSCR1	01-Jun-08	< 0.00025	0.007	< 0.001	0.035	< 0.001	< 0.001	< 0.05	223	0.0025	< 0.001	< 0.001	0.003	< 0.05	< 0.00002	4.8	0.009	85.7	0.04	< 0.0005	11.5	0.012	0.004	< 0.15	< 0.001	0.001	4.9	< 0.001	0.95	< 0.001	< 0.0005	< 0.001	0.0001	0.0018	< 0.001	4	< 0.01
GHSCR1	29-Sep-08	< 0.00025	0.027	< 0.001	0.047	< 0.001	< 0.001	< 0.05	221	0.0058	0.001	< 0.001	0.003	0.27	< 0.00002	4.9	0.012	89.7	0.25	< 0.0005	12.8	0.021	0.005	< 0.15	< 0.001	0.002	6.1	< 0.001	1	< 0.001	< 0.0005	< 0.001	0.0001	0.0017	< 0.001	9.29	< 0.01
K8	07-Jan-08	< 0.00025	0.007	< 0.001	0.024	< 0.001	< 0.001	< 0.05	19.3	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.5	< 0.001	2.52	< 0.001	< 0.0005	1.91	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	0.0001	0.0026	< 0.001	< 0.005	< 0.01
K8	18-Feb-08	< 0.00025	0.007	< 0.001	0.026	< 0.001	< 0.001	< 0.05	21.2	< 0.0002	< 0.001	0.001	< 0.001	< 0.05	< 0.00002	0.4	0.002	2.85	< 0.001	< 0.0005	2.37	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.2	< 0.001	0.13	< 0.001	< 0.0005	< 0.001	0.0001	0.0024	0.003	< 0.005	< 0.01
K8	17-Mar-08	< 0.00025	< 0.005	< 0.001	0.033	< 0.001	< 0.001	< 0.05	24	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.7	0.001	3.94	< 0.001	< 0.0005	2.8	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.9	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	0.0001	0.0044	< 0.001	< 0.005	< 0.01
K8	14-Apr-08	< 0.00025	< 0.005	< 0.001	0.038	< 0.001	< 0.001	< 0.05	27.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.7	0.003	4.16	< 0.001	< 0.0005	3.06	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	0.0001	0.0053	< 0.001	< 0.005	< 0.01
K8	14-May-08	< 0.00025	0.057	< 0.001	0.032	< 0.001	< 0.001	< 0.05	22.5	< 0.0002	< 0.001	< 0.001	0.002	0.09	< 0.00002	1.2	0.002	3.08	0.002	< 0.0005	1.74	0.001	0.001	< 0.15	< 0.001	< 0.001	3.6	< 0.001	0.13	< 0.001	< 0.0005	0.001	0.0001	0.0024	< 0.001	0.005	< 0.01
K8	16-Jun-08	< 0.00025	0.038	< 0.001	0.012	< 0.001	< 0.001	< 0.05	5.77	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.4	< 0.001	0.79	0.001	< 0.0005	1.28	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.5	< 0.001	0.032	< 0.001	< 0.0005	< 0.001	0.0001	< 0.0005	< 0.001	0.006	< 0.01
K8	14-Jul-08	< 0.00025	0.045	< 0.001	0.015	< 0.001	< 0.001	< 0.05	7.42	< 0.0002	< 0.001	< 0.001	< 0.001	0.08	< 0.00002	0.3	0.003	1.01	< 0.001	< 0.0005	1.38	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.2	< 0.001	0.044	< 0.001	< 0.0005	0.001	0.0001	< 0.0005	< 0.001	0.017	< 0.01
K8	11-Aug-08	< 0.00025	0.007	< 0.001	0.023	< 0.001	< 0.001	< 0.05	14	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.4	< 0.001	1.89	< 0.001	< 0.0005	1.77	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.7	< 0.001	0.08	< 0.001	< 0.0005	< 0.001	0.0001	0.0009	< 0.001	< 0.005	< 0.01
K8	15-Sep-08	< 0.00025	0.021	< 0.001	0.02	< 0.001	< 0.001	< 0.05	10.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.3	0.001	1.47	0.001	< 0.0005	1.66	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.4	< 0.001	0.08	< 0.001	< 0.0005	< 0.001	0.0001	0.0012	< 0.001	< 0.005	< 0.01
K8	15-Oct-08	< 0.00025	0.013	< 0.001	0.024	< 0.001	< 0.001	< 0.05	15.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.4	0.001	1.88	< 0.001	< 0.0005	1.68	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.094	< 0.001	< 0.0005	< 0.001	0.0001	0.0015	< 0.001	< 0.005	< 0.01
K8	03-Nov-08	0.0003	0.014	< 0.001	0.029	< 0.001	< 0.001	< 0.05	20.1	0.0003	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.6	< 0.001	2.88	0.003	< 0.0005	2.37	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.3	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	0.0001	0.0025	< 0.001	< 0.005	< 0.01
K8	01-Dec-08	< 0.00025	0.015	< 0.001	0.031	< 0.001	< 0.001	< 0.05	25.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.7	0.001	3.3	< 0.001	< 0.0005	2.48	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.1	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	0.0001	0.0032	< 0.001	< 0.005	< 0.01
K8	MEAN	0.000254	0.0195	0.001	0.026	0.001	0.001	0.05	17.8	0.00021	0.001	0.001	0.00108	0.0558333	0.00002	0.55	0.0015	2.48083	0.00125	0.0005	2.04167	0.001	0.001	0.15	0.001	0.001	4.78333	0.001	0.1075	0.001	0.0005	0.001	0.0001	0.002283	0.0011667	0.0060833	0.01
K8	MINIMUM	< 0.00025	< 0.005	< 0.001	0.012	< 0.001	< 0.001	< 0.05	5.77	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.3	< 0.001	0.79	< 0.001	< 0.0005	1.28	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.5	< 0.001	0.032	< 0.001	< 0.0005	< 0.001	0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
K8	MAXIMUM	0.0003	0.057	< 0.001	0.038	< 0.001	< 0.001	< 0.05	27.6	0.0003	< 0.001	< 0.001	0.002	0.09	< 0.00002	1.2	0.003	4.16	0.003	< 0.0005	3.06	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.1	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	0.0001	0.0053	0.003	0.017	< 0.01
K8	N > DL	1	10	0	12	0	0	0	12	1	0	1	1	2	0	12	8	12	4	0	12	1	1	0	0	0	12	0	12	0	0	2	0	10	1	3	0
K8	Median	0.00025	0.0135	0.001	0.025	0.001	0.001	0.05	19.7	0.0002	0.001	0.001	0.001	0.05	0.00002	0.45	0.001	2.685	0.001	0.0005	1.84	0.001	0.001	0.15	0.001	0.001	4.8	0.001	0.12	0.001	0.0005	0.001	0.0001	0.0024	0.001	0.005	0.01
NE1	02-Jun-08	< 0.00025	0.007	< 0.001	0.013	< 0.001	< 0.001	< 0.05	47.8	< 0.0002	< 0.001	< 0.001	0.004	< 0.05	< 0.00002	2.6	0.007	16.1	0.001	0.0047	3.64	0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.4	< 0.001	0.23	< 0.001	< 0.0005	< 0.001	0.0001	< 0.0005	< 0.001	0.008	< 0.01
NE1	30-Sep-08	< 0.00025	0.007	< 0.001	0.018	< 0.001	< 0.001	< 0.05	75.7	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	< 0.00002	3.1	0.012	27.2	< 0.001	0.0072	4.99	< 0.001	< 0.001	< 0.15	< 0.001	0.002	4.6	< 0.001	0.38	< 0.001	< 0.0005	< 0.001	0.0001	0.0011	< 0.001	0.006	< 0.01

Appendix 3
2008 Surface Water Quality Data
Rose Creek Drainage

Table 2. Surface Water Total Metals

Station	Date	AG-T mg/L	AL-T mg/L	AS-T mg/L	BA-T mg/L	BE-T mg/L	BI-T mg/L	B-T mg/L	CA-T mg/L	CD-T mg/L	CO-T mg/L	CR-T mg/L	CU-T mg/L	FE-T mg/L	HG-T mg/L	K-T mg/L	LI-T mg/L	MG-T mg/L	MN-T mg/L	MO-T mg/L	NA-T mg/L	NI-T mg/L	PB-T mg/L	P-T mg/L	SB-T mg/L	SE-T mg/L	SI-T mg/L	SN-T mg/L	SR-T mg/L	TE-T mg/L	TH-T mg/L	TI-T mg/L	TL-T mg/L	U-T mg/L	V-T mg/L	ZN-T mg/L	ZR-T mg/L
NE2	02-Jun-08	< 0.00025	< 0.005	< 0.001	0.067	< 0.001	< 0.001	< 0.05	192	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	< 0.00002	4.6	0.023	219	< 0.001	< 0.0005	10	0.002	< 0.001	< 0.15	< 0.001	0.003	6.5	< 0.001	0.91	< 0.001	< 0.0005	< 0.001	0.0001	0.013	< 0.001	< 0.005	< 0.01
NF1	02-Jun-08	< 0.00025	0.14	< 0.001	0.024	< 0.001	< 0.001	< 0.05	10	< 0.0002	< 0.001	< 0.001	0.001	0.2	< 0.00002	0.6	< 0.001	2.15	0.009	< 0.0005	1.16	< 0.001	0.002	< 0.15	< 0.001	< 0.001	3.6	< 0.001	0.041	< 0.001	< 0.0005	0.004	0.0001	< 0.0005	< 0.001	0.007	< 0.01
NF1	30-Sep-08	< 0.00025	0.027	< 0.001	0.044	< 0.001	< 0.001	< 0.05	21.3	< 0.0002	< 0.001	< 0.001	< 0.001	0.3	< 0.00002	0.7	0.002	5.22	0.052	< 0.0005	2.06	< 0.001	< 0.001	< 0.15	< 0.001	0.001	5.1	< 0.001	0.091	< 0.001	< 0.0005	< 0.001	0.0001	0.0006	< 0.001	0.009	< 0.01
NF2	24-Jan-08	< 0.000005	0.0053	0.00045	0.0728	< 0.00001	0.000005	< 0.005	43.3	0.000018	0.00010	0.0001	0.00043	0.114		0.99	0.007	9.1	0.0286	0.00081	3.2	0.0009	0.000268	< 0.005	0.00006	0.00043	5.79	< 0.00001	0.183			0.0005	0.00000	0.00245	< 0.0002	0.0104	< 0.0001
NF2	21-Feb-08	< 0.000005	0.0071	0.00042	0.0787	< 0.00001	0.000005	< 0.005	44	0.000016	0.00012	0.0001	0.00026	0.118		1.08	0.0085	9.49	0.0356	0.00092	3.45	0.00046	0.000282	< 0.005	0.00006	0.00043	5.32	< 0.00001	0.192			0.0005	0.00000	0.00283	< 0.0002	0.0099	< 0.0001
NF2	11-Mar-08	< 0.000005	0.0052	0.00046	0.0757	< 0.00001	0.000005	< 0.005	44.6	0.000019	0.00010	0.0001	0.00033	0.127		1.07	0.0086	9.47	0.0389	0.00092	3.48	0.00038	0.000282	0.005	0.00006	0.00045	6.05	< 0.00001	0.191			0.0005	0.00000	0.00282	< 0.0002	0.0144	< 0.0001
NF2	29-Apr-08	< 0.000005	0.144	0.00058	0.0715	0.00002	0.000005	< 0.05	40.2	0.000168	0.00035	0.0002	0.00285	0.287		1.23	0.0082	8.65	0.0487	0.00091	3.24	0.00101	0.0011	< 0.005	0.00007	0.00043	5.05	< 0.00001	0.185			0.0036	0.00000	0.00267	0.0003	0.122	< 0.0001
NF2	22-May-08	0.000014	0.243	0.00097	0.03	0.00005	0.000016	< 0.05	9.33	0.000066	0.00027	0.0004	0.00279	0.513		1.17	0.0016	1.83	0.0353	0.0001	< 0.05	0.00164	0.00591	0.031	0.00008	0.0001	2.88	< 0.00001	0.041			0.0076	0.00001	0.000372	0.0005	0.0135	0.0003
NF2	02-Jun-08	< 0.00025	0.16	< 0.001	0.026	< 0.001	< 0.001	< 0.05	9.87	< 0.0002	< 0.001	< 0.001	0.001	0.25	< 0.00002	0.6	< 0.001	2.02	0.017	< 0.0005	1.15	< 0.001	0.002	< 0.15	< 0.001	< 0.001	3.6	< 0.001	0.041	< 0.001	< 0.0005	0.026	0.0001	< 0.0005	< 0.001	0.006	< 0.01
NF2	25-Jun-08	0.000007	0.11	0.00059	0.0285	0.00002	0.000005	< 0.05	12.1	0.000025	0.00010	0.0003	0.00133	0.214		0.46	0.0018	2.52	0.0119	0.00028	1.14	0.00078	0.00118	0.01	0.00009	0.0001	3.66	< 0.00001	0.0523			0.004	0.00000	0.00041	0.0003	0.0055	0.0002
NF2	29-Jul-08	< 0.000005	0.0396	0.00052	0.0409	0.00001	0.000005	< 0.05	22	0.000019	0.00006	0.0002	0.0009	0.131		0.49	0.0026	4.74	0.0138	0.00045	2.53	0.00054	0.000699	0.006	0.00008	0.00027	4.84	< 0.00001	0.0894			0.0009	0.00000	0.000863	< 0.0002	0.007	0.0007
NF2	17-Sep-08	< 0.000005	0.0318	0.00045	0.0388	0.00001	0.000005	< 0.05	20.8	0.000016	0.00004	0.0001	0.00085	0.103		0.52	0.0024	4.19	0.00972	0.00037	1.71	0.00045	0.000477	< 0.005	0.00006	0.00027	4.71	< 0.00001	0.0839			0.0009	0.00000	0.000801	< 0.0002	0.0061	0.0001
NF2	30-Sep-08	< 0.00025	0.03	< 0.001	0.041	< 0.001	< 0.001	< 0.05	22.6	< 0.0002	< 0.001	< 0.001	0.001	0.13	< 0.00002	0.6	0.003	5.36	0.013	< 0.0005	2.12	< 0.001	< 0.001	< 0.15	< 0.001	0.001	5.3	< 0.001	0.096	< 0.001	< 0.0005	< 0.001	0.0001	0.0009	< 0.001	0.006	< 0.01
NF2	07-Oct-08	0.000003	0.0597	0.00054	0.0461	0.00001	0.000005	< 0.05	24.2	0.000025	0.00016	0.0003	0.00077	0.207		0.3	0.0033	5.03	0.0588	0.00045	1.97	0.0006	0.00112	< 0.005	0.00007	0.00004	5.11	0.001	0.102			0.00118	0.00000	0.000002	0.0115	< 0.0001	0.00058
NF2	11-Dec-08	< 0.000005	0.0249	0.00049	0.0645	< 0.00001	0.000005	< 0.05	36.8	0.000027	0.00015	0.0002	0.00058	0.152		0.87	0.0059	7.63	0.0415	0.00072	2.62	0.00055	0.000692		0.00008	0.00045	5.94	0.00004	0.153			0.0009	0.00000	0.0021	< 0.0002	0.0152	< 0.0001
NF2	MEAN	0.008546333	0.0717167	0.000623	0.051208	0.00018	0.000172	0.03875	27.48333	6.7E-05	0.00029	0.00033	0.00109	0.1955	0.00002	0.78167	0.00449	5.83583	0.0294017	0.000578	2.22167	0.000776	0.0012508	0.03427	0.00023	0.00041	4.85417	0.00026	0.1089669	0.001	0.0005	0.00397	2E-05	0.001393	0.0013167	0.0180083	0.001865
NF2	MINIMUM	< 0.000005	0.0052	0.00042	0.026	< 0.00001	0.000005	< 0.005	9.33	0.000016	5	0.0001	0.00026	0.103	< 0.00002	0.3	< 0.001	1.83	0.00972	0.0001	< 0.05	0.00038	0.000268	< 0.005	0.00006	0.00004	2.88	< 0.00001	0.041	< 0.001	< 0.0005	0.0005	0.00000	0.000002	< 0.0002	< 0.0001	< 0.0001
NF2	MAXIMUM	0.000014	0.243	< 0.001	0.0787	< 0.001	< 0.001	< 0.05	44.6	< 0.0002	< 0.001	< 0.001	0.00285	0.513	< 0.00002	1.23	0.0086	9.49	0.0588	0.00092	3.48	0.00164	0.00591	< 0.15	< 0.001	< 0.001	6.05	< 0.001	0.192	< 0.001	< 0.0005	0.026	0.0001	0.00283	0.0115	0.122	< 0.01
NF2	N > DL	3	12	10	12	6	1	0	12	10	10	8	12	12	0	12	11	12	12	10	11	10	11	4	10	10	12	2	12	0	0	8	9	10	4	11	5
NF2	Median	0.000005	0.0357	0.00053	0.04355	0.00001	0.000005	0.05	23.4	0.000025	9	0.0002	5	0.1415	97473788	0.735	0.00315	5.195	0.03195	0.0005	2.325	0.00069	0.0008495	0.005	5	0.00043	5.08	0.00001	0.0927	2374873E-	11874363	0.00095	4	5	0.00025	0.00845	0.00015
R1	23-Jan-08	< 0.000005	0.0182	0.00074	0.111	< 0.00001	0.000005	< 0.005	80.3	0.000035	0.00018	0.0002	0.00091	0.901		2.16	0.0035	11.5	0.217	0.00045	4.87	0.00079	0.000535	0.012	0.00009	0.00029	8.46	0.00004	0.368			0.0012	0.00000	0.00391	< 0.0002	0.0041	< 0.0001
R1	21-Feb-08	< 0.000005	0.0038	0.00043	0.0744	< 0.00001	0.000005	< 0.005	45	0.00001	0.00009	0.0001	0.0003	0.428		1.45	0.0023	7.07	0.12	0.00032	3.16	0.00044	0.000058	0.011	0.00003	0.00016	4.85	< 0.00001	0.231			0.0005	0.00000	0.00275	< 0.0002	0.0008	< 0.0001
R1	03-Mar-08	< 0.00025	0.01	0.001	0.07	< 0.001	< 0.001	< 0.05	44.1	< 0.0002	< 0.001	< 0.001	< 0.001	0.43	< 0.00002	1.7	0.002	8.66	0.095	< 0.0005	3.79	< 0.001	< 0.001	< 0.15	< 0.001	0.003	3.8	< 0.001	0.27	< 0.001	< 0.0005	< 0.001	0.0001	0.0021	< 0.001	< 0.005	< 0.01
R1	11-Mar-08	0.000006	0.016	0.00049	0.0756	< 0.00001	0.000005	< 0.005	46.6	0.000021	0.00011	0.0002	0.0008	0.528		1.48	0.0025	7.3	0.125	0.00029	3.29	0.00059	0.000328	0.012	0.00005	0.00017	5.1	0.0001	0.238			0.0006	0.00000	0.0025	< 0.0002	0.0169	< 0.0001
R1	29-Apr-08	< 0.000005	0.0457	0.00065	0.0602	< 0.00001	0.000005	< 0.05	33.8	0.000029	0.00022	0.0001	0.00082	0.83		2.12	0.002	5.09	0.138	0.00031	2.31	0.00083	0.00101	0.012	0.00005	0.00012	3.43	< 0.00001	0.177			0.0014	0.00000	0.00176	0.0002	0.0088	0.0001
R1	22-May-08	< 0.000005	0.276	0.00076	0.0342	0.00005	0.000012	< 0.05	15.7	0.00003	0.00033	0.0005	0.00238	0.791		1.27	0.0014	3.53	0.0509	0.00022	1	0.00162	0.00124	0.012	0.00006	0.00012	2.91	< 0.00001	0.074			0.0135	0.00000	0.000795	0.0005	0.0052	0.0003
R1	24-Jun-08	0.00001	0.712	0.0012	0.0389	0.00011	0.000023	< 0.05	9.72	0.000063	0.00087	0.0011	0.00287	1.66		0.58	0.0027	1.95	0.0944	0.00018	1.02	0.00208	0.00441	0.048	0.00007	0.00004	3.45	< 0.00001	0.0537			0.0321	0.00002	0.00103	0.0018	0.0102	0.0003
R1	22-Jul-08	< 0.000005	0.0419	0.00052	0.0361	0.00001	0.000005	< 0.05	18.8	0.000021	0.00006	0.0002	0.0011	0.091		0.4	0.0021	4.07	0.0159	0.00035	1.44	0.00076	0.000849		0.00007	0.00026	4.72	< 0.00001	0.0747			0.0015	0.00000	0.000684	0.0006	0.0195	0.0002
R1	29-Jul-08	< 0.000005	0.0639	0.00042	0.0382	0.00002	0.000005	< 0.05	25.1	0.000009	0.00009	0.0002	0.00083	0.285		0.69	0.0017	4.83	0.0313	0.00023	2.67	0.00049	0.000322	< 0.005	0.00005	0.00014	4.25	< 0.00001	0.126			0.0028	0.00000	0.00127	0.0002	0.0025	< 0.0001
R1	19-Aug-08	< 0.00025	0.031	< 0.001	0.037	< 0.001	< 0.001	< 0.05	25.8	< 0.0002	< 0.001	< 0.001	< 0.001	0.17	< 0.00002	0.8	0.002	4.83	0.031	< 0.0005	1.83	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.1	< 0.001	0.13	< 0.001	< 0.0005	0.001	0.0001	0.0011	< 0.001	< 0.005	< 0.01
R1	25-Aug-08	0.000009	0.214	0.00103	0.0368	0.00004	0.000013	< 0.05	15.2	0.00005	0.00030	0.0004	0.00212	0.578		0.69	0.0022	3.25	0.0602	0.00027	2	0.00149	0.00469		0.00011	0.00016	4.74	0.00001	0.0649			0.0081	0.00001	0.000504	0.0006	0.0369	0.0003
R1	17-Sep-08	< 0.000005	0.0439	0.00033	0.039	0.00001	0.000005	< 0.05	25.2	0.000008	0.00006	0.0001	0.00063	0.206		0.72	0.0018	5.08	0.0261	0.0002	1.89	0.00041	0.000215	< 0.005	0.00004	0.00018	4.11	< 0.00001	0.128			0.0012	0.00000	0.00131	< 0.0002	0.0016	< 0.0001
R1	08-Oct-08	0.000002	0.0443	0.00037	0.0444	< 0.00001	0.000005	< 0.05	30.1	0.00002	0.00008	0.0002	0.0006	0.257		0.19	0.0019	6.08	0.0394	0.00022	1.94	0.00041	0.000333	0.007	0.00004	0.00004	4.07	0.0016	0.151			0.00171	0.00000	0.000002	0.0014	< 0.0001	0.0008
R1	10-Dec-08	< 0.000005	0.0186	0.00043	0.0619	< 0.00001	0.000005	< 0.05	41.4	0.000028	0.00008	0.0001	0.00042	0.44		1.1	0.0023	6.94	0.0808	0.00027	2.52	0.00039	0.000159		0.00004	0.00022	5.07	< 0.00001	0.204			0.001	0.00000	0.00226	< 0.0002	0.0019	< 0.0001
R1	MEAN	0.010826071	0.10995	0.000669	0.054121	0.000164	0.00015	0.04036	32.63	5.2E-05	0.00032	0.00039	0.00113	0.5425	0.00002	1.09643	0.00217	5.72714	0.0803571	0.000308	2.40929	0.000879	0.0011535	0.03855	0.00019	0.00042	4.50429	0.0002736	0.1528073	0.001	0.0005	0.00483	1.9E-05	0.00157	0.0005929	0.0084643	0.0016143
R1	MINIMUM	< 0.000005	0.0038	0.00033	0.0342	< 0.00001	0.000005	< 0.005	9.72	0.000008	3	0.0001	0.0003	0.091	< 0.00002	0.19	0.0014	1.95	0.0159	0.00018	1	0.00039	0.000058	< 0.005	0.00003	0.00004	2.91	< 0.00001	0.0537	< 0.001	< 0.0005	0.0005	0.00000	0.000002	< 0.0002	< 0.0001	< 0.0001
R1	MAXIMUM	0.00001	0.712	0.0012	0.111	< 0.001	< 0.001	< 0.05	80.3	< 0.0002	< 0.001	0.0011	0.00287	1.66	< 0.00002	2.16	0.0035	11.5	0.217	< 0.0005	4.87	0.00208	0.00469	< 0.15	< 0.001	0.003	8.46	0.0016	0.368	< 0.001	< 0.0005	0.0321	0.0001	0.00391	0.0018	0.0369	< 0.01
R1	N > DL	4	14	13	14	6	3	0	14	12	12	11	12	14	0	14	14	14	14	12	14	12	12	7	12	11	14	4	14	0	0	12	10	13	7	11	6
R1	Median	0.000005	0.0429	0.000585	0.0417	0.00001	0.000005	0.05	27.95	5	2	0.0002	0.00087	0.435	97473788	0.95	0.00205	5.085	0.0705	0.00028	2.155	0.000775	0.000692	0.012	5	5	4.18	0.00001	0.129	2374873E-	11874363	0.0013	35	0.00129	0.00035	0.005	0.00015
R2	03-Mar-08	< 0.00025	0.014	0.001	0.07	< 0.001	< 0.001	< 0.05	128	< 0.0002	0.002	< 0.001	< 0.001	0.43	< 0.00002	2.7	0.009	32.2	3.5	0.001	13.7	0.006	< 0.001	< 0.15	< 0.001	0.003	5.1	< 0.001	0.44	< 0.001	< 0.0005	< 0.001	0.0001	0.0032	< 0.001	0.046	< 0.01
R2	21-Jul-08	< 0.000005	0.0336	0.00044	0.0362	< 0.00001	0.000005	< 0.05	32.6	0.000022	0.00048	0.0002	0.00095	0.149		0.74	0.0029	6.96	0.416	0.00041	2.38	0.0015	0.000425		0.00008	0.00024	4.16	0.0001	0.116			0.0014	0.00001	0.00096	0.0003	0.0162	0.0001
R2	19-Aug-08	< 0.00025	0.02	< 0.001	0.042	< 0.001	< 0.001	< 0.05	45.9	< 0.0002	< 0.001	< 0.001	< 0.001	0.09	< 0.00002	1.2	0.004	10.1	0.81	0.0006	3.61	0.003	< 0.001	< 0.15	< 0.001	< 0.001	4.6	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	0.0001	0.0012	< 0.001	0.025	< 0.01
R2	20-Aug-08	< 0.000005	0.0143	0.00047	0.0467	< 0.00001	0.000005	< 0.05	48.7	0.000023	0.00082	0.0001	0.00089	0.243		1.16	0.0051	10.9	0.717	0.00051	3.98	0.00217	0.000311	0.019	0.00009	0.00021	4.8	< 0.00001	0.184			0.0005	0.00002	0.00134	< 0.0002	0.0278	< 0.0001
R2	25-Aug-08	0.000008	0.339	0.00117	0.051	0.00004	0.000012	< 0.05	23.7	0.000078	0.00076	0.0007	0.00313	0.954		0.79	0.0026	5.56	0.252	0.00031	2.07	0.0024	0.00433		0.00012	0.00019	4.85	0.00001	0.0936			0.0125	0.00001	0.000746	0.0009	0.0318	0.0004
R2	MEAN	0.0001036	0.08418	0.000816	0.04918	0.000412	0.000404	0.05	55.78	0.0001	0.00101	0.0006	0.00139	0.3732	0.00002	1.318	0.00472	13.144	1.139	0.000566	5.148	0.003014	0.0014132	0.10633	0.00046	0.00093	4.702	0.000424	0.19872	0.001	0.0005	0.00328	5E-05	0.001489	0.00068	0.02936	0.00412
R2	MINIMUM	< 0.000005	0.014	0.00044	0.0362	< 0.00001	0.000005	< 0.05	23.7	2.2E-05	0.00048	0.0001	0.00089	0.09	< 0.00002	0.74	0.0026	5.56	0.252	0.00031	2.07	0.0015	0.000311	0.019	0.00008	0.00019	4.16	< 0.00001	0.0936	< 0.001	< 0.0005	0.0005	1.3E-05	0.000746	< 0.0002	0.0162	< 0.0001
R2	MAXIMUM	< 0.00025	0.339	0.00117	0.07	< 0.001	< 0.001	< 0.05	128	< 0.0002	0.002	< 0.001	0.00313	0.954	< 0.00002	2.7	0.009	32.2	3.5	0.001	13.7	0.006	0.00433	< 0.15	< 0.001	0.003	5.1	< 0.001	0.44	< 0.001	< 0.0005	0.0125	0.0001	0.0032	< 0.001	0.046	< 0.01
R2	N > DL	1	5	4	5	1	1	0	5	3	4	2	3	5	0	5	5	5	5	5	5	5	3	1	3	4	5	2	5	0	0	2	3	5	2	5	2
R2	Median	0.000008	0.02	0.001	0.0467	0.00004	0.000012	0.05	45.9	7.8E-05	0.00082	0.0007	0.001	0.243	2E-05	1.16	0.004	10.1	0.717	0.00051	3.61	0.0024	0.001	0.15	0.00012	0.00024	4.8	0.0001	0.16	0.001	0.0005	0.001	2.5E-05	0.0012	0.0009	0.0278	0.0004
R3	23-Jan-08	0.00001	0.168	0.0008	0.127	0.00003	0.000005	< 0.005	76.9	0.000102	0.00096	0.0005	0.00251	0.863		1.52	0.0043	15	0.728	0.00015	4.95	0.00249	0.00436	< 0.005	0.00029	0.00085	4.89	0.00002	0.257			0.0052	0.00000	0.00301	0.0002	0.0647	< 0.0001
R3	20-Feb-08	< 0.000005	0.0016	0.00016	0.0769	< 0.00001	0.000005	< 0.005	89.1	0.000014	0.00007	0.0001	0.00035	0.024		1.78	0.0054	19.2	0.0918	0.00038	7.12	0.00131	0.000033	< 0.005	0.00005	0.00057	4.97	< 0.00001	0.282			0.0005	0.00000	0.00273	< 0.0002	0.0076	< 0.0001
R3	04-Mar-08	< 0.00025	0.009	< 0.001	0.075	< 0.001	< 0.001	< 0.05	96.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	2.1	0.007	25.5	0.67	0.0005	10.1	0.003	< 0.001	< 0.15	< 0.001	0.003	5.1	< 0.001	0.35	< 0.001	< 0.0005	< 0.001	0.0001	0.0028	< 0.001	0.019	< 0.01
R3	13-Mar-08	< 0.000005	0.0015	0.00018	0.0781	< 0.00001	0.000005	< 0.005	92.6	0.000015	0.00008	0.0001	0.00032	0.039		1.8	0.0058	19.4	0.102	0.00039	7.35	0.00142	0.000059	< 0.005	0.00005	0.00056	5.34	< 0.00001	0.299			0.0005	0.00000	0.00291	< 0.0002	0.0116	< 0.0001
R3	28-Apr-08	< 0.000005	0.01	0.0003	0.0682	< 0.00001	0.000005	< 0.05	151	0.000067	0.00286	0.0001	0.0006	0.109		2.78	0.0085	28.8	3.19	0.00066	11.9	0.00881	0.000268	< 0.005	0.00009	0.00038	4.79	< 0.00001	0.466			0.0005	0.00002	0.00334	< 0.0002	0.0654	< 0.0001
R3	21-May-08	0.000013	0.319	0.00101	0.0459	0.00004	0.000011	< 0.05	23.7	0.000082	0.00079	0.0006	0.00362	0.786		1.42	0.0023	5.01	0.551	0.00028	1.78	0.00296	0.00471	0.014	0.00011	0.00014	2.83	< 0.00001	0.0857			0.0093	0.00002	0.00058	0.0008	0.0356	0.0003
R3	24-Jun-08	0.000016	0.566	0.00136	0.0496	0.00009	0.00003	< 0.05	17.3	0.000089	0.00116	0.001	0.00322	1.27		0.76	0.003	3.74	0.53	0.00027	1.65	0.00294	0.00694	0	0.00012	0.00011	3.76	< 0.00001	0.0699			0.0219	0.00002	0.000889	0.0013	0.0325	0.0003
R3	22-Jul-08	< 0.000005	0.0323	0.00042	0.0346	0.00001	0.000005	< 0.05	32.1	0.000022	0.00033	0.0002	0.00093	0.126		0.75	0.0028	6.6	0.286	0.00037	2.31	0.0012	0.000429		0.00008	0.00023	4.32	0.00005	0.113			0.0014	0.00001	0.000892	0.0003	0.0135	< 0.1
R3	29-Jul-08	< 0.000005	0.0245	0.00036	0.0472	< 0.00001	0.000005	< 0.05	40.6	0.000022	0.00042	0.0001	0.00085	0.138		0.95	0.0036	8.29	0.396	0.00048	3.76	0.00143	0.000292	< 0.005	0.00009	0.00032	4.78	< 0.00001	0.151			0.0005	0.00001	0.00112	< 0.0002	0.0157	< 0.0001
R3	19-Aug-08	< 0.00025	0.015	< 0.001	0.051	< 0.001	< 0.001	< 0.05	42.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.08	< 0.00002	1.1	0.003	9.86	0.43	< 0.0005	3.29	0.002	0.001	< 0.15	< 0.001	< 0.001	4.7	< 0.001	0.15	< 0.001	< 0.0005	< 0.001	0.0001	0.0011	< 0.001	0.018	< 0.01
R3	04-Sep-08	< 0.000005	0.0264	0.00036	0.0401	0.00001	0.000005	< 0.05	42.9	0.000024	0.00050	0.0001	0.00086	0.14		1	0.0038	8.49	0.443	0.00043	2.97	0.00151	0.000374		0.00009	0.00027	4.9	< 0.00001	0.157			0.0008	0.00001	0.00111	< 0.0002	0.0171	< 0.0001
R3	17-Sep-08	< 0.000005	0.048	0.0004	0.0506	0.00001	0.000005	< 0.05	40	0.00003	0.00039	0.0002	0.00097	0.171		1	0.0036	8.28	0.301	0.00043	2.72	0.00124	0.000328	0.007	0.00008	0.00037	4.45	< 0.00001	0.151			0.0015	0.00001	0.00105	< 0.0002	0.0173	0.0001
R3	08-Oct-08	0.000014	0.0214	0.00033	0.0525	< 0.00001	0.000005	< 0.05	44.3	0.00005	0.00049	0.0002	0.00146	0.149		0.38	0.0033	9.32	0.424	0.00049	2.93	0.00147	0.00026	< 0.005	0.00008	0.00004	4.27	< 0.00001	0.164			0.00137	0.00000	0.000002	0.0244	< 0.0001	0.001
R3	10-Dec-08	< 0.000005	0.0177	0.00024	0.0606	< 0.00001	0.000005	< 0.05	55.7	0.000028	0.00016	0.0002	0.00153	0.08		1.31	0.0042	12.5	0.225	0.00058	3.83	0.00091	0.000557		0.00023	0.0006	5.33	0.00002	0.197			0.0008	0.00000	0.00209	< 0.0002	0.0207	< 0.0001

Appendix 3
2008 Surface Water Quality Data
Rose Creek Drainage

Table 2. Surface Water Total Metals

Station	Date	AG-T mg/L	AL-T mg/L	AS-T mg/L	BA-T mg/L	BE-T mg/L	BI-T mg/L	B-T mg/L	CA-T mg/L	CD-T mg/L	CO-T mg/L	CR-T mg/L	CU-T mg/L	FE-T mg/L	HG-T mg/L	K-T mg/L	LI-T mg/L	MG-T mg/L	MN-T mg/L	MO-T mg/L	NA-T mg/L	NI-T mg/L	PB-T mg/L	P-T mg/L	SB-T mg/L	SE-T mg/L	SI-T mg/L	SN-T mg/L	SR-T mg/L	TE-T mg/L	TH-T mg/L	TI-T mg/L	TL-T mg/L	U-T mg/L	V-T mg/L	ZN-T mg/L	ZR-T mg/L
R3	MEAN	0.011755643	0.0900286	0.000566	0.061236	0.000161	0.000149	0.04036	60.37857	6.8E-05	0.00073	0.00039	0.00137	0.2875	0.00002	1.33214	0.00433	12.8564	0.5977	0.000422	4.76143	0.002335	0.0014721	0.03191	0.00024	0.0006	4.60214	0.0001557	0.194901	0.001	0.0005	0.00331	2.5E-05	0.001687	0.0021714	0.0242	0.0087429
R3	MINIMUM	< 0.000005	0.0015	0.00016	0.0346	< 0.00001	0.000005	< 0.005	17.3	0.000014	8	0.0001	0.00032	0.024	< 0.00002	0.38	0.0023	3.74	0.0918	0.00015	1.65	0.00091	0.000033	0	0.00005	0.00004	2.83	< 0.00001	0.0699	< 0.001	< 0.0005	0.0005	0.00000	0.000002	< 0.0002	< 0.0001	< 0.0001
R3	MAXIMUM	0.000016	0.566	0.00136	0.127	< 0.001	< 0.001	< 0.05	151	< 0.0002	0.00286	< 0.001	0.00362	1.27	< 0.00002	2.78	0.0085	28.8	3.19	0.00066	11.9	0.00881	0.00694	< 0.15	< 0.001	0.003	5.34	< 0.001	0.466	< 0.001	< 0.0005	0.0219	0.0001	0.00334	0.0244	0.0654	< 0.1
R3	N > DL	4	14	12	14	6	2	0	14	12	12	9	12	13	0	14	14	14	14	13	14	14	13	3	12	12	14	3	14	0	0	8	11	13	5	13	4
R3	Median	0.000005	0.02295	0.00038	0.05175	0.00001	0.000005	0.05	43.6	0.00004	05	0.0002	5	0.132	97473788	1.205	0.0037	9.59	0.427	0.00043	3.525	0.00149	0.0004015	0.005	0.00009	5	4.785	0.00001	0.154	2374873E-	11874363	0.001	55	0.001115	0.0002	0.01765	0.0001
R4	23-Jan-08	< 0.000005	0.0028	0.00022	0.087	< 0.00001	0.000005	< 0.005	79.2	0.000011	0.00003	0.0001	0.00061	0.031		1.62	0.0042	15.3	0.0273	0.0006	5.25	0.00077	0.000129	< 0.005	0.00012	0.00065	5.02	0.00001	0.248			0.0005	0.00000	0.00255	< 0.0002	0.0053	< 0.0001
R4	20-Feb-08	< 0.000005	0.0021	0.00021	0.0961	< 0.00001	0.000005	< 0.005	78.4	0.000007	0.00002	0.0002	0.00038	0.017		1.69	0.0042	16.2	0.023	0.00061	5.72	0.00053	0.000036	< 0.005	0.00013	0.00072	4.82	< 0.00001	0.258			0.0005	0.00000	0.00279	< 0.0002	0.0031	< 0.0001
R4	04-Mar-08	< 0.00025	< 0.005	< 0.001	0.1	< 0.001	< 0.001	< 0.05	85	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	1.9	0.004	21.2	0.025	0.0006	7.38	< 0.001	< 0.001	< 0.15	< 0.001	0.003	4.3	< 0.001	0.31	< 0.001	< 0.0005	< 0.001	0.0001	0.0026	< 0.001	< 0.005	< 0.01
R4	13-Mar-08	< 0.000005	0.0019	0.00022	0.0933	< 0.00001	0.000005	< 0.005	82.6	0.000025	0.00003	0.0001	0.0004	0.021		1.73	0.0045	17	0.0216	0.0006	6.12	0.00055	0.000057	< 0.005	0.00012	0.0007	5.03	< 0.00001	0.27			0.0005	0.00000	0.00283	< 0.0002	0.0065	< 0.0001
R4	28-Apr-08	< 0.000005	0.0043	0.00026	0.0858	< 0.00001	0.000005	< 0.05	121	0.000057	0.00066	0.0001	0.0004	0.064		2.38	0.0064	23.6	1.12	0.00061	9.45	0.00442	0.000196	< 0.005	0.00009	0.00047	4.8	< 0.00001	0.383			0.0005	0.00000	0.00307	< 0.0002	0.0338	< 0.0001
R4	21-May-08	< 0.000005	0.0791	0.00049	0.0333	0.00002	0.000005	0.000013	23.1	0.000046	0.00019	0.0002	0.00272	0.808		1.34	0.0019	4.96	0.141	0.00029	1.67	0.00212	0.000976	0.014	0.00011	0.00016	3	0.00002	0.0785			0.003	0.00001	0.000495	< 0.0002	0.0209	0.0002
R4	24-Jun-08	0.000025	0.586	0.00153	0.0636	0.00009	0.000031	< 0.05	17.9	0.000139	0.0014	0.0011	0.00405	1.27		0.78	0.0029	3.86	0.654	0.0003	1.64	0.00375	0.00974	0.005	0.00014	0.00016	3.83	< 0.00001	0.0702			0.0218	0.00003	0.000897	0.0015	0.0443	0.0003
R4	22-Jul-08	< 0.000005	0.0537	0.00045	0.0479	0.00001	0.000005	< 0.05	32.8	0.000026	0.00024	0.0003	0.00125	0.14		0.8	0.0025	6.76	0.208	0.00045	2.22	0.0014	0.000605		0.0001	0.00041	4.53	< 0.00001	0.114			0.0021	0.00001	0.000874	0.0004	0.0111	0.0001
R4	29-Jul-08	< 0.000005	0.0403	0.00035	0.0547	< 0.00001	0.000005	< 0.05	41	0.000022	0.00030	0.0002	0.00106	0.144		1.01	0.0034	8.3	0.316	0.00053	3.66	0.00148	0.000446	< 0.005	0.0001	0.00037	4.71	< 0.00001	0.151			0.0008	0.00001	0.00114	0.0002	0.0136	< 0.0001
R4	19-Aug-08	< 0.00025	0.033	< 0.001	0.048	< 0.001	< 0.001	< 0.05	40.6	< 0.0002	< 0.001	< 0.001	0.001	0.23	< 0.00002	1.2	0.003	9.72	0.37	0.0006	3.28	0.002	< 0.001	< 0.15	< 0.001	< 0.001	5.1	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	0.0001	0.0011	< 0.001	0.015	< 0.01
R4	04-Sep-08	< 0.000005	0.0445	0.00038	0.0559	< 0.00001	0.000005	< 0.05	40.4	0.00003	0.00034	0.0001	0.00127	0.154		1.01	0.0033	8.4	0.311	0.00049	2.75	0.00163	0.00049		0.00011	0.00043	4.99	< 0.00001	0.146			0.0015	0.00001	0.00105	< 0.0002	0.014	< 0.0001
R4	17-Sep-08	< 0.000005	0.0464	0.00039	0.0563	< 0.00001	0.000005	< 0.05	39.9	0.000032	0.00033	0.0002	0.00118	0.162		1.05	0.0034	8.18	0.264	0.00049	2.72	0.00149	0.00038	< 0.005	0.0001	0.00042	4.52	< 0.00001	0.146			0.0018	0.00001	0.00102	< 0.0002	0.0162	< 0.0001
R4	08-Oct-08	0.00001	0.0354	0.00033	0.0572	< 0.00001	0.000005	< 0.05	42.2	0.000036	0.00037	0.0002	0.00082	0.15		0.53	0.0032	8.88	0.34	0.00056	2.69	0.0015	0.000302	< 0.005	0.00009	0.00004	4.89	< 0.00001	0.153			0.00129	0.00000	0.000002	0.0201	< 0.0001	0.00098
R4	10-Dec-08	< 0.000005	0.0171	0.00025	0.0709	< 0.00001	0.000005	< 0.05	56.4	0.000018	0.00007	0.0002	0.00055	0.07		1.33	0.0038	12	0.114	0.00063	3.62	0.00091	0.000181		0.00012	0.00064	5.21	< 0.00001	0.191			0.0008	0.00000	0.00195	< 0.0002	0.0169	< 0.0001
R4	MEAN	0.010969643	0.0679714	0.000506	0.067857	0.000158	0.000149	0.03679	55.75	6.1E-05	0.00043	0.00036	0.00119	0.2365	0.00002	1.31214	0.00362	11.74	0.2810643	0.000526	4.155	0.001682	0.0011099	0.03218	0.00024	0.00066	4.625	0.0001521	0.1804079	0.001	0.0005	0.00265	2.3E-05	0.001598	0.0018429	0.0147	0.0015986
R4	MINIMUM	< 0.000005	0.0019	0.00021	0.0333	< 0.00001	0.000005	0.000013	17.9	0.000007	8	0.0001	0.00038	0.017	< 0.00002	0.53	0.0019	3.86	0.0216	0.00029	1.64	0.00053	0.000036	< 0.005	0.00009	0.00004	3	< 0.00001	0.0702	< 0.001	< 0.0005	0.0005	0.00000	0.000002	< 0.0002	< 0.0001	< 0.0001
R4	MAXIMUM	0.000025	0.586	0.00153	0.1	< 0.001	< 0.001	< 0.05	121	< 0.0002	0.0014	0.0011	0.00405	1.27	< 0.00002	2.38	0.0064	23.6	1.12	0.00063	9.45	0.00442	0.00974	< 0.15	< 0.001	0.003	5.21	< 0.001	0.383	< 0.001	< 0.0005	0.0218	0.0001	0.00307	0.0201	0.0443	< 0.01
R4	N > DL	2	13	12	14	3	1	1	14	12	12	11	13	13	0	14	14	14	14	14	14	13	12	2	12	12	14	2	14	0	0	8	11	13	4	12	4
R4	Median	0.000005	0.0342	0.000365	0.0604	0.00001	0.000005	0.05	41.6	0.000031	25	0.0002	0.001	0.142	97473788	1.265	0.0034	9.3	0.236	0.00058	3.45	0.001485	0.000413	0.005	5	0.00045	4.81	0.00001	0.1555	2374873E-	11874363	0.001	2	0.00112	0.0002	0.0138	0.0001
R5	04-Mar-08	< 0.00025	0.006	0.001	0.12	< 0.001	< 0.001	< 0.05	58.2	< 0.0002	< 0.001	< 0.001	< 0.001	0.12	< 0.00002	1.6	0.003	15.4	0.01	0.0016	3.13	0.003	< 0.001	< 0.15	< 0.001	0.003	5.1	< 0.001	0.2	< 0.001	< 0.0005	< 0.001	0.0001	0.0026	< 0.001	< 0.005	< 0.01
R5	22-Jul-08	< 0.000005	0.0689	0.00049	0.0494	0.00001	0.000005	< 0.05	32.6	0.000019	0.00009	0.0003	0.00108	0.133		0.78	0.0014	8.48	0.0286	0.00076	1.42	0.00066	0.000164		0.00011	0.00068	4.12	< 0.00001	0.0875			0.0029	0.00000	0.00119	0.0004	0.0017	0.0001
R5	19-Aug-08	< 0.00025	0.032	< 0.001	0.056	< 0.001	< 0.001	< 0.05	37.8	< 0.0002	< 0.001	< 0.001	0.001	0.21	< 0.00002	1.1	0.002	11.4	0.035	0.0011	1.95	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.12	< 0.001	< 0.0005	0.001	0.0001	0.0014	< 0.001	0.005	< 0.01
R5	04-Sep-08	< 0.000005	0.0445	0.0004	0.0577	< 0.00001	0.000005	< 0.05	36.6	0.000019	0.00008	0.0001	0.0009	0.136		0.93	0.0017	9.75	0.0396	0.00091	1.71	0.0006	0.000123		0.00012	0.00065	4.73	< 0.00001	0.108			0.0014	0.00000	0.00143	< 0.0002	0.0022	< 0.0001
R5	MEAN	0.0001275	0.03785	0.000723	0.070775	0.000505	0.000503	0.05	41.3	0.00011	0.00055	0.0006	0.001	0.14975	0.00002	1.1025	0.00203	11.2575	0.0283	0.001093	2.0525	0.001315	0.0005718	0.15	0.00056	0.00133	4.7125	0.000505	0.128875	0.001	0.0005	0.00158	5.2E-05	0.001655	0.00065	0.003475	0.00505
R5	MINIMUM	< 0.000005	0.006	0.0004	0.0494	< 0.00001	0.000005	< 0.05	32.6	1.9E-05	8.8E-05	0.0001	0.0009	0.12	< 0.00002	0.78	0.0014	8.48	0.01	0.00076	1.42	0.0006	0.000123	< 0.15	0.00011	0.00065	4.12	< 0.00001	0.0875	< 0.001	< 0.0005	< 0.001	2E-06	0.00119	< 0.0002	0.0017	< 0.0001
R5	MAXIMUM	< 0.00025	0.0689	< 0.001	0.12	< 0.001	< 0.001	< 0.05	58.2	< 0.0002	< 0.001	< 0.001	0.00108	0.21	< 0.00002	1.6	0.003	15.4	0.0396	0.0016	3.13	0.003	< 0.001	< 0.15	< 0.001	0.003	5.1	< 0.001	0.2	< 0.001	< 0.0005	0.0029	0.0001	0.0026	< 0.001	< 0.005	< 0.01
R5	N > DL	0	4	3	4	1	0	0	4	2	2	2	3	4	0	4	4	4	4	4	4	3	2	0	2	3	4	0	4	0	0	3	2	4	1	3	1
R5	Median	0.0001275	0.03825	0.000745	0.05685	0.000505	0.000503	0.05	37.2	0.00011	0.00055	0.00065	0.001	0.1345	2E-05	1.015	0.00185	10.575	0.0318	0.001005	1.83	0.00083	0.000582	0.15	0.00056	0.00084	4.815	0.000505	0.114	0.001	0.0005	0.0012	5.2E-05	0.001415	0.0007	0.0036	0.00505
R6	23-Jan-08	< 0.000005	0.0056	0.00042	0.095	< 0.00001	0.000005	< 0.005	48.3	0.000013	0.00002	0.0001	0.00029	0.117		1.26	0.0024	11.3	0.0111	0.00131	2.12	0.00024	0.000029	< 0.005	0.00011	0.00083	4.77	< 0.00001	0.151			0.0005	0.00000	0.00248	< 0.0002	0.0008	< 0.0001
R6	20-Feb-08	< 0.000005	0.0063	0.00045	0.0962	< 0.00001	0.000005	< 0.005	46.7	0.000013	0.00002	0.0001	0.00038	0.132		1.32	0.0026	10.3	0.00985	0.00136	2.22	0.00022	0.000029	0.005	0.00011	0.00076	4.62	< 0.00001	0.146			0.0005	0.00000	0.00244	< 0.0002	0.0014	< 0.0001
R6	04-Mar-08	< 0.00025	0.006	0.001	0.099	< 0.001	< 0.001	< 0.05	49.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.14	< 0.00002	1.5	0.002	14.9	0.01	0.0013	2.93	< 0.001	< 0.001	< 0.15	< 0.001	0.003	4.8	< 0.001	0.19	< 0.001	< 0.0005	< 0.001	0.0001	0.0021	< 0.001	< 0.005	< 0.01
R6	13-Mar-08	< 0.000005	0.0042	0.00048	0.0958	< 0.00001	0.000005	< 0.005	48.8	0.000007	0.00002	0.0001	0.00029	0.148		1.33	0.0026	10.9	0.00945	0.00138	2.15	0.00022	0.000054	< 0.005	0.00011	0.00079	4.91	< 0.00001	0.148			0.0005	0.00000	0.0024	< 0.0002	0.0037	< 0.0001
R6	28-Apr-08	< 0.000005	0.0115	0.00064	0.0887	< 0.00001	0.000005	< 0.05	43.1	0.000013	0.00004	0.0001	0.00028	0.281		1.32	0.0023	9.63	0.018	0.00127	1.94	0.00022	0.000078	0.009	0.00011	0.00073	4.05	< 0.00001	0.139			0.0005	0.00000	0.00225	< 0.0002	0.004	< 0.0001
R6	21-May-08	0.000008	0.244	0.00081	0.0404	0.00004	0.000006	< 0.05	16.5	0.000074	0.00026	0.0005	0.00292	0.568		1.39	0.0012	4.66	0.0398	0.00055	0.75	0.00183	0.00048	0.019	0.00012	0.00029	3.18	0.00007	0.0469			0.0104	0.00000	0.000577	0.0008	0.0053	0.0003
R6	24-Jun-08	0.000009	0.23	0.00066	0.0433	0.00004	0.000006	< 0.05	20.6	0.000052	0.00023	0.0005	0.00209	0.433		0.69	0.0015	5.77	0.0342	0.00062	0.97	0.00115	0.000575	< 0.005	0.00013	0.0004	3.43	< 0.00001	0.0592			0.0068	0.00000	0.00083	0.0007	0.0034	0.0002
R6	22-Jul-08	< 0.000005	0.0606	0.00046	0.0488	0.00001	0.000005	< 0.05	32.1	0.000023	0.00006	0.0003	0.00097	0.125		0.76	0.0013	8.47	0.0128	0.0008	1.35	0.00056	0.00009		0.00012	0.00074	4.26	< 0.00001	0.0854			0.0023	0.00000	0.00117	0.0002	0.0008	0.0001
R6	29-Jul-08	< 0.000005	0.0332	0.00038	0.0541	< 0.00001	0.000005	< 0.05	34.8	0.000015	0.00005	0.0001	0.00078	0.09		0.84	0.0016	9.03	0.0117	0.00101	2.18	0.00042	0.000142	< 0.005	0.00012	0.00075	4.4	< 0.00001	0.0998			0.0007	0.00000	0.00144	0.0002	0.0015	< 0.0001
R6	19-Aug-08	< 0.00025	0.028	< 0.001	0.056	< 0.001	< 0.001	< 0.05	39	< 0.0002	< 0.001	< 0.001	< 0.001	0.2	< 0.00002	1.1	0.002	11.7	0.013	0.0011	1.89	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	0.0001	0.0015	< 0.001	< 0.005	< 0.01
R6	04-Sep-08	< 0.000005	0.0419	0.0004	0.058	< 0.00001	0.000005	< 0.05	35.6	0.000019	0.00005	0.0002	0.00083	0.124		0.91	0.0017	9.7	0.013	0.00093	1.63	0.00052	0.000049		0.00012	0.00067	4.66	< 0.00001	0.104			0.0014	0.00000	0.00145	< 0.0002	0.0006	< 0.0001
R6	17-Sep-08	< 0.000005	0.0346	0.0004	0.0569	< 0.00001	0.000005	< 0.05	35.6	0.00002	0.00004	0.0001	0.00074	0.106		0.94	0.0016	9.41	0.013	0.00089	1.56	0.00046	0.000057	0.007	0.00011	0.00059	4.36	< 0.00001	0.101			0.0012	0.00000	0.00139	< 0.0002	0.0006	< 0.0001
R6	08-Oct-08	< 0.00005	0.0346	0.00041	0.062	< 0.00001	0.000005	< 0.05	39.9	0.000016	0.00004	0.0002	0.00068	0.11		0.73	0.0019	10.7	0.0165	0.00099	1.73	0.00041	0.000109	< 0.005	0.00011	0.00004	4.13	< 0.00001	0.111			0.00166	0.00000	0.000002	0.0011	< 0.0001	0.00101
R6	10-Dec-08	< 0.000005	0.0338	0.00042	0.0844	< 0.00001	0.000005	< 0.05	48.8	0.000017	0.00005	0.0002	0.00045	0.134		1.24	0.0025	12.3	0.018	0.00124	2.01	0.00034	0.00014		0.00017	0.00097	5.09	0.00002	0.141			0.0015	0.00000	0.00235	< 0.0002	0.0018	< 0.0001
R6	MEAN	0.007968714	0.0553071	0.000566	0.0699	0.000156	0.000147	0.04036	38.53571	4.9E-05	0.00021	0.00032	0.00091	0.1934286	0.00002	1.095	0.00194	9.91214	0.0164571	0.001054	1.81643	0.000614	0.0002737	0.03318	0.00025	0.00083	4.40429	0.0001564	0.1093821	0.001	0.0005	0.00214	1.7E-05	0.001599	0.0004571	0.0024286	0.0016007
R6	MINIMUM	< 0.000005	0.0042	0.00038	0.0404	< 0.00001	0.000005	< 0.005	16.5	0.000007	0.00002	0.0001	0.00028	0.09	< 0.00002	0.69	0.0012	4.66	0.00945	0.00055	0.75	0.00022	0.000029	< 0.005	0.00011	0.00004	3.18	< 0.00001	0.0469	< 0.001	< 0.0005	0.0005	0.00000	0.000002	< 0.0002	< 0.0001	< 0.0001
R6	MAXIMUM	0.000009	0.244	< 0.001	0.099	< 0.001	< 0.001	< 0.05	49.7	< 0.0002	< 0.001	< 0.001	0.00292	0.568	< 0.00002	1.5	0.0026	14.9	0.0398	0.00138	2.93	0.00183	< 0.001	< 0.15	< 0.001	0.003	5.09	< 0.001	0.19	< 0.001	< 0.0005	0.0104	0.0001	0.00248	0.0011	0.0053	< 0.01
R6	N > DL	3	14	13	14	3	2	0	14	12	12	9	12	14	0	14	14	14	14	14	14	12	12	4	12	12	14	2	13	0	0	8	4	13	5	11	4
R6	Median	0.000005	0.0335	0.000455	0.06	0.00001	0.000005	0.05	39.45	0.000018	15	0.0002	0.00076	0.133	97473788	1.17	0.00195	10	0.013	0.001055	1.915	0.00044	0.0000995	0.005	0.00012	5	4.51	0.00001	0.112	2374873E-	11874363	0.0011	2	0.001475	0.0002	0.00165	0.0001
R7	08-Jan-08	< 0.00025	0.017	< 0.001	0.063	< 0.001	< 0.001	< 0.05	36	< 0.0002	< 0.001	< 0.001	< 0.001	0.11	< 0.00002	0.9	0.005	7.14	0.008	0.0007	2.66	< 0.001	< 0.001	< 0.15	0.003	< 0.001	5.1	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	0.0001	0.0018	< 0.001	0.008	< 0.01
R7	19-Feb-08	< 0.00025	0.01	< 0.001	0.073	< 0.001	< 0.001	< 0.05	39.2	< 0.0002	< 0.001	0.001	< 0.001	< 0.05	< 0.00002	0.8	0.007	8.12	0.009	0.0009	3.21	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.9	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	0.0001	0.0015	0.002	< 0.005	< 0.01
R7	18-Mar-08	< 0.00025	0.008	< 0.001	0.077	< 0.001	< 0.001	< 0.05	40.1	< 0.0002	< 0.001	< 0.001	< 0.001	0.05	< 0.00002	1.1	0.007	9.39	0.006	0.0009	3.81	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.6	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	0.0001	0.0025	< 0.001	< 0.005	< 0.01
R7	14-Apr-08	< 0.00025	< 0.005	< 0.001	0.076	< 0.001	< 0.001	< 0.05	42.5	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	1.1	0.008	8.37	0.006	0.001	3.42	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.8	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	0.0001	0.0026	< 0.001	< 0.005	< 0.01
R7	15-May-08	< 0.00025	0.15	< 0.001	0.037	< 0.001	< 0.001	< 0.05	12	< 0.0002	< 0.001	< 0.001	0.002	0.47	< 0.00002	1.5	0.002	2.33	0.038	< 0.0005	1.05	0.001	< 0.001	< 0.15	< 0.001	< 0.001	2.7	< 0.001	0.051	< 0.001	< 0.0005	0.004	0.0001	0.0005	< 0.001	0.014	< 0.01
R7	25-May-08	0.000012	0.281	0.00141	0.0308	0.00005	0.000007	< 0.05	7.87	0.000071	0.00031	0.0004	0.00239	0.893		0.93		1.34	0.0752	0.00024	0.71	0.00124	0.000954		0.00009	0.00013		0.00001	0.0385			0.0113	0.00000	0.000385	0.0006	0.01	0.0003
R7	17-Jun-08	< 0.00025	0.12	< 0.001	0.039	< 0.001	< 0.001	< 0.05	19.5	< 0.0002	< 0.001	< 0.001	0.001	0.18	< 0.00002	0.6	< 0.001	4.87	0.015	< 0.0005	1.69	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.7	< 0.001	0.071	< 0.001	< 0.0005	0.004	0.0001	0.0007	< 0.001	0.008	< 0.01
R7	15-Jul-08	0.0004	0.59	< 0.001	0.039	< 0.001	< 0.001	< 0.05	14.1	< 0.0002	< 0.001	< 0.001	0.003	0.98	< 0.00002	0.5	0.003	2.86	0.033	< 0.0005	1.28	0.002	0.001	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.057	< 0.001	< 0.0005	0.03	0.0001	0.0005	0.001	0.012	< 0.01
R7	22-Jul-08	< 0.000005	0.0439	0.00055	0.036	< 0.00001	0.000005	< 0.05	18.9	0.000009	0.00004	0.0003	0.00073	0.114		0.34	0.0017	3.98	0.0147	0.00036	1.37	0.00038	0.000085		0.00008	0.00026	4.36	< 0.00001	0.0687			0.0017	0.00000	0.000638	0.0003	0.0008	0.0001
R7	12-Aug-08	< 0.00025	0.017	< 0.001	0.044	< 0.001	< 0.001	< 0.05	22.8	< 0.0002	< 0.001	< 0.001	< 0.001	0.22	< 0.00002	0.5	0.002	4.65	0.021	< 0.0005	1.78	< 0.001	0.002	< 0.15	< 0.001	< 0.001	4.8	< 0.001	0.084	< 0.001	< 0.0005	0.002	0.0001	0.0007	< 0.001	< 0.005	< 0.01
R7	21-Aug-08	< 0.000005	0.0187	0.00064	0.0477	< 0.00001	0.000005	< 0.05	23.9	0.00001	0.00003	0.0001	0.00175	0.152		0.5	0.003	5	0.0166	0.0005	2.04	0.00039	0.000312	0.025	0.00008	0.00024	5.6	< 0.00001	0.0977			0.0005	0.00000	0.000962	< 0.0002	0.0016	< 0.0001
R7	04-Sep-08	< 0.000005	0.0289	0.00053	0.0401	< 0.00001	0.000005	< 0.05	21.1	0.000017	0.00004	0.0001	0.00073	0.105		0.45	0.0022	4.26	0.0155	0.00041	1.64	0.00036	0.00009		0.00009	0.00029	5.17	< 0.00001	0.0813			0.0007	0.00000	0.000794	< 0.0002	0.0012	< 0.0001
R7	04-Sep-08	< 0.000005	0.0529	0.00056	0.0406	< 0.00001	0.000005	< 0.05	21	0.000011	0.00006	0.1	0.00069	0.166		0.46	0.0022	4.2	0.0169	0.00041	1.64	0.00038	0.000086		0.00008	0.00031	5.05	< 0.00001	0.0809			0.0024	0.00000	0.000789	< 0.0002	0.0008	< 0.0001
R7	15-Sep-08	< 0.00025	0.087	< 0.001	0.036	< 0.001	< 0.001	< 0.05	17.5	< 0.0002	< 0.001	< 0.001	0.001	0.22	< 0.00002	0.4	0.002	3.59	0.019	< 0.0005	1.59	< 0.001	0.003	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.084	< 0.001	< 0.0005	0.003	0.0001	0.0009	< 0.001	< 0.005	< 0.01

Appendix 3
2008 Surface Water Quality Data
Rose Creek Drainage

Table 2. Surface Water Total Metals

Station	Date	AG-T mg/L	AL-T mg/L	AS-T mg/L	BA-T mg/L	BE-T mg/L	BI-T mg/L	B-T mg/L	CA-T mg/L	CD-T mg/L	CO-T mg/L	CR-T mg/L	CU-T mg/L	FE-T mg/L	HG-T mg/L	K-T mg/L	LI-T mg/L	MG-T mg/L	MN-T mg/L	MO-T mg/L	NA-T mg/L	NI-T mg/L	PB-T mg/L	P-T mg/L	SB-T mg/L	SE-T mg/L	SI-T mg/L	SN-T mg/L	SR-T mg/L	TE-T mg/L	TH-T mg/L	TI-T mg/L	TL-T mg/L	U-T mg/L	V-T mg/L	ZN-T mg/L	ZR-T mg/L
R7	15-Oct-08	< 0.00025	0.019	< 0.001	0.042	< 0.001	< 0.001	< 0.05	24.3	< 0.0002	< 0.001	< 0.001	< 0.001	0.05	< 0.00002	0.5	0.003	4.49	0.019	< 0.0005	1.67	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.095	< 0.001	< 0.0005	< 0.001	0.0001	0.001	< 0.001	< 0.005	< 0.01
R7	04-Nov-08	< 0.00025	0.032	< 0.001	0.054	< 0.001	< 0.001	< 0.05	29.7	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.7	0.003	6.07	0.015	0.0006	2.22	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.3	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	0.0001	0.0013	< 0.001	< 0.005	< 0.01
R7	02-Dec-08	< 0.00025	0.029	< 0.001	0.058	< 0.001	< 0.001	< 0.05	35.3	< 0.0002	< 0.001	< 0.001	< 0.001	0.09	< 0.00002	0.9	0.005	6.74	0.022	0.0006	2.67	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.5	< 0.001	0.13	< 0.001	< 0.0005	< 0.001	0.0001	0.0017	< 0.001	0.014	< 0.01
R7	MEAN	0.00019	0.08879	0.00092	0.04901	0.00071	0.00071	0.05	25.0	0.00015	0.00074	0.00664	0.00125	0.2323529	0.00002	0.71647	0.00357	5.14118	0.0205824	0.000566	2.02647	0.000926	0.0009722	0.14038	0.00085	0.00078	5.24875	0.0007088	0.1011235	0.001	0.0005	0.00392	7.2E-05	0.001133	0.0008529	0.0062	0.0071
R7	MINIMUM	< 0.000005	< 0.005	0.00053	0.0308	< 0.00001	0.000005	< 0.05	7.87	9E-06	3.8E-05	0.0001	0.00069	< 0.05	< 0.00002	0.34	< 0.001	1.34	0.006	0.00024	0.71	0.00036	0.000085	0.025	0.00008	0.00013	2.7	< 0.00001	0.0385	< 0.001	< 0.0005	0.0005	0.00000	0.000385	< 0.0002	0.0008	< 0.0001
R7	MAXIMUM	0.0004	0.59	0.00141	0.077	< 0.001	< 0.001	< 0.05	42.5	< 0.0002	< 0.001	0.1	0.003	0.98	< 0.00002	1.5	0.008	9.39	0.0752	0.001	3.81	0.002	0.003	< 0.15	0.003	< 0.001	6.8	< 0.001	0.18	< 0.001	< 0.0005	0.03	0.0001	0.0026	0.002	0.014	< 0.01
R7	N > DL	2	16	5	17	1	1	0	17	5	5	4	9	14	0	17	15	17	17	11	17	7	8	1	6	5	16	1	17	0	0	9	3	17	4	10	2
R7	Median	0.00025	0.029	0.001	0.042	0.001	0.001	0.05	22.8	0.0002	0.001	0.001	0.001	0.114	0.00002	0.6	0.003	4.65	0.0166	0.0005	1.69	0.001	0.001	0.15	0.001	0.001	5.135	0.001	0.084	0.001	0.0005	0.001	0.0001	0.0009	0.001	0.005	0.01
R8	08-Jan-08	< 0.00025	0.01	< 0.001	0.063	< 0.001	< 0.001	< 0.05	36	< 0.0002	< 0.001	< 0.001	< 0.001	0.12	< 0.00002	0.9	0.005	7.2	0.01	0.0006	2.7	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.3	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	0.0001	0.0018	< 0.001	< 0.005	< 0.01
R8	19-Feb-08	< 0.00025	0.006	< 0.001	0.088	< 0.001	< 0.001	< 0.05	47.4	< 0.0002	< 0.001	0.001	< 0.001	< 0.05	< 0.00002	0.9	0.009	9.8	0.011	0.0011	3.71	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	7	< 0.001	0.2	< 0.001	< 0.0005	< 0.001	0.0001	0.0019	0.002	< 0.005	< 0.01
R8	18-Mar-08	< 0.00025	< 0.005	< 0.001	0.076	< 0.001	< 0.001	< 0.05	39.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.06	< 0.00002	1.1	0.007	9.3	0.006	0.0008	3.76	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.8	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	0.0001	0.0025	< 0.001	< 0.005	< 0.01
R8	14-Apr-08	< 0.00025	< 0.005	< 0.001	0.078	< 0.001	< 0.001	< 0.05	38.8	< 0.0002	< 0.001	< 0.001	< 0.001	0.12	< 0.00002	1	0.008	8.43	0.006	0.0009	3.55	< 0.001	< 0.001	< 0.15	< 0.001	0.002	5.6	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	0.0001	0.0025	< 0.001	< 0.005	< 0.01
R8	15-May-08	< 0.00025	0.2	< 0.001	0.036	< 0.001	< 0.001	< 0.05	11.8	< 0.0002	< 0.001	< 0.001	0.002	0.47	< 0.00002	1.5	0.002	2.2	0.036	< 0.0005	1.07	0.001	0.001	< 0.15	< 0.001	< 0.001	2.7	< 0.001	0.049	< 0.001	< 0.0005	0.003	0.0001	< 0.0005	< 0.001	0.009	< 0.01
R8	17-Jun-08	< 0.00025	0.098	< 0.001	0.027	< 0.001	< 0.001	< 0.05	12.9	< 0.0002	< 0.001	< 0.001	0.001	0.11	< 0.00002	0.5	< 0.001	3.16	0.01	< 0.0005	1.29	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.8	< 0.001	0.049	< 0.001	< 0.0005	0.004	0.0001	0.0005	< 0.001	0.008	< 0.01
R8	15-Jul-08	< 0.00025	1.13	< 0.001	0.043	< 0.001	< 0.001	< 0.05	11.9	< 0.0002	0.001	0.002	0.005	1.73	< 0.00002	0.6	0.005	2.64	0.049	< 0.0005	1.28	0.004	0.021	< 0.15	< 0.001	< 0.001	6.5	< 0.001	0.047	< 0.001	< 0.0005	0.05	0.0001	0.0006	0.003	0.03	< 0.01
R8	12-Aug-08	< 0.00025	0.028	< 0.001	0.04	< 0.001	< 0.001	< 0.05	20.9	< 0.0002	< 0.001	< 0.001	< 0.001	0.19	< 0.00002	0.5	0.002	4.23	0.017	< 0.0005	1.76	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5	< 0.001	0.079	< 0.001	< 0.0005	0.001	0.0001	0.0007	< 0.001	< 0.005	< 0.01
R8	15-Sep-08	< 0.00025	0.045	< 0.001	0.039	< 0.001	< 0.001	< 0.05	20.1	< 0.0002	< 0.001	< 0.001	0.001	0.17	< 0.00002	0.5	0.002	4.1	0.019	< 0.0005	1.67	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.6	< 0.001	0.094	< 0.001	< 0.0005	0.001	0.0001	0.001	< 0.001	< 0.005	< 0.01
R8	15-Oct-08	< 0.00025	0.04	< 0.001	0.041	< 0.001	< 0.001	< 0.05	22.9	< 0.0002	< 0.001	< 0.001	< 0.001	0.05	< 0.00002	0.5	0.003	4.18	0.019	< 0.0005	1.67	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.4	< 0.001	0.09	< 0.001	< 0.0005	< 0.001	0.0001	0.001	< 0.001	< 0.005	< 0.01
R8	04-Nov-08	< 0.00025	0.03	< 0.001	0.05	< 0.001	< 0.001	< 0.05	26.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.7	0.003	5.73	0.016	0.0006	2.21	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.4	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	0.0001	0.0013	< 0.001	0.006	< 0.01
R8	02-Dec-08	< 0.00025	0.025	< 0.001	0.063	< 0.001	< 0.001	< 0.05	37.4	< 0.0002	< 0.001	< 0.001	< 0.001	0.11	< 0.00002	1	0.005	7.09	0.026	0.0006	2.9	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	7.2	< 0.001	0.13	< 0.001	< 0.0005	< 0.001	0.0001	0.0018	< 0.001	0.015	< 0.01
R8	MEAN	0.00025	0.1352	0.001	0.054	0.001	0.001	0.05	27.2	0.0002	0.001	0.00108	0.00142	0.2691667	0.00002	0.80833	0.00433	5.67167	0.01875	0.000633	2.2975	0.00125	0.0026667	0.15	0.001	0.00108	5.44167	0.001	0.1106667	0.001	0.0005	0.0055	0.0001	0.001342	0.00125	0.0085833	0.01
R8	MINIMUM	< 0.00025	< 0.005	< 0.001	0.027	< 0.001	< 0.001	< 0.05	11.8	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.5	< 0.001	2.2	0.006	< 0.0005	1.07	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	2.7	< 0.001	0.047	< 0.001	< 0.0005	< 0.001	0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
R8	MAXIMUM	< 0.00025	1.13	< 0.001	0.088	< 0.001	< 0.001	< 0.05	47.4	< 0.0002	< 0.001	0.002	0.005	1.73	< 0.00002	1.5	0.009	9.8	0.049	0.0011	3.76	0.004	0.021	< 0.15	< 0.001	0.002	7.2	< 0.001	0.2	< 0.001	< 0.0005	0.05	0.0001	0.0025	0.003	0.03	< 0.01
R8	N > DL	0	10	0	12	0	0	0	12	0	1	2	4	10	0	12	11	12	12	6	12	2	2	0	0	1	12	0	12	0	0	5	0	11	2	5	0
R8	Median	0.00025	0.029	0.001	0.0465	0.001	0.001	0.05	24.75	0.0002	0.001	0.001	0.001	0.115	0.00002	0.8	0.004	4.98	0.0165	0.00055	1.985	0.001	0.001	0.15	0.001	0.001	5.4	0.001	0.102	0.001	0.0005	0.001	0.0001	0.00115	0.001	0.005	0.01
R9	08-Jan-08	< 0.00025	0.014	< 0.001	0.064	< 0.001	< 0.001	< 0.05	37.9	< 0.0002	< 0.001	< 0.001	< 0.001	0.1	< 0.00002	1	0.006	8.02	0.012	0.0007	2.75	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.2	< 0.001	0.15	< 0.001	< 0.0005	< 0.001	0.0001	0.0019	< 0.001	< 0.005	< 0.01
R9	19-Feb-08	< 0.00025	0.007	< 0.001	0.074	< 0.001	< 0.001	< 0.05	41.9	< 0.0002	< 0.001	0.001	0.002	< 0.05	< 0.00002	1	0.007	9.16	0.015	0.0008	3.38	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.9	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	0.0001	0.0017	0.003	< 0.005	< 0.01
R9	18-Mar-08	< 0.00025	< 0.005	< 0.001	0.075	< 0.001	< 0.001	< 0.05	42.9	< 0.0002	< 0.001	< 0.001	< 0.001	0.06	< 0.00002	1.2	0.008	11	0.01	0.0008	3.97	< 0.001	< 0.001	< 0.15	< 0.001	0.001	6.7	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	0.0001	0.0027	< 0.001	< 0.005	< 0.01
R9	14-Apr-08	< 0.00025	< 0.005	< 0.001	0.074	< 0.001	< 0.001	< 0.05	43.4	< 0.0002	< 0.001	< 0.001	< 0.001	0.1	< 0.00002	1.1	0.008	10.1	0.011	0.0009	3.84	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.8	< 0.001	0.19	< 0.001	< 0.0005	< 0.001	0.0001	0.0027	< 0.001	< 0.005	< 0.01
R9	15-May-08	< 0.00025	0.16	< 0.001	0.035	< 0.001	< 0.001	< 0.05	12.3	< 0.0002	< 0.001	< 0.001	0.002	0.45	< 0.00002	1.4	0.002	2.45	0.035	< 0.0005	1.08	< 0.001	0.001	< 0.15	< 0.001	< 0.001	2.7	< 0.001	0.053	< 0.001	< 0.0005	0.004	0.0001	< 0.0005	< 0.001	0.008	< 0.01
R9	17-Jun-08	< 0.00025	0.11	< 0.001	0.032	< 0.001	< 0.001	< 0.05	16.8	< 0.0002	< 0.001	< 0.001	0.001	0.14	< 0.00002	0.6	< 0.001	4.24	0.013	< 0.0005	1.61	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.7	< 0.001	0.063	< 0.001	< 0.0005	0.004	0.0001	0.0006	< 0.001	0.009	< 0.01
R9	15-Jul-08	< 0.00025	1.04	< 0.001	0.042	< 0.001	< 0.001	< 0.05	12.5	< 0.0002	< 0.001	0.002	0.005	1.55	< 0.00002	0.6	0.004	2.79	0.048	< 0.0005	1.29	0.003	0.017	< 0.15	< 0.001	< 0.001	6.6	< 0.001	0.053	< 0.001	< 0.0005	0.043	0.0001	0.0006	0.002	0.026	< 0.01
R9	12-Aug-08	< 0.00025	0.024	< 0.001	0.039	< 0.001	< 0.001	< 0.05	22.8	< 0.0002	< 0.001	< 0.001	< 0.001	0.17	< 0.00002	0.5	0.002	4.86	0.019	< 0.0005	1.85	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5	< 0.001	0.09	< 0.001	< 0.0005	< 0.001	0.0001	0.0007	< 0.001	0.008	< 0.01
R9	15-Sep-08	< 0.00025	0.14	< 0.001	0.04	< 0.001	< 0.001	< 0.05	19.3	< 0.0002	< 0.001	< 0.001	0.001	0.32	< 0.00002	0.5	0.002	4.02	0.023	< 0.0005	1.64	< 0.001	0.005	< 0.15	< 0.001	< 0.001	5	< 0.001	0.096	< 0.001	< 0.0005	0.005	0.0001	0.001	< 0.001	< 0.005	< 0.01
R9	15-Oct-08	< 0.00025	0.027	< 0.001	0.041	< 0.001	< 0.001	< 0.05	25.6	< 0.0002	< 0.001	< 0.001	< 0.001	0.07	< 0.00002	0.6	0.004	5.03	0.04	< 0.0005	1.88	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.3	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	0.0001	0.0011	< 0.001	0.008	< 0.01
R9	04-Nov-08	< 0.00025	0.033	< 0.001	0.051	< 0.001	< 0.001	< 0.05	29.5	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	0.8	0.003	6.23	0.016	0.0006	2.23	0.012	< 0.001	< 0.15	< 0.001	< 0.001	5.4	< 0.001	0.13	< 0.001	< 0.0005	< 0.001	0.0001	0.0014	< 0.001	0.012	< 0.01
R9	02-Dec-08	< 0.00025	0.023	< 0.001	0.066	< 0.001	< 0.001	< 0.05	40.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.1	< 0.00002	1.1	0.005	8.41	0.026	0.0007	3.02	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	7.6	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	0.0001	0.002	< 0.001	0.013	< 0.01
R9	MEAN	0.00025	0.132	0.001	0.05275	0.001	0.001	0.05	28.8	0.0002	0.001	0.00108	0.0015	0.2633333	0.00002	0.86667	0.00433	6.35917	0.0223333	0.000625	2.37833	0.002083	0.0026667	0.15	0.001	0.001	5.49167	0.001	0.12125	0.001	0.0005	0.00533	0.0001	0.001408	0.00125	0.0090833	0.01
R9	MINIMUM	< 0.00025	< 0.005	< 0.001	0.032	< 0.001	< 0.001	< 0.05	12.3	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.5	< 0.001	2.45	0.01	< 0.0005	1.08	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	2.7	< 0.001	0.053	< 0.001	< 0.0005	< 0.001	0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
R9	MAXIMUM	< 0.00025	1.04	< 0.001	0.075	< 0.001	< 0.001	< 0.05	43.4	< 0.0002	< 0.001	0.002	0.005	1.55	< 0.00002	1.4	0.008	11	0.048	0.0009	3.97	0.012	0.017	< 0.15	< 0.001	< 0.001	7.6	< 0.001	0.19	< 0.001	< 0.0005	0.043	0.0001	0.0027	0.003	0.026	< 0.01
R9	N > DL	0	10	0	12	0	0	0	12	0	0	2	6	10	0	12	11	12	12	6	12	2	3	0	0	1	12	0	12	0	0	4	0	11	2	7	0
R9	Median	0.00025	0.0255	0.001	0.0465	0.001	0.001	0.05	27.55	0.0002	0.001	0.001	0.001	0.1	0.00002	0.9	0.004	5.63	0.0175	0.00055	2.055	0.001	0.001	0.15	0.001	0.001	5.35	0.001	0.12	0.001	0.0005	0.001	0.0001	0.00125	0.001	0.008	0.01
R10	08-Jan-08	< 0.00025	0.007	< 0.001	0.059	< 0.001	< 0.001	< 0.05	35.5	< 0.0002	< 0.001	< 0.001	< 0.001	0.09	< 0.00002	0.9	0.005	7.56	0.012	0.0006	2.64	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.8	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	0.0001	0.0018	< 0.001	0.006	< 0.01
R10	19-Feb-08	< 0.00025	0.006	< 0.001	0.071	< 0.001	< 0.001	< 0.05	41	< 0.0002	< 0.001	0.001	< 0.001	< 0.05	< 0.00002	0.9	0.007	8.98	0.014	0.0009	3.34	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.8	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	0.0001	0.0017	0.002	< 0.005	< 0.01
R10	18-Mar-08	< 0.00025	0.046	0.001	0.078	< 0.001	< 0.001	< 0.05	43.4	< 0.0002	< 0.001	< 0.001	< 0.001	0.32	< 0.00002	1.3	0.008	11	0.027	0.0009	4.07	< 0.001	0.001	< 0.15	< 0.001	0.001	7	< 0.001	0.19	< 0.001	< 0.0005	0.002	0.0001	0.0027	< 0.001	0.016	< 0.01
R10	14-Apr-08	< 0.00025	0.018	0.001	0.076	< 0.001	< 0.001	< 0.05	43	< 0.0002	< 0.001	< 0.001	< 0.001	0.14	< 0.00002	1.1	0.008	10.2	0.012	0.0009	3.85	< 0.001	< 0.001	< 0.15	< 0.001	0.001	5.9	< 0.001	0.19	< 0.001	< 0.0005	< 0.001	0.0001	0.0027	< 0.001	0.015	< 0.01
R10	15-May-08	< 0.00025	0.17	< 0.001	0.037	< 0.001	< 0.001	< 0.05	12.9	< 0.0002	< 0.001	< 0.001	0.003	0.46	< 0.00002	1.5	0.003	2.63	0.035	< 0.0005	1.15	0.001	0.001	< 0.15	< 0.001	< 0.001	2.8	< 0.001	0.056	< 0.001	< 0.0005	0.004	0.0001	0.0005	< 0.001	0.014	< 0.01
R10	17-Jun-08	< 0.00025	0.12	< 0.001	0.033	< 0.001	< 0.001	< 0.05	16.8	< 0.0002	< 0.001	< 0.001	0.001	0.14	< 0.00002	0.6	< 0.001	4.2	0.014	< 0.0005	1.58	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.7	< 0.001	0.062	< 0.001	< 0.0005	0.004	0.0001	0.0006	< 0.001	0.008	< 0.01
R10	15-Jul-08	< 0.00025	1.14	< 0.001	0.043	< 0.001	< 0.001	< 0.05	12.5	< 0.0002	0.001	0.002	0.005	1.68	< 0.00002	0.6	0.007	2.88	0.051	< 0.0005	1.3	0.004	0.02	< 0.15	< 0.001	< 0.001	6.6	< 0.001	0.053	< 0.001	< 0.0005	0.049	0.0001	0.0006	0.003	0.031	< 0.01
R10	12-Aug-08	< 0.00025	0.022	< 0.001	0.04	< 0.001	< 0.001	< 0.05	22.8	< 0.0002	< 0.001	< 0.001	< 0.001	0.16	< 0.00002	0.5	0.002	4.72	0.017	< 0.0005	1.84	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.1	< 0.001	0.089	< 0.001	< 0.0005	0.001	0.0001	0.0008	< 0.001	0.007	< 0.01
R10	15-Sep-08	< 0.00025	0.076	< 0.001	0.035	< 0.001	< 0.001	< 0.05	19	< 0.0002	< 0.001	< 0.001	0.001	0.21	< 0.00002	0.5	0.002	3.92	0.018	< 0.0005	1.62	< 0.001	0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.094	< 0.001	< 0.0005	0.002	0.0001	0.001	< 0.001	0.006	< 0.01
R10	15-Oct-08	< 0.00025	0.039	< 0.001	0.039	< 0.001	< 0.001	< 0.05	23.8	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.6	0.003	4.41	0.019	< 0.0005	1.66	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.2	< 0.001	0.096	< 0.001	< 0.0005	< 0.001	0.0001	0.001	< 0.001	0.006	< 0.01
R10	04-Nov-08	0.0004	0.033	< 0.001	0.053	< 0.001	< 0.001	< 0.05	31	< 0.0002	< 0.001	< 0.001	< 0.001	0.07	< 0.00002	0.8	0.003	6.56	0.017	0.0005	2.39	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	0.0001	0.0014	< 0.001	0.008	< 0.01
R10	02-Dec-08	< 0.00025	0.042	< 0.001	0.061	< 0.001	< 0.001	< 0.05	37.1	< 0.0002	< 0.001	< 0.001	< 0.001	0.09	< 0.00002	1	0.005	7.36	0.026	0.0006	2.77	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.7	< 0.001	0.14	< 0.001	< 0.0005	0.002	0.0001	0.0018	< 0.001	0.017	< 0.01
R10	MEAN	0.0002625	0.14325	0.001	0.052	0.001	0.001	0.05	28.2	0.0002	0.001	0.00108	0.0015	0.2883333	0.00002	0.85833	0.0045	6.20167	0.0218333	0.000617	2.35083	0.00125	0.0025833	0.15	0.001	0.001	5.425	0.001	0.1175	0.001	0.0005	0.00575	0.0001	0.001383	0.00125	0.0115833	0.01
R10	MINIMUM	< 0.00025	0.006	< 0.001	0.033	< 0.001	< 0.001	< 0.05	12.5	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.5	< 0.001	2.63	0.012	< 0.0005	1.15	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	2.8	< 0.001	0.053	< 0.001	< 0.0005	< 0.001	0.0001	0.0005	< 0.001	< 0.005	< 0.01
R10	MAXIMUM	0.0004	1.14	< 0.001	0.078	< 0.001	< 0.001	< 0.05	43.4	< 0.0002	< 0.001	0.002	0.005	1.68	< 0.00002	1.5	0.008	11	0.051	0.0009	4.07	0.004	0.02	< 0.15	< 0.001	< 0.001	7	< 0.001	0.19	< 0.001	< 0.0005	0.049	0.0001	0.0027	0.003	0.031	< 0.01
R10	N > DL	1	12	2	12	0	0	0	12	0	1	2	4	10	0	12	11	12	12	6	12	2	4	0	0	2	12	0	12	0	0	7	0	12	2	11	0
R10	Median	0.00025	0.0405	0.001	0.048	0.001	0.001	0.05	27.4	0.0002	0.001	0.001	0.001	0.14	0.00002	0.85	0.004	5.64	0.0175	0.0005	2.115	0.001	0.001	0.15	0.001	0.001	5.4	0.001	0.108	0.001	0.0005	0.0015	0.0001	0.0012	0.001	0.008	0.01

Appendix 3
2008 Surface Water Quality Data
Rose Creek Drainage

Table 2. Surface Water Total Metals

Station	Date	AG-T mg/L	AL-T mg/L	AS-T mg/L	BA-T mg/L	BE-T mg/L	BI-T mg/L	B-T mg/L	CA-T mg/L	CD-T mg/L	CO-T mg/L	CR-T mg/L	CU-T mg/L	FE-T mg/L	HG-T mg/L	K-T mg/L	LI-T mg/L	MG-T mg/L	MN-T mg/L	MO-T mg/L	NA-T mg/L	NI-T mg/L	PB-T mg/L	P-T mg/L	SB-T mg/L	SE-T mg/L	SI-T mg/L	SN-T mg/L	SR-T mg/L	TE-T mg/L	TH-T mg/L	TI-T mg/L	TL-T mg/L	U-T mg/L	V-T mg/L	ZN-T mg/L	ZR-T mg/L
R11	04-Mar-08	< 0.00025	0.009	0.001	0.082	< 0.001	< 0.001	< 0.05	52.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	1.7	0.004	14.2	0.006	0.0009	4.66	< 0.001	< 0.001	< 0.15	< 0.001	0.003	4	< 0.001	0.2	< 0.001	< 0.0005	< 0.001	0.0001	0.0021	< 0.001	< 0.005	< 0.01
R11	19-Aug-08	< 0.00025	0.074	< 0.001	0.051	< 0.001	< 0.001	< 0.05	37.7	< 0.0002	< 0.001	< 0.001	0.002	0.24	< 0.00002	1.3	0.003	9.44	0.078	0.0012	2.67	0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.3	< 0.001	0.14	< 0.001	< 0.0005	0.003	0.0001	0.0013	< 0.001	0.007	< 0.01
SP5-6	02-Jun-08	< 0.00025	0.095	< 0.001	0.025	< 0.001	< 0.001	< 0.05	120	0.0024	0.003	< 0.001	0.006	< 0.05	< 0.00002	4.5	0.025	109	0.16	< 0.0005	7.75	0.025	< 0.001	< 0.15	< 0.001	< 0.001	6.8	< 0.001	0.49	< 0.001	< 0.0005	< 0.001	0.0001	0.0035	< 0.001	2.17	< 0.01
SP5-6	29-Sep-08	< 0.00025	1.56	< 0.001	0.032	< 0.001	< 0.001	< 0.05	174	0.0091	0.046	< 0.001	0.025	0.4	< 0.00002	5	0.044	181	1.54	< 0.0005	9.45	0.092	0.001	< 0.15	< 0.001	0.002	6	< 0.001	0.76	< 0.001	< 0.0005	< 0.001	0.0001	0.0092	< 0.001	8.49	< 0.01
W5	02-Jun-08	< 0.00025	0.024	< 0.001	0.039	< 0.001	< 0.001	< 0.05	151	0.0021	< 0.001	< 0.001	0.003	< 0.05	< 0.00002	3.7	0.021	105	0.006	< 0.0005	7.41	0.032	< 0.001	< 0.15	< 0.001	0.003	5.4	< 0.001	0.7	< 0.001	< 0.0005	0.001	0.0001	0.0072	< 0.001	2.76	< 0.01
W5	30-Sep-08	< 0.00025	0.1	< 0.001	0.025	< 0.001	< 0.001	< 0.05	92.4	0.0017	< 0.001	< 0.001	0.003	0.15	< 0.00002	3.4	0.022	78.5	0.022	< 0.0005	5.71	0.027	< 0.001	< 0.15	< 0.001	0.003	6.2	< 0.001	0.42	< 0.001	< 0.0005	0.004	0.0001	0.0055	< 0.001	2.32	< 0.01
W8	01-Jun-08	< 0.00025	0.07	< 0.001	0.015	< 0.001	< 0.001	< 0.05	8.29	< 0.0002	< 0.001	< 0.001	0.003	0.07	< 0.00002	0.5	< 0.001	1.09	0.01	< 0.0005	1.58	0.001	0.003	< 0.15	< 0.001	< 0.001	5.1	< 0.001	0.028	< 0.001	< 0.0005	0.002	0.0001	< 0.0005	< 0.001	0.04	< 0.01
W8	29-Sep-08	< 0.00025	0.025	< 0.001	0.036	< 0.001	< 0.001	< 0.05	16.7	< 0.0002	< 0.001	< 0.001	0.002	0.07	< 0.00002	0.7	0.002	2.56	0.009	< 0.0005	1.98	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.5	< 0.001	0.061	< 0.001	< 0.0005	< 0.001	0.0001	< 0.0005	< 0.001	0.017	< 0.01
W10	21-May-08	0.000018	0.153	0.00035	0.0127	0.00004	0.000019	< 0.05	7.47	0.000072	0.00011	0.0002	0.00256	0.149		1.09	0.001	1.09	0.0119	0.00009	0.83	0.00072	0.00229	0.014	0.00004	0.00005	3.36	< 0.00001	0.0252			0.0034	0.00000	0.000122	< 0.0002	0.0164	0.0002
W10	01-Jun-08	< 0.00025	0.057	< 0.001	0.008	< 0.001	< 0.001	< 0.05	7.88	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	< 0.00002	0.4	< 0.001	1.04	< 0.001	< 0.0005	1.4	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5	< 0.001	0.027	< 0.001	< 0.0005	< 0.001	0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
W10	24-Jun-08	< 0.000005	0.0292	0.00017	0.0125	0.00002	0.000005	< 0.05	12.1	0.000017	0.00002	0.0001	0.00145	0.024		0.41	0.0012	1.59	0.00035	0.00019	1.54	0.00049	0.000155	< 0.005	0.00004	0.00004	5.62	< 0.00001	0.0434			0.0005	0.00000	0.000114	< 0.0002	0.0023	0.0002
W10	30-Jul-08	< 0.000005	0.0234	0.00014	0.0143	0.00002	0.000005	< 0.05	14.9	0.000021	0.00002	0.0002	0.00143	0.02		0.39	0.0011	1.88	0.00046	0.00021	2.89	0.00043	0.000344	< 0.005	0.00004	0.00004	6.49	< 0.00001	0.0532			0.0005	0.00000	0.000126	0.0002	0.0045	0.0001
W10	17-Sep-08	< 0.000005	0.0217	0.00014	0.0135	0.00002	0.000005	< 0.05	14.9	0.000022	0.00002	0.0001	0.00132	0.018		0.45	0.001	1.92	0.00035	0.00019	1.68	0.00042	0.000085	< 0.005	0.00003	0.00005	5.81	< 0.00001	0.0501			0.0005	0.00000	0.000113	< 0.0002	0.0018	0.0001
W10	29-Sep-08	< 0.00025	0.035	< 0.001	0.014	< 0.001	< 0.001	< 0.05	16	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	0.5	< 0.001	2.14	< 0.001	< 0.0005	1.95	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.7	< 0.001	0.056	< 0.001	< 0.0005	< 0.001	0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
W10	08-Oct-08	0.000003	0.022	0.00013	0.0132	0.00001	0.000005	< 0.05	14.9	0.000048	0.00002	0.0001	0.00111	0.017		0.05	0.0011	1.98	0.00043	0.0002	1.62	0.00037	0.000304	< 0.005	0.00003	0.00004	5.99	< 0.00001	0.0504			0.00012	0.00000	0.000002	0.0026	0.0001	0.0004
W10	MEAN	0.00728	0.04876	0.00042	0.0126	0.00030	0.00029	0.05	12.6	8.3E-05	0.00032	0.00039	0.00155	0.0468571	0.00002	0.47	0.00106	1.66286	0.0022129	0.000269	1.70143	0.000633	0.0007397	0.04771	0.00031	0.00032	5.56714	0.0002929	0.0364147	0.001	0.0005	0.001	3.1E-05	0.000211	0.0007714	0.0050143	0.003
W10	MINIMUM	< 0.000005	0.0217	0.00013	0.008	0.00001	0.000005	< 0.05	7.47	1.7E-05	2.2E-05	0.0001	0.001	0.017	< 0.00002	0.05	< 0.001	1.04	0.00035	0.00009	0.83	0.00037	0.000085	< 0.005	0.00003	0.00004	3.36	< 0.00001	0.0252	< 0.001	< 0.0005	0.00013	0.00000	0.000002	< 0.0002	0.0001	0.0001
W10	MAXIMUM	0.000018	0.153	< 0.001	0.0143	< 0.001	< 0.001	< 0.05	16	< 0.0002	< 0.001	< 0.001	0.00256	0.149	< 0.00002	1.09	0.0012	2.14	0.0119	< 0.0005	2.89	< 0.001	0.00229	< 0.15	< 0.001	< 0.001	6.7	< 0.001	0.056	< 0.001	< 0.0005	0.0034	0.0001	< 0.0005	0.0026	0.0164	< 0.01
W10	N > DL	2	7	5	7	5	1	0	7	5	5	4	7	5	0	7	5	7	5	5	7	5	5	1	5	2	7	0	7	0	0	2	4	4	2	5	5
W10	Median	0.000018	0.0292	0.00017	0.0132	0.00002	0.000005	0.05	14.9	4.8E-05	2.7E-05	0.0002	0.00143	0.024	2E-05	0.41	0.001	1.88	0.00046	0.0002	1.62	0.00049	0.000344	0.005	0.00004	0.00005	5.81	0.00001	0.0434	0.001	0.0005	0.0005	4E-06	0.000122	0.0002	0.0045	0.0002
WEIR3	03-Mar-08	< 0.00025	0.006	0.002	0.06	< 0.001	< 0.001	< 0.05	267	< 0.0002	0.004	< 0.001	0.001	1.9	< 0.00002	5.1	0.008	63.5	10.5	0.0016	37.1	0.015	< 0.001	< 0.15	< 0.001	0.003	7.1	< 0.001	0.79	< 0.001	< 0.0005	< 0.001	0.0001	0.007	< 0.001	< 0.005	< 0.01
WEIR3	19-Aug-08	< 0.00025	< 0.005	< 0.001	0.06	< 0.001	< 0.001	< 0.05	275	< 0.0002	0.005	< 0.001	< 0.001	1.48	< 0.00002	5.3	0.009	57.7	10.6	0.0014	35	0.017	< 0.001	< 0.15	< 0.001	< 0.001	8	< 0.001	0.71	< 0.001	< 0.0005	< 0.001	0.0001	0.0079	< 0.001	0.005	< 0.01
X2	07-Jan-08	< 0.00025	0.017	< 0.001	0.053	< 0.001	< 0.001	< 0.05	33.3	< 0.0002	< 0.001	< 0.001	< 0.001	0.14	< 0.00002	0.9	0.006	8.71	0.08	0.0005	2.68	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.6	< 0.001	0.13	< 0.001	< 0.0005	< 0.001	0.0001	0.0016	< 0.001	0.056	< 0.01
X2	18-Feb-08	< 0.00025	0.025	< 0.001	0.069	< 0.001	< 0.001	< 0.05	47.4	< 0.0002	< 0.001	< 0.001	< 0.001	0.26	< 0.00002	1.3	0.007	12.1	0.17	0.0007	3.74	0.002	< 0.001	< 0.15	< 0.001	< 0.001	5.9	< 0.001	0.21	< 0.001	< 0.0005	< 0.001	0.0001	0.0018	< 0.001	0.099	< 0.01
X2	17-Mar-08	< 0.00025	< 0.005	< 0.001	0.077	< 0.001	< 0.001	< 0.05	39.6	< 0.0002	< 0.001	< 0.001	< 0.001	0.19	< 0.00002	1.1	0.005	12.7	0.16	0.0007	4.41	0.002	< 0.001	< 0.15	< 0.001	< 0.001	6.6	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	0.0001	0.0034	< 0.001	0.094	< 0.01
X2	14-Apr-08	< 0.00025	0.012	< 0.001	0.076	< 0.001	< 0.001	< 0.05	44.9	< 0.0002	< 0.001	< 0.001	< 0.001	0.26	< 0.00002	1.2	0.009	12.1	0.15	0.0009	3.9	0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.8	< 0.001	0.21	< 0.001	< 0.0005	0.002	0.0001	0.0028	< 0.001	0.097	< 0.01
X2	14-May-08	< 0.00025	0.19	0.001	0.031	< 0.001	< 0.001	< 0.05	12.1	< 0.0002	< 0.001	< 0.001	0.003	0.47	< 0.00002	1.6	0.002	2.63	0.06	< 0.0005	1.01	0.002	0.003	< 0.15	< 0.001	< 0.001	2.5	< 0.001	0.053	< 0.001	< 0.0005	0.004	0.0001	< 0.0005	< 0.001	0.076	< 0.01
X2	12-Jun-08	< 0.00002	0.156	0.0006	0.032	< 0.001		< 0.1	14.2	0.00003	0.0003	< 0.001	< 0.002	0.257	< 0.00002	< 2	< 0.005	3.25	0.0262	< 0.001	< 2	0.001	0.00184		0.0005	< 0.001		< 0.0005				< 0.01	0.0002	0.00057	< 0.001	0.0256	
X2	16-Jun-08	< 0.00025	0.14	< 0.001	0.037	< 0.001	< 0.001	< 0.05	19.3	< 0.0002	< 0.001	< 0.001	0.002	0.25	< 0.00002	0.6	0.002	4.7	0.033	< 0.0005	1.72	< 0.001	0.002	< 0.15	< 0.001	< 0.001	5.3	< 0.001	0.073	< 0.001	< 0.0005	0.004	0.0001	0.0007	< 0.001	0.037	< 0.01
X2	14-Jul-08	< 0.00025	0.08	< 0.001	0.03	< 0.001	< 0.001	< 0.05	15.6	< 0.0002	< 0.001	< 0.001	0.001	0.16	< 0.00002	0.5	< 0.001	3.54	0.017	< 0.0005	1.38	< 0.001	0.001	< 0.15	< 0.001	< 0.001	5.5	< 0.001	0.063	< 0.001	< 0.0005	0.002	0.0001	< 0.0005	< 0.001	0.024	< 0.01
X2	22-Jul-08	< 0.000005	0.0435	0.00052	0.034	0.00001	0.000005	< 0.05	18.8	0.000026	0.00007	0.0002	0.00136	0.101		0.43	0.002	4.14	0.0191	0.00035	1.5	0.00069	0.000883		0.00008	0.00024	4.53	< 0.00001	0.0705			0.0014	0.00000	0.00065	0.0003	0.0225	0.0001
X2	11-Aug-08	< 0.00025	0.048	< 0.001	0.044	< 0.001	< 0.001	< 0.05	21.6	< 0.0002	< 0.001	< 0.001	< 0.001	0.18	< 0.00002	0.6	< 0.001	5.79	0.035	< 0.0005	1.98	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	8.5	< 0.001	0.089	< 0.001	< 0.0005	0.002	0.0001	0.0009	< 0.001	0.03	< 0.01
X2	19-Aug-08	< 0.000005	0.0246	0.00056	0.0428	< 0.00001	0.000005	< 0.05	23.3	0.000018	0.00008	0.0001	0.00079	0.153		0.53	0.003	5.37	0.0359	0.00044	2.03	0.00075	0.000767	0.017	0.00008	0.00022	5.8	< 0.00001	0.1			0.0006	0.00000	0.000881	< 0.0002	0.036	< 0.0001
X2	25-Aug-08	0.00001	0.309	0.00127	0.0443	0.00005	0.000018	< 0.05	15.7	0.000074	0.00049	0.0007	0.00231	0.834		0.68	0.0025	3.41	0.103	0.00026	1.9	0.00181	0.00743		0.0001	0.00019	5.35	0.00001	0.0674			0.0114	0.00001	0.000556	0.0007	0.0431	0.0003
X2	15-Sep-08	< 0.00025	0.034	< 0.001	0.036	< 0.001	< 0.001	< 0.05	19.9	< 0.0002	< 0.001	< 0.001	0.002	0.13	< 0.00002	0.5	0.002	4.33	0.027	< 0.0005	1.71	0.002	< 0.001	< 0.15	< 0.001	< 0.001	5	< 0.001	0.099	< 0.001	< 0.0005	< 0.001	0.0001	0.001	< 0.001	0.024	< 0.01
X2	15-Oct-08	< 0.00025	0.043	< 0.001	0.044	< 0.001	< 0.001	< 0.05	25.4	< 0.0002	< 0.001	< 0.001	< 0.001	0.07	< 0.00002	0.6	0.003	5.31	0.052	0.0007	1.82	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.3	< 0.001	0.1	< 0.001	< 0.0005	< 0.001	0.0001	0.0011	< 0.001	0.039	< 0.01
X2	03-Nov-08	< 0.00025	0.049	< 0.001	0.055	< 0.001	< 0.001	< 0.05	32.7	0.0003	< 0.001	< 0.001	< 0.001	0.07	< 0.00002	0.9	0.004	8.23	0.12	0.0006	2.54	0.002	0.001	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.13	< 0.001	< 0.0005	< 0.001	0.0001	0.0014	< 0.001	0.1	< 0.01
X2	01-Dec-08	< 0.00025	0.031	< 0.001	0.065	< 0.001	< 0.001	< 0.05	38.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.29	< 0.00002	0.9	0.006	10.2	0.13	0.0007	3.37	0.001	0.001	< 0.15	< 0.001	< 0.001	6.8	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	0.0001	0.0016	< 0.001	0.092	< 0.01
X2	MEAN	0.00019	0.0754	0.0009	0.0481	0.0008	0.0008	0.053	26.4	0.00017	0.00081	0.00088	0.0014	0.2384375	0.00002	0.89625	0.00378	6.65688	0.0761375	0.000584	2.35563	0.001328	0.00162	0.13977	0.0008	0.00085	5.53867	0.0007831	0.1143267	0.001	0.0005	0.00278	8.9E-05	0.001247	0.0008875	0.05595	0.0080333
X2	MINIMUM	< 0.000005	< 0.005	0.00052	0.03	< 0.00001	0.000005	< 0.05	12.1	1.8E-05	0.00007	0.0001	0.00079	0.07	< 0.00002	0.43	< 0.001	2.63	0.017	0.00026	1.01	0.00069	0.000767	0.017	0.00008	0.00019	2.5	< 0.00001	0.053	< 0.001	< 0.0005	0.0006	3E-06	< 0.0005	< 0.0002	0.0225	< 0.0001
X2	MAXIMUM	< 0.00025	0.309	0.00127	0.077	< 0.001	< 0.001	< 0.1	47.4	0.0003	< 0.001	< 0.001	0.003	0.834	< 0.00002	< 2	0.009	12.7	0.17	< 0.001	4.41	0.002	0.00743	< 0.15	< 0.001	< 0.001	8.5	< 0.001	0.21	< 0.001	< 0.0005	0.0114	0.0002	0.0034	< 0.001	0.1	< 0.01
X2	N > DL	1	15	5	16	2	1	0	16	5	3	2	7	16	0	15	13	16	16	10	15	11	9	1	3	3	15	1	15	0	0	8	3	14	2	16	2
X2	Median	0.00025	0.04325	0.001	0.044	0.001	0.001	0.05	22.45	0.0002	0.001	0.001	0.001	0.185	0.00002	0.79	0.003	5.34	0.056	0.0005	1.99	0.001	0.001	0.15	0.001	0.001	5.5	0.001	0.1	0.001	0.0005	0.0012	0.0001	0.00095	0.001	0.04105	0.01
X3	07-Jan-08	< 0.00025	0.008	< 0.001	0.063	< 0.001	< 0.001	< 0.05	39.3	< 0.0002	< 0.001	< 0.001	< 0.001	0.15	< 0.00002	1.1	0.006	9.65	0.077	0.0005	3.06	< 0.001	< 0.001	< 0.15	< 0.001	0.001	5.3	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	0.0001	0.0018	< 0.001	0.047	< 0.01
X3	18-Feb-08	< 0.00025	0.006	< 0.001	0.068	< 0.001	< 0.001	< 0.05	48	< 0.0002	< 0.001	< 0.001	< 0.001	0.15	< 0.00002	1.4	0.007	11.9	0.13	0.0008	3.67	0.002	< 0.001	< 0.15	< 0.001	< 0.001	5.7	< 0.001	0.21	< 0.001	< 0.0005	< 0.001	0.0001	0.0018	< 0.001	0.088	< 0.01
X3	17-Mar-08	< 0.00025	< 0.005	< 0.001	0.074	< 0.001	< 0.001	< 0.05	38.5	< 0.0002	< 0.001	< 0.001	< 0.001	0.12	< 0.00002	1.1	0.004	12.1	0.11	0.0006	4.27	0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.2	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	0.0001	0.0033	< 0.001	0.071	< 0.01
X3	14-Apr-08	< 0.00025	< 0.005	< 0.001	0.075	< 0.001	< 0.001	< 0.05	45	< 0.0002	< 0.001	< 0.001	< 0.001	0.21	< 0.00002	1.2	0.008	11.5	0.11	0.0007	3.78	0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.7	< 0.001	0.21	< 0.001	< 0.0005	< 0.001	0.0001	0.0027	< 0.001	0.076	< 0.01
X3	14-May-08	< 0.00025	0.21	< 0.001	0.032	< 0.001	< 0.001	< 0.05	12.5	< 0.0002	< 0.001	< 0.001	0.002	0.86	< 0.00002	1.6	0.002	2.54	0.086	< 0.0005	1.23	0.001	0.003	< 0.15	< 0.001	< 0.001	3.1	< 0.001	0.058	< 0.001	< 0.0005	0.007	0.0001	< 0.0005	< 0.001	0.043	< 0.01
X3	16-Jun-08	< 0.00025	0.074	< 0.001	0.027	< 0.001	< 0.001	< 0.05	15.3	< 0.0002	< 0.001	< 0.001	< 0.001	0.2	< 0.00002	0.6	< 0.001	3.26	0.02	< 0.0005	1.39	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.5	< 0.001	0.068	< 0.001	< 0.0005	0.003	0.0001	0.0006	< 0.001	0.012	< 0.01
X3	14-Jul-08	< 0.00025	0.081	< 0.001	0.029	< 0.001	< 0.001	< 0.05	18.1	< 0.0002	< 0.001	< 0.001	0.001	0.2	< 0.00002	0.6	< 0.001	4.04	0.018	< 0.0005	1.47	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.081	< 0.001	< 0.0005	0.004	0.0001	0.0007	< 0.001	0.017	< 0.01
X3	11-Aug-08	< 0.00025	0.044	< 0.001	0.044	< 0.001	< 0.001	< 0.05	24	< 0.0002	< 0.001	< 0.001	< 0.001	0.21	< 0.00002	0.7	< 0.001	6.02	0.032	< 0.0005	2	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	8.2	< 0.001	0.11	< 0.001	< 0.0005	0.001	0.0001	0.0011	< 0.001	0.016	< 0.01
X3	15-Sep-08	< 0.00025	0.027	< 0.001	0.037	< 0.001	< 0.001	< 0.05	22.4	< 0.0002	< 0.001	< 0.001	0.001	0.18	< 0.00002	0.6	0.002	4.79	0.026	< 0.0005	1.72	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.4	< 0.001	0.13	< 0.001	< 0.0005	< 0.001	0.0001	0.0013	< 0.001	0.01	< 0.01
X3	15-Oct-08	< 0.00025	0.023	< 0.001	0.043	< 0.001	< 0.001	< 0.05	28.1	< 0.0002	< 0.001	< 0.001	< 0.001	0.08	< 0.00002	0.7	0.003	5.3	0.043	< 0.0005	1.75	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.13	< 0.001	< 0.0005	< 0.001	0.0001	0.0012	< 0.001	0.023	< 0.01
X3	03-Nov-08	< 0.00025	0.04	< 0.001	0.052	< 0.001	< 0.001	< 0.05	33.8	0.0003	< 0.001	< 0.001	< 0.001	0.07	< 0.00002	1	0.002	7.64	0.083	< 0.0005	2.77	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.3	< 0.001	0.15	< 0.001	< 0.0005	< 0.001	0.0001	0.0014	< 0.001	0.054	< 0.01
X3	01-Dec-08	< 0.00025	0.028	< 0.001	0.065	< 0.001	< 0.001	< 0.05	41.8	< 0.0002	< 0.001	< 0.001	< 0.001	0.33	< 0.00002	1.1	0.004	10	0.11	< 0.0005	3.38	0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.7	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	0.0001	0.0017	< 0.001	0.065	< 0.01
X3	MEAN	0.00025	0.0459	0.001	0.05075	0.001	0.001	0.05	30.6	0.0002	0.001	0.001	0.00108	0.23	0.00002	0.975	0.00342	7.395	0.0704167	0.00055	2.54083	0.001083	0.0011667	0.15	0.001	0.001	5.325	0.001	0.13975	0.001	0.0005	0.00192	0.0001	0.001508	0.001	0.0435	0.01
X3	MINIMUM	< 0.00025	< 0.005	< 0.001	0.027	< 0.001	< 0.001	< 0.05	12.5	< 0.0002	< 0.001	< 0.001	< 0.001	0.07	< 0.00002	0.6	< 0.001	2.54	0.018	< 0.0005	1.23	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.1	< 0.001	0.058	< 0.001	< 0.0005	< 0.001	0.0001	< 0.0005	< 0.001	0.01	< 0.01
X3	MAXIMUM	< 0.00025	0.21	< 0.001	0.075	< 0.001	< 0.001	< 0.05	48	0.0003	< 0.001	< 0.001	0.002	0.86	< 0.00002	1.6	0.008	12.1	0.13	0.0008	4.27	0.002	0.003	< 0.15	< 0.001	< 0.001	8.2	< 0.001	0.21	< 0.001	< 0.0005	0.007	0.0001	0.0033	< 0.001	0.088	< 0.01
X3	N > DL	0	10	0	12	0	0	0	12	1	0	0	3	12	0	12	9	12	12	4	12	5	1	0	0	1	12	0	12	0	0	4	0	11	0	12	0
X3	Median	0.00025	0.0275	0.001	0.048	0.001	0.001	0.05	30.95	0.0002	0.001	0.001	0.001	0.19	0.00002	1.05	0.0025	6.83	0.08	0.0005	2.385	0.001	0.001	0.15	0.001	0.001	5.3	0.001	0.14	0.001	0.0005	0.001	0.0001	0.00135	0.001	0.045	0.01
X4	08-Jan-08	< 0.00025	0.14	< 0.001	0.012	< 0.001	< 0.001	< 0.05	193	0.0085	0.046	< 0.001	0.03	12.9	< 0.00002	4	0.014	54.9	14.8	0.0012	12.6	0.055	0.052	< 0.15	< 0.001	0.002	4.9	< 0.001	0.7	< 0.001	< 0.0005	< 0.001	0.0009	0.0008	< 0.001	17.1	< 0.01
X4	19-Feb-08	< 0.00025	0.009	< 0.001	0.019	< 0.001	< 0.001	< 0.05	194	0.0041	0.04	< 0.001	0.005	18.7	0.00002	4	0.01	41.4	17.3	0.0021	12.5	0.045	< 0.001	< 0.15	< 0.001	< 0.001	5.9	< 0.001	0.71	< 0.001	< 0.0005	< 0.001	0.0006	0.0009	< 0.001	9.54	< 0.01
X4	18-Mar-08	< 0.00025	0.014	< 0.001	0.02	< 0.001	< 0.001	< 0.05	146	0.0009	0.028	< 0.001	0.004	24.3	< 0.00002	3.2	0.006	30	12.2	0.0012	12.9	0.027	0.002	< 0.15	< 0.001	< 0.001	6	< 0.001	0.47	< 0.001	< 0.0005	< 0.001	0.0002	0.0022	< 0.001	3.62	< 0.01
X4	15-Apr-08	< 0.00025	0.13	< 0.001	0.014	< 0.001	< 0.001	< 0.05	175	0.0085	0.047	< 0.001	0.035	6.6	< 0.00002	3.5	0.014	52	15.1	0.001	12.3	0.055	0.056	< 0.15	< 0.001	0.001	4.7	< 0.001	0.67	< 0.001	< 0.0005	< 0.001	0.001	0.001	< 0.001	15.4	< 0.01
X4	15-May-08	< 0.00025	0.13	< 0.001	0.023	< 0.001	< 0.001	< 0.05	154	0.012	0.047	< 0.001	0.043	13.4	< 0.00002	3	0.012	43.3	11.8	0.0011	8.65	0.052	0.041	< 0.15	< 0.001	< 0.001	3.6	< 0.001	0.57	< 0.001	< 0.0005	< 0.001	0.0008	< 0.0005	< 0.001	18	< 0.01
X4	16-Jun-08	< 0.00025	0.078	< 0.001	0.015	< 0.001	< 0.001	< 0.05	149	0.0091	0.04	< 0.001	0.027	2.92	< 0.00002	2.9	0.01	46.2	11.6	0.001	8.98	0.047	0.041	< 0.15	< 0.001	< 0.001	3.2	< 0.001	0.54	< 0.001	< 0.0005	< 0.001	0.0009	< 0.0005	< 0.001	16.2	< 0.01
X4	14-Jul-08	< 0.00025	0.32	0.004	0.027	< 0.001	< 0.001	< 0.05	162	0.0098	0.054	< 0.001	0.079	6.33	< 0.00002	3.3	0.015	60.5	12.6	< 0.0005	9.97	0.061	0.18	< 0.15	< 0.001	0.001	4.6	< 0.001	0.56	< 0.001	< 0.0005	< 0.001	0.0011	0.001	< 0.001	18.9	< 0.01
X4	11-Aug-08	< 0.00025	0.84	0.002	0.042	< 0.001	< 0.001	< 0.05	167	0.01	0.061	< 0.001	0.099	12.5	< 0.00002	3.5	0.019	70.6	16	< 0.0005	12.1	0.069	0.34	< 0.15	< 0.001	0.002	7.1	< 0.001	0.62	< 0.001	< 0.0005	0.003	0.0013	0.0015	< 0.001	22.3	< 0.01

Appendix 3
2008 Surface Water Quality Data
Rose Creek Drainage

Table 2. Surface Water Total Metals

Station	Date	AG-T mg/L	AL-T mg/L	AS-T mg/L	BA-T mg/L	BE-T mg/L	BI-T mg/L	B-T mg/L	CA-T mg/L	CD-T mg/L	CO-T mg/L	CR-T mg/L	CU-T mg/L	FE-T mg/L	HG-T mg/L	K-T mg/L	LI-T mg/L	MG-T mg/L	MN-T mg/L	MO-T mg/L	NA-T mg/L	NI-T mg/L	PB-T mg/L	P-T mg/L	SB-T mg/L	SE-T mg/L	SI-T mg/L	SN-T mg/L	SR-T mg/L	TE-T mg/L	TH-T mg/L	TI-T mg/L	TL-T mg/L	U-T mg/L	V-T mg/L	ZN-T mg/L	ZR-T mg/L
X4	15-Sep-08	< 0.00025	1.01	0.002	0.015	< 0.001	< 0.001	< 0.05	168	0.016	0.092	0.002	0.16	18.9	< 0.00002	3.6	0.018	70.7	16	0.0008	12	0.087	0.44	< 0.15	< 0.001	< 0.001	4.7	< 0.001	0.69	< 0.001	< 0.0005	< 0.001	0.0017	0.0023	< 0.001	22.3	< 0.01
X4	15-Oct-08	< 0.00025	0.82	< 0.001	0.014	< 0.001	< 0.001	< 0.05	192	0.015	0.082	0.001	0.13	24.3	< 0.00002	3.8	0.019	67.8	17.6	0.0013	10.8	0.092	0.39	< 0.15	< 0.001	< 0.001	5	< 0.001	0.77	< 0.001	< 0.0005	< 0.001	0.0011	0.0015	< 0.001	31.4	< 0.01
X4	04-Nov-08	0.0015	0.95	< 0.001	0.014	< 0.001	< 0.001	< 0.05	215	0.016	0.088	0.001	0.13	27.3	< 0.00002	4.4	0.018	89.5	20.2	0.0013	16	0.097	0.41	< 0.15	< 0.001	0.002	5.5	< 0.001	0.83	< 0.001	< 0.0005	< 0.001	0.0012	0.0018	< 0.001	34.4	< 0.01
X4	01-Dec-08	< 0.00025	0.97	< 0.001	0.015	< 0.001	< 0.001	< 0.05	238	0.013	0.096	0.001	0.13	35.5	< 0.00002	4.5	0.021	95.4	19.8	0.0012	17.3	0.12	0.37	< 0.15	< 0.001	< 0.001	6.9	< 0.001	0.87	< 0.001	< 0.0005	< 0.001	0.0011	0.0016	< 0.001	32.4	< 0.01
X4	MEAN	0.00035	0.451	0.00142	0.01917	0.001	0.001	0.05	179.4	0.0102	0.06008	0.00108	0.07267	16.970833	0.00002	3.64167	0.01467	60.1917	15.416667	0.0011	12.175	0.06725	0.1935833	0.15	0.001	0.00125	5.175	0.001	0.6666667	0.001	0.0005	0.00117	0.00099	0.0013	0.001	20.13	0.01
X4	MINIMUM	< 0.00025	0.009	< 0.001	0.012	< 0.001	< 0.001	< 0.05	146	0.0009	0.028	< 0.001	0.004	2.92	< 0.00002	2.9	0.006	30	11.6	< 0.0005	8.65	0.027	< 0.001	< 0.15	< 0.001	< 0.001	3.2	< 0.001	0.47	< 0.001	< 0.0005	< 0.001	0.0002	< 0.0005	< 0.001	3.62	< 0.01
X4	MAXIMUM	0.0015	1.01	0.004	0.042	< 0.001	< 0.001	< 0.05	238	0.016	0.096	0.002	0.16	35.5	< 0.00002	4.5	0.021	95.4	20.2	0.0021	17.3	0.12	0.44	< 0.15	< 0.001	0.002	7.1	< 0.001	0.87	< 0.001	< 0.0005	0.003	0.0017	0.0023	< 0.001	34.4	< 0.01
X4	N > DL	1	12	3	12	0	0	0	12	12	12	4	12	12	1	12	12	12	12	10	12	12	11	0	0	5	12	0	12	0	0	1	12	10	0	12	0
X4	Median	0.00025	0.23	0.001	0.015	0.001	0.001	0.05	171.5	0.0099	0.0505	0.001	0.061	16.05	0.00002	3.55	0.0145	57.7	15.55	0.00115	12.2	0.058	0.118	0.15	0.001	0.001	4.95	0.001	0.68	0.001	0.0005	0.001	0.00105	0.00125	0.001	18.45	0.01
X5	14-Apr-08	< 0.00025	0.005	0.001	0.042	< 0.001	< 0.001	< 0.05	239	< 0.0002	0.015	< 0.001	0.002	0.26	< 0.00002	6.1	0.019	65.2	12.7	0.0024	30.5	0.032	< 0.001	< 0.15	< 0.001	0.003	7.2	< 0.001	0.92	< 0.001	< 0.0005	< 0.001	0.0001	0.0063	< 0.001	0.16	< 0.01
X5	15-Apr-08	< 0.00025	< 0.005	< 0.001	0.036	< 0.001	< 0.001	< 0.05	265	< 0.0002	0.014	< 0.001	0.002	0.25	< 0.00002	5.6	0.016	58.6	14.4	0.002	28.8	0.031	< 0.001	< 0.15	< 0.001	0.001	6.5	< 0.001	0.81	< 0.001	< 0.0005	< 0.001	0.0001	0.0053	< 0.001	0.14	< 0.01
X5	22-Apr-08	< 0.00025	< 0.005	< 0.001	0.027	< 0.001	< 0.001	< 0.05	292	< 0.0002	0.016	< 0.001	0.002	0.14	< 0.00002	5.2	0.017	51.5	16.2	0.0019	25.5	0.033	< 0.001	< 0.15	< 0.001	0.001	6.1	< 0.001	0.92	< 0.001	< 0.0005	0.002	0.0001	0.0041	< 0.001	0.14	< 0.01
X5	29-Apr-08	< 0.00025	< 0.005	< 0.001	0.022	< 0.001	< 0.001	< 0.05	284	< 0.0002	0.012	< 0.001	0.001	0.1	< 0.00002	5.8	0.014	54	11.6	0.0017	23.6	0.025	< 0.001	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.83	< 0.001	< 0.0005	< 0.001	0.0002	0.0033	< 0.001	0.22	< 0.01
X5	06-May-08	< 0.00025	0.006	< 0.001	0.02	< 0.001	< 0.001	< 0.05	230	< 0.0002	0.007	< 0.001	0.001	0.14	< 0.00002	5.3	0.019	47.5	6.4	0.0012	21.4	0.016	< 0.001	< 0.15	< 0.001	0.001	3.8	< 0.001	0.75	< 0.001	< 0.0005	< 0.001	0.0004	0.0024	0.001	0.11	< 0.01
X5	13-May-08	< 0.00025	0.011	< 0.001	0.017	< 0.001	< 0.001	< 0.05	225	< 0.0002	0.007	< 0.001	0.001	0.27	< 0.00002	4.6	0.019	33.7	5.99	0.001	16.7	0.013	< 0.001	< 0.15	< 0.001	0.002	2.8	< 0.001	0.79	< 0.001	< 0.0005	< 0.001	0.0003	0.0014	0.002	0.085	< 0.01
X5	15-May-08	< 0.00025	< 0.005	< 0.001	0.023	< 0.001	< 0.001	< 0.05	239	< 0.0002	0.008	< 0.001	0.002	0.07	< 0.00002	6.1	0.022	43.4	6.73	0.0014	21.8	0.017	0.001	< 0.15	< 0.001	0.001	4.1	< 0.001	1	< 0.001	< 0.0005	< 0.001	0.0004	0.0021	0.002	0.16	< 0.01
X5	20-May-08	< 0.00025	0.006	< 0.001	0.017	< 0.001	< 0.001	< 0.05	217	< 0.0002	0.006	< 0.001	0.001	0.17	< 0.00002	4.9	0.019	42.7	5.49	0.0013	19.9	0.014	< 0.001	< 0.15	< 0.001	0.002	3.4	< 0.001	0.75	< 0.001	< 0.0005	< 0.001	0.0003	0.0016	0.001	0.16	< 0.01
X5	27-May-08	< 0.00025	0.02	< 0.001	0.015	< 0.001	< 0.001	< 0.05	211	< 0.0002	0.008	< 0.001	0.001	0.1	< 0.00002	4.4	0.015	42.6	7.38	0.0012	20.8	0.017	< 0.001	< 0.15	< 0.001	0.002	3.3	< 0.001	0.68	< 0.001	< 0.0005	< 0.001	0.0002	0.0013	0.001	0.21	< 0.01
X5	03-Jun-08	< 0.00025	0.009	< 0.001	0.014	< 0.001	< 0.001	< 0.05	199	< 0.0002	0.004	< 0.001	< 0.001	0.12	< 0.00002	4.5	0.018	30	3.38	0.0008	15.7	0.009	< 0.001	< 0.15	< 0.001	0.002	2.2	< 0.001	0.66	< 0.001	< 0.0005	< 0.001	0.0003	0.0008	0.001	0.082	< 0.01
X5	10-Jun-08	< 0.00025	0.008	< 0.001	0.016	< 0.001	< 0.001	< 0.05	225	< 0.0002	0.01	< 0.001	0.001	0.1	< 0.00002	5.3	0.023	44.5	8.01	0.0012	21.8	0.021	< 0.001	< 0.15	< 0.001	< 0.001	3.8	< 0.001	0.68	< 0.001	< 0.0005	< 0.001	0.0003	0.0014	0.001	0.2	< 0.01
X5	16-Jun-08	< 0.00025	0.011	< 0.001	0.013	< 0.001	< 0.001	< 0.05	195	< 0.0002	0.003	< 0.001	< 0.001	0.08	< 0.00002	5.7	0.031	31.4	2.11	0.0011	16.4	0.006	< 0.001	< 0.15	< 0.001	0.001	2.2	< 0.001	0.66	< 0.001	< 0.0005	< 0.001	0.0004	0.0007	0.002	0.071	< 0.01
X5	17-Jun-08	< 0.00025	0.005	< 0.001	0.013	< 0.001	< 0.001	< 0.05	204	< 0.0002	0.005	< 0.001	< 0.001	0.06	< 0.00002	5.3	0.028	33.2	3.96	0.0011	16.9	0.01	< 0.001	< 0.15	< 0.001	0.002	2.4	< 0.001	0.66	< 0.001	< 0.0005	< 0.001	0.0003	0.001	0.001	0.12	< 0.01
X5	24-Jun-08	< 0.00025	0.009	< 0.001	0.017	< 0.001	< 0.001	< 0.05	284	< 0.0002	0.021	< 0.001	0.001	0.11	< 0.00002	6	0.023	60.8	17.7	0.0022	26.8	0.041	< 0.001	< 0.15	< 0.001	< 0.001	5.5	< 0.001	0.86	< 0.001	< 0.0005	< 0.001	0.0002	0.0026	< 0.001	0.22	< 0.01
X5	01-Jul-08	< 0.00025	0.012	< 0.001	0.016	< 0.001	< 0.001	< 0.05	264	< 0.0002	0.015	< 0.001	0.002	0.45	< 0.00002	6.5	0.029	52.5	11.8	0.0024	25.5	0.033	< 0.001	< 0.15	< 0.001	0.002	3.9	< 0.001	0.86	< 0.001	< 0.0005	< 0.001	0.0002	0.0021	0.001	0.19	< 0.01
X5	08-Jul-08	< 0.00025	< 0.005	< 0.001	0.014	< 0.001	< 0.001	< 0.05	245	< 0.0002	0.012	< 0.001	< 0.001	0.11	< 0.00002	6.6	0.034	44.1	8.59	0.0017	22	0.024	< 0.001	< 0.15	< 0.001	< 0.001	3.6	< 0.001	0.84	< 0.001	< 0.0005	< 0.001	0.0003	0.0018	< 0.001	0.11	< 0.01
X5	14-Jul-08	< 0.00025	0.012	< 0.001	0.015	< 0.001	< 0.001	< 0.05	252	< 0.0002	0.013	< 0.001	0.002	0.83	< 0.00002	6.7	0.039	50	9.6	0.0008	22.9	0.027	< 0.001	< 0.15	< 0.001	0.001	4.4	< 0.001	0.73	< 0.001	< 0.0005	< 0.001	0.0003	0.0019	< 0.001	0.12	< 0.01
X5	16-Jul-08	< 0.00025	0.008	< 0.001	0.015	< 0.001	< 0.001	< 0.05	255	< 0.0002	0.012	< 0.001	0.001	0.84	< 0.00002	6.9	0.038	48	9.23	0.0008	22.9	0.024	< 0.001	< 0.15	< 0.001	< 0.001	4.2	< 0.001	0.74	< 0.001	< 0.0005	< 0.001	0.0003	0.0018	< 0.001	0.095	< 0.01
X5	22-Jul-08	< 0.00025	0.021	< 0.001	0.015	< 0.001	< 0.001	< 0.05	236	< 0.0002	0.01	< 0.001	< 0.001	0.16	< 0.00002	6.5	0.032	45.6	8.1	0.0015	23.3	0.023	< 0.001	< 0.15	< 0.001	< 0.001	3.5	< 0.001	0.77	< 0.001	< 0.0005	< 0.001	0.0003	0.0016	< 0.001	0.11	< 0.01
X5	31-Jul-08	< 0.00025	< 0.005	< 0.001	0.014	< 0.001	< 0.001	< 0.05	222	< 0.0002	0.009	< 0.001	0.001	0.19	< 0.00002	5.9	0.032	36.8	6.59	0.0015	20.6	0.019	< 0.001	< 0.15	< 0.001	0.002	2.7	< 0.001	0.8	< 0.001	< 0.0005	< 0.001	0.0004	0.0016	< 0.001	0.084	< 0.01
X5	05-Aug-08	< 0.00025	< 0.005	0.001	0.018	< 0.001	< 0.001	< 0.05	270	< 0.0002	0.015	< 0.001	0.001	0.3	< 0.00002	6.4	0.031	51.3	12.1	0.0018	25.7	0.03	< 0.001	< 0.15	< 0.001	0.002	4.1	< 0.001	0.83	< 0.001	< 0.0005	< 0.001	0.0002	0.0021	< 0.001	0.12	< 0.01
X5	11-Aug-08	< 0.00025	0.014	< 0.001	0.017	< 0.001	< 0.001	< 0.05	256	< 0.0002	0.015	< 0.001	0.002	0.79	< 0.00002	6.5	0.038	52.9	13	0.0006	24.4	0.03	< 0.001	< 0.15	< 0.001	0.002	6.5	< 0.001	0.78	< 0.001	< 0.0005	< 0.001	0.0002	0.0025	< 0.001	0.12	< 0.01
X5	12-Aug-08	< 0.00025	0.008	< 0.001	0.015	< 0.001	< 0.001	< 0.05	230	< 0.0002	0.009	< 0.001	0.001	0.71	< 0.00002	6.8	0.047	43.7	7.05	0.0007	21.7	0.018	< 0.001	< 0.15	< 0.001	0.002	5	< 0.001	0.76	< 0.001	< 0.0005	< 0.001	0.0003	0.0017	< 0.001	0.067	< 0.01
X5	19-Aug-08	< 0.00025	< 0.005	< 0.001	0.015	< 0.001	< 0.001	< 0.05	240	< 0.0002	0.011	< 0.001	0.001	0.74	< 0.00002	7	0.038	47.8	7.5	0.0013	24	0.021	< 0.001	< 0.15	< 0.001	0.002	3.7	< 0.001	0.93	< 0.001	< 0.0005	< 0.001	0.0003	0.0016	< 0.001	0.079	< 0.01
X5	28-Aug-08	< 0.00025	0.015	< 0.001	0.016	< 0.001	< 0.001	< 0.05	252.5	< 0.0002	0.011	< 0.001	< 0.001	0.29	< 0.00002	6.7	0.035	42.5	8.56	0.0016	22.2	0.022	< 0.001	< 0.15	< 0.001	< 0.001	3.3	< 0.001	0.94	< 0.001	< 0.0005	< 0.001	0.0003	0.0016	< 0.001	0.1	< 0.01
X5	02-Sep-08	< 0.00025	0.008	< 0.001	0.017	< 0.001	< 0.001	< 0.05		< 0.0002	0.011	< 0.001	0.001	0.26	< 0.00002	6.3	0.033		8.38	0.0014	20.3	0.023	0.001	< 0.15	< 0.001	< 0.001	3.3	< 0.001	0.87	< 0.001	< 0.0005	< 0.001	0.0003	0.0015	< 0.001	0.11	< 0.01
X5	09-Sep-08	< 0.00025	0.022	< 0.001	0.015	< 0.001	< 0.001	< 0.05	234	< 0.0002	0.006	< 0.001	< 0.001	0.1	< 0.00002	6	0.036	37	3.91	0.0009	20.9	0.012	< 0.001	< 0.15	< 0.001	< 0.001	2.7	< 0.001	0.77	< 0.001	< 0.0005	< 0.001	0.0004	0.001	< 0.001	0.069	< 0.01
X5	15-Sep-08	< 0.00025	< 0.005	< 0.001	0.016	< 0.001	< 0.001	< 0.05	221	< 0.0002	0.009	< 0.001	< 0.001	0.16	< 0.00002	6	0.033	38	4.94	0.0011	18.6	0.014	< 0.001	< 0.15	< 0.001	< 0.001	2.6	< 0.001	0.78	< 0.001	< 0.0005	< 0.001	0.0005	0.0015	< 0.001	0.11	< 0.01
X5	16-Sep-08	0.0003	< 0.005	< 0.001	0.015	< 0.001	< 0.001	< 0.05	220	< 0.0002	0.008	< 0.001	0.001	0.43	< 0.00002	5.9	0.034	36.5	4.7	0.0012	18.3	0.013	< 0.001	< 0.15	< 0.001	< 0.001	2.5	< 0.001	0.8	< 0.001	< 0.0005	< 0.001	0.0005	0.0015	< 0.001	0.099	< 0.01
X5	23-Sep-08	< 0.00025	< 0.005	< 0.001	0.016	< 0.001	< 0.001	< 0.05	234	< 0.0002	0.009	< 0.001	< 0.001	0.19	< 0.00002	5.8	0.033	38.7	5.52	0.001	18.9	0.016	< 0.001	< 0.15	< 0.001	< 0.001	2.7	< 0.001	0.83	< 0.001	< 0.0005	< 0.001	0.0005	0.0016	< 0.001	0.13	< 0.01
X5	30-Sep-08	< 0.00025	0.008	< 0.001	0.016	< 0.001	< 0.001	< 0.05	287	0.0002	0.01	< 0.001	0.001	0.19	< 0.00002	5.2	0.028	43.6	7.28	0.0013	16.4	0.02	< 0.001	< 0.15	< 0.001	0.001	2.9	< 0.001	0.95	< 0.001	< 0.0005	< 0.001	0.0004	0.0014	< 0.001	0.16	< 0.01
X5	07-Oct-08	< 0.00025	0.031	< 0.001	0.017	< 0.001	< 0.001	< 0.05	292	0.0003	0.013	< 0.001	0.001	0.22	< 0.00002	5.3	0.026	47.4	9.34	0.0014	20.8	0.023	< 0.001	< 0.15	< 0.001	< 0.001	3.7	< 0.001	0.92	< 0.001	< 0.0005	< 0.001	0.0004	0.0016	< 0.001	0.24	< 0.01
X5	14-Oct-08	< 0.00025	0.019	< 0.001	0.017	< 0.001	< 0.001	< 0.05	299.5	0.0003	0.018	< 0.001	0.002	0.27	< 0.00002	5.8	0.024	49.7	13.3	0.0016	21.7	0.032	0.003	< 0.15	< 0.001	0.002	4.4	< 0.001	0.92	< 0.001	< 0.0005	< 0.001	0.0003	0.002	< 0.001	0.29	< 0.01
X5	15-Oct-08	< 0.00025	0.01	< 0.001	0.021	< 0.001	< 0.001	< 0.05	305	0.0003	0.018	< 0.001	0.002	0.31	< 0.00002	5.6	0.024	53.1	13.3	0.0017	21.3	0.033	0.004	< 0.15	< 0.001	0.001	4.4	< 0.001	0.95	< 0.001	< 0.0005	< 0.001	0.0003	0.0022	< 0.001	0.31	< 0.01
X5	21-Oct-08	< 0.00025	0.023	0.001	0.019	< 0.001	< 0.001	< 0.05	338	0.0003	0.029	0.005	0.002	0.65	< 0.00002	5.2	0.022	69.9	22.5	0.0025	28.2	0.062	0.004	< 0.15	< 0.001	0.003	5.4	< 0.001	1	< 0.001	< 0.0005	< 0.001	0.0002	0.0034	< 0.001	0.42	< 0.01
X5	MEAN	0.000251429	0.0101714	0.001	0.018029	0.001	0.001	0.05	248.8824	0.00021	0.0114	0.00111	0.00129	0.2902857	0.00002	5.84	0.02769	46.1235	9.0668571	0.001409	21.92	0.022971	0.0012286	0.15	0.001	0.00146	3.95429	0.001	0.8211429	0.001	0.0005	0.00103	0.0003	0.002066	0.0010857	0.1488857	0.01
X5	MINIMUM	< 0.00025	< 0.005	< 0.001	0.013	< 0.001	< 0.001	< 0.05	195	< 0.0002	0.003	< 0.001	< 0.001	0.06	< 0.00002	4.4	0.014	30	2.11	0.0006	15.7	0.006	< 0.001	< 0.15	< 0.001	< 0.001	2.2	< 0.001	0.66	< 0.001	< 0.0005	< 0.001	0.0001	0.0007	< 0.001	0.067	< 0.01
X5	MAXIMUM	0.0003	0.031	< 0.001	0.042	< 0.001	< 0.001	< 0.05	338	0.0003	0.029	0.005	0.002	0.84	< 0.00002	7	0.047	69.9	22.5	0.0025	30.5	0.062	0.004	< 0.15	< 0.001	0.003	7.2	< 0.001	1	< 0.001	< 0.0005	0.002	0.0005	0.0063	0.002	0.42	< 0.01
X5	N > DL	1	24	3	35	0	0	0	34	5	35	1	26	35	0	35	35	34	35	35	35	35	5	0	0	22	35	0	35	0	0	1	35	35	10	35	0
X5	Median	0.00025	0.008	0.001	0.016	0.001	0.001	0.05	239.5	0.0002	0.011	0.001	0.001	0.19	0.00002	5.9	0.028	45.05	8.1	0.0013	21.7	0.022	0.001	0.15	0.001	0.001	3.7	0.001	0.81	0.001	0.0005	0.001	0.0003	0.0016	0.001	0.12	0.01
X5P	08-Jan-08	< 0.00025	0.007	< 0.001	0.043	< 0.001	< 0.001	< 0.05	259	0.0002	0.01	< 0.001	0.002	0.37	< 0.00002	6.6	0.016	59.1	10.2	0.0022	25.4	0.022	< 0.001	< 0.15	< 0.001	0.002	6.4	< 0.001	0.76	< 0.001	< 0.0005	< 0.001	0.0001	0.0057	< 0.001	0.16	< 0.01
X5P	19-Feb-08	< 0.00025	< 0.005	< 0.001	0.039	< 0.001	< 0.001	< 0.05	259	0.0003	0.009	< 0.001	0.003	0.43	< 0.00002	6.2	0.011	53.9	10.1	0.0025	27.8	0.02	< 0.001	< 0.15	< 0.001	< 0.001	7	< 0.001	0.77	< 0.001	< 0.0005	< 0.001	0.0001	0.0046	< 0.001	0.12	< 0.01
X5P	18-Mar-08	< 0.00025	< 0.005	< 0.001	0.055	< 0.001	< 0.001	< 0.05	221	< 0.0002	0.009	< 0.001	0.003	0.1	< 0.00002	5.3	0.01	58.4	9.37	0.0021	30	0.021	< 0.001	< 0.15	< 0.001	0.001	7.9	< 0.001	0.67	< 0.001	< 0.0005	< 0.001	0.0001	0.007	< 0.001	0.12	< 0.01
X5P	04-Nov-08	< 0.00025	0.046	< 0.001	0.023	< 0.001	< 0.001	< 0.05	312	0.0005	0.01	< 0.001	0.002	0.24	< 0.00002	6.3	0.026	48.6	7.26	0.0013	25.8	0.019	0.005	< 0.15	< 0.001	0.002	3.8	< 0.001	0.92	< 0.001	< 0.0005	< 0.001	0.0004	0.0017	< 0.001	0.17	< 0.01
X5P	01-Dec-08	< 0.00025	0.015	< 0.001	0.034	< 0.001	< 0.001	< 0.05	294	< 0.0002	0.01	< 0.001	0.002	0.43	< 0.00002	6	0.024	47	8.91	0.0017	28	0.02	0.001	< 0.15	< 0.001	< 0.001	5.7	< 0.001	0.87	< 0.001	< 0.0005	< 0.001	0.0004	0.0029	< 0.001	0.19	< 0.01
X5P	MEAN	0.00025	0.0156	0.001	0.0388	0.001	0.001	0.05	269	0.00028	0.0096	0.001	0.0024	0.314	0.00002	6.08	0.0174	53.4	9.168	0.00196	27.4	0.0204	0.0018	0.15	0.001	0.0014	6.16	0.001	0.798	0.001	0.0005	0.001	0.00022	0.00438	0.001	0.152	0.01
X5P	MINIMUM	< 0.00025	< 0.005	< 0.001	0.023	< 0.001	< 0.001	< 0.05	221	< 0.0002	0.009	< 0.001	0.002	0.1	< 0.00002	5.3	0.01	47	7.26	0.0013	25.4	0.019	< 0.001	< 0.15	< 0.001	< 0.001	3.8	< 0.001	0.67	< 0.001	< 0.0005	< 0.001	0.0001	0.0017	< 0.001	0.12	< 0.01
X5P	MAXIMUM	< 0.00025	0.046	< 0.001	0.055	< 0.001	< 0.001	< 0.05	312	0.0005	0.01	< 0.001	0.003	0.43	< 0.00002	6.6	0.026	59.1	10.2	0.0025	30	0.022	0.005	< 0.15	< 0.001	0.002	7.9	< 0.001	0.92	< 0.001	< 0.0005	< 0.001	0.0004	0.007	< 0.001	0.19	< 0.01
X5P	N > DL	0	3	0	5	0	0	0	5	3	5	0	5	5	0	5	5	5	5	5	5	5	2	0	0	3	5	0	5	0	0	0	4	5	0	5	0
X5P	Median	0.00025	0.007	0.001	0.039	0.001	0.001	0.05	259	0.0002	0.01	0.001	0.002	0.37	0.00002	6.2	0.016	53.9	9.37	0.0021	27.8	0.02	0.001	0.15	0.001	0.001	6.4	0.001	0.77	0.001	0.0005	0.001	0.0001	0.0046	0.001	0.16	0.01
X7	01-Jun-08	0.0008	1.21	0.01	0.01	< 0.001	< 0.001	< 0.05	418	0.0094	0.56	0.001	0.006	1180	< 0.00002	11.1	0.093	694	67.1	0.0081	62.1	0.66	0.015	< 0.15	< 0.001	0.005	17.8	< 0.001	3.7	< 0.001	< 0.0005	< 0.001	0.0002	0.003	0.001	356	< 0.01
X7	29-Sep-08	0.001	1.9	0.015	0.02	0.002	< 0.001	< 0.05	440	0.015	0.63	0.003	0.008	1870	< 0.00002	12	0.12	639	70.8	0.006	91.3	0.66	0.025	< 0.15	< 0.001	0.006	18.2	< 0.001	3.18	< 0.001	< 0.0005	0.01	0.0002	0.0047	0.001	455	< 0.01
X10	08-Jan-08	< 0.00025	0.018	< 0.001	0.065	< 0.001	< 0.001	< 0.05	43.2	< 0.0002	< 0.001	< 0.001	< 0.001	0.2	< 0.00002	1.1	0.005	10.5	0.042	0.0006	2.96	< 0.001	< 0.001	< 0.15	< 0.001	0.001	5.3	< 0.001	0.19	< 0.001	< 0.0005	< 0.001	0.0001	0.002	< 0.001	0.064	< 0.01
X10	24-Jan-08	< 0.000005	0.0023	0.0002	0.0699	< 0.00001	0.000005	< 0.005	47.6	0.000016	0.00005	0.0001	0.00044	0.157		1.12	0.0059	11.1	0.0386	0.00064	3.14	0.00089	0.000097	< 0.005	0.00006	0.00039	5.63	< 0.00001	0.2			0.0005	0.00000	0.00243	< 0.0002	0.0667	< 0.0001
X10	19-Feb-08	< 0.00025	< 0.005	< 0.001	0.073	< 0.001	< 0.001	< 0.05	51.3	< 0.0002	< 0.001	< 0.001	< 0.001	0.14	< 0.00002	1.4	0.006	12.8	0.038	0.0006	3.52	0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.22	< 0.001	< 0.0005	< 0.001	0.0001	0.0018	< 0.001	0.076	< 0.01
X10	20-Feb-08	< 0.000005	0.0024	0.00019	0.0794	< 0.00001	0.000005	< 0.005	51.3	0.000019	0.00004	0.0001	0.00032	0.09		1.24	0.008	13	0.0347	0.00081	3.48	0.00112	0.000087	< 0.005	0.00006	0.00048	5.81	< 0.00001	0.213			0.0005	0.00000	0.00283	< 0.0002	0.0701	< 0.0001
X10	11-Mar-08	< 0.000005	0.002	0.00019	0.0766	< 0.00001	0.000005	< 0.005	50.2	0.00002	0.00003	0.0001	0.00036	0.129		1.22	0.0073	12.3	0.0295	0.00071	3.5	0.00111	0.000085	< 0.005	0.00006	0.00041	6.39	< 0.00001	0.21			0.0005	0.00000	0.00274	< 0.0002	0.0807	< 0.0001
X10	18-Mar-08	< 0.00025	< 0.005	< 0.001	0.076	< 0.001	< 0.001	< 0.05	40	< 0.0002	< 0.001	< 0.001	< 0.001	0.12	< 0.00002	1.1	0.004	12.7	0.025	0.0006	3.99	0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.8	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	0.0001	0.0032	< 0.001	0.069	< 0.01

Appendix 3
2008 Surface Water Quality Data
Rose Creek Drainage

Table 2. Surface Water Total Metals

Station	Date	AG-T mg/L	AL-T mg/L	AS-T mg/L	BA-T mg/L	BE-T mg/L	BI-T mg/L	B-T mg/L	CA-T mg/L	CD-T mg/L	CO-T mg/L	CR-T mg/L	CU-T mg/L	FE-T mg/L	HG-T mg/L	K-T mg/L	LI-T mg/L	MG-T mg/L	MN-T mg/L	MO-T mg/L	NA-T mg/L	NI-T mg/L	PB-T mg/L	P-T mg/L	SB-T mg/L	SE-T mg/L	SI-T mg/L	SN-T mg/L	SR-T mg/L	TE-T mg/L	TH-T mg/L	TI-T mg/L	TL-T mg/L	U-T mg/L	V-T mg/L	ZN-T mg/L	ZR-T mg/L
X10	15-Apr-08	< 0.00025	0.012	< 0.001	0.077	< 0.001	< 0.001	< 0.05	48.5	< 0.0002	< 0.001	< 0.001	< 0.001	0.23	< 0.00002	1.3	0.008	12.3	0.035	0.0008	3.6	0.001	0.001	< 0.15	< 0.001	< 0.001	5.5	< 0.001	0.22	< 0.001	< 0.0005	< 0.001	0.0001	0.0028	< 0.001	0.073	< 0.01
X10	29-Apr-08	< 0.000005	0.0449	0.00035	0.0665	< 0.00001	0.000005	< 0.05	43.6	0.000029	0.00009	0.0001	0.001	0.272		1.32	0.0066	10.2	0.0404	0.0007	3.02	0.00135	0.000479	0.007	0.00008	0.00032	5.33	< 0.00001	0.196			0.0008	0.00000	0.00249	< 0.0002	0.103	< 0.0001
X10	15-May-08	< 0.00025	0.15	< 0.001	0.035	< 0.001	< 0.001	< 0.05	15.4	< 0.0002	< 0.001	< 0.001	0.003	0.69	< 0.00002	1.4	0.002	3.59	0.081	< 0.0005	1.3	0.002	0.002	< 0.15	< 0.001	< 0.001	3	< 0.001	0.067	< 0.001	< 0.0005	0.004	0.0001	0.0006	< 0.001	0.049	< 0.01
X10	22-May-08	0.000008	0.201	0.00079	0.032	0.00003	0.000012	< 0.05	13.2	0.000047	0.00023	0.0004	0.00254	0.502		1.21	0.0015	3.2	0.0454	0.00025	0.9	0.00153	0.00355	0.023	0.00007	0.00012	2.69	< 0.00001	0.0564			0.0066	0.00000	0.000482	0.0003	0.0225	0.0002
X10	16-Jun-08	< 0.00025	0.05	< 0.001	0.027	< 0.001	< 0.001	< 0.05	15.1	< 0.0002	< 0.001	< 0.001	< 0.001	0.15	< 0.00002	0.5	< 0.001	3.8	0.017	< 0.0005	1.27	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3	< 0.001	0.062	< 0.001	< 0.0005	0.002	0.0001	0.0006	< 0.001	0.014	< 0.01
X10	24-Jun-08	0.000006	0.22	0.00091	0.0296	0.00004	0.000011	< 0.05	10.3	0.000078	0.00030	0.0004	0.00197	0.59		0.53	0.0016	2.28	0.0563	0.00025	1.05	0.00121	0.00332	0.023	0.00009	0.00007	3.36	< 0.00001	0.0498			0.0075	0.00001	0.000543	0.0006	0.0158	0.0003
X10	14-Jul-08	0.0003	0.071	< 0.001	0.032	< 0.001	< 0.001	< 0.05	20.2	0.0003	< 0.001	< 0.001	0.002	0.23	< 0.00002	0.6	< 0.001	5.47	0.021	0.0007	1.46	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.1	< 0.001	0.081	0.003	0.0007	0.003	0.0004	0.0009	< 0.001	0.021	< 0.01
X10	30-Jul-08	< 0.000005	0.0285	0.00045	0.0424	0.00001	0.000005	< 0.05	26.7	0.000014	0.00008	0.0002	0.00086	0.23		0.61	0.0022	6.34	0.031	0.00042	2.65	0.00062	0.00041	< 0.005	0.00008	0.00027	4.5	< 0.00001	0.113			0.0009	0.00000	0.00113	< 0.0002	0.0206	< 0.0001
X10	11-Aug-08	< 0.00025	0.045	< 0.001	0.048	< 0.001	< 0.001	< 0.05	25.8	< 0.0002	< 0.001	< 0.001	< 0.001	0.29	< 0.00002	0.7	0.003	7.28	0.036	< 0.0005	1.98	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	8.2	< 0.001	0.11	< 0.001	< 0.0005	0.002	0.0001	0.0012	< 0.001	0.022	< 0.01
X10	15-Sep-08	< 0.00025	0.027	< 0.001	0.041	< 0.001	< 0.001	< 0.05	24.4	< 0.0002	< 0.001	< 0.001	< 0.001	0.23	< 0.00002	0.6	0.002	5.96	0.031	< 0.0005	1.68	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.5	< 0.001	0.13	< 0.001	< 0.0005	< 0.001	0.0001	0.0013	< 0.001	0.017	< 0.01
X10	18-Sep-08	< 0.000005	0.0281	0.00037	0.0455	< 0.00001	0.000005	< 0.05	26.1	0.000014	0.00007	0.0001	0.00069	0.196		0.65	0.0022	6.25	0.0287	0.0004	1.73	0.00056	0.000551	< 0.005	0.00007	0.0003	4.21	< 0.00001	0.115			0.0009	0.00000	0.00113	< 0.0002	0.0183	0.0001
X10	07-Oct-08	0.000002	0.028	0.00041	0.0488	< 0.00001	0.000005	< 0.05	30.5	0.000019	0.00014	0.0002	0.00071	0.281		0.31	0.0026	7.45	0.0644	0.00044	1.94	0.00071	0.000515	< 0.005	0.00007	0.00004	4.13	0.0007	0.133			0.0015	0.00000	0.000002	0.0327	< 0.0001	0.00072
X10	15-Oct-08	< 0.00025	0.048	< 0.001	0.049	< 0.001	< 0.001	< 0.05	30.2	< 0.0002	< 0.001	< 0.001	< 0.001	0.3	< 0.00002	0.7	0.003	6.65	0.061	< 0.0005	1.76	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.13	< 0.001	< 0.0005	0.001	0.0001	0.0014	< 0.001	0.035	< 0.01
X10	04-Nov-08	< 0.00025	0.1	< 0.001	0.06	< 0.001	< 0.001	< 0.05	37.4	0.0004	< 0.001	< 0.001	0.002	0.83	< 0.00002	1.2	0.003	9	0.13	< 0.0005	3.03	0.002	0.004	< 0.15	< 0.001	0.001	5.4	< 0.001	0.15	< 0.001	< 0.0005	0.004	0.0001	0.0016	< 0.001	0.091	< 0.01
X10	01-Dec-08	< 0.00025	0.025	< 0.001	0.066	< 0.001	< 0.001	< 0.05	43.8	< 0.0002	< 0.001	< 0.001	< 0.001	0.31	< 0.00002	1.1	0.004	11.2	0.09	< 0.0005	3.16	0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.5	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	0.0001	0.0016	< 0.001	0.076	< 0.01
X10	10-Dec-08	< 0.000005	0.0166	0.00029	0.0648	< 0.00001	0.000005	< 0.05	41.5	0.000022	0.00013	0.0001	0.00065	0.237		0.99	0.0048	9.7	0.0722	0.0006	2.65	0.00095	0.000306		0.00007	0.00042	5.4	0.00001	0.177			0.0005	0.00000	0.0022	< 0.0002	0.0723	< 0.0001
X10	MEAN	0.006186318	0.0513545	0.000734	0.05475	0.000552	0.000548	0.04386	33.46818	0.00014	0.0006	0.00063	0.00116	0.2910909	0.00002	0.95	0.00385	8.32136	0.0476455	0.000546	2.44409	0.001093	0.0011545	0.08967	0.00058	0.00067	5.01136	0.0005814	0.138191	0.001167	0.000517	0.00192	7E-05	0.00159	0.0021364	0.0489591	0.0055418
X10	MINIMUM	< 0.000005	0.002	0.00019	0.027	< 0.00001	0.000005	< 0.005	10.3	0.000014	9	0.0001	0.00032	0.09	< 0.00002	0.31	< 0.001	2.28	0.017	0.00025	0.9	0.00056	0.000085	< 0.005	0.00006	0.00004	2.69	< 0.00001	0.0498	< 0.001	< 0.0005	0.0005	0.00000	0.000002	< 0.0002	< 0.0001	< 0.0001
X10	MAXIMUM	0.0003	0.22	< 0.001	0.0794	< 0.001	< 0.001	< 0.05	51.3	0.0004	< 0.001	< 0.001	0.003	0.83	< 0.00002	1.4	0.008	13	0.13	0.00081	3.99	0.002	0.004	< 0.15	< 0.001	< 0.001	8.2	< 0.001	0.22	0.003	0.0007	0.0075	0.0004	0.0032	0.0327	0.103	< 0.01
X10	N > DL	4	20	10	22	3	2	0	22	12	10	6	13	22	0	22	20	22	22	15	22	16	13	3	10	11	22	2	22	1	1	12	9	21	3	21	4
X10	Median	0.00025	0.02805	0.001	0.0545	0.001	0.001	0.05	33.95	0.0002	0.001	0.001	0.001	0.23	0.00002	1.1	0.003	8.225	0.0383	0.0005	2.65	0.001	0.001	0.15	0.001	0.001	5.315	0.001	0.14	0.001	0.0005	0.001	0.0001	0.0015	0.001	0.0565	0.01
X11	03-Mar-08	< 0.00025	0.013	0.004	0.05	< 0.001	< 0.001	< 0.05	408	< 0.0002	0.023	< 0.001	0.002	3.92	< 0.00002	7.1	0.016	96.8	22.9	0.0023	41.7	0.026	< 0.001	< 0.15	< 0.001	0.003	7.8	< 0.001	1.16	< 0.001	< 0.0005	< 0.001	0.0001	0.005	< 0.001	0.008	< 0.01
X11	19-Aug-08	< 0.00025	0.006	0.002	0.045	< 0.001	< 0.001	< 0.05	451	< 0.0002	0.024	< 0.001	0.001	3.3	< 0.00002	7.6	0.017	99.4	25.1	0.0016	50.6	0.028	< 0.001	< 0.15	< 0.001	< 0.001	9.7	< 0.001	1.17	< 0.001	< 0.0005	< 0.001	0.0001	0.0056	< 0.001	0.009	< 0.01
X12	03-Mar-08	< 0.00025	0.2	0.001	0.038	< 0.001	< 0.001	< 0.05	195	< 0.0002	< 0.001	< 0.001	0.002	0.47	< 0.00002	5.8	0.005	49.7	0.49	0.0006	22.8	0.001	0.001	< 0.15	< 0.001	0.003	4.3	< 0.001	0.65	< 0.001	< 0.0005	0.005	0.0001	0.0085	< 0.001	< 0.005	< 0.01
X12	19-Aug-08	< 0.00025	< 0.005	< 0.001	0.037	< 0.001	< 0.001	< 0.05	195	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	6.6	0.008	47.7	0.27	0.0006	21.6	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.3	< 0.001	0.6	< 0.001	< 0.0005	< 0.001	0.0001	0.01	< 0.001	< 0.005	< 0.01
X13	08-Jan-08	< 0.00025	< 0.005	0.002	0.067	< 0.001	< 0.001	< 0.05	300	0.0003	0.008	< 0.001	0.002	2.72	< 0.00002	5.3	0.011	61.6	13.8	0.0025	32	0.019	< 0.001	< 0.15	< 0.001	0.002	8.2	< 0.001	0.8	< 0.001	< 0.0005	< 0.001	0.0002	0.0059	< 0.001	0.013	< 0.01
X13	19-Feb-08	< 0.00025	0.006	0.002	0.057	< 0.001	< 0.001	< 0.05	360	< 0.0002	0.011	< 0.001	0.001	3.26	< 0.00002	5.6	0.011	65.3	17.8	0.0026	33.2	0.021	< 0.001	< 0.15	< 0.001	0.002	7.5	< 0.001	0.92	< 0.001	< 0.0005	< 0.001	0.0001	0.0041	< 0.001	0.014	< 0.01
X13	18-Mar-08	< 0.00025	< 0.005	0.003	0.063	< 0.001	< 0.001	< 0.05	325	< 0.0002	0.015	< 0.001	0.001	3.14	< 0.00002	5.6	0.009	84.6	18.8	0.0022	47.9	0.022	< 0.001	< 0.15	< 0.001	0.002	8.7	< 0.001	0.91	< 0.001	< 0.0005	< 0.001	0.0001	0.0072	< 0.001	0.009	< 0.01
X13	15-Apr-08	< 0.00025	< 0.005	0.002	0.064	< 0.001	< 0.001	< 0.05	350	< 0.0002	0.013	< 0.001	0.001	2.32	< 0.00002	5.7	0.013	76.1	17.1	0.0022	37.6	0.022	< 0.001	< 0.15	< 0.001	< 0.001	7.5	< 0.001	0.99	< 0.001	< 0.0005	< 0.001	0.0001	0.0064	< 0.001	0.009	< 0.01
X13	15-May-08	< 0.00025	< 0.005	0.003	0.056	< 0.001	< 0.001	< 0.05	363	< 0.0002	0.014	< 0.001	0.002	3.16	< 0.00002	6	0.014	74.1	18.3	0.0024	34.7	0.022	< 0.001	< 0.15	< 0.001	0.001	7.3	< 0.001	0.98	< 0.001	< 0.0005	< 0.001	0.0001	0.0055	< 0.001	0.01	< 0.01
X13	16-Jun-08	< 0.00025	< 0.005	0.002	0.054	< 0.001	< 0.001	< 0.05	357	< 0.0002	0.012	< 0.001	0.001	2.61	< 0.00002	5.7	0.012	75	16.5	0.0024	36.2	0.021	< 0.001	< 0.15	< 0.001	0.002	8.1	< 0.001	0.93	< 0.001	< 0.0005	< 0.001	0.0001	0.0061	< 0.001	0.011	< 0.01
X13	14-Jul-08	< 0.00025	0.012	0.002	0.058	< 0.001	< 0.001	< 0.05	307	< 0.0002	0.009	< 0.001	0.002	3.22	< 0.00002	5.3	0.015	71.8	14.2	0.0009	33.4	0.019	< 0.001	< 0.15	< 0.001	0.001	8.2	< 0.001	0.74	< 0.001	< 0.0005	< 0.001	0.0001	0.0063	< 0.001	0.016	< 0.01
X13	11-Aug-08	< 0.00025	0.007	0.001	0.071	< 0.001	< 0.001	< 0.05	252	< 0.0002	0.006	< 0.001	0.002	2.07	< 0.00002	4.9	0.012	60.5	11.2	0.0012	30.6	0.016	< 0.001	< 0.15	< 0.001	0.002	11.1	< 0.001	0.65	< 0.001	< 0.0005	< 0.001	0.0001	0.0072	< 0.001	0.009	< 0.01
X13	15-Sep-08	< 0.00025	< 0.005	0.002	0.059	< 0.001	< 0.001	< 0.05	336	< 0.0002	0.014	< 0.001	< 0.001	2.57	< 0.00002	5.6	0.012	73.8	15.9	0.0019	32.8	0.02	< 0.001	< 0.15	< 0.001	< 0.001	7.6	< 0.001	0.81	< 0.001	< 0.0005	< 0.001	0.0001	0.0082	< 0.001	0.008	< 0.01
X13	15-Oct-08	< 0.00025	0.008	0.002	0.06	< 0.001	< 0.001	< 0.05	297	0.0002	0.008	< 0.001	0.001	2.71	< 0.00002	5.1	0.01	55.7	14	0.0018	29.5	0.02	< 0.001	< 0.15	< 0.001	0.001	8.1	< 0.001	0.79	< 0.001	< 0.0005	< 0.001	0.0001	0.0069	< 0.001	0.008	< 0.01
X13	04-Nov-08	< 0.00025	0.018	< 0.001	0.068	< 0.001	< 0.001	< 0.05	211	0.0002	0.002	< 0.001	0.001	0.64	< 0.00002	4.3	0.007	47.8	6.46	0.0025	27.2	0.011	< 0.001	< 0.15	< 0.001	0.001	6.8	< 0.001	0.55	< 0.001	< 0.0005	< 0.001	0.0001	0.0066	< 0.001	0.006	< 0.01
X13	01-Dec-08	< 0.00025	0.015	0.002	0.067	< 0.001	< 0.001	< 0.05	388	< 0.0002	0.013	< 0.001	0.001	4.49	< 0.00002	6.2	0.013	81.7	18.6	0.002	42	0.026	< 0.001	< 0.15	< 0.001	< 0.001	9.5	< 0.001	0.96	< 0.001	< 0.0005	< 0.001	0.0001	0.0057	< 0.001	0.011	< 0.01
X13	MEAN	0.00025	0.008	0.002	0.062	0.001	0.001	0.05	320.5	0.00021	0.01042	0.001	0.00133	2.7425	0.00002	5.44167	0.01158	69	15.221667	0.00205	34.7583	0.019917	0.001	0.15	0.001	0.00142	8.21667	0.001	0.8358333	0.001	0.0005	0.001	0.00011	0.006342	0.001	0.0103333	0.01
X13	MINIMUM	< 0.00025	< 0.005	< 0.001	0.054	< 0.001	< 0.001	< 0.05	211	< 0.0002	0.002	< 0.001	< 0.001	0.64	< 0.00002	4.3	0.007	47.8	6.46	0.0009	27.2	0.011	< 0.001	< 0.15	< 0.001	< 0.001	6.8	< 0.001	0.55	< 0.001	< 0.0005	< 0.001	0.0001	0.0041	< 0.001	0.006	< 0.01
X13	MAXIMUM	< 0.00025	0.018	0.003	0.071	< 0.001	< 0.001	< 0.05	388	0.0003	0.015	< 0.001	0.002	4.49	< 0.00002	6.2	0.015	84.6	18.8	0.0026	47.9	0.026	< 0.001	< 0.15	< 0.001	0.002	11.1	< 0.001	0.99	< 0.001	< 0.0005	< 0.001	0.0002	0.0082	< 0.001	0.016	< 0.01
X13	N > DL	0	6	11	12	0	0	0	12	3	12	0	11	12	0	12	12	12	12	12	12	12	0	0	0	9	12	0	12	0	0	0	1	12	0	12	0
X13	Median	0.00025	0.0055	0.002	0.0615	0.001	0.001	0.05	330.5	0.0002	0.0115	0.001	0.001	2.715	0.00002	5.6	0.012	72.8	16.2	0.0022	33.3	0.0205	0.001	0.15	0.001	0.001	8.1	0.001	0.86	0.001	0.0005	0.001	0.0001	0.00635	0.001	0.0095	0.01
X14	08-Jan-08	< 0.00025	0.007	< 0.001	0.065	< 0.001	< 0.001	< 0.05	88.1	< 0.0002	0.001	< 0.001	< 0.001	0.4	< 0.00002	1.9	0.006	19.2	1.97	0.0008	7.46	0.004	< 0.001	< 0.15	< 0.001	< 0.001	5.4	< 0.001	0.31	< 0.001	< 0.0005	< 0.001	0.0001	0.0024	< 0.001	0.049	< 0.01
X14	24-Jan-08	< 0.000005	0.0042	0.00038	0.0688	< 0.00001	0.000005	< 0.005	110	0.00005	0.00158	0.0001	0.00036	0.366		2	0.007	21.8	2.45	0.00074	8.67	0.00415	0.000137	< 0.005	0.00006	0.00036	5.93	0.00001	0.32			0.0005	0.00000	0.00307	< 0.0002	0.0498	< 0.0001
X14	19-Feb-08	< 0.00025	0.019	< 0.001	0.069	< 0.001	< 0.001	< 0.05	120	< 0.0002	0.002	< 0.001	< 0.001	0.53	< 0.00002	2.5	0.007	25.6	3.26	0.0011	10.7	0.006	< 0.001	< 0.15	< 0.001	0.001	5.8	< 0.001	0.4	< 0.001	< 0.0005	0.001	0.0001	0.0023	< 0.001	0.052	< 0.01
X14	20-Feb-08	0.000005	0.0133	0.00043	0.0777	< 0.00001	0.000005	< 0.005	125	0.000062	0.00217	0.0001	0.00031	0.386		2.41	0.0093	26.5	3.36	0.00096	11.3	0.00546	0.000204	< 0.005	0.00006	0.00036	5.67	< 0.00001	0.383			0.0007	0.00001	0.00379	< 0.0002	0.0481	< 0.0001
X14	11-Mar-08	< 0.000005	0.0078	0.00047	0.0752	< 0.00001	0.000005	< 0.005	130	0.000061	0.00243	0.0001	0.00034	0.407		2.42	0.009	27.3	3.57	0.00082	11.9	0.00586	0.000186	< 0.005	0.00006	0.00031	6.7	< 0.00001	0.387			0.0008	0.00000	0.00368	< 0.0002	0.0555	< 0.0001
X14	18-Mar-08	< 0.00025	0.022	< 0.001	0.075	< 0.001	< 0.001	< 0.05	113	< 0.0002	0.002	< 0.001	0.001	0.39	< 0.00002	2.3	0.005	28.1	3.27	0.0009	13.7	0.006	0.001	< 0.15	< 0.001	0.001	6.6	< 0.001	0.36	< 0.001	< 0.0005	< 0.001	0.0001	0.0043	< 0.001	0.058	< 0.01
X14	14-Apr-08	< 0.00025	0.13	0.001	0.062	< 0.001	< 0.001	< 0.05	181	< 0.0002	0.007	< 0.001	0.002	0.77	< 0.00002	3.8	0.013	40.5	7.38	0.0016	18.4	0.016	0.002	< 0.15	< 0.001	0.002	6.4	< 0.001	0.58	< 0.001	< 0.0005	0.006	0.0001	0.0043	< 0.001	0.1	< 0.01
X14	15-Apr-08	< 0.00025	0.12	0.001	0.063	< 0.001	< 0.001	< 0.05	176	< 0.0002	0.007	< 0.001	0.002	0.72	< 0.00002	3.7	0.012	40.6	7.32	0.0015	19.2	0.015	0.002	< 0.15	< 0.001	0.001	6.2	< 0.001	0.58	< 0.001	< 0.0005	0.006	0.0001	0.0044	< 0.001	0.096	< 0.01
X14	22-Apr-08	< 0.00025	0.071	< 0.001	0.055	< 0.001	< 0.001	< 0.05	191	< 0.0002	0.008	< 0.001	0.001	0.42	< 0.00002	3.4	0.013	32.6	8.13	0.0015	15.3	0.016	0.001	< 0.15	< 0.001	< 0.001	5.5	< 0.001	0.64	< 0.001	< 0.0005	0.003	0.0001	0.0036	< 0.001	0.089	< 0.01
X14	29-Apr-08	< 0.00025	0.1	< 0.001	0.05	< 0.001	< 0.001	< 0.05	170	< 0.0002	0.006	< 0.001	0.002	0.45	< 0.00002	3.4	0.011	35.3	6.15	0.0014	15.6	0.014	0.001	< 0.15	< 0.001	0.001	5	< 0.001	0.53	< 0.001	< 0.0005	0.003	0.0001	0.003	< 0.001	0.13	< 0.01
X14	29-Apr-08	< 0.000005	0.113	0.00059	0.0532	0.00001	0.000005	< 0.05	174	0.000119	0.00638	0.0002	0.00123	0.477		3.31	0.011	31.2	6.03	0.00077	13.8	0.0139	0.00193	0.009	0.00013	0.00022	5.82	< 0.00001	0.54			0.0037	0.00011	0.00346	0.0004	0.128	< 0.0001
X14	06-May-08	< 0.00025	0.097	< 0.001	0.045	< 0.001	< 0.001	< 0.05	101	< 0.0002	0.003	< 0.001	0.003	0.53	< 0.00002	3.2	0.008	21.8	2.46	0.0008	9.42	0.007	0.002	< 0.15	< 0.001	< 0.001	3.8	< 0.001	0.35	< 0.001	< 0.0005	0.004	0.0001	0.0019	< 0.001	0.12	< 0.01
X14	13-May-08	< 0.00025	0.23	0.001	0.036	< 0.001	< 0.001	< 0.05	44.5	< 0.0002	0.001	< 0.001	0.003	1	< 0.00002	2	0.003	8.23	1.13	< 0.0005	3.42	0.004	0.004	< 0.15	< 0.001	0.001	2.7	< 0.001	0.17	< 0.001	< 0.0005	0.007	0.0001	0.0008	< 0.001	0.071	< 0.01
X14	15-May-08	< 0.00025	0.15	< 0.001	0.035	< 0.001	< 0.001	< 0.05	49	< 0.0002	0.001	< 0.001	0.003	0.65	< 0.00002	2	0.004	9.13	0.99	0.0005	3.88	0.004	0.003	< 0.15	< 0.001	< 0.001	3.1	< 0.001	0.16	< 0.001	< 0.0005	0.005	0.0001	0.0009	< 0.001	0.059	< 0.01
X14	20-May-08	< 0.00025	0.3	< 0.001	0.033	< 0.001	< 0.001	< 0.05	23.5	< 0.0002	< 0.001	< 0.001	0.003	0.75	< 0.00002	1.6	0.002	5.28	0.34	< 0.0005	1.91	0.002	0.003	< 0.15	< 0.001	< 0.001	2.5	< 0.001	0.084	< 0.001	< 0.0005	0.009	0.0001	< 0.0005	< 0.001	0.034	< 0.01
X14	22-May-08	0.000009	0.231	0.00088	0.0344	0.00004	0.00001	< 0.05	23.8	0.000051	0.00053	0.0005	0.00253	0.592		1.37	0.0025	5.08	0.316	0.00027	1.8	0.0021	0.00378	0.034	0.00009	0.00013	2.72	< 0.00001	0.0874			0.0086	0.00001	0.00059	0.0005	0.0266	0.0003
X14	26-May-08	0.00001	0.277	0.0012	0.0334	0.00006	0.000013	< 0.05	22.5	0.000079	0.00086	0.0006	0.00274	0.875		1.12		3.97	0.482	0.00025	1.62	0.0026	0.00678		0.00008	0.00011		0.00004	0.0669			0.0083	0.00001	0.00055	0.0006	0.0934	0.0002
X14	26-May-08	0.000011	0.25	0.00119	0.0341	0.00004	0.000015	< 0.05	16.7	0.000079	0.00077	0.0004	0.00264	0.827		1.02		3.29	0.395	0.00025	1.37	0.00227	0.0069		0.00009	0.00011		0.00002	0.0637			0.0069	0.00001	0.000536	0.0004	0.0412	0.0003
X14	27-May-08	< 0.00025	0.5	0.001	0.028	< 0.001	< 0.001	< 0.05	14.9	< 0.0002	< 0.001	0.001	0.003	0.91	< 0.00002	1.1	0.002	3.57	0.2	< 0.0005	1.49	0.002	0.006	< 0.15	< 0.001	< 0.001	3.1	< 0.001	0.055	< 0.001	< 0.0005	0.017	0.0001	< 0.0005	0.003	0.025	< 0.01
X14	03-Jun-08	< 0.00025	0.13	< 0.001	0.028	< 0.001	< 0.001	< 0.05	26.2	< 0.0002	< 0.001	< 0.001	0.001	0.28	< 0.00002	1	0.002	5.49	0.24	< 0.0005	2.33	0.001	0.002	< 0.15	< 0.001	< 0.001	3.1	< 0.001	0.092	< 0.001	< 0.0005	0.005	0.0001	0.0006	< 0.001	0.015	< 0.01

Appendix 3
2008 Surface Water Quality Data
Rose Creek Drainage

Table 2. Surface Water Total Metals

Station	Date	AG-T mg/L	AL-T mg/L	AS-T mg/L	BA-T mg/L	BE-T mg/L	BI-T mg/L	B-T mg/L	CA-T mg/L	CD-T mg/L	CO-T mg/L	CR-T mg/L	CU-T mg/L	FE-T mg/L	HG-T mg/L	K-T mg/L	LI-T mg/L	MG-T mg/L	MN-T mg/L	MO-T mg/L	NA-T mg/L	NI-T mg/L	PB-T mg/L	P-T mg/L	SB-T mg/L	SE-T mg/L	SI-T mg/L	SN-T mg/L	SR-T mg/L	TE-T mg/L	TH-T mg/L	TI-T mg/L	TL-T mg/L	U-T mg/L	V-T mg/L	ZN-T mg/L	ZR-T mg/L
X14	10-Jun-08	0.0003	0.13	< 0.001	0.031	< 0.001	< 0.001	< 0.05	29.1	< 0.0002	< 0.001	< 0.001	0.002	0.31	< 0.00002	0.9	0.003	7.25	0.51	< 0.0005	2.88	0.002	0.001	< 0.15	< 0.001	< 0.001	4.6	< 0.001	0.093	< 0.001	< 0.0005	0.004	0.0001	0.0006	< 0.001	0.025	< 0.01
X14	16-Jun-08	< 0.00025	0.047	< 0.001	0.028	< 0.001	< 0.001	< 0.05	31.7	< 0.0002	< 0.001	< 0.001	0.001	0.16	< 0.00002	1	0.001	8.56	0.3	< 0.0005	3.39	0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.9	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	0.0001	0.0008	< 0.001	0.021	< 0.01
X14	17-Jun-08	< 0.00025	0.048	< 0.001	0.029	< 0.001	< 0.001	< 0.05	30.5	< 0.0002	< 0.001	< 0.001	< 0.001	0.19	< 0.00002	0.9	0.003	6.22	0.34	< 0.0005	2.57	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.4	< 0.001	0.1	< 0.001	< 0.0005	0.002	0.0001	0.0007	< 0.001	0.018	< 0.01
X14	24-Jun-08	< 0.00025	0.56	0.001	0.033	< 0.001	< 0.001	< 0.05	17.7	< 0.0002	0.001	< 0.001	0.002	1.1	< 0.00002	0.8	0.003	3.98	0.51	< 0.0005	1.81	0.002	0.005	< 0.15	< 0.001	< 0.001	4.2	< 0.001	0.064	< 0.001	< 0.0005	0.026	0.0001	0.0006	0.001	0.027	< 0.01
X14	24-Jun-08	0.000007	0.224	0.00092	0.031	0.00005	0.000011	< 0.05	19.4	0.00006	0.00094	0.0004	0.00188	0.623		0.69	0.0023	4.13	0.561	0.00029	1.89	0.0024	0.0033	0.026	0.0001	0.00006	3.47	< 0.00001	0.0744			0.0086	0.00001	0.000661	0.0005	0.0228	0.0002
X14	01-Jul-08	< 0.00025	0.045	< 0.001	0.033	< 0.001	< 0.001	< 0.05	41.2	< 0.0002	0.001	< 0.001	0.001	0.24	< 0.00002	1.1	0.003	9.82	1.14	0.0006	3.84	0.004	< 0.001	< 0.15	< 0.001	< 0.001	4	< 0.001	0.15	< 0.001	< 0.0005	0.001	0.0001	0.0009	< 0.001	0.041	< 0.01
X14	08-Jul-08	< 0.00025	0.045	< 0.001	0.035	< 0.001	< 0.001	< 0.05	35	< 0.0002	< 0.001	< 0.001	< 0.001	0.13	< 0.00002	0.9	0.004	7.62	0.64	0.0005	2.79	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4.1	< 0.001	0.13	< 0.001	< 0.0005	0.001	0.0001	0.0009	< 0.001	0.026	< 0.01
X14	14-Jul-08	< 0.00025	0.069	< 0.001	0.035	< 0.001	< 0.001	< 0.05	30.3	< 0.0002	< 0.001	< 0.001	0.001	0.3	< 0.00002	0.7	0.004	6.94	0.46	< 0.0005	2.43	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4.8	< 0.001	0.11	< 0.001	< 0.0005	0.002	0.0001	0.0008	< 0.001	0.022	< 0.01
X14	16-Jul-08	< 0.00025	0.29	< 0.001	0.031	< 0.001	< 0.001	< 0.05	28.1	< 0.0002	< 0.001	< 0.001	0.003	0.57	< 0.00002	0.9	0.002	6.08	0.47	< 0.0005	2.37	0.003	0.003	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.1	< 0.001	< 0.0005	0.011	0.0001	0.0006	< 0.001	0.031	< 0.01
X14	22-Jul-08	< 0.00025	0.046	< 0.001	0.04	< 0.001	< 0.001	< 0.05	37	< 0.0002	< 0.001	< 0.001	0.001	0.24	< 0.00002	0.9	0.003	8.69	0.46	< 0.0005	3.04	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.14	< 0.001	< 0.0005	0.001	0.0001	0.001	< 0.001	0.022	< 0.01
X14	30-Jul-08	< 0.000005	0.0317	0.00042	0.0445	< 0.00001	0.000005	< 0.05	47.1	0.000029	0.00087	0.0001	0.00079	0.235		1.07	0.0046	9.51	0.764	0.00049	4.08	0.0022	0.000458	< 0.005	0.00008	0.00022	4.47	< 0.00001	0.179			0.0008	0.00002	0.00134	< 0.0002	0.0246	< 0.0001
X14	31-Jul-08	< 0.00025	0.017	< 0.001	0.036	< 0.001	< 0.001	< 0.05	41.2	< 0.0002	< 0.001	< 0.001	0.001	0.23	< 0.00002	1	0.004	8.66	0.76	< 0.0005	3.63	0.002	< 0.001	< 0.15	< 0.001	0.001	3.7	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	0.0001	0.0013	< 0.001	0.027	< 0.01
X14	05-Aug-08	< 0.00025	0.038	< 0.001	0.049	< 0.001	< 0.001	< 0.05	52.2	< 0.0002	0.001	< 0.001	0.001	0.32	< 0.00002	1.3	0.005	11.4	1	< 0.0005	4.28	0.003	0.002	< 0.15	< 0.001	< 0.001	4.5	< 0.001	0.18	< 0.001	< 0.0005	0.001	0.0001	0.0013	< 0.001	0.033	< 0.01
X14	11-Aug-08	< 0.00025	0.043	< 0.001	0.048	< 0.001	< 0.001	< 0.05	48.1	< 0.0002	0.001	< 0.001	< 0.001	0.37	< 0.00002	1.3	0.004	12.3	1.14	< 0.0005	4.34	0.003	< 0.001	< 0.15	< 0.001	< 0.001	7.7	< 0.001	0.18	< 0.001	< 0.0005	0.001	0.0001	0.0015	< 0.001	0.028	< 0.01
X14	12-Aug-08	< 0.00025	0.044	< 0.001	0.05	< 0.001	< 0.001	< 0.05	48.8	< 0.0002	< 0.001	< 0.001	0.001	0.37	< 0.00002	1.3	0.006	12.2	0.79	< 0.0005	4.34	0.003	< 0.001	< 0.15	< 0.001	< 0.001	8.1	< 0.001	0.19	< 0.001	< 0.0005	0.001	0.0001	0.0014	< 0.001	0.032	< 0.01
X14	19-Aug-08	< 0.00025	0.023	< 0.001	0.041	< 0.001	< 0.001	< 0.05	48	< 0.0002	0.001	< 0.001	0.001	0.37	< 0.00002	1.3	0.005	11.6	0.97	0.0007	4.17	0.003	< 0.001	< 0.15	< 0.001	< 0.001	5.3	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	0.0001	0.0012	< 0.001	0.031	< 0.01
X14	28-Aug-08	< 0.00025	0.1	< 0.001	0.04	< 0.001	< 0.001	< 0.05	33.8	< 0.0002	< 0.001	< 0.001	0.002	0.3	< 0.00002	0.9	0.003	7.65	0.38	0.0006	2.52	0.002	< 0.001	< 0.15	< 0.001	< 0.001	5	< 0.001	0.13	< 0.001	< 0.0005	0.007	0.0001	0.0008	< 0.001	0.018	< 0.01
X14	02-Sep-08	< 0.00025	0.038	< 0.001	0.04	< 0.001	< 0.001	< 0.05	41.3	< 0.0002	< 0.001	< 0.001	0.001	0.21	< 0.00002	1.1	0.004	8.54	0.53	< 0.0005	2.9	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4.5	< 0.001	0.15	< 0.001	< 0.0005	< 0.001	0.0001	0.0009	< 0.001	0.023	< 0.01
X14	09-Sep-08	< 0.00025	0.07	< 0.001	0.037	< 0.001	< 0.001	< 0.05	34.2	< 0.0002	< 0.001	< 0.001	0.002	0.17	< 0.00002	0.9	0.003	7.45	0.33	< 0.0005	2.79	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.13	< 0.001	< 0.0005	0.002	0.0001	0.0008	< 0.001	0.016	< 0.01
X14	15-Sep-08	< 0.00025	0.022	< 0.001	0.041	< 0.001	< 0.001	< 0.05	42.9	< 0.0002	< 0.001	< 0.001	< 0.001	0.23	< 0.00002	1.1	0.004	9.05	0.51	< 0.0005	3.16	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4.5	< 0.001	0.19	< 0.001	< 0.0005	< 0.001	0.0001	0.0014	< 0.001	0.025	< 0.01
X14	16-Sep-08	< 0.00025	0.028	< 0.001	0.04	< 0.001	< 0.001	< 0.05	41.3	< 0.0002	< 0.001	< 0.001	0.001	0.26	< 0.00002	1	0.004	8.48	0.49	< 0.0005	3.01	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4.3	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	0.0001	0.0014	< 0.001	0.023	< 0.01
X14	18-Sep-08	< 0.000005	0.0296	0.00041	0.0434	< 0.00001	0.000005	< 0.05	46.6	0.000029	0.00063	0.0001	0.00193	0.211		1.11	0.0045	9.14	0.489	0.00044	3.2	0.00163	0.000506	< 0.005	0.00008	0.00029	4.29	0.0001	0.176			0.001	0.00002	0.00117	< 0.0002	0.0249	< 0.0001
X14	23-Sep-08	< 0.00025	0.019	< 0.001	0.042	< 0.001	< 0.001	< 0.05	48.2	< 0.0002	< 0.001	< 0.001	< 0.001	0.24	< 0.00002	1.1	0.005	9.86	0.62	< 0.0005	3.54	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4.4	< 0.001	0.22	< 0.001	< 0.0005	< 0.001	0.0001	0.0015	< 0.001	0.031	< 0.01
X14	30-Sep-08	< 0.00025	0.035	0.001	0.044	< 0.001	< 0.001	< 0.05	49.9	< 0.0002	< 0.001	< 0.001	< 0.001	0.21	< 0.00002	1.1	0.004	8.7	0.72	0.0005	2.98	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4.4	< 0.001	0.19	< 0.001	< 0.0005	< 0.001	0.0001	0.0013	< 0.001	0.036	< 0.01
X14	07-Oct-08	< 0.00025	0.032	< 0.001	0.047	< 0.001	< 0.001	< 0.05	50.3	< 0.0002	< 0.001	< 0.001	< 0.001	0.3	< 0.00002	1.1	0.004	10.9	0.78	0.0006	3.6	0.002	< 0.001	< 0.15	< 0.001	< 0.001	5.1	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	0.0001	0.0014	< 0.001	0.044	< 0.01
X14	07-Oct-08	0.000019	0.0285	0.00043	0.0487	< 0.00001	0.000005	< 0.05	47.8	0.000086	0.00071	0.0003	0.00067	0.304		0.32	0.0041	9.91	0.584	0.00048	3.18	0.00184	0.000586	< 0.005	0.00007	0.00004	4.52	0.0007	0.179			0.00159	0.00000	0.000002	0.0383	< 0.0001	0.00105
X14	14-Oct-08	< 0.00025	0.031	< 0.001	0.045	< 0.001	< 0.001	< 0.05	61.5	< 0.0002	0.002	< 0.001	< 0.001	0.25	< 0.00002	1.3	0.005	12.3	1.58	0.0007	4.23	0.005	< 0.001	< 0.15	< 0.001	0.001	5.1	< 0.001	0.22	< 0.001	< 0.0005	< 0.001	0.0001	0.0015	< 0.001	0.059	< 0.01
X14	15-Oct-08	< 0.00025	0.022	< 0.001	0.046	< 0.001	< 0.001	< 0.05	61.8	< 0.0002	0.002	< 0.001	< 0.001	0.24	< 0.00002	1.3	0.005	11.6	1.41	0.001	4.05	0.004	0.001	< 0.15	< 0.001	< 0.001	5	< 0.001	0.23	< 0.001	< 0.0005	< 0.001	0.0001	0.0015	< 0.001	0.06	< 0.01
X14	21-Oct-08	< 0.00025	0.084	< 0.001	0.053	< 0.001	< 0.001	< 0.05	65	< 0.0002	0.003	0.005	0.001	0.52	< 0.00002	1.3	0.006	13.9	2.22	0.0012	5	0.01	< 0.001	< 0.15	< 0.001	0.002	4.9	< 0.001	0.24	< 0.001	< 0.0005	0.002	0.0001	0.0019	< 0.001	0.076	< 0.01
X14	04-Nov-08	< 0.00025	0.028	< 0.001	0.055	< 0.001	< 0.001	< 0.05	44.5	< 0.0002	< 0.001	< 0.001	< 0.001	0.26	< 0.00002	1.2	0.003	11.3	0.49	0.0007	3.52	0.002	< 0.001	< 0.15	< 0.001	< 0.001	5.2	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	0.0001	0.0017	< 0.001	0.062	< 0.01
X14	01-Dec-08	< 0.00025	0.019	< 0.001	0.07	< 0.001	< 0.001	< 0.05	67	< 0.0002	< 0.001	< 0.001	< 0.001	0.42	< 0.00002	1.5	0.005	16.6	1.12	0.0007	5.62	0.002	< 0.001	< 0.15	< 0.001	< 0.001	6.7	< 0.001	0.24	< 0.001	< 0.0005	< 0.001	0.0001	0.002	< 0.001	0.075	< 0.01
X14	10-Dec-08	< 0.000005	0.0204	0.00034	0.0652	< 0.00001	0.000005	< 0.05	64.8	0.000036	0.00081	0.0001	0.00045	0.339		1.37	0.0056	14.4	1.03	0.00066	4.85	0.00233	0.000277		0.00007	0.00044	5.89	< 0.00001	0.233			0.0006	0.00000	0.00256	< 0.0002	0.0624	< 0.0001
X14	MEAN	0.00351	0.10370	0.00091	0.04566	0.00076	0.00076	0.0475	62.3	0.00017	0.00171	0.00089	0.00145	0.4296481	0.00002	1.51444	0.00501	13.2824	1.5698333	0.000657	5.36315	0.004075	0.0017467	0.12498	0.00078	0.00085	4.81673	0.0007769	0.2125263	0.001	0.0005	0.00375	8.1E-05	0.001586	0.001613	0.0462	0.0076454
X14	MINIMUM	< 0.000005	0.0042	0.00034	0.028	< 0.00001	0.000005	< 0.005	14.9	2.9E-05	0.00053	0.0001	0.00031	0.13	< 0.00002	0.32	0.001	3.29	0.2	0.00025	1.37	< 0.001	0.000137	< 0.005	0.00006	0.00004	2.5	< 0.00001	0.055	< 0.001	< 0.0005	0.0005	0.00000	0.000002	< 0.0002	< 0.0001	< 0.0001
X14	MAXIMUM	0.0003	0.56	0.0012	0.0777	< 0.001	< 0.001	< 0.05	191	< 0.0002	0.008	0.005	0.003	1.1	< 0.00002	3.8	0.013	40.6	8.13	0.0016	19.2	0.016	0.0069	< 0.15	< 0.001	0.002	8.1	< 0.001	0.64	< 0.001	< 0.0005	0.026	0.00011	0.0044	0.0383	0.13	< 0.01
X14	N > DL	7	54	20	54	5	4	0	54	13	31	13	41	54	0	54	52	54	54	33	54	53	30	3	13	21	52	5	54	0	0	38	13	50	9	53	5
X14	Median	0.00025	0.045	0.001	0.0427	0.001	0.001	0.05	47.45	0.0002	0.001	0.001	0.001	0.368	0.00002	1.16	0.004	9.665	0.762	0.0005	3.57	0.0023	0.001	0.15	0.001	0.001	4.85	0.001	0.1795	0.001	0.0005	0.001	0.0001	0.0013	0.001	0.0335	0.01
X22B	07-Jan-08	< 0.00025	0.02	< 0.001	0.015	< 0.001	< 0.001	< 0.05	133	0.016	0.035	< 0.001	0.024	0.13	< 0.00002	7.3	0.046	62.6	2.19	0.001	15.8	0.12	0.001	< 0.15	< 0.001	0.001	5.2	< 0.001	0.53	< 0.001	< 0.0005	< 0.001	0.0004	0.0016	< 0.001	20.8	< 0.01
X22B	18-Feb-08	< 0.00025	0.011	< 0.001	0.015	< 0.001	< 0.001	< 0.05	139	0.0083	0.041	< 0.001	0.008	0.2	< 0.00002	8.6	0.049	62.6	2.44	0.0015	19.2	0.11	0.009	< 0.15	< 0.001	0.002	3.8	< 0.001	0.62	< 0.001	< 0.0005	< 0.001	0.0005	0.0014	< 0.001	15.5	< 0.01
X22B	17-Mar-08	< 0.00025	0.014	< 0.001	0.015	< 0.001	< 0.001	< 0.05	117	0.027	0.037	< 0.001	0.057	< 0.05	< 0.00002	5.7	0.035	75.8	2.13	0.0007	18	0.13	0.001	< 0.15	< 0.001	0.001	7.9	< 0.001	0.43	< 0.001	< 0.0005	< 0.001	0.0004	0.0017	< 0.001	30.8	< 0.01
X22B	15-Apr-08	< 0.00025	0.038	< 0.001	0.017	< 0.001	< 0.001	< 0.05	130	0.039	0.039	< 0.001	0.1	0.07	< 0.00002	5.3	0.046	78.1	2.19	0.0007	12.7	0.15	0.001	< 0.15	< 0.001	< 0.001	9.1	< 0.001	0.51	< 0.001	< 0.0005	< 0.001	0.0003	0.0012	< 0.001	28.8	< 0.01
X22B	14-May-08	< 0.00025	0.065	< 0.001	0.017	< 0.001	< 0.001	< 0.05	145	0.0094	0.043	< 0.001	0.018	0.33	< 0.00002	8.8	0.055	65.8	2.57	0.0016	19.1	0.12	0.003	< 0.15	< 0.001	< 0.001	3.6	< 0.001	0.62	< 0.001	< 0.0005	< 0.001	0.0005	0.002	< 0.001	16.9	< 0.01
X22B	16-Jun-08	< 0.00025	0.023	< 0.001	0.016	< 0.001	< 0.001	< 0.05	149	0.0098	0.043	< 0.001	0.016	0.19	< 0.00002	8.6	0.051	71.6	2.52	0.0014	21.3	0.11	0.001	< 0.15	< 0.001	< 0.001	3.9	< 0.001	0.61	< 0.001	< 0.0005	< 0.001	0.0005	0.002	< 0.001	17.8	< 0.01
X22B	14-Jul-08	< 0.00025	0.04	< 0.001	0.016	< 0.001	< 0.001	< 0.05	130	0.0099	0.046	< 0.001	0.013	0.58	< 0.00002	7.8	0.068	70.7	2.36	0.001	19.7	0.11	0.003	< 0.15	< 0.001	0.001	3.9	< 0.001	0.54	< 0.001	< 0.0005	< 0.001	0.0005	0.0017	< 0.001	15.7	< 0.01
X22B	12-Aug-08	< 0.00025	0.042	< 0.001	0.017	< 0.001	< 0.001	< 0.05	126	0.01	0.044	< 0.001	0.01	0.45	< 0.00002	7.7	0.062	72.8	2.6	0.0008	19	0.11	0.002	< 0.15	< 0.001	0.001	5.7	< 0.001	0.54	< 0.001	< 0.0005	< 0.001	0.0005	0.0012	< 0.001	16	< 0.01
X22B	15-Sep-08	< 0.00025	0.022	< 0.001	0.017	< 0.001	< 0.001	< 0.05	133	0.014	0.055	< 0.001	0.011	0.28	< 0.00002	7.7	0.052	65.6	2.41	0.0012	17.7	0.11	0.002	< 0.15	< 0.001	< 0.001	3.6	< 0.001	0.56	< 0.001	< 0.0005	< 0.001	0.0007	0.0012	< 0.001	13.7	< 0.01
X22B	15-Oct-08	< 0.00025	0.033	< 0.001	0.016	< 0.001	< 0.001	< 0.05	139	0.013	0.046	< 0.001	0.012	0.1	< 0.00002	8.4	0.054	59.9	2.43	0.0013	16.3	0.11	0.001	< 0.15	< 0.001	0.001	3.7	< 0.001	0.61	< 0.001	< 0.0005	< 0.001	0.0005	0.001	< 0.001	16.8	< 0.01
X22B	04-Nov-08	0.0005	0.071	< 0.001	0.018	< 0.001	< 0.001	< 0.05	146	0.014	0.051	< 0.001	0.018	0.2	< 0.00002	9.2	0.051	82.6	2.89	0.0013	23.3	0.12	0.001	< 0.15	< 0.001	< 0.001	4.2	< 0.001	0.63	< 0.001	< 0.0005	< 0.001	0.0005	0.0013	< 0.001	19.2	< 0.01
X22B	02-Dec-08	< 0.00025	0.043	< 0.001	0.019	< 0.001	< 0.001	< 0.05	175	0.015	0.055	< 0.001	0.02	0.2	< 0.00002	9.6	0.061	85.2	3.49	0.0011	24.4	0.15	0.001	< 0.15	< 0.001	< 0.001	4.5	< 0.001	0.66	< 0.001	< 0.0005	< 0.001	0.0005	0.0011	< 0.001	20.7	< 0.01
X22B	MEAN	0.00027	0.03517	0.001	0.0165	0.001	0.001	0.05	138.5	0.01545	0.04458	0.001	0.02558	0.2316667	0.00002	7.89167	0.0525	71.1083	2.5183333	0.001133	18.875	0.120833	0.0022	0.15	0.001	0.00108	4.925	0.001	0.5716667	0.001	0.0005	0.001	0.00048	0.00145	0.001	19.4	0.01
X22B	MINIMUM	< 0.00025	0.011	< 0.001	0.015	< 0.001	< 0.001	< 0.05	117	0.0083	0.035	< 0.001	0.008	< 0.05	< 0.00002	5.3	0.035	59.9	2.13	0.0007	12.7	0.11	0.001	< 0.15	< 0.001	< 0.001	3.6	< 0.001	0.43	< 0.001	< 0.0005	< 0.001	0.0003	0.001	< 0.001	13.7	< 0.01
X22B	MAXIMUM	0.0005	0.071	< 0.001	0.019	< 0.001	< 0.001	< 0.05	175	0.039	0.055	< 0.001	0.1	0.58	< 0.00002	9.6	0.068	85.2	3.49	0.0016	24.4	0.15	0.009	< 0.15	< 0.001	0.002	9.1	< 0.001	0.66	< 0.001	< 0.0005	< 0.001	0.0007	0.002	< 0.001	30.8	< 0.01
X22B	N > DL	1	12	0	12	0	0	0	12	12	12	0	12	11	0	12	12	12	12	12	12	12	12	0	0	6	12	0	12	0	0	0	12	12	0	12	0
X22B	Median	0.00025	0.0355	0.001	0.0165	0.001	0.001	0.05	136	0.0135	0.0435	0.001	0.017	0.2	0.00002	8.1	0.0515	71.15	2.435	0.00115	19.05	0.115	0.001	0.15	0.001	0.001	4.05	0.001	0.585	0.001	0.0005	0.001	0.0005	0.00135	0.001	17.35	0.01

Appendix 3
2008 Surface Water Quality Data
Rose Creek Drainage

Table 2. Surface Water Total Metals

Station	Date	AG-T mg/L	AL-T mg/L	AS-T mg/L	BA-T mg/L	BE-T mg/L	BI-T mg/L	B-T mg/L	CA-T mg/L	CD-T mg/L	CO-T mg/L	CR-T mg/L	CU-T mg/L	FE-T mg/L	HG-T mg/L	K-T mg/L	LI-T mg/L	MG-T mg/L	MN-T mg/L	MO-T mg/L	NA-T mg/L	NI-T mg/L	PB-T mg/L	P-T mg/L	SB-T mg/L	SE-T mg/L	SI-T mg/L	SN-T mg/L	SR-T mg/L	TE-T mg/L	TH-T mg/L	TI-T mg/L	TL-T mg/L	U-T mg/L	V-T mg/L	ZN-T mg/L	ZR-T mg/L
X23	08-Jan-08	0.0005	0.01	0.002	0.017	< 0.001	< 0.001	< 0.05	480	0.026	0.69	< 0.001	0.014	15.4	< 0.00002	16.6	0.15	794	64.4	0.0072	59.2	0.79	0.024	< 0.15	< 0.001	0.005	6.6	< 0.001	4.15	< 0.001	< 0.0005	< 0.001	0.0013	0.012	< 0.001	207	< 0.01
X23	19-Feb-08	0.0005	0.006	0.002	0.014	< 0.001	< 0.001	< 0.05	502	0.021	0.65	< 0.001	0.01	11.5	< 0.00002	15.4	0.13	856	71.9	0.009	54.9	0.7	0.003	< 0.15	< 0.001	0.006	5.7	< 0.001	4.1	< 0.001	< 0.0005	< 0.001	0.0012	0.0078	< 0.001	233	< 0.01
X23	18-Mar-08	0.0004	< 0.005	0.002	0.014	< 0.001	< 0.001	< 0.05	429	0.018	0.67	< 0.001	0.011	17.8	< 0.00002	15.1	0.13	965	74	0.007	70.7	0.68	0.002	< 0.15	< 0.001	0.006	6.4	< 0.001	3.77	< 0.001	< 0.0005	< 0.001	0.0013	0.015	< 0.001	239	< 0.01
X23	14-May-08	0.002	4.24	0.012	0.022	0.003	< 0.001	< 0.05	446	0.817	1.17	0.002	5.65	85	0.00003	15.4	0.17	689	76	0.0087	42.9	1.36	0.053	< 0.15	< 0.001	0.013	9.5	< 0.001	4.35	< 0.001	0.001	< 0.001	0.0019	0.032	< 0.001	770	< 0.01
X23	17-Jun-08	0.0008	0.16	0.003	0.017	< 0.001	< 0.001	< 0.05	481	0.167	0.89	< 0.001	0.43	57.5	< 0.00002	15.5	0.16	916	74.7	0.0073	56.9	1.04	0.017	< 0.15	< 0.001	0.007	9.4	< 0.001	4	< 0.001	< 0.0005	< 0.001	0.0017	0.014	< 0.001	385	< 0.01
X23	15-Jul-08	0.041	39.5	0.85	0.096	0.006	0.004	< 0.05	256	0.855	0.68	0.14	8.02	464	0.00079	4.6	0.11	284	43.4	0.0023	14.1	0.55	26	0.6	0.071	0.016	8.3	0.004	0.94	< 0.001	0.013	0.07	0.019	0.023	0.038	803	< 0.01
X23	12-Aug-08	< 0.00025	0.033	0.002	0.018	< 0.001	< 0.001	< 0.05	477	0.07	0.82	< 0.001	0.13	81.6	< 0.00002	15.7	0.18	932	74.9	< 0.0005	54.3	1	0.004	< 0.15	< 0.001	0.01	10.7	< 0.001	3.65	< 0.001	0.0007	0.002	0.0015	0.013	< 0.001	396	< 0.01
X23	15-Sep-08	0.001	0.031	0.002	0.019	< 0.001	< 0.001	< 0.05	506	0.155	1.11	< 0.001	0.24	146	< 0.00002	15.8	0.17	968	86.4	0.0061	54.6	1.14	0.005	< 0.15	< 0.001	0.005	8.6	< 0.001	3.67	< 0.001	< 0.0005	0.001	0.0024	0.015	< 0.001	578	< 0.01
X23	15-Oct-08	0.0013	0.03	0.002	0.016	< 0.001	< 0.001	< 0.05	486	0.2	1.23	< 0.001	0.089	224	< 0.00002	16.9	0.2	992	94.4	0.0069	44.3	1.42	0.002	< 0.15	< 0.001	0.008	9.1	< 0.001	4.08	< 0.001	< 0.0005	< 0.001	0.0016	0.0088	< 0.001	732	< 0.01
X23	04-Nov-08	0.0041	0.021	0.002	0.018	< 0.001	< 0.001	< 0.05	520	0.209	1.61	< 0.001	0.071	256	< 0.00002	18.2	0.17	1130	105	0.0072	90.8	1.68	0.003	< 0.15	< 0.001	0.007	10.2	< 0.001	4.11	< 0.001	< 0.0005	< 0.001	0.0019	0.01	< 0.001	839	< 0.01
X23	02-Dec-08	0.0017	0.019	0.001	0.019	< 0.001	< 0.001	< 0.05	546	0.195	1.72	< 0.001	0.061	267	< 0.00002	19.7	0.23	1120	109	0.0072	72.9	1.84	0.005	< 0.15	< 0.001	0.002	9	< 0.001	4.29	< 0.001	< 0.0005	< 0.001	0.002	0.0083	< 0.001	839	< 0.01
X23	MEAN	0.00487	4.005	0.08	0.025	0.002	0.001	0.05	466.3	0.2485	1.02182	0.01373	1.33873	147.8	9.09E-05	15.3545	0.16364	876.909	79.463636	0.006309	55.9636	1.109091	2.3743636	0.19091	0.00736	0.00773	8.5	0.0012727	3.7372727	0.001	0.0017	0.00736	0.00325	0.014445	0.0043636	547.36364	0.01
X23	MINIMUM	< 0.00025	< 0.005	0.001	0.014	< 0.001	< 0.001	< 0.05	256	0.018	0.65	< 0.001	0.01	11.5	< 0.00002	4.6	0.11	284	43.4	< 0.0005	14.1	0.55	0.002	< 0.15	< 0.001	0.002	5.7	< 0.001	0.94	< 0.001	< 0.0005	< 0.001	0.0012	0.0078	< 0.001	207	< 0.01
X23	MAXIMUM	0.041	39.5	0.85	0.096	0.006	0.004	< 0.05	546	0.855	1.72	0.14	8.02	464	0.00079	19.7	0.23	1130	109	0.009	90.8	1.84	26	0.6	0.071	0.016	10.7	0.004	4.35	< 0.001	0.013	0.07	0.019	0.032	0.038	839	< 0.01
X23	N > DL	10	10	11	11	2	1	0	11	11	11	2	11	11	2	11	11	11	11	10	11	11	11	1	1	11	11	1	11	0	3	3	11	11	1	11	0
X23	Median	0.001	0.03	0.002	0.018	0.001	0.001	0.05	481	0.167	0.89	0.001	0.089	85	0.00002	15.7	0.17	932	74.9	0.0072	54.9	1.04	0.005	0.15	0.001	0.007	9	0.001	4.08	0.001	0.0005	0.001	0.0017	0.013	0.001	578	0.01
X26	16-Jun-08	< 0.00025	< 0.005	0.003	0.007	< 0.001	< 0.001	< 0.05	515	0.017	0.4	< 0.001	0.004	22.1	< 0.00002	13.9	0.18	285	10	0.0012	54.7	1.24	0.036	< 0.15	< 0.001	0.003	7.2	< 0.001	3	< 0.001	< 0.0005	< 0.001	0.001	0.014	< 0.001	54.3	< 0.01
X26	15-Jul-08	< 0.00025	0.021	0.003	0.007	< 0.001	< 0.001	< 0.05	532	0.017	0.45	< 0.001	0.006	49.9	< 0.00002	14.5	0.23	317	12.5	< 0.0005	55.6	1.29	0.052	< 0.15	< 0.001	0.003	6.7	< 0.001	2.96	< 0.001	< 0.0005	0.001	0.0012	0.014	< 0.001	73.4	< 0.01
X26	12-Aug-08	< 0.00025	0.1	0.004	0.011	< 0.001	< 0.001	< 0.05	510	0.015	0.45	< 0.001	0.007	69.2	< 0.00002	15.2	0.26	321	14.5	< 0.0005	57.8	1.23	0.083	< 0.15	< 0.001	0.006	11	< 0.001	2.99	< 0.001	< 0.0005	0.004	0.0013	0.017	< 0.001	82	< 0.01
X26	15-Sep-08	< 0.00025	< 0.005	0.003	0.008	< 0.001	< 0.001	< 0.05	506	0.022	0.49	< 0.001	0.004	80.4	< 0.00002	14.5	0.21	328	13.6	0.001	55.1	1.08	0.069	< 0.15	< 0.001	0.001	6.4	< 0.001	2.82	< 0.001	< 0.0005	< 0.001	0.0018	0.02	< 0.001	87.4	< 0.01
X26	MEAN	0.00025	0.03275	0.00325	0.00825	0.001	0.001	0.05	515.75	0.01775	0.4475	0.001	0.00525	55.4	0.00002	14.525	0.22	312.75	12.65	0.0008	55.8	1.21	0.06	0.15	0.001	0.00325	7.825	0.001	2.9425	0.001	0.0005	0.00175	0.00133	0.01625	0.001	74.275	0.01
X26	MINIMUM	< 0.00025	< 0.005	0.003	0.007	< 0.001	< 0.001	< 0.05	506	0.015	0.4	< 0.001	0.004	22.1	< 0.00002	13.9	0.18	285	10	< 0.0005	54.7	1.08	0.036	< 0.15	< 0.001	0.001	6.4	< 0.001	2.82	< 0.001	< 0.0005	< 0.001	0.001	0.014	< 0.001	54.3	< 0.01
X26	MAXIMUM	< 0.00025	0.1	0.004	0.011	< 0.001	< 0.001	< 0.05	532	0.022	0.49	< 0.001	0.007	80.4	< 0.00002	15.2	0.26	328	14.5	0.0012	57.8	1.29	0.083	< 0.15	< 0.001	0.006	11	< 0.001	3	< 0.001	< 0.0005	0.004	0.0018	0.02	< 0.001	87.4	< 0.01
X26	N > DL	0	2	4	4	0	0	0	4	4	4	0	4	4	0	4	4	4	4	2	4	4	4	0	0	4	4	0	4	0	0	2	4	4	0	4	0
X26	Median	0.00025	0.013	0.003	0.0075	0.001	0.001	0.05	512.5	0.017	0.45	0.001	0.005	59.55	0.00002	14.5	0.22	319	13.05	0.00075	55.35	1.235	0.0605	0.15	0.001	0.003	6.95	0.001	2.975	0.001	0.0005	0.001	0.00125	0.0155	0.001	77.7	0.01

Note:
Statistics only generated where there are more than 2 values in a data set

average	*average of values, including values less than detection limit as set to DL value if it is the DL value will be shown without the < symbol*
minimum	*lowest value and will be least DL value if these are present in the data set*
maximum	*highest vale*
N > DL	*number of values measured that are above detection limits*
median	*the median value of the data set - if it is a DL value will be shown without the < symbol*

Appendix 3
2008 Surface Water Quality Data
Rose Creek Drainage

Table 3. Surface Water Dissolved Metals

Station	Date	AG-D mg/L	AL-D mg/L	AS-D mg/L	BA-D mg/L	B-D mg/L	BE-D mg/L	BI-D mg/L	CA-D mg/L	CD-D mg/L	CO-D mg/L	CR-D mg/L	CU-D mg/L	FE-D mg/L	K-D mg/L	LI-D mg/L	MG-D mg/L	MN-D mg/L	MO-D mg/L	NA-D mg/L	NI-D mg/L	PB-D mg/L	P-D mg/L	SB-D mg/L	SE-D mg/L	SI-D mg/L	SN-D mg/L	SR-D mg/L	TE-D mg/L	TH-D mg/L	TI-D mg/L	TL-D mg/L	U-D mg/L	V-D mg/L	ZN-D mg/L	ZR-D mg/L
A25	02-Jun-08	< 0.00025	< 0.005	< 0.001	0.053	< 0.05	< 0.001	< 0.001	49.3	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1.7	0.007	15.7	< 0.001	0.0005	2.88	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	1.8	< 0.001	0.54	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001	< 0.005	< 0.01
A25	30-Sep-08	< 0.00025	0.012	< 0.001	0.062	< 0.05	< 0.001	< 0.001	41.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1.6	0.007	12.6	0.001	0.0006	2.36	< 0.001	< 0.001	< 0.15	< 0.001	0.001	2.3	< 0.001	0.45	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001	0.023	< 0.01
A30	02-Jun-08	0.0013	22.3	< 0.001	0.007	< 0.05	0.005	< 0.001	40.6	0.141	0.26	0.012	2.1	29.7	1.2	0.037	112	6.75	0.0008	2.69	0.23	0.86	< 0.15	< 0.001	0.001	8.7	< 0.001	0.18	< 0.001	0.0076	< 0.001	0.0003	0.015	< 0.001	108	< 0.01
A30	30-Sep-08	0.0011	13	< 0.001	0.011	< 0.05	0.005	< 0.001	42.3	0.093	0.2	0.006	1.36	4.95	1.2	0.035	70.7	4.73	< 0.0005	3.6	0.17	0.8	< 0.15	< 0.001	0.002	10.5	< 0.001	0.21	< 0.001	0.0023	< 0.001	0.0003	0.011	< 0.001	66	< 0.01
FAROCR	08-Jan-08	< 0.00025	0.007	< 0.001	0.029	< 0.05	< 0.001	< 0.001	11.5	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	0.5	0.003	2.93	0.003	0.0008	2.32	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	7	< 0.001	0.051	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0007	< 0.001	0.017	< 0.01
FAROCR	15-May-08	< 0.00025	0.2	< 0.001	0.024	< 0.05	< 0.001	< 0.001	6.23	< 0.0002	< 0.001	< 0.001	0.007	0.27	0.8	0.002	1.4	0.008	< 0.0005	1.18	0.003	0.012	< 0.15	< 0.001	< 0.001	3.5	< 0.001	0.032	< 0.001	< 0.0005	0.003	< 0.0001	0.0005	< 0.001	0.039	< 0.01
FAROCR	17-Jun-08	< 0.00025	0.07	< 0.001	0.01	< 0.05	< 0.001	< 0.001	3.06	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	0.3	< 0.001	0.81	0.002	< 0.0005	1.21	< 0.001	0.002	< 0.15	< 0.001	< 0.001	4.8	< 0.001	0.015	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.02	< 0.01
FAROCR	15-Jul-08	< 0.00025	0.15	< 0.001	0.012	< 0.05	< 0.001	< 0.001	3.64	< 0.0002	< 0.001	< 0.001	0.005	0.16	0.2	0.002	0.81	0.006	< 0.0005	1.14	0.002	0.004	< 0.15	< 0.001	< 0.001	5.4	< 0.001	0.019	< 0.001	< 0.0005	0.003	< 0.0001	< 0.0005	< 0.001	0.031	< 0.01
FAROCR	12-Aug-08	< 0.00025	0.078	< 0.001	0.018	< 0.05	< 0.001	< 0.001	6.42	< 0.0002	< 0.001	< 0.001	0.002	0.06	0.5	0.003	1.84	0.011	< 0.0005	1.96	0.002	0.003	< 0.15	< 0.001	< 0.001	12.9	< 0.001	0.034	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.016	< 0.01
FAROCR	15-Sep-08	< 0.00025	0.075	< 0.001	0.014	< 0.05	< 0.001	< 0.001	4.28	< 0.0002	< 0.001	< 0.001	0.002	0.05	0.2	0.001	1	0.002	< 0.0005	1.51	0.001	0.001	< 0.15	< 0.001	< 0.001	5.9	< 0.001	0.028	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.03	< 0.01
FAROCR	15-Oct-08	< 0.00025	0.038	< 0.001	0.013	< 0.05	< 0.001	< 0.001	4.91	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.2	0.002	1.04	0.001	< 0.0005	1.26	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.5	< 0.001	0.025	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.009	< 0.01
FAROCR	04-Nov-08	< 0.00025	0.071	< 0.001	0.016	< 0.05	< 0.001	< 0.001	6.42	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	0.2	< 0.001	1.84	0.003	< 0.0005	1.81	0.001	0.001	< 0.15	< 0.001	< 0.001	6.2	< 0.001	0.033	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.039	< 0.01
FAROCR	02-Dec-08	< 0.00025	0.056	< 0.001	0.018	< 0.05	< 0.001	< 0.001	7.91	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.3	0.002	1.67	0.002	< 0.0005	2	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	7.4	< 0.001	0.035	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.017	< 0.01
FAROCR	MEAN	0.00025	0.083	0.001	0.017	0.05	0.001	0.001	6.04	0.0002	0.001	0.001	0.002556	0.08778	0.36	0.0018889	1.4822222	0.004222	0.0005333	1.598889	0.0014444	0.0028889	0.15	0.001	0.001	6.62	0.001	0.03022	0.001	0.0005	0.0014444	0.0001	0.0005222	0.001	0.024	0.01
FAROCR	MINIMUM	< 0.00025	0.007	< 0.001	0.01	< 0.05	< 0.001	< 0.001	3.06	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.2	< 0.001	0.81	0.001	< 0.0005	1.14	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.5	< 0.001	0.015	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.009	< 0.01
FAROCR	MAXIMUM	< 0.00025	0.2	< 0.001	0.029	< 0.05	< 0.001	< 0.001	11.5	< 0.0002	< 0.001	< 0.001	0.007	0.27	0.8	0.003	2.93	0.011	0.0008	2.32	0.003	0.012	< 0.15	< 0.001	< 0.001	12.9	< 0.001	0.051	< 0.001	< 0.0005	0.003	< 0.0001	0.0007	< 0.001	0.039	< 0.01
FAROCR	N > DL	0	9	0	9	0	0	0	9	0	0	0	7	4	9	7	9	9	1	9	5	6	0	0	0	9	0	9	0	0	2	0	2	0	9	0
FAROCR	Median	0.00025	0.071	0.001	0.016	0.05	0.001	0.001	6.23	0.0002	0.001	0.001	0.002	0.05	0.3	0.002	1.4	0.003	0.0005	1.51	0.001	0.001	0.15	0.001	0.001	6.2	0.001	0.032	0.001	0.0005	0.001	0.0001	0.0005	0.001	0.02	0.01
FCO	02-Jun-08	< 0.00025	0.025	< 0.001	0.02	< 0.05	< 0.001	< 0.001	20.5	0.0008	0.002	< 0.001	0.01	< 0.05	0.7	< 0.001	3.32	0.065	< 0.0005	1.98	0.004	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.063	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.57	< 0.01
FCO	30-Sep-08	< 0.00025	0.034	< 0.001	0.034	< 0.05	< 0.001	< 0.001	16.1	0.0037	0.007	< 0.001	0.062	< 0.05	0.5	0.005	4.85	0.14	< 0.0005	2.19	0.012	< 0.001	< 0.15	< 0.001	< 0.001	7.1	< 0.001	0.068	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	2.56	< 0.01
FDL	02-Jun-08	< 0.00025	0.093	< 0.001	0.008	< 0.05	< 0.001	< 0.001	1.47	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.3	< 0.001	0.32	0.002	< 0.0005	0.96	< 0.001	0.002	< 0.15	< 0.001	< 0.001	3.6	< 0.001	0.009	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.006	< 0.01
FDL	29-Sep-08	< 0.00025	0.073	< 0.001	0.012	< 0.05	< 0.001	< 0.001	3	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.2	0.001	0.69	0.002	< 0.0005	1.48	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.2	< 0.001	0.019	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.008	< 0.01
FDU	24-May-08																						0.02													
FDU	02-Jun-08	< 0.00025	0.098	< 0.001	0.007	< 0.05	< 0.001	< 0.001	1.39	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.3	< 0.001	0.41	0.042	< 0.0005	0.97	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.6	< 0.001	0.009	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.12	< 0.01
FDU	29-Sep-08	< 0.00025	0.065	< 0.001	0.011	< 0.05	< 0.001	< 0.001	2.53	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.1	0.001	0.56	0.001	< 0.0005	1.52	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.4	< 0.001	0.017	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
FDU	MEAN	0.00025	0.0815	0.001	0.009	0.05	0.001	0.001	1.96	0.0002	0.001	0.001	0.001	0.05	0.2	0.001	0.485	0.0215	0.0005	1.245	0.001	0.001	0.10667	0.001	0.001	5	0.001	0.013	0.001	0.0005	0.001	0.0001	0.0005	0.001	0.0625	0.01
FDU	MINIMUM	< 0.00025	0.065	< 0.001	0.007	< 0.05	< 0.001	< 0.001	1.39	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.1	< 0.001	0.41	0.001	< 0.0005	0.97	< 0.001	< 0.001	0.02	< 0.001	< 0.001	3.6	< 0.001	0.009	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
FDU	MAXIMUM	< 0.00025	0.098	< 0.001	0.011	< 0.05	< 0.001	< 0.001	2.53	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.3	< 0.001	0.56	0.042	< 0.0005	1.52	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.4	< 0.001	0.017	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.12	< 0.01
FDU	N > DL	0	2	0	2	0	0	0	2	0	0	0	0	0	1	1	2	2	0	2	0	0	1	0	0	2	0	2	0	0	0	0	0	0	1	0
FDU	Median	0.00025	0.081	0.001	0.009	0.05	0.001	0.001	1.96	0.0002	0.001	0.001	0.001	0.05	0.2	0.001	0.485	0.0215	0.0005	1.245	0.001	0.001	0.15	0.001	0.001	5	0.001	0.013	0.001	0.0005	0.001	1E-04	0.0005	0.001	0.0625	0.01
GCULV	07-Jan-08	< 0.00025	0.006	< 0.001	0.031	< 0.05	< 0.001	< 0.001	11.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.4	< 0.001	2.08	< 0.001	< 0.0005	1.81	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.7	< 0.001	0.063	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0007	< 0.001	< 0.005	< 0.01
GCULV	18-Feb-08	< 0.00025	< 0.005	< 0.001	0.035	< 0.05	< 0.001	< 0.001	13.5	< 0.0002	< 0.001	0.001	< 0.001	< 0.05	0.3	0.001	2.41	< 0.001	0.0006	2.21	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.7	< 0.001	0.072	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0007	0.003	< 0.005	< 0.01
GCULV	17-Mar-08	< 0.00025	< 0.005	< 0.001	0.042	< 0.05	< 0.001	< 0.001	14.7	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.5	< 0.001	3.26	< 0.001	0.0006	2.63	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.075	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0015	< 0.001	< 0.005	< 0.01
GCULV	14-Apr-08	< 0.00025	< 0.005	< 0.001	0.045	< 0.05	< 0.001	< 0.001	16.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.6	0.001	3.13	< 0.001	0.0007	2.73	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.4	< 0.001	0.089	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	< 0.001	< 0.005	< 0.01
GCULV	14-May-08	< 0.00025	0.018	< 0.001	0.021	< 0.05	< 0.001	< 0.001	6.19	< 0.0002	< 0.001	< 0.001	< 0.001	0.18	0.6	< 0.001	0.92	0.01	< 0.0005	1.46	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.7	< 0.001	0.04	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
GCULV	16-Jun-08	< 0.00025	0.019	< 0.001	0.011	< 0.05	< 0.001	< 0.001	3.64	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.4	< 0.001	0.6	0.002	< 0.0005	1.01	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	2.7	< 0.001	0.021	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.007	< 0.01
GCULV	14-Jul-08	< 0.00025	0.037	< 0.001	0.015	< 0.05	< 0.001	< 0.001	4.72	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.2	< 0.001	0.76	< 0.001	< 0.0005	1.11	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.3	< 0.001	0.029	< 0.001	< 0.0005	0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
GCULV	11-Aug-08	< 0.00025	0.029	< 0.001	0.023	< 0.05	< 0.001	< 0.001	6.21	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.3	< 0.001	1.15	0.003	< 0.0005	1.33	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.7	< 0.001	0.037	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
GCULV	15-Sep-08	< 0.00025	0.022	< 0.001	0.017	< 0.05	< 0.001	< 0.001	5.69	< 0.0002	< 0.001	< 0.001	< 0.001	0.06	0.2	< 0.001	0.91	0.003	< 0.0005	1.24	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.4	< 0.001	0.043	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
GCULV	15-Oct-08	< 0.00025	0.066	< 0.001	0.018	< 0.05	< 0.001	< 0.001	6.64	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.2	< 0.001	0.96	0.002	< 0.0005	1.15	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.7	< 0.001	0.039	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
GCULV	03-Nov-08	< 0.00025	0.03	< 0.001	0.024	< 0.05	< 0.001	< 0.001	7.87	0.0003	< 0.001	< 0.001	< 0.001	< 0.05	0.3	< 0.001	1.4	0.004	< 0.0005	1.68	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.3	< 0.001	0.044	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
GCULV	01-Dec-08	< 0.00025	0.019	< 0.001	0.027	< 0.05	< 0.001	< 0.001	10.3	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.4	< 0.001	1.45	0.001	< 0.0005	1.78	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.05	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0006	< 0.001	< 0.005	< 0.01
GCULV	MEAN	0.00025	0.02175	0.001	0.02575	0.05	0.001	0.001	9.00	0.0002	0.001	0.001	0.001	0.06167	0.3666667	0.001	1.5858333	0.0025	0.0005333	1.678333	0.001	0.001	0.15	0.001	0.001	4.2	0.001	0.05017	0.001	0.0005	0.001	0.0001	0.0007167	0.0011667	0.0052	0.01
GCULV	MINIMUM	< 0.00025	< 0.005	< 0.001	0.011	< 0.05	< 0.001	< 0.001	3.64	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.2	< 0.001	0.6	< 0.001	< 0.0005	1.01	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	2.7	< 0.001	0.021	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
GCULV	MAXIMUM	< 0.00025	0.066	< 0.001	0.045	< 0.05	< 0.001	< 0.001	16.6	0.0003	< 0.001	< 0.001	< 0.001	0.18	0.6	< 0.001	3.26	0.01	0.0007	2.73	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.7	< 0.001	0.089	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	0.003	0.007	< 0.01
GCULV	N > DL	0	9	0	12	0	0	0	12	1	0	1	0	2	12	2	12	7	3	12	0	0	0	0	0	12	0	12	0	0	1	0	5	1	1	0
GCULV	Median	0.00025	0.019	0.001	0.0235	0.05	0.001	0.001	7.255	0.0002	0.001	0.001	0.001	0.05	0.35	0.001	1.275	0.0015	0.0005	1.57	0.001	0.001	0.15	0.001	0.001	4	0.001	0.0435	0.001	0.0005	0.001	0.0001	0.0005	0.001	0.005	0.01
GHSCR1	01-Jun-08	< 0.00025	0.005	< 0.001	0.029	< 0.05	< 0.001	< 0.001	188	0.0022	< 0.001	< 0.001	0.002	< 0.05	3.7	0.007	72.2	0.013	< 0.0005	9.46	0.01	< 0.001	< 0.15	< 0.001	< 0.001	4.5	< 0.001	0.8	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0017	< 0.001	3.08	< 0.01
GHSCR1	29-Sep-08	< 0.00025	0.008	< 0.001	0.039	< 0.05	< 0.001	< 0.001	188	0.005	0.001	< 0.001	0.002	< 0.05	4	0.011	75.8	0.21	< 0.0005	10.9	0.017	< 0.001	< 0.15	< 0.001	0.002	5.6	< 0.001	0.86	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0015	< 0.001	6.98	< 0.01
K8	07-Jan-08	< 0.00025	< 0.005	< 0.001	0.022	< 0.05	< 0.001	< 0.001	17.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.5	< 0.001	2.26	< 0.001	< 0.0005	1.74	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.7	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0022	< 0.001	< 0.005	< 0.01
K8	18-Feb-08	< 0.00025	0.009	< 0.001	0.026	< 0.05	< 0.001	< 0.001	21.2	< 0.0002	< 0.001	0.001	< 0.001	< 0.05	0.4	0.001	2.84	< 0.001	< 0.0005	2.3	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.1	< 0.001	0.13	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0024	0.003	< 0.005	< 0.01
K8	17-Mar-08	< 0.00025	< 0.005	< 0.001	0.029	< 0.05	< 0.001	< 0.001	22.5	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.6	0.001	3.67	< 0.001	< 0.0005	2.66	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.13	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0039	< 0.001	< 0.005	< 0.01
K8	14-Apr-08	< 0.00025	< 0.005	< 0.001	0.031	< 0.05	< 0.001	< 0.001	22.1	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.6	0.002	3.3	< 0.001	< 0.0005	2.5	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.6	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.004	< 0.001	< 0.005	< 0.01
K8	14-May-08	< 0.00025	0.035	< 0.001	0.027	< 0.05	< 0.001	< 0.001	19.4	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	1	0.002	2.7	< 0.001	< 0.0005	1.52	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.4	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0021	< 0.001	< 0.005	< 0.01
K8	16-Jun-08	< 0.00025	0.027	< 0.001	0.009	< 0.05	< 0.001	< 0.001	4.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.3	< 0.001	0.65	0.001	< 0.0005	1.04	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.1	< 0.001	0.026	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.006	< 0.01
K8	14-Jul-08	< 0.00025	0.024	< 0.001	0.012	< 0.05	< 0.001	< 0.001	6.98	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.3	0.002	0.89	< 0.001	< 0.0005	1.28	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4	< 0.001	0.04	< 0.001	< 0.0005	0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
K8	11-Aug-08	< 0.00025	< 0.005	< 0.001	0.02	< 0.05	< 0.001	< 0.001	12.5	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.3	< 0.001	1.73	< 0.001	< 0.0005	1.64	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.6	< 0.001	0.074	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0007	< 0.001	< 0.005	< 0.01
K8	15-Sep-08	< 0.00025	0.019	< 0.001	0.018	< 0.05	< 0.001	< 0.001	10.1	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.3	0.001	1.38	< 0.001	< 0.0005	1.55	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.2	< 0.001	0.074	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001	< 0.005	< 0.01
K8	15-Oct-08	< 0.00025	0.046	< 0.001	0.019	< 0.05	< 0.001	< 0.001	13.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.3	0.002	1.65	< 0.001	< 0.0005	1.41	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.4	< 0.001	0.081	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001	< 0.005	< 0.01
K8	03-Nov-08	< 0.00025	0.02	< 0.001	0.023	< 0.05	< 0.001	< 0.001	16.6	0.0003	< 0.001	< 0.001	< 0.001	< 0.05	0.5	< 0.001	2.33	0.003	< 0.0005	2.26	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.8	< 0.001	0.1	< 0.001	< 0.0005	< 0.001	< 0.0001	0.002	< 0.001	< 0.005	< 0.01
K8	01-Dec-08	< 0.00025	0.012	< 0.001	0.025	< 0.05	< 0.001	< 0.001	20.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.6	< 0.001	2.64	< 0.001	< 0.0005	1.95	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.1	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0025	< 0.001	< 0.005	< 0.01
K8	MEAN	0.00025	0.018	0.001	0.02175	0.05	0.001	0.001	15.64	0.0002	0.001	0.001	0.001	0.05	0.475	0.0013333	2.17	0.001167	0.0005	1.820833	0.001	0.001	0.15	0.001	0.001	4.3833333	0.001	0.09375	0.001	0.0005	0.001	0.0001	0.0019083	0.0011667	0.005083333	0.01
K8	MINIMUM	< 0.00025	< 0.005	< 0.001	0.009	< 0.05	< 0.001	< 0.001	4.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.3	< 0.001	0.65	< 0.001	< 0.0005	1.04	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.1	< 0.001	0.026	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
K8	MAXIMUM	< 0.00025	0.046	< 0.001	0.031	< 0.05	< 0.001	< 0.001	22.5	0.0003	< 0.001	< 0.001	< 0.001	< 0.05	1	0.002	3.67	0.003	< 0.0005	2.66	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.004	0.003	0.006	< 0.01
K8	N > DL	0	8	0	12	0	0	0	12	1	0	1	1	0	12	7	12	2	0	12	0	0	0	0	0	12	0	12	0	0	1	0	10	1	1	0
K8	Median	0.00025	0.0155	0.001	0.0225	0.05	0.001	0.001	17.25	0.0002	0.001	0.001	0.001	0.05	0.45	0.001	2.295	0.001	0.0005	1.69	0.001	0.001	0.15	0.001	0.001	4.5	0.001	0.105	0.001	0.0005	0.001	0.0001	0.00205	0.001	0.005	0.01
NE1	02-Jun-08	< 0.00025	< 0.005	< 0.001	0.01	< 0.05	< 0.001	< 0.001	37	< 0.0002	< 0.001	< 0.001	0.003	< 0.05	1.8	0.006	12.9	0.001	0.0041	2.92	0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.9	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.009	< 0.01
NE1	30-Sep-08	< 0.00025	0.044	< 0.001	0.015	< 0.05	< 0.001	< 0.001	66.6	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	2.6	0.011	24	< 0.001	0.0063	4.34	0.001	< 0.001	< 0.15	< 0.001	0.002	4.3	< 0.001	0.33	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001	0.007	< 0.01
NE2	02-Jun-08	< 0.00025	< 0.005	< 0.001	0.053	< 0.05	< 0.001	< 0.001	155	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	3.7	0.018	177	< 0.001	< 0.0005	8.17	0.001	< 0.001	< 0.15	< 0.001	0.002	5.1	< 0.001	0.73	< 0.001	< 0.0005	< 0.001	< 0.0001	0.01	< 0.001	< 0.005	< 0.01
NF1	02-Jun-08	< 0.00025	0.025	< 0.001	0.017	< 0.05	< 0.001	< 0.001	7.88	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.4	< 0.001	1.68	0.002	< 0.0005	0.96	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.3	< 0.001	0.033	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.005	< 0.01
NF1	30-Sep-08	< 0.00025	0.009	< 0.001	0.036	< 0.05	< 0.001	< 0.001	18.4	< 0.0002	< 0.001	< 0.001	< 0.001	0.14	0.6	0.002	4.54	0.006	< 0.0005	1.83	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.077	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0005	< 0.001	0.007	< 0.01
NF2	24-Jan-08	< 0.000005	0.0018	0.00026	0.0595	< 0.005	< 0.00001	0.000005	33.7	0.000012	0.00008	< 0.0001	0.00034	0.031	0.78	0.0058	7.18	0.0216	0.00067	2.51	0.00032	0.000053		0.00005	0.00035	4.4	0.00001	0.146			< 0.0005	< 0.000002	0.00205	< 0.0002	0.0089	< 0.0001
NF2	21-Feb-08	< 0.000005	0.003	0.00029	0.0791	< 0.005	< 0.00001	0.000005	46.6	0.000016	0.000117	< 0.0001	0.0003	0.039	1.12	0.0086	9.84	0.0366	0.00085	3.6	0.00043	0.000061		0.00006	0.00044	5.98	0.00001	0.195			< 0.0005	0.000002	0.0029	< 0.0002	0.0106	0.0003
NF2	11-Mar-08	< 0.000005	0.0022	0.00039	0.0767	< 0.005	< 0.00001	0.000005	44.9	0.000017	0.000094	< 0.0001	0.00036	0.08	1.1	0.0084	9.53	0.0379	0.00091	3.52	0.00044	0.000096		0.00006	0.00046	5.89	0.00001	0.191			< 0.0005	< 0.000002	0.00282	< 0.0002	0.0147	< 0.0001
NF2	29-Apr-08	< 0.000005	0.0521	0.00048	0.0724	< 0.05	< 0.00001	0.000005	44.6	0.000164	0.000324	0.0002	0.00256	0.115	1.3	0.0084	8.67	0.0483	0.00096	3.15	0.00094	0.000792		0.00008	0.00041	6.02	0.00001	0.183			0.0017	0.000003	0.00262	0.0004	0.124	< 0.0001
NF2	22-May-08	0.000007	0.121	0.00062	0.0278	< 0.05	0.00004	0.000006	10.8	0.000038	0.000089	0.0002	0.00234	0.237	1.19	0.0014	1.93	0.00803	0.00024	0.84	0.00116	0.00293		0.00008	0.0001	2.5	0.00001	0.0461			0.0018	0.000006	0.000315	< 0.0002	0.0139	0.0002
NF2	02-Jun-08	< 0.00025	0.028	< 0.001	0.018	< 0.05	< 0.001	< 0.001	7.88	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.4	< 0.001	1.63	0.004	< 0.0005	0.94	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.3	< 0.001	0.033	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
NF2	25-Jun-08	< 0.000005	0.0627	0.00051	0.0269	< 0.05	0.00002	0.000005	12.2	0.000012	0.000055	0.0002	0.00128	0.108	0.44	0.0017	2.52	0.005	0.00028	1.14	0.00065	0.000629		0.00009	0.0001	3.83	0.00001	0.0527			0.0012	0.000004	0.000407	< 0.0002	0.0056	0.0002
NF2	29-Jul-08	< 0.000005	0.021	0.00049	0.0413	< 0.05	< 0.00001	0.000005	22.1	0.00002	0.000039	0.0001	0.0009	0.096	0.49	0.0026	4.83	0.0105	0.00045	2.71	0.0005	0.00039		0.00009	0.00028	4.91	0.00001	0.0893			0.0006	0.000003	0.000861	< 0.0002	0.0075	< 0.0001
NF2	17-Sep-08	0.000009	0.026	0.00046	0.0387	< 0.05	0.00001	0.000005	20.6	0.000023	0.000039	0.0001	0.00082	0.078	0.51	0.0024	4.16	0.00703	0.00039	1.66	0.00048	0.000413		0.00008	0.00025	5.03	0.00001	0.0855			0.0006	0.000002	0.000857	< 0.0002	0.0071	0.0001

Appendix 3
2008 Surface Water Quality Data
Rose Creek Drainage

Table 3. Surface Water Dissolved Metals

Station	Date	AG-D mg/L	AL-D mg/L	AS-D mg/L	BA-D mg/L	B-D mg/L	BE-D mg/L	BI-D mg/L	CA-D mg/L	CD-D mg/L	CO-D mg/L	CR-D mg/L	CU-D mg/L	FE-D mg/L	K-D mg/L	LI-D mg/L	MG-D mg/L	MN-D mg/L	MO-D mg/L	NA-D mg/L	NI-D mg/L	PB-D mg/L	P-D mg/L	SB-D mg/L	SE-D mg/L	SI-D mg/L	SN-D mg/L	SR-D mg/L	TE-D mg/L	TH-D mg/L	TI-D mg/L	TL-D mg/L	U-D mg/L	V-D mg/L	ZN-D mg/L	ZR-D mg/L
NF2	30-Sep-08	< 0.00025	0.011	< 0.001	0.036	< 0.05	< 0.001	< 0.001	19.5	< 0.0002	< 0.001	< 0.001	< 0.001	0.06	0.5	0.002	4.8	0.008	< 0.0005	1.95	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.2	< 0.001	0.083	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0007	< 0.001	0.009	< 0.01
NF2	07-Oct-08	< 0.000005	0.0347	0.00046	0.0456	< 0.05	0.00001	0.000005	24.7	0.00003	0.000094	0.0002	0.0009	0.131	0.6	0.0034	5.13	0.0372	0.00045	1.98	0.00055	0.000471		0.00008	0.00032	5.39	0.00001	0.104			< 0.0005	0.000002	0.00119	< 0.0002	0.0114	< 0.0001
NF2	11-Dec-08	< 0.000005	0.017	0.00037	0.0645	< 0.05	< 0.00001	0.000005	37.5	0.00003	0.000134	0.0002	0.00104	0.075	0.89	0.0058	7.67	0.0371	0.00072	2.65	0.00051	0.000285		0.00008	0.00044	5.71	0.00004	0.154			0.0009	0.000003	0.00208	< 0.0002	0.0146	< 0.0001
NF2	MEAN	4.63333E-05	0.0317083	0.0005275	0.048875	0.03875	0.0001783	0.000171	27.09	0.0000635	0.0002554	0.0002917	0.00107	0.09167	0.7766667	0.0042917	5.6575	0.021772	0.0005767	2.220833	0.000665	0.0006767	0.15	0.0002292	0.000429	4.8466667	0.00018	0.11355	0.001	0.0005	0.0009	1.908E-05	0.0014417	0.00035	0.019358333	0.001783333
NF2	MINIMUM	< 0.000005	0.0018	0.00026	0.018	< 0.005	< 0.00001	0.000005	7.88	0.000012	0.000039	< 0.0001	0.0003	0.031	0.4	< 0.001	1.63	0.004	0.00024	0.84	0.00032	0.000053	< 0.15	0.00005	0.0001	2.5	0.00001	0.033	< 0.001	< 0.0005	< 0.0005	< 0.000002	0.000315	< 0.0002	< 0.005	< 0.0001
NF2	MAXIMUM	< 0.00025	0.121	< 0.001	0.0791	< 0.05	< 0.001	< 0.001	46.6	< 0.0002	< 0.001	< 0.001	0.00256	0.237	1.3	0.0086	9.84	0.0483	0.00096	3.6	0.00116	0.00293	< 0.15	< 0.001	< 0.001	6.02	< 0.001	0.195	< 0.001	< 0.0005	0.0018	< 0.0001	0.0029	< 0.001	0.124	< 0.01
NF2	N > DL	2	12	10	12	0	4	1	12	10	10	7	10	11	12	11	12	12	10	12	10	10	0	10	10	12	2	12	0	0	6	8	11	1	11	4
NF2	Median	0.000005	0.0235	0.00047	0.04345	0.05	0.00001	0.000005	23.4	0.0000265	0.000094	0.0002	0.00095	0.079	0.69	0.003	4.98	0.01605	0.0005	2.245	0.00053	0.000442	0029802	0.00008	0.00038	5.115	0.00001	0.09665	0237487	1187436	0.00075	0.000003	0.0010255	0.0002	0.0098	0.0001
R1	23-Jan-08	< 0.000005	0.0074	0.00041	0.108	< 0.005	< 0.00001	0.000005	73.3	0.000029	0.00017	0.0001	0.00118	0.118	2.05	0.0035	11.1	0.198	0.00045	4.74	0.00077	0.000286		0.00011	0.00027	7.67	0.00006	0.361			< 0.0005	0.000003	0.004	< 0.0002	0.0057	< 0.0001
R1	21-Feb-08	< 0.000005	0.0019	0.00035	0.0842	< 0.005	< 0.00001	0.000005	48	0.000008	0.000093	< 0.0001	0.00028	0.141	1.52	0.0026	7.45	0.125	0.00032	3.4	0.00046	0.000019		0.00004	0.00016	5.44	0.00001	0.261			< 0.0005	< 0.000002	0.00319	< 0.0002	0.0013	< 0.0001
R1	03-Mar-08	< 0.00025	< 0.005	< 0.001	0.066	< 0.05	< 0.001	< 0.001	43.3	< 0.0002	< 0.001	< 0.001	< 0.001	0.08	1.6	0.002	8.23	0.098	< 0.0005	3.62	< 0.001	< 0.001	< 0.15	< 0.001	0.002	3.4	< 0.001	0.26	< 0.001	< 0.0005	< 0.001	< 0.0001	0.002	< 0.001	< 0.005	< 0.01
R1	11-Mar-08	< 0.000005	0.0025	0.00036	0.0755	0.011	< 0.00001	0.000005	46.9	0.000018	0.000119	< 0.0001	0.00072	0.111	1.86	0.0026	7.38	0.122	0.00029	4.8	0.00634	0.000098		0.00005	0.00014	5	0.00008	0.238			< 0.0005	< 0.000002	0.00248	< 0.0002	0.0163	< 0.0001
R1	29-Apr-08	< 0.000005	0.0165	0.00052	0.0584	< 0.05	< 0.00001	0.000005	37	0.000027	0.000206	< 0.0001	0.00085	0.424	2.25	0.002	5.12	0.141	0.00031	2.25	0.00081	0.000468		0.00005	0.00013	4.2	0.00001	0.175			0.0015	0.000003	0.00167	0.0003	0.0083	< 0.0001
R1	22-May-08	< 0.000005	0.0443	0.00042	0.0278	< 0.05	0.00002	0.000005	14.7	0.000019	0.000074	< 0.0001	0.00143	0.228	1.17	0.0009	3.14	0.0188	0.00023	0.89	0.00089	0.000397		0.00006	0.0001	2.34	0.00001	0.074			0.0011	< 0.000002	0.000672	0.0002	0.0023	0.0001
R1	24-Jun-08	0.000005	0.047	0.00042	0.0203	< 0.05	0.00002	0.000008	9.55	0.000335	0.00009	0.0002	0.00142	0.159	0.74	0.0013	1.78	0.0245	0.0002	1.25	0.00117	0.000571		0.00007	< 0.00004	2.92	0.00002	0.0517			0.0014	0.000003	0.000413	0.0002	0.0104	0.0001
R1	22-Jul-08	< 0.000005	0.0238	0.00053	0.0346	< 0.05	< 0.00001	0.000005	20.1	0.000021	0.000047	0.0002	0.00106	0.059	0.44	0.002	4.4	0.0132	0.00036	1.57	0.00066	0.000306		0.00008	0.00026	4.79	0.00001	0.0765			0.0012	0.000003	0.000684	0.0007	0.019	0.0001
R1	29-Jul-08	< 0.000005	0.0172	0.00034	0.0389	< 0.05	< 0.00001	0.000011	25.3	0.000008	0.000054	0.0002	0.00077	0.152	0.7	0.0016	4.78	0.0283	0.00024	2.69	0.00038	0.000277		0.00005	0.00011	4.17	0.00001	0.126			< 0.0005	0.000003	0.00127	< 0.0002	0.0025	< 0.0001
R1	19-Aug-08	< 0.00025	< 0.005	< 0.001	0.033	< 0.05	< 0.001	< 0.001	22.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.6	0.002	4.53	0.027	< 0.0005	1.81	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.7	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001	0.005	< 0.01
R1	25-Aug-08	< 0.000005	0.0378	0.00058	0.0278	< 0.05	0.00001	0.000005	15.1	0.000024	0.000055	0.0001	0.0015	0.127	0.75	0.0018	3.31	0.0111	0.00028	1.9	0.00096	0.000647		0.0001	0.00018	4.5	0.00001	0.0642			< 0.0005	0.000002	0.000452	< 0.0002	0.0254	0.0002
R1	17-Sep-08	0.000007	0.0158	0.00032	0.0395	< 0.05	0.00001	0.000005	26.8	0.000008	0.00005	< 0.0001	0.00062	0.125	0.76	0.0016	5.33	0.0251	0.00021	1.79	0.00038	0.00023		0.00004	0.00016	4.17	0.00001	0.134			< 0.0005	< 0.000002	0.00136	< 0.0002	0.0013	0.0001
R1	08-Oct-08	< 0.000005	0.017	0.00032	0.0432	< 0.05	< 0.00001	0.000005	30	0.000023	0.000056	0.0002	0.00089	0.159	0.82	0.0018	6.13	0.035	0.00023	1.97	0.00039	0.00042		0.00005	0.00019	4.16	0.00003	0.149			< 0.0005	< 0.000002	0.00173	< 0.0002	0.0025	< 0.0001
R1	10-Dec-08	< 0.000005	0.0153	0.00034	0.0605	< 0.05	< 0.00001	0.000005	41.5	0.000015	0.000083	0.0003	0.00144	0.189	1.19	0.0022	6.91	0.0793	0.00027	2.55	0.00045	0.000126		0.00012	0.00022	4.75	0.00001	0.206			0.001	0.000002	0.00221	< 0.0002	0.004	< 0.0001
R1	MEAN	4.01429E-05	0.0183214	0.0004936	0.0512643	0.040786	0.0001529	0.000148	32.439286	6.679E-05	0.0002212	0.0002714	0.001011	0.15157	1.175	0.0019929	5.685	0.067593	0.0003136	2.516429	0.0011186	0.0004175	0.15	0.0002014	0.000354	4.3721429	0.00016	0.16331	0.001	0.0005	0.0008357	1.636E-05	0.0016451	0.0003571	0.007785714	0.001521429
R1	MINIMUM	< 0.000005	0.0019	0.00032	0.0203	< 0.005	< 0.00001	0.000005	9.55	0.000008	0.000047	< 0.0001	0.00028	< 0.05	0.44	0.0009	1.78	0.0111	0.0002	0.89	0.00038	0.000019	< 0.15	0.00004	< 0.00004	2.34	0.00001	0.0517	< 0.001	< 0.0005	< 0.0005	< 0.000002	0.000413	< 0.0002	0.0013	< 0.0001
R1	MAXIMUM	< 0.00025	0.047	< 0.001	0.108	< 0.05	< 0.001	< 0.001	73.3	0.000335	< 0.001	< 0.001	0.0015	0.424	2.25	0.0035	11.1	0.198	< 0.0005	4.8	0.00634	< 0.001	< 0.15	< 0.001	0.002	7.67	< 0.001	0.361	< 0.001	< 0.0005	0.0015	< 0.0001	0.004	< 0.001	0.0254	< 0.01
R1	N > DL	2	12	12	14	1	4	3	14	12	12	7	12	13	14	14	14	14	12	14	12	12	0	12	12	14	6	14	0	0	5	7	14	4	13	5
R1	Median	0.000005	0.01615	0.000415	0.04135	0.05	0.00001	0.000005	28.4	0.000022	0.0000865	0.00015	0.001	0.134	0.995	0.002	5.225	0.03165	0.000285	2.11	0.00079	0.0003515	0029802	0.000065	0.00017	4.185	0.00001	0.1415	0237487	1187436	0.00075	0.0000025	0.001515	0.0002	0.005	0.0001
R2	03-Mar-08	< 0.00025	< 0.005	< 0.001	0.066	< 0.05	< 0.001	< 0.001	120	< 0.0002	0.002	< 0.001	< 0.001	< 0.05	2.4	0.008	30	3.3	0.001	12.7	0.006	< 0.001	< 0.15	< 0.001	0.003	4.4	< 0.001	0.41	< 0.001	< 0.0005	< 0.001	< 0.0001	0.003	< 0.001	0.031	< 0.01
R2	21-Jul-08	< 0.000005	0.0206	0.0005	0.0375	< 0.05	0.00001	0.000005	35.7	0.000024	0.000505	0.0002	0.00114	0.102	0.83	0.0031	7.61	0.424	0.0004	2.62	0.00172	0.000315		0.0001	0.00024	4.12	0.00001	0.125			0.002	0.000016	0.000993	0.0008	0.0172	0.0001
R2	19-Aug-08	< 0.00025	< 0.005	< 0.001	0.038	< 0.05	< 0.001	< 0.001	41.8	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1	0.004	9.08	0.73	0.0005	3.39	0.003	< 0.001	< 0.15	< 0.001	< 0.001	4.2	< 0.001	0.15	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001	0.016	< 0.01
R2	20-Aug-08	< 0.000005	0.0148	0.00046	0.0502	< 0.05	< 0.00001	0.000005	49.3	0.00004	0.00077	0.0002	0.00109	0.183		0.0053	10.3	0.699	0.00056	3.71	0.00209	0.000638		0.00011	0.00026	4.5	0.00002	0.193			< 0.0005	0.000027	0.00142	< 0.0002	0.0315	< 0.0001
R2	25-Aug-08	< 0.000005	0.0353	0.00048	0.0343	< 0.05	0.00001	0.000005	23.1	0.000021	0.000248	0.0001	0.00153	0.121	0.61	0.002	5.55	0.166	0.00038	2.01	0.00132	0.000333		0.0001	0.00021	4.17	0.00001	0.0912			< 0.0005	0.000007	0.000629	< 0.0002	0.0136	0.0002
R2	MEAN	0.000103	0.01614	0.000688	0.0452	0.05	0.000406	0.000403	53.98	0.000097	0.0009046	0.0005	0.001152	0.1012	1.21	0.00448	12.508	1.0638	0.000568	4.886	0.002826	0.0006572	0.15	0.000462	0.000942	4.278	0.00041	0.19384	0.001	0.0005	0.001	0.00005	0.0014084	0.00064	0.02186	0.00408
R2	MINIMUM	< 0.000005	< 0.005	0.00046	0.0343	< 0.05	< 0.00001	0.000005	23.1	0.000021	0.000248	0.0001	< 0.001	< 0.05	0.61	0.002	5.55	0.166	0.00038	2.01	0.00132	0.000315	< 0.15	0.0001	0.00021	4.12	0.00001	0.0912	< 0.001	< 0.0005	< 0.0005	0.000007	0.000629	< 0.0002	0.0136	< 0.0001
R2	MAXIMUM	< 0.00025	0.0353	< 0.001	0.066	< 0.05	< 0.001	< 0.001	120	< 0.0002	0.002	< 0.001	0.00153	0.183	2.4	0.008	30	3.3	0.001	12.7	0.006	< 0.001	< 0.15	< 0.001	0.003	4.5	< 0.001	0.41	< 0.001	< 0.0005	0.002	< 0.0001	0.003	< 0.001	0.0315	< 0.01
R2	N > DL	0	3	3	5	0	2	0	5	3	4	3	3	3	4	5	5	5	5	5	5	3	0	3	4	5	1	5	0	0	1	3	5	1	5	2
R2	Median	0.000005	0.0148	0.0005	0.038	0.05	0.00001	0.000005	41.8	0.00004	0.00077	0.0002	0.00109	0.102	0.915	0.004	9.08	0.699	0.0005	3.39	0.00209	0.000638	0.15	0.00011	0.00026	4.2	0.00002	0.15	0.001	0.0005	0.001	0.000027	0.001	0.0008	0.0172	0.0002
R3	23-Jan-08	< 0.000005	0.0064	0.00022	0.0818	< 0.005	< 0.00001	0.000005	77.9	0.000024	0.000031	0.0003	0.00099	0.016	1.52	0.0041	15.2	0.00321	0.00048	5	0.00048	0.000352		0.00024	0.00083	4.84	0.00004	0.254			< 0.0005	< 0.000002	0.00292	< 0.0002	0.0084	< 0.0001
R3	20-Feb-08	< 0.000005	0.0015	0.00016	0.0828	< 0.005	< 0.00001	0.000005	95.3	0.000009	0.000058	0.0001	0.00029	0.008	1.86	0.0058	19.9	0.0543	0.00039	7.44	0.00138	0.000008		0.00006	0.00057	5.61	0.00001	0.305			< 0.0005	0.000003	0.00301	< 0.0002	0.0074	< 0.0001
R3	04-Mar-08	< 0.00025	< 0.005	< 0.001	0.067	< 0.05	< 0.001	< 0.001	92.1	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	2	0.006	24.5	0.62	0.0005	9.69	0.003	< 0.001	< 0.15	< 0.001	0.003	4.9	< 0.001	0.34	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0024	< 0.001	0.012	< 0.01
R3	13-Mar-08	< 0.000005	0.002	0.00017	0.0777	< 0.005	< 0.00001	0.000005	95.2	0.000023	0.000082	0.0001	0.00065	0.009	1.93	0.0057	19.9	0.0803	0.00043	7.48	0.00168	0.000162		0.00006	0.00055	5.15	0.00002	0.298			< 0.0005	< 0.000002	0.00287	< 0.0002	0.0129	< 0.0001
R3	28-Apr-08	< 0.000005	0.0024	0.00028	0.0648	< 0.05	< 0.00001	0.000005	154	0.000066	0.00278	0.0001	0.00051	0.023	2.92	0.0083	30	3.22	0.00058	12.3	0.00879	0.000152		0.00009	0.00038	5.76	0.00001	0.46			0.0012	0.000027	0.0032	0.0003	0.0642	< 0.0001
R3	21-May-08	0.000008	0.0802	0.00049	0.0323	< 0.05	0.00002	0.000005	22.2	0.000036	0.00024	0.0003	0.00239	0.201	1.32	0.002	4.62	0.177	0.00027	1.7	0.00184	0.00101		0.0001	0.00014	2.43	0.00001	0.0822			0.0019	0.000013	0.00051	< 0.0002	0.0234	0.0002
R3	24-Jun-08	0.000008	0.16	0.00061	0.0303	< 0.05	0.00002	0.000009	17.9	0.000056	0.000454	0.0003	0.00183	0.327	0.73	0.0019	3.95	0.305	0.0003	1.77	0.00174	0.00143		0.00011	0.00019	3.83	0.00001	0.0692			0.0058	0.000011	0.00056	0.0003	0.0152	0.0002
R3	22-Jul-08	< 0.000005	0.0199	0.00045	0.0366	< 0.05	0.00001	0.000005	35.1	0.000019	0.000344	0.0002	0.0011	0.086	0.84	0.003	7.15	0.298	0.00038	2.53	0.00144	0.000223		0.00011	0.00025	4.54	0.00001	0.122			0.0018	0.000012	0.000934	0.0007	0.0139	< 0.0001
R3	29-Jul-08	< 0.000005	0.0143	0.00031	0.049	< 0.05	< 0.00001	0.000005	41.1	0.000024	0.000401	0.0001	0.00087	0.104	0.97	0.0036	8.59	0.397	0.00047	3.66	0.00147	0.000187		0.00009	0.00033	4.69	0.00001	0.153			< 0.0005	0.000013	0.00115	< 0.0002	0.0151	< 0.0001
R3	19-Aug-08	< 0.00025	0.005	< 0.001	0.044	< 0.05	< 0.001	< 0.001	39.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1	0.004	8.85	0.38	< 0.0005	3.06	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4.3	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001	0.009	< 0.01
R3	04-Sep-08	< 0.000005	0.015	0.00032	0.0407	< 0.05	< 0.00001	0.000005	43.9	0.000021	0.00049	< 0.0001	0.00076	0.094	1.03	0.0038	8.77	0.44	0.00046	2.97	0.00148	0.000138		0.00009	0.00026	4.89	0.00001	0.16			0.0006	0.000019	0.00116	< 0.0002	0.0166	< 0.0001
R3	17-Sep-08	0.000005	0.0199	0.00033	0.0491	< 0.05	< 0.00001	0.000005	41.8	0.000016	0.000353	0.0001	0.00075	0.097	1.04	0.0036	8.72	0.296	0.00046	2.87	0.00125	0.000268		0.0001	0.00037	4.91	0.00002	0.153			0.0007	0.000018	0.00107	< 0.0002	0.0164	< 0.0001
R3	08-Oct-08	< 0.000005	0.0166	0.0003	0.0523	< 0.05	< 0.00001	0.000005	44.3	0.000023	0.000477	0.0002	0.00095	0.124	1	0.0033	9.45	0.415	0.00049	3.08	0.00143	0.000253		0.00008	0.0004	4.53	0.00002	0.163			< 0.0005	0.000013	0.00137	< 0.0002	0.0238	< 0.0001
R3	10-Dec-08	< 0.000005	0.0148	0.00022	0.0596	< 0.05	< 0.00001	0.000005	58.4	0.000024	0.000142	0.0002	0.00072	0.032	1.32	0.0041	12.4	0.212	0.00051	3.83	0.00086	0.000095		0.00013	0.00055	5.23	0.00002	0.2			0.0008	0.000003	0.0021	< 0.0002	0.0226	< 0.0001
R3	MEAN	4.04286E-05	0.0259286	0.0004186	0.0548571	0.040357	0.0001529	0.000147	61.328571	5.293E-05	0.0005609	0.0002929	0.000986	0.08721	1.3914286	0.0042286	13	0.492701	0.0004443	4.812857	0.00206	0.0004484	0.15	0.0002329	0.00063	4.6864286	0.00016	0.2071	0.001	0.0005	0.0012357	0.000024	0.0017324	0.0003643	0.018635714	0.001528571
R3	MINIMUM	< 0.000005	0.0015	0.00016	0.0303	< 0.005	< 0.00001	0.000005	17.9	0.000009	0.000031	< 0.0001	0.00029	0.008	0.73	0.0019	3.95	0.00321	0.00027	1.7	0.00048	0.000008	< 0.15	0.00006	0.00014	2.43	0.00001	0.0692	< 0.001	< 0.0005	< 0.0005	< 0.000002	0.00051	< 0.0002	0.0074	< 0.0001
R3	MAXIMUM	< 0.00025	0.16	< 0.001	0.0828	< 0.05	< 0.001	< 0.001	154	< 0.0002	0.00278	< 0.001	0.00239	0.327	2.92	0.0083	30	3.22	0.00058	12.3	0.00879	0.00143	< 0.15	< 0.001	0.003	5.76	< 0.001	0.46	< 0.001	< 0.0005	0.0058	< 0.0001	0.0032	< 0.001	0.0642	< 0.01
R3	N > DL	3	13	12	14	0	3	1	14	12	12	11	12	12	14	14	14	14	13	14	14	12	0	12	13	14	6	14	0	0	7	10	14	3	14	2
R3	Median	0.000005	0.01455	0.000315	0.0507	0.05	0.00001	0.000005	44.1	0.000024	0.000377	0.0002	0.00091	0.068	1.18	0.0039	9.15	0.3015	0.000465	3.37	0.001475	0.000238	0029802	0.0001	0.00039	4.865	0.000015	0.1615	0237487	1187436	0.00075	0.000013	0.001265	0.0002	0.01515	0.0001
R4	23-Jan-08	< 0.000005	0.0012	0.0002	0.0833	< 0.005	< 0.00001	0.000005	75.9	0.000009	0.000027	0.0001	0.00041	0.008	1.56	0.0041	14.7	0.0172	0.00058	5.03	0.00068	0.000026		0.00012	0.00064	4.98	0.00001	0.24			< 0.0005	0.000003	0.00247	< 0.0002	0.0047	< 0.0001
R4	20-Feb-08	< 0.000005	0.0024	0.00021	0.0981	< 0.005	< 0.00001	0.000005	83.8	0.000006	0.000027	0.0001	0.0004	0.006	1.78	0.0043	16.9	0.0167	0.0006	6.07	0.00059	0.000017		0.00013	0.00076	5.6	0.00001	0.27			< 0.0005	0.000002	0.0029	< 0.0002	0.0034	< 0.0001
R4	04-Mar-08	< 0.00025	< 0.005	< 0.001	0.09	< 0.05	< 0.001	< 0.001	75.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1.7	0.004	18.8	0.014	0.0005	6.55	< 0.001	< 0.001	< 0.15	< 0.001	0.003	3.4	< 0.001	0.29	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0023	< 0.001	< 0.005	< 0.01
R4	13-Mar-08	< 0.000005	0.0017	0.00022	0.0945	< 0.005	< 0.00001	0.000005	85.3	0.000025	0.000032	0.0002	0.0006	0.008	1.84	0.0044	17.3	0.0153	0.00061	6.29	0.00078	0.000097		0.00013	0.00068	5	0.00001	0.269			< 0.0005	< 0.000002	0.0028	< 0.0002	0.0073	< 0.0001
R4	28-Apr-08	< 0.000005	0.0014	0.00028	0.0866	< 0.05	< 0.00001	0.000005	130	0.000052	0.000679	0.0001	0.0005	0.022	2.64	0.0065	25.7	1.12	0.00061	10.3	0.00467	0.000119		0.0001	0.0005	5.75	0.00001	0.383			0.001	0.000011	0.00309	0.0003	0.035	< 0.0001
R4	21-May-08	< 0.000005	0.0791	0.00049	0.0333	< 0.05	0.00002	0.000005	22	0.000046	0.000197	0.0002	0.00272	0.193	1.34	0.0019	4.74	0.141	0.00029	1.67	0.00212	0.000976		0.00011	0.00016	2.6	0.00002	0.0785			0.003	0.000012	0.000495	< 0.0002	0.0209	0.0002
R4	24-Jun-08	0.000007	0.0656	0.00051	0.0305	< 0.05	0.00001	0.000005	18	0.00038	0.000242	0.0002	0.00259	0.15	0.79	0.0016	3.95	0.194	0.00027	1.77	0.00181	0.000981		0.00014	0.00023	3.79	0.00004	0.0694			0.0019	0.00001	0.000488	< 0.0002	0.0165	0.0002
R4	22-Jul-08	0.000005	0.0169	0.00043	0.0479	< 0.05	< 0.00001	0.000005	32.6	0.000021	0.000168	0.0002	0.0011	0.063	0.81	0.0026	6.69	0.176	0.00045	2.18	0.00121	0.000163		0.0001	0.00036	4.31	0.00001	0.113			0.0018	0.000009	0.000884	0.0006	0.0098	< 0.0001
R4	29-Jul-08	< 0.000005	0.016	0.00033	0.053	< 0.05	< 0.00001	0.000005	40.8	0.000027	0.00027	0.0004	0.00102	0.102	0.99	0.0034	8.36	0.297	0.00056	3.64	0.00162	0.000268		0.00013	0.00041	4.93	0.00001	0.149			< 0.0005	0.000012	0.00111	< 0.0002	0.013	< 0.0001
R4	19-Aug-08	< 0.00025	0.007	< 0.001	0.042	< 0.05	< 0.001	< 0.001	36.9	< 0.0002	< 0.001	< 0.001	0.001	0.12	1	0.003	8.82	0.3	0.0006	3.07	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4.7	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001	0.011	< 0.01
R4	04-Sep-08	< 0.000005	0.0163	0.00032	0.0533	< 0.05	< 0.00001	0.000005	43	0.000025	0.000277	< 0.0001	0.00102	0.071	1.06	0.0034	8.82	0.277	0.00051	2.77	0.00141	0.000127		0.00011	0.00038	4.7	0.00007	0.15			0.0006	0.000012	0.00109	< 0.0002	0.0141	< 0.0001
R4	17-Sep-08	< 0.000005	0.0197	0.00034	0.0539	< 0.05	< 0.00001	0.000005	40.1	0.000016	0.000261	0.0002	0.00084	0.092	1.06	0.0034	8.2	0.236	0.00053	2.77	0.00135	0.000275		0.00011	0.0004	4.63	0.00002	0.146			0.0006	0.000016	0.00102	< 0.0002	0.0138	< 0.0001
R4	08-Oct-08	< 0.000005	0.0304	0.00033	0.0573	< 0.05	< 0.00001	0.000005	43.5	0.000034	0.000369	0.0002	0.00088	0.115	1.04	0.0031	9.12	0.341	0.00055	2.8	0.00157	0.00027		0.00009	0.0005	4.86	0.00001	0.154			< 0.0005	0.000012	0.00127	< 0.0002	0.0199	< 0.0001
R4	10-Dec-08	< 0.000005	0.0167	0.00022	0.0696	< 0.05	< 0.00001	0.000005	56.8	0.000018	0.000063	0.0002	0.00084	0.04	1.38	0.0038	12	0.102	0.00062	3.64	0.00097	0.000208		0.00011	0.00064	5.19	0.00002	0.19			0.0009	0.000004	0.00196	< 0.0002	0.0183	< 0.0001
R4	MEAN	4.01429E-05	0.0199571	0.00042	0.0638071	0.040357	0.0001521	0.000147	56.042857	7.564E-05	0.0003294	0.0003	0.001066	0.07429	1.3564286	0.0035357	11.721429	0.231943	0.00052	4.182143	0.0015557	0.0003948	0.15	0.0002414	0.00069	4.6028571	0.00016	0.18871	0.001	0.0005	0.0010214	2.179E-05	0.0016269	0.00035	0.013764286	0.001528571
R4	MINIMUM	< 0.000005	0.0012	0.0002	0.0305	< 0.005	< 0.00001	0.000005	18	0.000006	0.000027	< 0.0001	0.0004	0.006	0.79	0.0016	3.95	0.014	0.00027	1.67	0.00059	0.000017	< 0.15	0.00009	0.00016	2.6	0.00001	0.0694	< 0.001	< 0.0005	< 0.0005	< 0.000002	0.000488	< 0.0002	0.0034	< 0.0001
R4	MAXIMUM	< 0.00025	0.0791	< 0.001	0.0981	< 0.05	< 0.001	< 0.001	130	0.00038	< 0.001	< 0.001	0.00272	0.193	2.64	0.0065	25.7	1.12	0.00062	10.3	0.00467	< 0.001	< 0.15	< 0.001	0.003	5.75	< 0.001	0.383	< 0.001	< 0.0005	0.003	< 0.0001	0.00309	< 0.001	0.035	< 0.01
R4	N > DL	2	13	12	14	0	2	0	14	12	12	11	13	13	14	14	14	14	14	14	13	12	0	12	13	14	6	14	0	0	7	11	14	2	13	2
R4	Median	0.000005	0.01615	0.00033	0.0556	0.05	0.00001	0.000005	43.25	0.000026	0.0002515	0.0002	0.00094	0.067	1.2	0.0034	8.97	0.185	0.000555	3.355	0.00138	0.000238	0029802	0.000115	0.0005	4.78	0.000015	0.152	0237487	1187436	0.00075	0.0000115	0.00119	0.0002	0.0134	0.0001
R5	04-Mar-08	< 0.00025	< 0.005	< 0.001	0.088	< 0.05	< 0.001	< 0.001	45.1	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1.3	0.002	12.1	0.003	0.0013	2.44	< 0.001	< 0.001	< 0.15	< 0.001	0.003	3.3	< 0.001	0.15	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0019	< 0.001	< 0.005	< 0.01
R5	22-Jul-08	< 0.000005	0.0216	0.00043	0.0516	< 0.05	< 0.00001	0.000005	34.6	0.000014	0.000045	0.0002	0.00096	0.053	0.83	0.0014	9.02	0.0208	0.00081	1.51	0.00066	0.000066		0.00011	0.00066	4.18	0.00001	0.0919			0.0015	0.000003	0.0012	0.0005	0.0016	< 0.0001
R5	19-Aug-08	< 0.00025	0.008	< 0.001	0.048	< 0.05	< 0.001	< 0.001	35	< 0.0002	< 0.001	< 0.001	0.001	0.09	1	0.002	10.4	0.024	0.0011	1.99	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.5	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0013	< 0.001	0.006	< 0.01
R5	04-Sep-08	< 0.000005	0.0133	0.00037	0.054	< 0.05	< 0.00001	0.000005	39.3	0.000014	0.000056	< 0.0001	0.00075	0.067	0.98	0.0017	10.1	0.0342	0.00088	1.72	0.0005	0.000019		0.00011	0.0006	4.58	0.00001	0.106			0.0006	0.000003	0.0014	< 0.0002	0.0018	< 0.0001
R5	MEAN	0.0001275	0.011975	0.0007	0.0604	0.05	0.000505	0.000503	38.5	0.000107	0.0005253	0.000575	0.000928	0.065	1.0275	0.001775	10.405	0.0205	0.0010225	1.915	0.00079	0.0005213	0.15	0.000555	0.001315	4.14	0.00051	0.11448	0.001	0.0005	0.001025	0.0000515	0.00145	0.000675	0.0036	0.00505

AECOM

Appendix 3
2008 Surface Water Quality Data
Rose Creek Drainage

Table 3. Surface Water Dissolved Metals

Station	Date	AG-D mg/L	AL-D mg/L	AS-D mg/L	BA-D mg/L	B-D mg/L	BE-D mg/L	BI-D mg/L	CA-D mg/L	CD-D mg/L	CO-D mg/L	CR-D mg/L	CU-D mg/L	FE-D mg/L	K-D mg/L	LI-D mg/L	MG-D mg/L	MN-D mg/L	MO-D mg/L	NA-D mg/L	NI-D mg/L	PB-D mg/L	P-D mg/L	SB-D mg/L	SE-D mg/L	SI-D mg/L	SN-D mg/L	SR-D mg/L	TE-D mg/L	TH-D mg/L	TI-D mg/L	TL-D mg/L	U-D mg/L	V-D mg/L	ZN-D mg/L	ZR-D mg/L
R5	MINIMUM	< 0.000005	< 0.005	0.00037	0.048	< 0.05	< 0.00001	0.000005	34.6	0.000014	0.000045	< 0.0001	0.00075	< 0.05	0.83	0.0014	9.02	0.003	0.00081	1.51	0.0005	0.000019	< 0.15	0.00011	0.0006	3.3	0.00001	0.0919	< 0.001	< 0.0005	0.0006	0.000003	0.0012	< 0.0002	0.0016	< 0.0001
R5	MAXIMUM	< 0.00025	0.0216	< 0.001	0.088	< 0.05	< 0.001	< 0.001	45.1	< 0.0002	< 0.001	< 0.001	< 0.001	0.09	1.3	0.002	12.1	0.0342	0.0013	2.44	< 0.001	< 0.001	< 0.15	< 0.001	0.003	4.58	< 0.001	0.15	< 0.001	< 0.0005	0.0015	< 0.0001	0.0019	< 0.001	0.006	< 0.01
R5	N > DL	0	3	2	4	0	0	0	4	2	2	1	3	3	4	4	4	4	4	4	2	2	0	2	3	4	0	4	0	0	2	2	4	1	3	0
R5	Median	0.0001275	0.01065	0.000715	0.0528	0.05	0.000505	0.000503	37.15	0.000107	0.000528	0.0006	0.00098	0.06	0.99	0.00185	10.25	0.0224	0.00099	1.855	0.00083	0.000533	0.15	0.000555	0.00083	4.34	0.00051	0.108	0.001	0.0005	0.001	0.0000515	0.00135	0.00075	0.0034	0.00505
R6	23-Jan-08	< 0.000005	0.0018	0.00033	0.0951	< 0.005	< 0.00001	0.000005	49	0.000014	0.000014	< 0.0001	0.00046	0.034	1.31	0.0024	11.3	0.00573	0.00132	5.41	0.00028	0.000053		0.00013	0.00083	5.01	0.00002	0.149			< 0.0005	< 0.000002	0.00246	< 0.0002	0.0018	< 0.0001
R6	20-Feb-08	< 0.000005	0.0024	0.00033	0.096	< 0.005	< 0.00001	0.000005	50.9	0.000007	0.000012	< 0.0001	0.00026	0.026	1.39	0.0027	11.1	0.00481	0.00138	2.36	0.0002	0.000009		0.00011	0.0008	5.38	0.00001	0.151			< 0.0005	< 0.000002	0.00251	< 0.0002	0.0012	< 0.0001
R6	04-Mar-08	< 0.00025	< 0.005	< 0.001	0.093	< 0.05	< 0.001	< 0.001	47.1	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1.3	0.002	11.8	0.004	0.0013	2.39	< 0.001	< 0.001	< 0.15	< 0.001	0.003	3.3	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0021	< 0.001	< 0.005	< 0.01
R6	13-Mar-08	< 0.000005	0.0026	0.00036	0.0977	< 0.005	< 0.00001	0.000005	50.4	0.000017	0.000013	0.0001	0.00046	0.023	1.41	0.0026	11	0.00374	0.00141	2.27	0.00038	0.000097		0.00012	0.00082	4.85	0.00001	0.149			< 0.0005	< 0.000002	0.00241	< 0.0002	0.0054	< 0.0001
R6	28-Apr-08	< 0.000005	0.0026	0.0005	0.0879	< 0.05	< 0.00001	0.000005	46.6	0.000049	0.000016	< 0.0001	0.00041	0.121	1.42	0.0023	9.83	0.00613	0.00128	1.9	0.00027	0.000143		0.00011	0.00074	4.78	0.00001	0.134			0.001	< 0.000002	0.00216	0.0004	0.0058	< 0.0001
R6	21-May-08	< 0.000005	0.0792	0.00043	0.0345	< 0.05	0.00002	0.000005	16.2	0.000044	0.000067	0.0002	0.00241	0.209	1.36	0.001	4.49	0.00723	0.00054	0.74	0.00132	0.000144		0.0001	0.00023	2.54	0.00001	0.0467			0.0015	0.000003	0.000518	< 0.0002	0.003	0.0002
R6	24-Jun-08	< 0.000005	0.0595	0.00039	0.0371	< 0.05	0.00001	0.000005	21.9	0.000084	0.000054	0.0002	0.00177	0.094	0.73	0.001	6.22	0.00725	0.00066	1.1	0.00109	0.000321		0.00014	0.00046	3.58	0.00002	0.0617			0.0014	0.000003	0.000804	< 0.0002	0.0027	0.0001
R6	22-Jul-08	< 0.000005	0.0214	0.00043	0.0527	< 0.05	< 0.00001	0.000005	32.5	0.000014	0.000031	0.0002	0.00085	0.048	0.78	0.0013	8.52	0.00706	0.00087	1.35	0.00056	0.000086		0.00013	0.00064	3.91	0.00001	0.0889			0.0016	< 0.000002	0.00128	0.0004	0.0007	< 0.0001
R6	29-Jul-08	< 0.000005	0.0174	0.00037	0.0566	< 0.05	< 0.00001	0.000005	36.6	0.000013	0.000031	0.0002	0.0008	0.06	0.88	0.0016	9.63	0.00875	0.001	2.38	0.00039	0.000119		0.00012	0.00074	4.46	0.00001	0.104			< 0.0005	0.000002	0.00148	< 0.0002	0.002	< 0.0001
R6	19-Aug-08	< 0.00025	0.006	< 0.001	0.05	< 0.05	< 0.001	< 0.001	36.1	< 0.0002	< 0.001	< 0.001	< 0.001	0.09	1	0.002	11	0.009	0.0009	1.91	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.7	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001	< 0.005	< 0.01
R6	04-Sep-08	< 0.000005	0.0134	0.00036	0.0552	< 0.05	< 0.00001	0.000005	38.3	0.000012	0.000032	< 0.0001	0.0007	0.066	0.96	0.0016	9.88	0.00953	0.00096	1.59	0.00039	0.000009		0.00011	0.00062	4.55	0.00001	0.104			0.0007	< 0.000002	0.00146	< 0.0002	0.0006	< 0.0001
R6	17-Sep-08	0.000014	0.0237	0.00039	0.0594	< 0.05	< 0.00001	0.000005	37.3	0.000007	0.000044	0.0001	0.00062	0.095	1.03	0.0016	10	0.0113	0.00092	1.77	0.0005	0.000006		0.00012	0.00068	4.62	0.00002	0.104			0.0012	0.000002	0.00147	< 0.0002	0.0001	< 0.0001
R6	08-Oct-08	< 0.000005	0.0296	0.00038	0.0632	< 0.05	< 0.00001	0.000005	39.6	0.000016	0.000038	0.0001	0.0006	0.089	1.01	0.0018	10.7	0.0141	0.00102	1.73	0.0004	0.000155		0.00012	0.00073	4.37	0.00001	0.111			< 0.0005	< 0.000002	0.0017	< 0.0002	0.0016	< 0.0001
R6	10-Dec-08	< 0.000005	0.0134	0.00035	0.0848	< 0.05	< 0.00001	0.000005	50.1	0.000015	0.00002	0.0002	0.00054	0.044	1.29	0.0025	12.3	0.00825	0.00125	2.09	0.0003	0.000096		0.00013	0.00096	5.1	0.00002	0.142			0.0007	< 0.000002	0.00236	< 0.0002	0.0028	< 0.0001
R6	MEAN	4.06429E-05	0.0198571	0.0004729	0.0688	0.040357	0.0001521	0.000147	39.471429	4.943E-05	0.0001694	0.0002643	0.000849	0.07493	1.1335714	0.0018857	9.8407143	0.007634	0.0010579	2.070714	0.0005771	0.0002313	0.15	0.0002457	0.000875	4.3678571	0.00015	0.11538	0.001	0.0005	0.0009	1.614E-05	0.0017223	0.0003429	0.002692857	0.001521429
R6	MINIMUM	< 0.000005	0.0018	0.00033	0.0345	< 0.005	< 0.00001	0.000005	16.2	0.000007	0.000012	< 0.0001	0.00026	0.023	0.73	0.001	4.49	0.00374	0.00054	0.74	0.0002	0.000006	< 0.15	0.0001	0.00023	2.54	0.00001	0.0467	< 0.001	< 0.0005	< 0.0005	< 0.000002	0.000518	< 0.0002	0.0001	< 0.0001
R6	MAXIMUM	< 0.00025	0.0792	< 0.001	0.0977	< 0.05	< 0.001	< 0.001	50.9	< 0.0002	< 0.001	< 0.001	0.00241	0.209	1.42	0.0027	12.3	0.0141	0.00141	5.41	0.00132	< 0.001	< 0.15	< 0.001	0.003	5.38	< 0.001	0.16	< 0.001	< 0.0005	0.0016	< 0.0001	0.00251	< 0.001	0.0058	< 0.01
R6	N > DL	1	13	12	14	0	2	0	14	12	12	8	12	13	14	14	14	14	14	14	12	12	0	12	13	14	6	14	0	0	7	4	14	2	12	2
R6	Median	0.000005	0.0134	0.000385	0.0613	0.05	0.00001	0.000005	38.95	0.0000155	0.0000315	0.00015	0.00066	0.063	1.16	0.0019	10.35	0.00724	0.00101	1.905	0.000395	0.000108	0029802	0.00012	0.00074	4.585	0.00001	0.1105	0237487	1187436	0.00085	0.000002	0.00159	0.0002	0.00235	0.0001
R7	08-Jan-08	< 0.00025	< 0.005	< 0.001	0.06	< 0.05	< 0.001	< 0.001	34.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.8	0.005	6.8	0.007	0.0006	2.52	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0017	< 0.001	< 0.005	< 0.01
R7	19-Feb-08	< 0.00025	< 0.005	< 0.001	0.06	< 0.05	< 0.001	< 0.001	34.1	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.6	0.006	6.89	0.006	0.0007	2.72	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.8	< 0.001	0.15	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0013	0.003	< 0.005	< 0.01
R7	18-Mar-08	< 0.00025	< 0.005	< 0.001	0.071	< 0.05	< 0.001	< 0.001	37.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.9	0.007	8.63	0.004	0.0009	3.45	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6	< 0.001	0.15	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0022	< 0.001	< 0.005	< 0.01
R7	14-Apr-08	< 0.00025	< 0.005	< 0.001	0.068	< 0.05	< 0.001	< 0.001	35.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.06	0.9	0.007	7.86	0.004	0.0008	3.31	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.3	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0022	< 0.001	< 0.005	< 0.01
R7	15-May-08	< 0.00025	0.097	< 0.001	0.029	< 0.05	< 0.001	< 0.001	9.51	< 0.0002	< 0.001	< 0.001	0.002	0.21	1.2	0.002	1.95	0.006	< 0.0005	0.9	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	2.4	< 0.001	0.042	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
R7	25-May-08																						0.021													
R7	17-Jun-08	< 0.00025	0.011	< 0.001	0.025	< 0.05	< 0.001	< 0.001	13.3	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.4	< 0.001	3.3	0.005	< 0.0005	1.17	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.3	< 0.001	0.049	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.005	< 0.01
R7	15-Jul-08	< 0.00025	0.042	< 0.001	0.026	< 0.05	< 0.001	< 0.001	12.7	< 0.0002	< 0.001	< 0.001	0.001	0.11	0.3	0.002	2.54	0.002	< 0.0005	1.24	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.6	< 0.001	0.05	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
R7	22-Jul-08	< 0.000005	0.0212	0.00055	0.0366	< 0.05	< 0.00001	0.000005	20.2	0.000007	0.000031	0.0002	0.00072	0.059	0.37	0.0018	4.26	0.0111	0.00038	1.44	0.00039	0.000028		0.00008	0.00028	4.4	0.00001	0.071			0.0014	< 0.000002	0.000661	0.0006	0.0006	< 0.0001
R7	12-Aug-08	< 0.00025	0.005	< 0.001	0.036	< 0.05	< 0.001	< 0.001	20.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.4	0.001	4.22	0.015	< 0.0005	1.63	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.5	< 0.001	0.076	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0006	< 0.001	0.006	< 0.01
R7	21-Aug-08	< 0.000005	0.0172	0.00062	0.047	< 0.05	< 0.00001	0.000005	24.5	0.000013	0.000049	< 0.0001	0.00075	0.119		0.0028	4.81	0.0163	0.00049	1.88	0.00036	0.000873		0.00008	0.00025	4.6	0.00001	0.0973			< 0.0005	0.000002	0.000931	< 0.0002	0.0043	< 0.0001
R7	04-Sep-08	< 0.000005	0.0151	0.00048	0.0362	< 0.05	< 0.00001	0.000005	22	0.000016	0.00003	< 0.0001	0.00062	0.072	0.47	0.0021	4.26	0.0134	0.00039	1.59	0.00031	0.000067		0.00008	0.00027	4.96	0.00001	0.0773			0.0006	< 0.000002	0.000754	< 0.0002	0.0012	< 0.0001
R7	04-Sep-08	< 0.000005	0.0158	0.0005	0.0392	< 0.05	< 0.00001	0.000005	20.7	0.000007	0.000033	< 0.0001	0.00061	0.085	0.45	0.002	4.12	0.0135	0.0004	1.6	0.0005	0.000024		0.00008	0.00029	4.89	0.00001	0.0813			< 0.0005	< 0.000002	0.000808	< 0.0002	0.0009	< 0.0001
R7	15-Sep-08	< 0.00025	0.006	< 0.001	0.034	< 0.05	< 0.001	< 0.001	18.2	< 0.0002	< 0.001	< 0.001	0.001	0.09	0.4	0.002	3.74	0.014	< 0.0005	1.52	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.2	< 0.001	0.085	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0008	< 0.001	< 0.005	< 0.01
R7	15-Oct-08	< 0.00025	0.025	< 0.001	0.037	< 0.05	< 0.001	< 0.001	21.8	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.4	0.003	3.99	0.015	< 0.0005	1.47	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.7	< 0.001	0.084	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001	< 0.005	< 0.01
R7	04-Nov-08	< 0.00025	0.026	< 0.001	0.044	< 0.05	< 0.001	< 0.001	25.5	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.6	0.003	5.25	0.012	0.0006	2.02	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.1	< 0.001	0.1	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001	< 0.005	< 0.01
R7	02-Dec-08	< 0.00025	0.014	< 0.001	0.054	< 0.05	< 0.001	< 0.001	32.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.8	0.004	6.52	0.014	0.0005	2.53	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.3	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0015	< 0.001	0.013	< 0.01
R7	MEAN	0.00019	0.0197	0.0009	0.0439	0.05	0.0008	0.0008	23.90	0.00015	0.00076	0.0007813	0.000981	0.07531	0.5993333	0.0032313	4.94625	0.009894	0.0005475	1.936875	0.0008475	0.000812	0.14008	0.00077	0.000818	4.746875	0.00075	0.09581	0.001	0.0005	0.0009375	0.0000755	0.0010596	0.00095	0.00475	0.007525
R7	MINIMUM	< 0.000005	< 0.005	0.00048	0.025	< 0.05	< 0.00001	0.000005	9.51	0.000007	0.00003	< 0.0001	0.00061	< 0.05	0.3	< 0.001	1.95	0.002	0.00038	0.9	0.00031	0.000024	0.021	0.00008	0.00025	2.4	0.00001	0.042	< 0.001	< 0.0005	< 0.0005	< 0.000002	< 0.0005	< 0.0002	0.0006	< 0.0001
R7	MAXIMUM	< 0.00025	0.097	< 0.001	0.071	< 0.05	< 0.001	< 0.001	37.2	< 0.0002	< 0.001	< 0.001	0.002	0.21	1.2	0.007	8.63	0.0163	0.0009	3.45	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.3	< 0.001	0.16	< 0.001	< 0.0005	0.0014	< 0.0001	0.0022	0.003	0.013	< 0.01
R7	N > DL	0	12	4	16	0	0	0	16	4	4	1	7	8	15	15	16	16	10	16	4	4	1	4	4	16	0	16	0	0	2	1	13	2	7	0
R7	Median	0.00025	0.01455	0.001	0.0381	0.05	0.001	0.001	21.9	0.0002	0.001	0.001	0.001	0.0545	0.47	0.00245	4.26	0.01155	0.0005	1.615	0.001	0.001	0.15	0.001	0.001	4.795	0.001	0.0845	0.001	0.0005	0.001	0.0001	0.000854	0.001	0.005	0.01
R8	08-Jan-08	< 0.00025	< 0.005	< 0.001	0.06	< 0.05	< 0.001	< 0.001	34.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.8	0.005	6.81	0.008	0.0007	2.57	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0017	< 0.001	< 0.005	< 0.01
R8	19-Feb-08	< 0.00025	< 0.005	< 0.001	0.059	< 0.05	< 0.001	< 0.001	32.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.6	0.006	6.8	0.006	0.0008	2.77	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.8	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	0.002	< 0.005	< 0.01
R8	18-Mar-08	< 0.00025	< 0.005	< 0.001	0.067	< 0.05	< 0.001	< 0.001	35.8	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.9	0.006	8.46	0.005	0.0008	3.44	< 0.001	< 0.001	< 0.15	< 0.001	0.001	6.1	< 0.001	0.15	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0022	< 0.001	< 0.005	< 0.01
R8	14-Apr-08	< 0.00025	< 0.005	< 0.001	0.066	< 0.05	< 0.001	< 0.001	34.5	< 0.0002	< 0.001	< 0.001	< 0.001	0.06	0.9	0.007	7.64	0.004	0.0009	3.22	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0022	< 0.001	< 0.005	< 0.01
R8	15-May-08	< 0.00025	0.078	< 0.001	0.027	< 0.05	< 0.001	< 0.001	9.52	< 0.0002	< 0.001	< 0.001	0.002	0.21	1.2	0.002	1.8	0.007	< 0.0005	0.93	0.001	< 0.001	< 0.15	< 0.001	< 0.001	2.4	< 0.001	0.043	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.008	< 0.01
R8	17-Jun-08	< 0.00025	0.016	< 0.001	0.021	< 0.05	< 0.001	< 0.001	11.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.3	< 0.001	2.77	0.005	< 0.0005	1.12	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.5	< 0.001	0.041	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.006	< 0.01
R8	15-Jul-08	< 0.00025	0.078	< 0.001	0.022	< 0.05	< 0.001	< 0.001	10.2	< 0.0002	< 0.001	< 0.001	0.002	0.12	0.3	0.002	2.02	0.002	< 0.0005	1.11	< 0.001	0.001	< 0.15	< 0.001	< 0.001	4.5	< 0.001	0.04	< 0.001	< 0.0005	0.002	< 0.0001	< 0.0005	< 0.001	0.007	< 0.01
R8	12-Aug-08	< 0.00025	< 0.005	< 0.001	0.035	< 0.05	< 0.001	< 0.001	19.1	< 0.0002	< 0.001	< 0.001	< 0.001	0.08	0.4	0.001	3.93	0.013	< 0.0005	1.65	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.7	< 0.001	0.072	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0006	< 0.001	< 0.005	< 0.01
R8	15-Sep-08	< 0.00025	0.017	< 0.001	0.031	< 0.05	< 0.001	< 0.001	16	< 0.0002	< 0.001	< 0.001	< 0.001	0.08	0.3	0.002	3.31	0.011	< 0.0005	1.46	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.5	< 0.001	0.076	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0008	< 0.001	< 0.005	< 0.01
R8	15-Oct-08	< 0.00025	0.026	< 0.001	0.033	< 0.05	< 0.001	< 0.001	19.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.4	0.003	3.51	0.014	< 0.0005	1.42	0.001	< 0.001	< 0.15	< 0.001	< 0.001	5	< 0.001	0.075	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0008	< 0.001	< 0.005	< 0.01
R8	04-Nov-08	< 0.00025	0.029	< 0.001	0.043	< 0.05	< 0.001	< 0.001	24.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.6	0.003	4.9	0.013	0.0006	1.9	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.1	< 0.001	0.099	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001	< 0.005	< 0.01
R8	02-Dec-08	< 0.00025	0.01	< 0.001	0.052	< 0.05	< 0.001	< 0.001	30.5	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.8	0.004	6.02	0.017	< 0.0005	2.42	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.3	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001	0.012	< 0.01
R8	MEAN	0.00025	0.02325	0.001	0.043	0.05	0.001	0.001	23.1	0.0002	0.001	0.001	0.001167	0.075	0.625	0.0035	4.8308333	0.00875	0.0006083	2.000833	0.001	0.001	0.15	0.001	0.001	4.825	0.001	0.0955	0.001	0.0005	0.0010833	0.0001	0.0011333	0.0010833	0.006083333	0.01
R8	MINIMUM	< 0.00025	< 0.005	< 0.001	0.021	< 0.05	< 0.001	< 0.001	9.52	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.3	< 0.001	1.8	0.002	< 0.0005	0.93	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	2.4	< 0.001	0.04	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
R8	MAXIMUM	< 0.00025	0.078	< 0.001	0.067	< 0.05	< 0.001	< 0.001	35.8	< 0.0002	< 0.001	< 0.001	0.002	0.21	1.2	0.007	8.46	0.017	0.0009	3.44	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.3	< 0.001	0.16	< 0.001	< 0.0005	0.002	< 0.0001	0.0022	0.002	0.012	< 0.01
R8	N > DL	0	7	0	12	0	0	0	12	0	0	0	2	5	12	11	12	12	5	12	2	1	0	0	1	12	0	12	0	0	1	0	9	1	4	0
R8	Median	0.00025	0.013	0.001	0.039	0.05	0.001	0.001	21.8	0.0002	0.001	0.001	0.001	0.05	0.6	0.003	4.415	0.0075	0.0005	1.775	0.001	0.001	0.15	0.001	0.001	5	0.001	0.0875	0.001	0.0005	0.001	0.0001	0.0009	0.001	0.005	0.01
R9	08-Jan-08	< 0.00025	0.006	< 0.001	0.061	< 0.05	< 0.001	< 0.001	37	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.9	0.005	7.78	0.01	0.0006	2.67	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.2	< 0.001	0.15	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0018	< 0.001	< 0.005	< 0.01
R9	19-Feb-08	< 0.00025	< 0.005	< 0.001	0.064	< 0.05	< 0.001	< 0.001	37.4	< 0.0002	< 0.001	0.001	< 0.001	< 0.05	0.8	0.006	7.88	0.01	0.0008	2.95	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.9	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0015	0.003	< 0.005	< 0.01
R9	18-Mar-08	< 0.00025	< 0.005	< 0.001	0.069	< 0.05	< 0.001	< 0.001	38.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1	0.007	9.62	0.008	0.0008	3.52	< 0.001	< 0.001	< 0.15	< 0.001	0.001	6.1	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0024	< 0.001	< 0.005	< 0.01
R9	14-Apr-08	< 0.00025	< 0.005	< 0.001	0.066	< 0.05	< 0.001	< 0.001	36.8	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.9	0.008	8.66	0.007	0.0009	3.28	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.1	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0023	< 0.001	< 0.005	< 0.01
R9	15-May-08	< 0.00025	0.082	< 0.001	0.028	< 0.05	< 0.001	< 0.001	10.7	< 0.0002	< 0.001	< 0.001	0.002	0.21	1.2	0.002	2.11	0.006	< 0.0005	0.93	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	2.4	< 0.001	0.047	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.005	< 0.01
R9	17-Jun-08	< 0.00025	0.023	< 0.001	0.023	< 0.05	< 0.001	< 0.001	11.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.4	< 0.001	3.03	0.005	< 0.0005	1.16	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.6	< 0.001	0.046	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.006	< 0.01
R9	15-Jul-08	< 0.00025	0.069	< 0.001	0.022	< 0.05	< 0.001	< 0.001	10.5	< 0.0002	< 0.001	< 0.001	0.002	0.12	0.3	0.002	2.12	0.003	< 0.0005	1.13	0.001	0.001	< 0.15	< 0.001	< 0.001	4.5	< 0.001	0.044	< 0.001	< 0.0005	0.002	< 0.0001	< 0.0005	< 0.001	0.009	< 0.01
R9	12-Aug-08	< 0.00025	< 0.005	< 0.001	0.035	< 0.05	< 0.001	< 0.001	20.4	< 0.0002	< 0.001	< 0.001	< 0.001	0.08	0.4	0.002	4.34	0.014	< 0.0005	1.64	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.8	< 0.001	0.08	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0006	< 0.001	< 0.005	< 0.01
R9	15-Sep-08	< 0.00025	0.027	< 0.001	0.032	< 0.05	< 0.001	< 0.001	17.4	< 0.0002	< 0.001	< 0.001	< 0.001	0.08	0.4	0.002	3.59	0.01	< 0.0005	1.5	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.5	< 0.001	0.085	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001	< 0.005	< 0.01
R9	15-Oct-08	< 0.00025	0.029	< 0.001	0.034	< 0.05	< 0.001	< 0.001	21.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.5	0.003	4.1	0.025	< 0.0005	1.54	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.8	< 0.001	0.088	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0008	< 0.001	0.008	< 0.01
R9	04-Nov-08	< 0.00025	0.034	< 0.001	0.042	< 0.05	< 0.001	< 0.001	24.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.6	0.003	5.39	0.012	0.0005	1.95	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.1	< 0.001	0.1	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001	< 0.005	< 0.01
R9	02-Dec-08	< 0.00025	0.015	< 0.001	0.051	< 0.05	< 0.001	< 0.001	32.1	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.8	0.004	6.39	0.017	0.0006	2.4	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.2	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	< 0.001	0.015	< 0.01
R9	MEAN	0.00025	0.025	0.001	0.044	0.05	0.001	0.001	24.925	0.0002	0.001	0.001	0.001167	0.07417	0.6833333	0.00375	5.4175	0.010583	0.0006	2.055833	0.001	0.001	0.15	0.001	0.001	4.85	0.001	0.10417	0.001	0.0005	0.0010833	0.0001	0.0012083	0.0011667	0.0065	0.01
R9	MINIMUM	< 0.00025	< 0.005	< 0.001	0.022	< 0.05	< 0.001	< 0.001	10.5	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.3	< 0.001	2.11	0.003	< 0.0005	0.93	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	2.4	< 0.001	0.044	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
R9	MAXIMUM	< 0.00025	0.082	< 0.001	0.069	< 0.05	< 0.001	< 0.001	38.6	< 0.0002	< 0.001	< 0.001	0.002	0.21	1.2	0.008	9.62	0.025	0.0009	3.52	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.2	< 0.001	0.17	< 0.001	< 0.0005	0.002	< 0.0001	0.0024	0.003	0.015	< 0.01
R9	N > DL	0	8	0	12	0	0	0	12	0	0	1	2	4	12	11	12	12	6	12	1	1	0	0	1	12	0	12	0	0	1	0	9	1	5	0
R9	Median	0.00025	0.019	0.001	0.0385	0.05	0.001	0.001	23.15	0.0002	0.001	0.001	0.001	0.05	0.7	0.003	4.865	0.01	0.0005	1.795	0.001	0.001	0.15	0.001	0.001	4.95	0.001	0.094	0.001	0.0005	0.001	0.0001	0.001	0.001	0.005	0.01

Appendix 3
2008 Surface Water Quality Data
Rose Creek Drainage

Table 3. Surface Water Dissolved Metals

Station	Date	AG-D mg/L	AL-D mg/L	AS-D mg/L	BA-D mg/L	B-D mg/L	BE-D mg/L	BI-D mg/L	CA-D mg/L	CD-D mg/L	CO-D mg/L	CR-D mg/L	CU-D mg/L	FE-D mg/L	K-D mg/L	LI-D mg/L	MG-D mg/L	MN-D mg/L	MO-D mg/L	NA-D mg/L	NI-D mg/L	PB-D mg/L	P-D mg/L	SB-D mg/L	SE-D mg/L	SI-D mg/L	SN-D mg/L	SR-D mg/L	TE-D mg/L	TH-D mg/L	TI-D mg/L	TL-D mg/L	U-D mg/L	V-D mg/L	ZN-D mg/L	ZR-D mg/L
R10	08-Jan-08	< 0.00025	0.012	< 0.001	0.058	< 0.05	< 0.001	< 0.001	33.4	< 0.0002	< 0.001	0.001	0.007	0.08	0.8	0.005	7.18	0.011	0.0008	2.6	0.003	< 0.001	< 0.15	< 0.001	< 0.001	4.6	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	< 0.001	0.082	< 0.01
R10	19-Feb-08	< 0.00025	< 0.005	< 0.001	0.059	< 0.05	< 0.001	< 0.001	35.8	< 0.0002	< 0.001	0.001	< 0.001	< 0.05	0.7	0.006	7.72	0.011	0.0008	2.89	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.8	< 0.001	0.15	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	0.003	< 0.005	< 0.01
R10	18-Mar-08	< 0.00025	< 0.005	< 0.001	0.072	< 0.05	< 0.001	< 0.001	39.7	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1.1	0.007	10.5	0.008	0.0008	3.83	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.2	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0025	< 0.001	0.012	< 0.01
R10	14-Apr-08	< 0.00025	< 0.005	< 0.001	0.078	< 0.05	< 0.001	< 0.001	46.7	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1.2	< 0.001	10.3	0.008	0.001	3.85	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	7	< 0.001	0.19	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0028	< 0.001	0.015	< 0.01
R10	15-May-08	< 0.00025	0.074	< 0.001	0.029	< 0.05	< 0.001	< 0.001	10.2	< 0.0002	< 0.001	< 0.001	0.002	0.2	1.1	0.002	2.02	0.006	< 0.0005	0.94	0.001	< 0.001	< 0.15	< 0.001	< 0.001	2.4	< 0.001	0.046	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.01	< 0.01
R10	17-Jun-08	< 0.00025	0.026	< 0.001	0.023	< 0.05	< 0.001	< 0.001	13.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.4	< 0.001	3.28	0.005	< 0.0005	1.26	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.7	< 0.001	0.049	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.007	< 0.01
R10	15-Jul-08	< 0.00025	0.074	< 0.001	0.022	< 0.05	< 0.001	< 0.001	11.4	< 0.0002	< 0.001	< 0.001	0.002	0.13	0.3	0.002	2.21	0.003	< 0.0005	1.18	0.001	0.001	< 0.15	< 0.001	< 0.001	4.7	< 0.001	0.045	< 0.001	< 0.0005	0.002	< 0.0001	< 0.0005	< 0.001	0.009	< 0.01
R10	12-Aug-08	< 0.00025	0.007	< 0.001	0.035	< 0.05	< 0.001	< 0.001	20	< 0.0002	< 0.001	< 0.001	< 0.001	0.09	0.4	0.002	4.27	0.011	< 0.0005	1.63	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.8	< 0.001	0.078	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0006	< 0.001	0.005	< 0.01
R10	15-Sep-08	< 0.00025	0.011	< 0.001	0.033	< 0.05	< 0.001	< 0.001	17.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.08	0.4	0.002	3.69	0.012	< 0.0005	1.52	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.6	< 0.001	0.087	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0008	< 0.001	< 0.005	< 0.01
R10	15-Oct-08	< 0.00025	0.023	< 0.001	0.032	< 0.05	< 0.001	< 0.001	20.7	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.4	0.003	3.83	0.015	< 0.0005	1.44	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.8	< 0.001	0.083	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0008	< 0.001	< 0.005	< 0.01
R10	04-Nov-08	< 0.00025	0.027	< 0.001	0.042	< 0.05	< 0.001	< 0.001	25	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.6	0.003	5.61	0.013	< 0.0005	2.01	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.2	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001	0.005	< 0.01
R10	02-Dec-08	< 0.00025	0.011	< 0.001	0.052	< 0.05	< 0.001	< 0.001	33	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.9	0.005	6.96	0.022	0.0005	2.55	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.3	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	< 0.001	0.007	< 0.01
R10	MEAN	0.00025	0.0233	0.001	0.045	0.05	0.001	0.001	25.6	0.0002	0.001	0.001	0.001667	0.0775	0.6916667	0.00325	5.6308333	0.010417	0.0006167	2.141667	0.0011667	0.001	0.15	0.001	0.001	5.01	0.001	0.10483	0.001	0.0005	0.0010833	0.0001	0.0012333	0.0011667	0.0139	0.01
R10	MINIMUM	< 0.00025	< 0.005	< 0.001	0.022	< 0.05	< 0.001	< 0.001	10.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.3	< 0.001	2.02	0.003	< 0.0005	0.94	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	2.4	< 0.001	0.045	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
R10	MAXIMUM	< 0.00025	0.074	< 0.001	0.078	< 0.05	< 0.001	< 0.001	46.7	< 0.0002	< 0.001	< 0.001	0.007	0.2	1.2	0.007	10.5	0.022	0.001	3.85	0.003	< 0.001	< 0.15	< 0.001	< 0.001	7	< 0.001	0.19	< 0.001	< 0.0005	0.002	< 0.0001	0.0028	0.003	0.082	< 0.01
R10	N > DL	0	9	0	12	0	0	0	12	0	0	2	3	5	12	10	12	12	5	12	3	1	0	0	0	12	0	12	0	0	1	0	9	1	9	0
R10	Median	0.00025	0.0115	0.001	0.0385	0.05	0.001	0.001	22.85	0.0002	0.001	0.001	0.001	0.05	0.65	0.0025	4.94	0.011	0.0005	1.82	0.001	0.001	0.15	0.001	0.001	4.8	0.001	0.0985	0.001	0.0005	0.001	0.0001	0.001	0.001	0.007	0.01
R11	04-Mar-08	< 0.00025	< 0.005	0.001	0.093	< 0.05	< 0.001	< 0.001	58.5	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	1.8	0.004	15.2	< 0.001	0.0013	4.89	< 0.001	< 0.001	< 0.15	< 0.001	0.003	4.8	< 0.001	0.22	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0026	< 0.001	< 0.005	< 0.01
R11	19-Aug-08	< 0.00025	0.009	< 0.001	0.043	< 0.05	< 0.001	< 0.001	34.7	< 0.0002	< 0.001	< 0.001	0.001	0.09	1.1	0.003	8.74	0.06	0.0014	2.64	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001	< 0.005	< 0.01
SP5-6	02-Jun-08	< 0.00025	0.11	< 0.001	0.019	< 0.05	< 0.001	< 0.001	90.4	0.002	0.003	< 0.001	0.006	< 0.05	3.1	0.019	79.1	0.13	< 0.0005	5.56	0.019	0.001	< 0.15	< 0.001	< 0.001	5.5	< 0.001	0.37	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0027	< 0.001	1.71	< 0.01
SP5-6	29-Sep-08	< 0.00025	0.044	< 0.001	0.028	< 0.05	< 0.001	< 0.001	152	0.0072	0.039	< 0.001	0.009	0.06	4.2	0.039	157	1.34	< 0.0005	8.28	0.081	< 0.001	< 0.15	< 0.001	0.002	5.4	< 0.001	0.67	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0078	< 0.001	6.43	< 0.01
W5	02-Jun-08	< 0.00025	< 0.005	< 0.001	0.03	< 0.05	< 0.001	< 0.001	126	0.0017	< 0.001	< 0.001	0.002	< 0.05	2.8	0.018	91.3	< 0.001	< 0.0005	6.35	0.026	< 0.001	< 0.15	< 0.001	0.003	5.1	< 0.001	0.58	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0062	< 0.001	2.31	< 0.01
W5	30-Sep-08	< 0.00025	0.029	< 0.001	0.021	< 0.05	< 0.001	< 0.001	80	0.0016	< 0.001	< 0.001	0.003	< 0.05	2.8	0.019	67.3	0.004	< 0.0005	4.94	0.023	< 0.001	< 0.15	< 0.001	0.003	5.7	< 0.001	0.36	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0048	< 0.001	1.99	< 0.01
W8	01-Jun-08	< 0.00025	0.03	< 0.001	0.009	< 0.05	< 0.001	< 0.001	6.12	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	0.4	< 0.001	0.91	0.001	< 0.0005	1.28	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.8	< 0.001	0.022	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.024	< 0.01
W8	29-Sep-08	< 0.00025	0.031	< 0.001	0.03	< 0.05	< 0.001	< 0.001	13.7	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	0.6	0.001	2.3	0.007	0.0005	1.71	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.1	< 0.001	0.052	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.023	< 0.01
W10	21-May-08	0.000017	0.113	0.00033	0.0123	< 0.05	0.00003	0.000005	7.05	0.000077	0.000081	0.0002	0.00249	0.096	1.06	0.0009	1.04	0.00742	0.0001	0.81	0.00067	0.00124		0.00006	0.00005	3.14	0.00001	0.0256			0.001	0.000006	0.000118	< 0.0002	0.0161	0.0002
W10	01-Jun-08	< 0.00025	0.024	< 0.001	0.007	< 0.05	< 0.001	< 0.001	6.32	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	0.3	< 0.001	0.87	< 0.001	< 0.0005	1.13	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.022	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
W10	24-Jun-08	< 0.000005	0.026	0.00016	0.0124	< 0.05	0.00002	0.000005	12.3	0.000025	0.000025	0.0001	0.00151	0.019	0.43	0.0014	1.64	0.00017	0.00021	1.61	0.0005	0.000153		0.00004	< 0.00004	5.91	0.00001	0.0444			< 0.0005	0.000003	0.000132	< 0.0002	0.0026	0.0002
W10	30-Jul-08	< 0.000005	0.0232	0.00014	0.0162	< 0.05	0.00002	0.000005	15.7	0.000023	0.000021	0.0001	0.00138	0.02	0.41	0.0012	2.07	0.00057	0.00021	2.65	0.00043	0.00023		0.00005	< 0.00004	6.71	0.00001	0.0583			< 0.0005	0.000004	0.000138	0.0003	0.0038	0.0001
W10	17-Sep-08	0.00001	0.0197	0.00015	0.014	< 0.05	0.00002	0.000005	14.8	0.000012	0.000024	< 0.0001	0.00151	0.015	0.47	0.0011	1.88	0.00029	0.00021	1.73	0.0004	0.000094		0.00005	0.00005	6.3	0.00002	0.0526			0.0006	< 0.000002	0.000123	< 0.0002	0.0005	0.0002
W10	29-Sep-08	< 0.00025	0.016	< 0.001	0.012	< 0.05	< 0.001	< 0.001	13.4	< 0.0002	< 0.001	< 0.001	0.001	0.07	0.4	< 0.001	1.84	< 0.001	< 0.0005	1.75	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.4	< 0.001	0.048	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.015	< 0.01
W10	08-Oct-08	< 0.000005	0.0335	0.00013	0.0136	< 0.05	0.00002	0.000005	15.1	0.000014	0.000024	0.0001	0.00102	0.016	0.4	0.001	2.03	0.00023	0.00021	1.66	0.00036	0.000119		0.00003	< 0.00004	5.93	0.00001	0.052			< 0.0005	0.000002	0.000129	< 0.0002	0.0026	0.0001
W10	MEAN	7.74286E-05	0.03649	0.00042	0.0125	0.05	0.00030	0.000289	12.1	7.871E-05	0.000311	0.0003714	0.001559	0.04086	0.4957143	0.0010857	1.6242857	0.001526	0.0002771	1.62	0.0006229	0.000548	0.15	0.0003186	0.000317	5.6128571	0.00029	0.04327	0.001	0.0005	0.0007286	0.000031	0.0002343	0.0004429	0.006514286	0.002971429
W10	MINIMUM	< 0.000005	0.016	0.00013	0.007	< 0.05	0.00002	0.000005	6.32	0.000012	0.000021	< 0.0001	0.001	0.015	0.3	0.0009	0.87	0.00017	0.0001	0.81	0.00036	0.000094	< 0.15	0.00003	< 0.00004	3.14	0.00001	0.022	< 0.001	< 0.0005	< 0.0005	< 0.000002	0.000118	< 0.0002	0.0005	0.0001
W10	MAXIMUM	< 0.00025	0.113	< 0.001	0.0162	< 0.05	< 0.001	< 0.001	15.7	< 0.0002	< 0.001	< 0.001	0.00249	0.096	1.06	0.0014	2.07	0.00742	< 0.0005	2.65	< 0.001	0.00124	< 0.15	< 0.001	< 0.001	6.71	< 0.001	0.0583	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.0161	< 0.01
W10	N > DL	2	7	5	7	0	5	0	7	5	5	4	7	6	7	5	7	5	5	7	5	5	0	5	2	7	1	7	0	0	2	4	5	1	6	5
W10	Median	0.00001	0.024	0.00016	0.0124	0.05	0.00002	0.000005	13.4	0.000025	0.000025	0.0001	0.00151	0.02	0.41	0.001	1.84	0.00057	0.00021	1.66	0.0005	0.00023	0.15	0.00005	0.00005	5.93	0.00001	0.048	0.001	0.0005	0.0006	0.000004	0.000132	0.0002	0.0038	0.0002
WEIR3	03-Mar-08	< 0.00025	< 0.005	0.001	0.057	< 0.05	< 0.001	< 0.001	253	< 0.0002	0.004	< 0.001	< 0.001	0.09	4.8	0.008	61.6	10.5	0.0016	36.3	0.015	< 0.001	< 0.15	< 0.001	0.003	6.7	< 0.001	0.77	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0067	< 0.001	< 0.005	< 0.01
WEIR3	19-Aug-08	< 0.00025	< 0.005	< 0.001	0.051	< 0.05	< 0.001	< 0.001	249	< 0.0002	0.004	< 0.001	< 0.001	< 0.05	4.7	0.008	51.5	9.56	0.0012	32.6	0.015	< 0.001	< 0.15	< 0.001	< 0.001	7.3	< 0.001	0.63	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0071	< 0.001	0.006	< 0.01
X2	07-Jan-08	< 0.00025	< 0.005	< 0.001	0.056	< 0.05	< 0.001	< 0.001	36	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.9	0.006	9.33	0.083	0.0006	2.86	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	< 0.001	0.051	< 0.01
X2	18-Feb-08	< 0.00025	0.005	< 0.001	0.062	< 0.05	< 0.001	< 0.001	41.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.06	1.1	0.007	10.8	0.15	0.0006	3.39	0.002	< 0.001	< 0.15	< 0.001	< 0.001	6	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	< 0.001	0.079	< 0.01
X2	17-Mar-08	< 0.00025	< 0.005	< 0.001	0.071	< 0.05	< 0.001	< 0.001	37.1	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1	0.005	11.8	0.14	0.0007	4.05	0.002	< 0.001	< 0.15	< 0.001	< 0.001	5.8	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0032	< 0.001	0.064	< 0.01
X2	14-Apr-08	< 0.00025	< 0.005	< 0.001	0.068	< 0.05	< 0.001	< 0.001	41.3	< 0.0002	< 0.001	< 0.001	< 0.001	0.08	1.1	0.008	10.7	0.14	0.0009	3.39	0.002	< 0.001	< 0.15	< 0.001	< 0.001	5.1	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0024	< 0.001	0.074	< 0.01
X2	14-May-08	< 0.00025	0.072	< 0.001	0.022	< 0.05	< 0.001	< 0.001	9.53	< 0.0002	< 0.001	< 0.001	0.002	0.19	1.2	0.002	2.06	0.028	< 0.0005	0.84	0.001	0.001	< 0.15	< 0.001	< 0.001	2.1	< 0.001	0.044	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.058	< 0.01
X2	12-Jun-08	< 0.00002	0.0405	< 0.0005	0.029	< 0.1	< 0.001		14.1	0.000028	< 0.0003	< 0.001	0.0013	0.086	< 2	< 0.005	3.2	0.0137	< 0.001	< 2	< 0.001	0.00071		< 0.0005	< 0.001		< 0.0005				< 0.01	< 0.0002	0.00049	< 0.001	0.0229	
X2	16-Jun-08	< 0.00025	0.014	< 0.001	0.022	< 0.05	< 0.001	< 0.001	12.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.4	< 0.001	3.02	0.01	< 0.0005	1.12	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.3	< 0.001	0.048	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.015	< 0.01
X2	14-Jul-08	< 0.00025	0.033	< 0.001	0.025	< 0.05	< 0.001	< 0.001	14.2	< 0.0002	< 0.001	< 0.001	0.001	0.07	0.4	< 0.001	3.2	0.008	< 0.0005	1.28	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.056	< 0.001	< 0.0005	0.001	< 0.0001	< 0.0005	< 0.001	0.018	< 0.01
X2	22-Jul-08	< 0.000005	0.0239	0.00049	0.0357	< 0.05	0.01	0.000005	19.8	0.000022	0.000049	0.0002	0.00117	0.061	0.46	0.0021	4.3	0.0156	0.00035	1.56	0.00066	0.00035		0.00008	0.00023	4.71	0.00001	0.0758			0.0016	0.000003	0.000674	0.0008	0.0221	0.0001
X2	11-Aug-08	< 0.00025	0.022	< 0.001	0.039	< 0.05	< 0.001	< 0.001	20.2	< 0.0002	< 0.001	< 0.001	< 0.001	0.1	0.5	0.002	5.4	0.029	< 0.0005	1.88	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	8.5	< 0.001	0.085	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0008	< 0.001	0.022	< 0.01
X2	19-Aug-08	< 0.000005	0.0126	0.00051	0.0424	< 0.05	< 0.00001	0.000005	23.5	0.000016	0.000059	< 0.0001	0.00078	0.102		0.0029	5.16	0.0307	0.00044	1.9	0.00071	0.000332		0.00007	0.00023	4.9	0.00001	0.0992			< 0.0005	0.000004	0.000873	< 0.0002	0.0345	< 0.0001
X2	25-Aug-08	< 0.000005	0.0371	0.00057	0.0286	< 0.05	0.00002	0.000005	15	0.000023	0.000059	0.0001	0.00143	0.129		0.0018	3.29	0.0123	0.00029	1.9	0.00095	0.000634		0.00008	0.00018	4.51	0.00001	0.0647			0.0006	0.000003	0.000467	< 0.0002	0.0254	0.0002
X2	15-Sep-08	< 0.00025	0.008	< 0.001	0.034	< 0.05	< 0.001	< 0.001	18.8	< 0.0002	< 0.001	< 0.001	< 0.001	0.07	0.4	0.002	4.12	0.02	< 0.0005	1.61	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.7	< 0.001	0.092	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001	0.016	< 0.01
X2	15-Oct-08	< 0.00025	0.014	< 0.001	0.038	< 0.05	< 0.001	< 0.001	22.1	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.5	0.003	4.6	0.042	0.0007	1.54	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.09	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001	0.032	< 0.01
X2	03-Nov-08	< 0.00025	0.028	< 0.001	0.048	< 0.05	< 0.001	< 0.001	28.3	0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.7	0.003	7.24	0.1	0.0006	2.27	0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.2	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001	0.079	< 0.01
X2	01-Dec-08	< 0.00025	0.015	< 0.001	0.055	< 0.05	< 0.001	< 0.001	34	< 0.0002	< 0.001	< 0.001	< 0.001	0.09	0.8	0.005	9.05	0.11	0.0005	3.02	0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.2	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001	0.08	< 0.01
X2	MEAN	0.00019	0.02126	0.00088	0.04223	0.05313	0.00144	0.00080	24.3	0.00016	0.000779	0.0008375	0.001105	0.0805	0.8185714	0.00355	6.079375	0.058269	0.0005738	2.163125	0.001145	0.0008766	0.15	0.0007956	0.000853	5.05	0.00078	0.10298	0.001	0.0005	0.0015438	8.813E-05	0.001119	0.0008875	0.043	0.008
X2	MINIMUM	< 0.000005	< 0.005	0.00049	0.022	< 0.05	< 0.00001	0.000005	9.53	0.000016	0.000049	< 0.0001	0.00078	< 0.05	0.4	< 0.001	2.06	0.008	0.00029	0.84	0.00066	0.000332	< 0.15	0.00007	0.00018	2.1	0.00001	0.044	< 0.001	< 0.0005	< 0.0005	0.000003	0.000467	< 0.0002	0.015	< 0.0001
X2	MAXIMUM	< 0.00025	0.072	< 0.001	0.071	< 0.1	0.01	< 0.001	41.7	< 0.0002	< 0.001	< 0.001	0.002	0.19	< 2	0.008	11.8	0.15	< 0.001	4.05	0.002	< 0.001	< 0.15	< 0.001	< 0.001	8.5	< 0.001	0.18	< 0.001	< 0.0005	< 0.01	< 0.0002	0.0032	< 0.001	0.08	< 0.01
X2	N > DL	0	13	3	16	0	2	0	16	5	3	2	6	11	13	13	16	16	10	15	9	5	0	3	3	15	0	15	0	0	3	3	13	1	16	2
X2	Median	0.00025	0.0145	0.001	0.0385	0.05	0.001	0.001	21.15	0.0002	0.001	0.001	0.001	0.07	0.75	0.00295	4.88	0.02985	0.0005	1.9	0.001	0.001	0.15	0.001	0.001	4.9	0.001	0.092	0.001	0.0005	0.001	0.0001	0.0008865	0.001	0.03325	0.01
X3	07-Jan-08	< 0.00025	0.008	< 0.001	0.059	< 0.05	< 0.001	< 0.001	38.3	< 0.0002	< 0.001	< 0.001	< 0.001	0.06	1	0.006	9.37	0.072	< 0.0005	2.98	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0017	< 0.001	0.069	< 0.01
X3	18-Feb-08	< 0.00025	< 0.005	< 0.001	0.062	< 0.05	< 0.001	< 0.001	42.9	< 0.0002	< 0.001	< 0.001	< 0.001	0.05	1.1	0.006	10.6	0.12	0.0007	3.35	0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.8	< 0.001	0.19	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	< 0.001	0.064	< 0.01
X3	17-Mar-08	< 0.00025	< 0.005	< 0.001	0.07	< 0.05	< 0.001	< 0.001	36.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1	0.004	11.2	0.1	0.0006	3.94	0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0032	< 0.001	0.051	< 0.01
X3	14-Apr-08	< 0.00025	< 0.005	< 0.001	0.066	< 0.05	< 0.001	< 0.001	40.2	< 0.0002	< 0.001	< 0.001	< 0.001	0.07	1	0.007	10.4	0.092	0.0007	3.32	0.002	< 0.001	< 0.15	< 0.001	< 0.001	5.1	< 0.001	0.19	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0023	< 0.001	0.058	< 0.01
X3	14-May-08	< 0.00025	0.043	< 0.001	0.023	< 0.05	< 0.001	< 0.001	10.2	< 0.0002	< 0.001	< 0.001	0.002	0.25	1.2	0.001	2	0.023	< 0.0005	1.06	0.001	< 0.001	< 0.15	< 0.001	< 0.001	2.6	< 0.001	0.05	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.028	< 0.01
X3	16-Jun-08	< 0.00025	0.012	< 0.001	0.021	< 0.05	< 0.001	< 0.001	12.7	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.5	< 0.001	2.75	0.01	< 0.0005	1.2	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3	< 0.001	0.055	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.006	< 0.01
X3	14-Jul-08	< 0.00025	0.025	< 0.001	0.025	< 0.05	< 0.001	< 0.001	16.8	< 0.0002	< 0.001	< 0.001	< 0.001	0.09	0.5	< 0.001	3.93	0.01	< 0.0005	1.33	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.5	< 0.001	0.073	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0006	< 0.001	0.006	< 0.01
X3	11-Aug-08	< 0.00025	0.018	< 0.001	0.038	< 0.05	< 0.001	< 0.001	21.6	< 0.0002	< 0.001	< 0.001	< 0.001	0.1	0.5	< 0.001	5.56	0.027	< 0.0005	1.86	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	7.6	< 0.001	0.1	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001	0.011	< 0.01
X3	15-Sep-08	< 0.00025	< 0.005	< 0.001	0.033	< 0.05	< 0.001	< 0.001	21	< 0.0002	< 0.001	< 0.001	< 0.001	0.1	0.5	0.002	4.5	0.02	< 0.0005	1.6	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.1	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001	0.007	< 0.01
X3	15-Oct-08	< 0.00025	0.009	< 0.001	0.037	< 0.05	< 0.001	< 0.001	23.8	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.6	0.002	4.55	0.034	< 0.0005	1.49	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.5	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001	0.013	< 0.01
X3	03-Nov-08	< 0.00025	0.015	< 0.001	0.042	< 0.05	< 0.001	< 0.001	27.7	0.0003	< 0.001	< 0.001	< 0.001	< 0.05	0.7	0.002	6.39	0.065	< 0.0005	2.07	< 0.001	< 0.001	< 0.15	< 0.001	0.001	4.9	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001	0.038	< 0.01
X3	01-Dec-08	< 0.00025	0.008	< 0.001	0.053	< 0.05	< 0.001	< 0.001	35.5	< 0.0002	< 0.001	< 0.001	< 0.001	0.08	0.9	0.004	8.65	0.087	< 0.0005	3.03	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0015	< 0.001	0.053	< 0.01
X3	MEAN	0.00025	0.0132	0.001	0.0441	0.05	0.001	0.001	27.3	0.0002083	0.001	0.001	0.001083	0.08333	0.7916667	0.0030833	6.6583333	0.055	0.0005417	2.269167	0.0010833	0.001	0.15	0.001	0.001	4.89	0.001	0.12483	0.001	0.0005	0.001	0.0001	0.0013417	0.001	0.034	0.01
X3	MINIMUM	< 0.00025	< 0.005	< 0.001	0.021	< 0.05	< 0.001	< 0.001	10.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.5	< 0.001	2	0.01	< 0.0005	1.06	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	2.6	< 0.001	0.05	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.006	< 0.01
X3	MAXIMUM	< 0.00025	0.043	< 0.001	0.07	< 0.05	< 0.001	< 0.001	42.9	0.0003	< 0.001	< 0.001	0.002	0.25	1.2	0.007	11.2	0.12	0.0007	3.94	0.002	< 0.001	< 0.15	< 0.001	< 0.001	7.6	< 0.001	0.19	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0032	< 0.001	0.069	< 0.01
X3	N > DL	0	8	0	12	0	0	0	12	1	0	0	1	8	12	9	12	12	3	12	4	0	0	0	1	12	0	12	0	0	0	0	10	0	12	0

Appendix 3
2008 Surface Water Quality Data
Rose Creek Drainage

Table 3. Surface Water Dissolved Metals

Station	Date	AG-D mg/L	AL-D mg/L	AS-D mg/L	BA-D mg/L	B-D mg/L	BE-D mg/L	BI-D mg/L	CA-D mg/L	CD-D mg/L	CO-D mg/L	CR-D mg/L	CU-D mg/L	FE-D mg/L	K-D mg/L	LI-D mg/L	MG-D mg/L	MN-D mg/L	MO-D mg/L	NA-D mg/L	NI-D mg/L	PB-D mg/L	P-D mg/L	SB-D mg/L	SE-D mg/L	SI-D mg/L	SN-D mg/L	SR-D mg/L	TE-D mg/L	TH-D mg/L	TI-D mg/L	TL-D mg/L	U-D mg/L	V-D mg/L	ZN-D mg/L	ZR-D mg/L
X3	Median	0.00025	0.0085	0.001	0.04	0.05	0.001	0.001	25.75	0.0002	0.001	0.001	0.001	0.065	0.8	0.002	5.975	0.0495	0.0005	1.965	0.001	0.001	0.15	0.001	0.001	4.95	0.001	0.12	0.001	0.0005	0.001	0.0001	0.0011	0.001	0.033	0.01
X4	08-Jan-08	< 0.00025	0.012	< 0.001	0.011	< 0.05	< 0.001	< 0.001	186	0.0081	0.044	< 0.001	0.016	4.79	3.8	0.013	53.4	14.1	0.0012	12.4	0.054	< 0.001	< 0.15	< 0.001	0.001	4.7	< 0.001	0.65	< 0.001	< 0.0005	< 0.001	0.0008	< 0.0005	< 0.001	16.3	< 0.01
X4	19-Feb-08	< 0.00025	< 0.005	< 0.001	0.018	< 0.05	< 0.001	< 0.001	164	0.0025	0.033	< 0.001	< 0.001	13.6	3.2	0.008	32.3	14.6	0.0018	10.5	0.036	< 0.001	< 0.15	< 0.001	< 0.001	6	< 0.001	0.58	< 0.001	< 0.0005	< 0.001	0.0004	0.0008	< 0.001	6.61	< 0.01
X4	18-Mar-08	< 0.00025	< 0.005	< 0.001	0.016	< 0.05	< 0.001	< 0.001	140	0.0008	0.026	< 0.001	< 0.001	6.58	2.9	0.006	27.7	11.5	0.001	11.6	0.026	< 0.001	< 0.15	< 0.001	< 0.001	4.5	< 0.001	0.44	< 0.001	< 0.0005	< 0.001	0.0002	0.0008	< 0.001	3.27	< 0.01
X4	15-Apr-08	< 0.00025	0.015	< 0.001	0.013	< 0.05	< 0.001	< 0.001	163	0.0079	0.045	< 0.001	0.024	3.29	3.3	0.013	49	14.5	0.001	11.5	0.051	< 0.001	< 0.15	< 0.001	0.001	4.2	< 0.001	0.63	< 0.001	< 0.0005	< 0.001	0.0008	< 0.0005	< 0.001	14.2	< 0.01
X4	15-May-08	< 0.00025	0.035	< 0.001	0.013	< 0.05	< 0.001	< 0.001	130	0.011	0.04	< 0.001	0.03	7.31	2.5	0.011	36.7	10.1	0.0009	7.35	0.045	< 0.001	< 0.15	< 0.001	< 0.001	3.3	< 0.001	0.49	< 0.001	< 0.0005	< 0.001	0.0007	< 0.0005	< 0.001	16	< 0.01
X4	16-Jun-08	< 0.00025	0.045	< 0.001	0.01	< 0.05	< 0.001	< 0.001	128	0.0081	0.035	< 0.001	0.022	1.68	2.4	0.01	40.3	9.86	0.0008	7.86	0.042	0.02	< 0.15	< 0.001	< 0.001	3	< 0.001	0.47	< 0.001	< 0.0005	< 0.001	0.0008	< 0.0005	< 0.001	14.9	< 0.01
X4	14-Jul-08	< 0.00025	0.29	< 0.001	0.009	< 0.05	< 0.001	< 0.001	157	0.0088	0.049	< 0.001	0.07	4.46	3	0.014	55.5	11.6	< 0.0005	9.53	0.054	0.16	< 0.15	< 0.001	< 0.001	4.1	< 0.001	0.5	< 0.001	< 0.0005	< 0.001	0.001	0.0009	< 0.001	16.2	< 0.01
X4	11-Aug-08	< 0.00025	0.69	< 0.001	0.011	< 0.05	< 0.001	< 0.001	153	0.0094	0.056	< 0.001	0.09	10.9	3.1	0.016	66.1	14.9	< 0.0005	11.2	0.064	0.31	< 0.15	< 0.001	0.002	6.5	< 0.001	0.57	< 0.001	< 0.0005	< 0.001	0.0011	0.0014	< 0.001	21	< 0.01
X4	15-Sep-08	< 0.00025	0.9	< 0.001	0.01	< 0.05	< 0.001	< 0.001	159	0.014	0.083	0.002	0.14	15.3	3.1	0.016	63.6	14.9	0.0007	10.8	0.078	0.39	< 0.15	< 0.001	< 0.001	4.2	< 0.001	0.62	< 0.001	< 0.0005	< 0.001	0.0015	0.0021	< 0.001	20.5	< 0.01
X4	15-Oct-08	< 0.00025	0.75	< 0.001	0.009	< 0.05	< 0.001	< 0.001	172	0.014	0.075	0.001	0.11	19.7	3.3	0.018	61.8	15.9	0.0011	9.85	0.081	0.34	< 0.15	< 0.001	< 0.001	4.8	< 0.001	0.69	< 0.001	< 0.0005	< 0.001	0.0009	0.0014	< 0.001	28.3	< 0.01
X4	04-Nov-08	0.0013	0.87	< 0.001	0.011	< 0.05	< 0.001	< 0.001	182	0.014	0.076	0.001	0.12	23.2	3.6	0.017	78.1	18.1	0.0011	14	0.085	0.35	< 0.15	< 0.001	0.002	5.5	< 0.001	0.72	< 0.001	< 0.0005	< 0.001	0.001	0.0016	< 0.001	30.9	< 0.01
X4	01-Dec-08	< 0.00025	0.83	< 0.001	0.012	< 0.05	< 0.001	< 0.001	211	0.012	0.088	< 0.001	0.12	31	3.9	0.019	84.1	18.9	0.0009	15.5	0.1	0.33	< 0.15	< 0.001	< 0.001	6.1	< 0.001	0.77	< 0.001	< 0.0005	< 0.001	0.0009	0.0014	< 0.001	30.6	< 0.01
X4	MEAN	0.0003375	0.371	0.001	0.012	0.05	0.001	0.001	162.1	0.0092	0.054	0.0010833	0.062	11.8175	3.175	0.0134167	54.05	14.08	0.0009583	11.0075	0.0596667	0.15875	0.15	0.001	0.001167	4.7416667	0.001	0.59417	0.001	0.0005	0.001	0.0008417	0.0010333	0.001	18.23	0.01
X4	MINIMUM	< 0.00025	< 0.005	< 0.001	0.009	< 0.05	< 0.001	< 0.001	128	0.0008	0.026	< 0.001	< 0.001	1.68	2.4	0.006	27.7	9.86	< 0.0005	7.35	0.026	< 0.001	< 0.15	< 0.001	< 0.001	3	< 0.001	0.44	< 0.001	< 0.0005	< 0.001	0.0002	< 0.0005	< 0.001	3.27	< 0.01
X4	MAXIMUM	0.0013	0.9	< 0.001	0.018	< 0.05	< 0.001	< 0.001	211	0.014	0.088	0.002	0.14	31	3.9	0.019	84.1	18.9	0.0018	15.5	0.1	0.39	< 0.15	< 0.001	0.002	6.5	< 0.001	0.77	< 0.001	< 0.0005	< 0.001	0.0015	0.0021	< 0.001	30.9	< 0.01
X4	N > DL	1	10	0	12	0	0	0	12	12	12	3	10	12	12	12	12	12	10	12	12	7	0	0	4	12	0	12	0	0	0	12	8	0	12	0
X4	Median	0.00025	0.1675	0.001	0.011	0.05	0.001	0.001	161	0.0091	0.047	0.001	0.05	9.105	3.15	0.0135	54.45	14.55	0.00095	11	0.054	0.09	0.15	0.001	0.001	4.6	0.001	0.6	0.001	0.0005	0.001	0.00085	0.00085	0.001	16.25	0.01
X5	14-Apr-08	< 0.00025	< 0.005	< 0.001	0.033	< 0.05	< 0.001	< 0.001	235	< 0.0002	0.012	< 0.001	0.001	0.08	5	0.016	53.7	11.8	0.0021	25.5	0.028	< 0.001	< 0.15	< 0.001	0.002	5.8	< 0.001	0.73	< 0.001	< 0.0005	< 0.001	< 0.0001	0.005	< 0.001	0.12	< 0.01
X5	15-Apr-08	< 0.00025	< 0.005	< 0.001	0.031	< 0.05	< 0.001	< 0.001	232	< 0.0002	0.012	< 0.001	0.001	0.05	4.7	0.014	52.9	11.5	0.0019	25.6	0.028	< 0.001	< 0.15	< 0.001	< 0.001	5.8	< 0.001	0.73	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0048	< 0.001	0.098	< 0.01
X5	22-Apr-08	< 0.00025	< 0.005	< 0.001	0.025	< 0.05	< 0.001	< 0.001	266	< 0.0002	0.015	< 0.001	0.001	< 0.05	4.9	0.016	50.1	14.7	0.0018	25.5	0.031	< 0.001	< 0.15	< 0.001	0.001	5.9	< 0.001	0.85	< 0.001	< 0.0005	< 0.001	0.0001	0.0039	< 0.001	0.1	< 0.01
X5	29-Apr-08	< 0.00025	< 0.005	< 0.001	0.022	< 0.05	< 0.001	< 0.001	274	< 0.0002	0.012	< 0.001	< 0.001	< 0.05	5.1	0.015	50.3	10.7	0.0017	22.1	0.024	< 0.001	< 0.15	< 0.001	0.001	5.1	< 0.001	0.79	< 0.001	< 0.0005	< 0.001	0.0002	0.0033	< 0.001	0.17	< 0.01
X5	06-May-08	< 0.00025	< 0.005	< 0.001	0.017	< 0.05	< 0.001	< 0.001	190	< 0.0002	0.006	< 0.001	< 0.001	0.06	4.1	0.017	40.2	5.35	0.0014	18	0.014	< 0.001	< 0.15	< 0.001	0.001	3.6	< 0.001	0.62	< 0.001	< 0.0005	< 0.001	0.0002	0.0022	< 0.001	0.07	< 0.01
X5	13-May-08	< 0.00025	0.01	< 0.001	0.015	< 0.05	< 0.001	< 0.001	209	< 0.0002	0.006	< 0.001	0.001	0.19	4.2	0.018	31.6	5.51	0.001	16.2	0.012	< 0.001	< 0.15	< 0.001	0.002	2.6	< 0.001	0.75	< 0.001	< 0.0005	< 0.001	0.0003	0.0013	0.001	0.047	< 0.01
X5	15-May-08	< 0.00025	< 0.005	< 0.001	0.015	< 0.05	< 0.001	< 0.001	216	< 0.0002	0.005	< 0.001	< 0.001	< 0.05	4.1	0.016	31.4	4.8	0.001	15.7	0.012	< 0.001	< 0.15	< 0.001	0.001	3.2	< 0.001	0.71	< 0.001	< 0.0005	< 0.001	0.0002	0.0015	< 0.001	0.061	< 0.01
X5	20-May-08	< 0.00025	< 0.005	< 0.001	0.015	< 0.05	< 0.001	< 0.001	181	< 0.0002	0.005	< 0.001	< 0.001	0.1	3.7	0.016	33.7	4.4	0.0011	15.6	0.012	< 0.001	< 0.15	< 0.001	0.001	3	< 0.001	0.61	< 0.001	< 0.0005	< 0.001	0.0002	0.0013	< 0.001	0.089	< 0.01
X5	27-May-08	< 0.00025	< 0.005	< 0.001	0.012	< 0.05	< 0.001	< 0.001	185	< 0.0002	0.007	< 0.001	< 0.001	0.1	3.7	0.014	36.1	6.43	0.0011	17.6	0.016	< 0.001	< 0.15	< 0.001	0.001	3.1	< 0.001	0.57	< 0.001	< 0.0005	< 0.001	0.0002	0.0011	< 0.001	0.17	< 0.01
X5	03-Jun-08	< 0.00025	< 0.005	< 0.001	0.013	< 0.05	< 0.001	< 0.001	196	< 0.0002	0.004	< 0.001	< 0.001	< 0.05	4.4	0.018	29.7	3.17	0.0009	15.5	0.008	< 0.001	< 0.15	< 0.001	0.002	2.2	< 0.001	0.66	< 0.001	< 0.0005	< 0.001	0.0003	0.0007	< 0.001	0.059	< 0.01
X5	10-Jun-08	< 0.00025	0.007	< 0.001	0.015	< 0.05	< 0.001	< 0.001	221	< 0.0002	0.01	< 0.001	0.001	0.07	5.1	0.023	44	8.02	0.0012	21.5	0.021	< 0.001	< 0.15	< 0.001	< 0.001	3.8	< 0.001	0.68	< 0.001	< 0.0005	< 0.001	0.0002	0.0013	< 0.001	0.18	< 0.01
X5	16-Jun-08	< 0.00025	< 0.005	< 0.001	0.011	< 0.05	< 0.001	< 0.001	176	< 0.0002	0.002	< 0.001	< 0.001	< 0.05	4.9	0.027	28.5	1.79	0.0012	14.8	0.005	< 0.001	< 0.15	< 0.001	0.001	1.9	< 0.001	0.59	< 0.001	< 0.0005	< 0.001	0.0003	0.0006	< 0.001	0.029	< 0.01
X5	17-Jun-08	< 0.00025	< 0.005	< 0.001	0.006	< 0.05	< 0.001	< 0.001	85.3	< 0.0002	0.002	< 0.001	< 0.001	< 0.05	2.3	0.012	15.4	1.7	< 0.0005	8.08	0.004	< 0.001	< 0.15	< 0.001	< 0.001	1.3	< 0.001	0.28	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.04	< 0.01
X5	24-Jun-08	< 0.00025	< 0.005	< 0.001	0.016	< 0.05	< 0.001	< 0.001	260	< 0.0002	0.02	< 0.001	0.001	< 0.05	5.7	0.024	56.5	16.2	0.0022	25.4	0.039	< 0.001	< 0.15	< 0.001	< 0.001	5.2	< 0.001	0.82	< 0.001	< 0.0005	< 0.001	0.0002	0.0024	< 0.001	0.19	< 0.01
X5	01-Jul-08	< 0.00025	0.007	< 0.001	0.014	< 0.05	< 0.001	< 0.001	242	< 0.0002	0.013	< 0.001	< 0.001	0.33	5.9	0.027	47	10.5	0.0021	22.9	0.03	< 0.001	< 0.15	< 0.001	0.002	3.5	< 0.001	0.77	< 0.001	< 0.0005	< 0.001	0.0002	0.0018	< 0.001	0.16	< 0.01
X5	08-Jul-08	< 0.00025	< 0.005	< 0.001	0.013	< 0.05	< 0.001	< 0.001	218	< 0.0002	0.01	< 0.001	< 0.001	< 0.05	5.8	0.03	38.2	7.41	0.0012	19.3	0.02	< 0.001	< 0.15	< 0.001	< 0.001	3.2	< 0.001	0.73	< 0.001	< 0.0005	< 0.001	0.0003	0.0015	< 0.001	0.077	< 0.01
X5	14-Jul-08	< 0.00025	0.006	< 0.001	0.013	< 0.05	< 0.001	< 0.001	246	< 0.0002	0.013	< 0.001	0.001	0.67	5.9	0.032	46.2	8.76	0.0007	20.4	0.024	< 0.001	< 0.15	< 0.001	0.001	4	< 0.001	0.69	< 0.001	< 0.0005	< 0.001	0.0003	0.0017	< 0.001	0.098	< 0.01
X5	16-Jul-08	< 0.00025	< 0.005	< 0.001	0.014	< 0.05	< 0.001	< 0.001	238	< 0.0002	0.011	< 0.001	0.001	0.68	6	0.035	44.2	7.95	0.0007	20.6	0.022	< 0.001	< 0.15	< 0.001	0.002	4	< 0.001	0.68	< 0.001	< 0.0005	< 0.001	0.0003	0.0016	< 0.001	0.067	< 0.01
X5	22-Jul-08	< 0.00025	< 0.005	< 0.001	0.014	< 0.05	< 0.001	< 0.001	221	< 0.0002	0.01	< 0.001	< 0.001	< 0.05	6	0.03	42.8	7.58	0.0013	22	0.02	< 0.001	< 0.15	< 0.001	< 0.001	3.3	< 0.001	0.72	< 0.001	< 0.0005	< 0.001	0.0003	0.0015	< 0.001	0.085	< 0.01
X5	31-Jul-08	< 0.00025	< 0.005	< 0.001	0.011	< 0.05	< 0.001	< 0.001	195	< 0.0002	0.008	< 0.001	< 0.001	< 0.05	5	0.028	32.6	6.27	0.0012	18.3	0.017	< 0.001	< 0.15	< 0.001	0.002	2.5	< 0.001	0.69	< 0.001	< 0.0005	< 0.001	0.0003	0.0015	< 0.001	0.058	< 0.01
X5	05-Aug-08	< 0.00025	< 0.005	< 0.001	0.015	< 0.05	< 0.001	< 0.001	233	< 0.0002	0.013	< 0.001	< 0.001	< 0.05	5.5	0.028	47.7	10.4	0.0015	22.8	0.025	< 0.001	< 0.15	< 0.001	< 0.001	3.7	< 0.001	0.73	< 0.001	< 0.0005	< 0.001	0.0002	0.0018	< 0.001	0.095	< 0.01
X5	11-Aug-08	< 0.00025	0.014	< 0.001	0.017	< 0.05	< 0.001	< 0.001	251	< 0.0002	0.015	< 0.001	0.002	0.64	6.2	0.037	53	13.1	0.0006	24.1	0.03	< 0.001	< 0.15	< 0.001	0.002	6.4	< 0.001	0.77	< 0.001	< 0.0005	< 0.001	0.0002	0.0024	< 0.001	0.13	< 0.01
X5	12-Aug-08	< 0.00025	< 0.005	< 0.001	0.015	< 0.05	< 0.001	< 0.001	215	< 0.0002	0.009	< 0.001	0.001	0.55	6.3	0.043	42.5	6.83	0.0007	20.8	0.018	< 0.001	< 0.15	< 0.001	0.002	4.7	< 0.001	0.7	< 0.001	< 0.0005	< 0.001	0.0003	0.0016	< 0.001	0.055	< 0.01
X5	19-Aug-08	< 0.00025	< 0.005	< 0.001	0.013	< 0.05	< 0.001	< 0.001	221	< 0.0002	0.01	< 0.001	0.001	0.47	6.4	0.035	42.9	6.83	0.0012	21.8	0.02	< 0.001	< 0.15	< 0.001	0.002	3.4	< 0.001	0.85	< 0.001	< 0.0005	< 0.001	0.0003	0.0015	< 0.001	0.05	< 0.01
X5	28-Aug-08	< 0.00025	0.011	< 0.001	0.014	< 0.05	< 0.001	< 0.001	219	< 0.0002	0.01	< 0.001	< 0.001	< 0.05	5.8	0.031	38.3	7.5	0.0011	19.5	0.02	< 0.001	< 0.15	< 0.001	< 0.001	3.4	< 0.001	0.83	< 0.001	< 0.0005	< 0.001	0.0003	0.0014	< 0.001	0.07	< 0.01
X5	02-Sep-08	< 0.00025	0.005	< 0.001	0.015	< 0.05	< 0.001	< 0.001	245	< 0.0002	0.011	< 0.001	< 0.001	< 0.05	6	0.032	40.2	8.08	0.0013	19.5	0.022	< 0.001	< 0.15	< 0.001	< 0.001	3.1	< 0.001	0.83	< 0.001	< 0.0005	< 0.001	0.0003	0.0015	< 0.001	0.094	< 0.01
X5	09-Sep-08	< 0.00025	0.011	< 0.001	0.016	< 0.05	< 0.001	< 0.001	220	< 0.0002	0.006	< 0.001	< 0.001	< 0.05	6	0.039	34.8	3.84	0.0011	20.2	0.012	< 0.001	< 0.15	< 0.001	< 0.001	2.9	< 0.001	0.83	< 0.001	< 0.0005	< 0.001	0.0003	0.0011	< 0.001	0.023	< 0.01
X5	15-Sep-08	< 0.00025	< 0.005	< 0.001	0.013	< 0.05	< 0.001	< 0.001	198	< 0.0002	0.007	< 0.001	< 0.001	< 0.05	5.3	0.03	33.3	4.13	0.001	16.5	0.012	< 0.001	< 0.15	< 0.001	< 0.001	2.3	< 0.001	0.71	< 0.001	< 0.0005	< 0.001	0.0004	0.0014	< 0.001	0.063	< 0.01
X5	16-Sep-08	< 0.00025	< 0.005	< 0.001	0.014	< 0.05	< 0.001	< 0.001	203	< 0.0002	0.008	< 0.001	< 0.001	0.26	5.3	0.032	34.8	4.55	0.001	17.3	0.013	< 0.001	< 0.15	< 0.001	< 0.001	2.5	< 0.001	0.72	< 0.001	< 0.0005	< 0.001	0.0004	0.0014	< 0.001	0.057	< 0.01
X5	23-Sep-08	< 0.00025	< 0.005	< 0.001	0.013	< 0.05	< 0.001	< 0.001	198	< 0.0002	0.008	< 0.001	< 0.001	< 0.05	4.6	0.028	33.2	4.72	0.0009	16.1	0.013	< 0.001	< 0.15	< 0.001	< 0.001	2.5	< 0.001	0.7	< 0.001	< 0.0005	< 0.001	0.0004	0.0014	< 0.001	0.092	< 0.01
X5	30-Sep-08	< 0.00025	0.016	< 0.001	0.015	< 0.05	< 0.001	< 0.001	268	< 0.0002	0.009	< 0.001	0.002	< 0.05	4.4	0.026	41	6.51	0.0013	15	0.017	< 0.001	< 0.15	< 0.001	0.002	3	< 0.001	0.83	< 0.001	< 0.0005	< 0.001	0.0003	0.0013	< 0.001	0.14	< 0.01
X5	07-Oct-08	< 0.00025	0.017	< 0.001	0.014	< 0.05	< 0.001	< 0.001	239	0.0002	0.011	< 0.001	< 0.001	< 0.05	4.3	0.022	38	7.93	0.0011	17.8	0.022	< 0.001	< 0.15	< 0.001	< 0.001	3.5	< 0.001	0.77	< 0.001	< 0.0005	< 0.001	0.0003	0.0014	< 0.001	0.17	< 0.01
X5	14-Oct-08	< 0.00025	0.025	< 0.001	0.015	< 0.05	< 0.001	< 0.001	281	0.0002	0.016	< 0.001	0.001	< 0.05	5.1	0.022	43.7	12.5	0.0015	19	0.029	< 0.001	< 0.15	< 0.001	0.002	4.1	< 0.001	0.83	< 0.001	< 0.0005	< 0.001	0.0002	0.0019	< 0.001	0.24	< 0.01
X5	15-Oct-08	< 0.00025	0.008	< 0.001	0.016	< 0.05	< 0.001	< 0.001	274	0.0002	0.015	< 0.001	0.001	< 0.05	5.1	0.022	48.2	11.5	0.0015	17.4	0.029	< 0.001	< 0.15	< 0.001	0.002	4.2	< 0.001	0.88	< 0.001	< 0.0005	< 0.001	0.0002	0.0018	< 0.001	0.26	< 0.01
X5	21-Oct-08	< 0.00025	0.011	< 0.001	0.017	< 0.05	< 0.001	< 0.001	311	0.0004	0.026	0.005	0.001	0.09	4.7	0.02	62.1	20	0.0023	24.3	0.054	< 0.001	< 0.15	< 0.001	0.003	5.1	< 0.001	0.91	< 0.001	< 0.0005	< 0.001	0.0002	0.003	< 0.001	0.35	< 0.01
X5	MEAN	0.00025	0.0073714	0.001	0.0156286	0.05	0.001	0.001	224.63714	0.0002057	0.0102	0.0011143	0.001057	0.15257	5.0714286	0.025	41.108571	8.084571	0.0012686	19.50514	0.0206571	0.001	0.15	0.001	0.0014	3.6514286	0.001	0.73029	0.001	0.0005	0.001	0.0002486	0.00184	0.001	0.1102	0.01
X5	MINIMUM	< 0.00025	< 0.005	< 0.001	0.006	< 0.05	< 0.001	< 0.001	85.3	< 0.0002	0.002	< 0.001	< 0.001	< 0.05	2.3	0.012	15.4	1.7	< 0.0005	8.08	0.004	< 0.001	< 0.15	< 0.001	< 0.001	1.3	< 0.001	0.28	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.023	< 0.01
X5	MAXIMUM	< 0.00025	0.025	< 0.001	0.033	< 0.05	< 0.001	< 0.001	311	0.0004	0.026	0.005	0.002	0.68	6.4	0.043	62.1	20	0.0023	25.6	0.054	< 0.001	< 0.15	< 0.001	0.003	6.4	< 0.001	0.91	< 0.001	< 0.0005	< 0.001	0.0004	0.005	< 0.001	0.35	< 0.01
X5	N > DL	0	13	0	35	0	0	0	35	4	35	1	15	15	35	35	35	35	34	35	35	0	0	0	21	35	0	35	0	0	0	32	34	1	35	0
X5	Median	0.00025	0.005	0.001	0.015	0.05	0.001	0.001	221	0.0002	0.01	0.001	0.001	0.05	5.1	0.026	41	7.5	0.0012	19.5	0.02	0.001	0.15	0.001	0.001	3.4	0.001	0.73	0.001	0.0005	0.001	0.0003	0.0015	0.001	0.092	0.01
X5P	08-Jan-08	< 0.00025	0.017	< 0.001	0.042	< 0.05	< 0.001	< 0.001	246	0.0002	0.009	< 0.001	0.002	0.05	6.1	0.015	56.2	9.67	0.0021	24.4	0.021	< 0.001	< 0.15	< 0.001	0.002	6.1	< 0.001	0.73	< 0.001	< 0.0005	< 0.001	0.0001	0.0054	< 0.001	0.14	< 0.01
X5P	19-Feb-08	< 0.00025	0.01	< 0.001	0.032	< 0.05	< 0.001	< 0.001	208	< 0.0002	0.007	< 0.001	0.002	0.2	4.6	0.009	45	8.55	0.0021	22.7	0.018	< 0.001	< 0.15	< 0.001	< 0.001	6.8	< 0.001	0.63	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0041	< 0.001	0.096	< 0.01
X5P	18-Mar-08	< 0.00025	< 0.005	< 0.001	0.051	< 0.05	< 0.001	< 0.001	202	< 0.0002	0.009	< 0.001	0.002	< 0.05	4.8	0.01	53.7	8.58	0.0018	28.4	0.02	< 0.001	< 0.15	< 0.001	0.001	7	< 0.001	0.61	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0063	< 0.001	0.094	< 0.01
X5P	04-Nov-08	< 0.00025	0.012	< 0.001	0.018	< 0.05	< 0.001	< 0.001	287	0.0006	0.008	< 0.001	0.001	0.11	5.1	0.022	43.4	6.13	0.0013	21.5	0.016	< 0.001	< 0.15	< 0.001	0.002	3.5	< 0.001	0.78	< 0.001	< 0.0005	< 0.001	0.0003	0.0016	< 0.001	0.12	< 0.01
X5P	01-Dec-08	< 0.00025	0.01	< 0.001	0.028	< 0.05	< 0.001	< 0.001	265	< 0.0002	0.008	< 0.001	0.001	< 0.05	5.1	0.021	45.3	7.11	0.0016	23.9	0.017	< 0.001	< 0.15	< 0.001	< 0.001	5.5	< 0.001	0.8	< 0.001	< 0.0005	< 0.001	0.0003	0.0028	< 0.001	0.14	< 0.01
X5P	MEAN	0.00025	0.0108	0.001	0.0342	0.05	0.001	0.001	241.6	0.00028	0.0082	0.001	0.0016	0.092	5.14	0.0154	48.72	8.008	0.00178	24.18	0.0184	0.001	0.15	0.001	0.0014	5.78	0.001	0.71	0.001	0.0005	0.001	0.00018	0.00404	0.001	0.118	0.01
X5P	MINIMUM	< 0.00025	< 0.005	< 0.001	0.018	< 0.05	< 0.001	< 0.001	202	< 0.0002	0.007	< 0.001	0.001	< 0.05	4.6	0.009	43.4	6.13	0.0013	21.5	0.016	< 0.001	< 0.15	< 0.001	< 0.001	3.5	< 0.001	0.61	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	< 0.001	0.094	< 0.01
X5P	MAXIMUM	< 0.00025	0.017	< 0.001	0.051	< 0.05	< 0.001	< 0.001	287	0.0006	0.009	< 0.001	0.002	0.2	6.1	0.022	56.2	9.67	0.0021	28.4	0.021	< 0.001	< 0.15	< 0.001	0.002	7	< 0.001	0.8	< 0.001	< 0.0005	< 0.001	0.0003	0.0063	< 0.001	0.14	< 0.01
X5P	N > DL	0	4	0	5	0	0	0	5	2	5	0	5	3	5	5	5	5	5	5	5	0	0	0	3	5	0	5	0	0	0	3	5	0	5	0
X5P	Median	0.00025	0.01	0.001	0.032	0.05	0.001	0.001	246	0.0002	0.008	0.001	0.002	0.05	5.1	0.015	45.3	8.55	0.0018	23.9	0.018	0.001	0.15	0.001	0.001	6.1	0.001	0.73	0.001	0.0005	0.001	0.0001	0.0041	0.001	0.12	0.01
X7	01-Jun-08	0.0007	1.26	0.003	0.008	< 0.05	< 0.001	< 0.001	347	0.016	0.54	< 0.001	0.005	1020	9.2	0.078	585	61.3	0.0075	58.8	0.62	< 0.001	< 0.15	< 0.001	0.005	18	< 0.001	3.23	< 0.001	< 0.0005	< 0.001	0.0002	0.0028	< 0.001	314	< 0.01
X7	29-Sep-08	0.0008	1.1	0.003	0.012	< 0.05	0.001	< 0.001	388	0.013	0.58	0.001	0.006	1600	10.6	0.11	569	64.3	0.0051	80.4	0.6	< 0.001	< 0.15	< 0.001	0.006	15.6	< 0.001	2.84	< 0.001	< 0.0005	< 0.001	0.0002	0.0023	< 0.001	405	< 0.01
X10	08-Jan-08	< 0.00025	< 0.005	< 0.001	0.058	< 0.05	< 0.001	< 0.001	38.5	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1	0.005	9.64	0.037	< 0.0005	2.72	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.6	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0017	< 0.001	0.039	< 0.01
X10	24-Jan-08	< 0.000005	0.0011	0.00014	0.0698	< 0.005	< 0.00001	0.000005	45	0.000018	0.00005	< 0.0001	0.00038	0.043	1.06	0.0058	10.7	0.0341	0.00063	2.91	0.00085	0.000026		0.00006	0.00038	5.28	0.00001	0.195			< 0.0005	< 0.000002	0.00248	< 0.0002	0.0644	< 0.0001
X10	19-Feb-08	< 0.00025	< 0.005	< 0.001	0.06	< 0.05	< 0.001	< 0.001	42.2	< 0.0002	< 0.001	< 0.001	< 0.001	0.06	1.1	0.005	10.9	0.041	0.0007	3.02	0.002	< 0.001	< 0.15	< 0.001	< 0.001	5.5	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0015	< 0.001	0.05	< 0.01
X10	20-Feb-08	< 0.000005	0.0015	0.00015	0.0834	< 0.005	< 0.00001	0.000005	54	0.000017	0.000043	< 0.0001	0.0003	0.034	1.29	0.0082	13.6	0.034	0.00077	3.66	0.00116	0.00004		0.00007	0.00046	6.31	0.00001	0.229			< 0.0005	0.000002	0.00304	< 0.0002	0.0728	< 0.0001
X10	11-Mar-08	< 0.000005	0.0013	0.00014	0.0754	< 0.005	< 0.00001	0.000005	50.7	0.000019	0.000034	< 0.0001	0.00038	0.051	1.27	0.0074	12.3	0.0289	0.00072	3.45	0.00105	0.000068		0.00006	0.00043	5.76	0.00001	0.213			< 0.0005	< 0.000002	0.00276	< 0.0002	0.083	< 0.0001
X10	18-Mar-08	< 0.00025	< 0.005	< 0.001	0.07	< 0.05	< 0.001	< 0.001	37.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1	0.003	12.3	0.03	0.0005	4	0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.4	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	< 0.0001	0.003	< 0.001	0.042	< 0.01

Appendix 3
2008 Surface Water Quality Data
Rose Creek Drainage

Table 3. Surface Water Dissolved Metals

Station	Date	AG-D mg/L	AL-D mg/L	AS-D mg/L	BA-D mg/L	B-D mg/L	BE-D mg/L	BI-D mg/L	CA-D mg/L	CD-D mg/L
X10	15-Apr-08	< 0.00025	< 0.005	< 0.001	0.067	< 0.05	< 0.001	< 0.001	42.1	< 0.0002
X10	29-Apr-08	< 0.000005	0.0149	0.00028	0.0654	< 0.05	< 0.00001	0.000005	45.4	0.000032
X10	15-May-08	< 0.00025	0.04	< 0.001	0.025	< 0.05	< 0.001	< 0.001	13.1	< 0.0002
X10	22-May-08	0.000005	0.0825	0.0005	0.0259	< 0.05	0.00002	0.000008	11.6	0.000029
X10	16-Jun-08	< 0.00025	0.016	< 0.001	0.023	< 0.05	< 0.001	< 0.001	14.3	< 0.0002
X10	24-Jun-08	0.000008	0.0628	0.00052	0.0224	< 0.05	0.00002	0.000007	10.5	0.000039
X10	14-Jul-08	< 0.00025	0.028	< 0.001	0.028	< 0.05	< 0.001	< 0.001	18.1	< 0.0002
X10	30-Jul-08	< 0.000005	0.0153	0.00039	0.043	< 0.05	< 0.00001	0.000005	26.5	0.000012
X10	11-Aug-08	< 0.00025	0.02	< 0.001	0.044	< 0.05	< 0.001	< 0.001	24.5	< 0.0002
X10	15-Sep-08	< 0.00025	0.008	< 0.001	0.035	< 0.05	< 0.001	< 0.001	22.2	< 0.0002
X10	18-Sep-08	0.000019	0.0175	0.00038	0.0425	< 0.05	< 0.00001	0.000005	25.7	0.000013
X10	07-Oct-08	< 0.000005	0.0169	0.00037	0.0485	< 0.05	< 0.00001	0.000005	30.9	0.000058
X10	15-Oct-08	< 0.00025	0.007	< 0.001	0.041	< 0.05	< 0.001	< 0.001	27.7	< 0.0002
X10	04-Nov-08	< 0.00025	0.017	< 0.001	0.046	< 0.05	< 0.001	< 0.001	29.4	0.0005
X10	01-Dec-08	< 0.00025	0.021	< 0.001	0.057	< 0.05	< 0.001	< 0.001	38.2	< 0.0002
X10	10-Dec-08	< 0.000005	0.0124	0.00019	0.0633	< 0.05	< 0.00001	0.000005	42	0.00002
X10	MEAN	0.000139409	0.0183273	0.0006845	0.0497091	0.043864	0.0005509	0.000548	31.363636	0.0001344
X10	MINIMUM	< 0.000005	0.0011	0.00014	0.0224	< 0.005	< 0.00001	0.000005	10.5	0.000012
X10	MAXIMUM	< 0.00025	0.0825	< 0.001	0.0834	< 0.05	< 0.001	< 0.001	54	0.0005
X10	N > DL	3	18	10	22	0	2	2	22	11
X10	Median	0.00025	0.0151	0.001	0.04725	0.05	0.001	0.001	30.15	0.0002
X11	03-Mar-08	< 0.00025	< 0.005	0.002	0.046	< 0.05	< 0.001	< 0.001	412	< 0.0002
X11	19-Aug-08	< 0.00025	< 0.005	< 0.001	0.037	< 0.05	< 0.001	< 0.001	409	< 0.0002
X12	03-Mar-08	< 0.00025	< 0.005	< 0.001	0.036	< 0.05	< 0.001	< 0.001	184	< 0.0002
X12	19-Aug-08	< 0.00025	< 0.005	< 0.001	0.033	< 0.05	< 0.001	< 0.001	175	< 0.0002
X13	08-Jan-08	< 0.00025	0.008	0.001	0.062	< 0.05	< 0.001	< 0.001	261	< 0.0002
X13	19-Feb-08	< 0.00025	< 0.005	< 0.001	0.057	< 0.05	< 0.001	< 0.001	346	< 0.0002
X13	18-Mar-08	< 0.00025	< 0.005	0.001	0.066	< 0.05	< 0.001	< 0.001	254	< 0.0002
X13	15-Apr-08	< 0.00025	< 0.005	0.002	0.062	< 0.05	< 0.001	< 0.001	292	< 0.0002
X13	15-May-08	< 0.00025	< 0.005	0.001	0.047	< 0.05	< 0.001	< 0.001	298	< 0.0002
X13	16-Jun-08	< 0.00025	< 0.005	0.001	0.047	< 0.05	< 0.001	< 0.001	310	< 0.0002
X13	14-Jul-08	< 0.00025	0.017	< 0.001	0.049	< 0.05	< 0.001	< 0.001	304	< 0.0002
X13	11-Aug-08	< 0.00025	0.008	< 0.001	0.062	< 0.05	< 0.001	< 0.001	250	< 0.0002
X13	15-Sep-08	< 0.00025	< 0.005	< 0.001	0.053	< 0.05	< 0.001	< 0.001	298	< 0.0002
X13	15-Oct-08	< 0.00025	0.006	< 0.001	0.051	< 0.05	< 0.001	< 0.001	234	< 0.0002
X13	04-Nov-08	< 0.00025	0.014	< 0.001	0.058	< 0.05	< 0.001	< 0.001	210	0.0003
X13	01-Dec-08	< 0.00025	0.008	< 0.001	0.059	< 0.05	< 0.001	< 0.001	351	< 0.0002
X13	MEAN	0.00025	0.0076	0.0011	0.0561	0.05	0.001	0.001	284	0.00021
X13	MINIMUM	< 0.00025	< 0.005	< 0.001	0.047	< 0.05	< 0.001	< 0.001	210	< 0.0002
X13	MAXIMUM	< 0.00025	0.017	0.002	0.066	< 0.05	< 0.001	< 0.001	351	0.0003
X13	N > DL	0	6	5	12	0	0	0	12	1
X13	Median	0.00025	0.0055	0.001	0.0575	0.05	0.001	0.001	295	0.0002
X14	08-Jan-08	< 0.00025	< 0.005	< 0.001	0.056	< 0.05	< 0.001	< 0.001	79.5	< 0.0002
X14	24-Jan-08	< 0.000005	0.0008	0.00024	0.0714	< 0.005	< 0.00001	0.000005	105	0.000046
X14	19-Feb-08	< 0.00025	< 0.005	< 0.001	0.061	< 0.05	< 0.001	< 0.001	104	< 0.0002
X14	20-Feb-08	< 0.000005	0.0041	0.00027	0.0741	< 0.005	< 0.00001	0.000005	124	0.000053
X14	11-Mar-08	< 0.000005	0.0018	0.00038	0.073	< 0.005	< 0.00001	0.000005	130	0.000054
X14	18-Mar-08	< 0.00025	< 0.005	< 0.001	0.068	< 0.05	< 0.001	< 0.001	105	< 0.0002
X14	14-Apr-08	< 0.00025	< 0.005	< 0.001	0.051	< 0.05	< 0.001	< 0.001	157	< 0.0002
X14	15-Apr-08	< 0.00025	< 0.005	0.001	0.054	< 0.05	< 0.001	< 0.001	159	< 0.0002
X14	22-Apr-08	< 0.00025	< 0.005	< 0.001	0.05	< 0.05	< 0.001	< 0.001	181	< 0.0002
X14	29-Apr-08	< 0.00025	< 0.005	< 0.001	0.041	< 0.05	< 0.001	< 0.001	166	< 0.0002
X14	29-Apr-08	< 0.000005	0.0101	0.00037	0.05	< 0.05	< 0.00001	0.000005	188	0.000104
X14	06-May-08	< 0.00025	0.015	< 0.001	0.036	< 0.05	< 0.001	< 0.001	87.7	< 0.0002
X14	13-May-08	< 0.00025	0.051	< 0.001	0.026	< 0.05	< 0.001	< 0.001	37.5	< 0.0002
X14	15-May-08	< 0.00025	0.034	< 0.001	0.027	< 0.05	< 0.001	< 0.001	40.4	< 0.0002
X14	20-May-08	< 0.00025	0.05	< 0.001	0.024	< 0.05	< 0.001	< 0.001	21.1	< 0.0002
X14	22-May-08	< 0.000005	0.0759	0.00051	0.0283	< 0.05	0.00002	0.000005	24.5	0.000033
X14	26-May-08									
X14	26-May-08									
X14	27-May-08	< 0.00025	0.038	< 0.001	0.016	< 0.05	< 0.001	< 0.001	12.2	< 0.0002
X14	03-Jun-08	< 0.00025	0.017	< 0.001	0.022	< 0.05	< 0.001	< 0.001	21.5	< 0.0002
X14	10-Jun-08	< 0.00025	0.027	< 0.001	0.023	< 0.05	< 0.001	< 0.001	25.3	< 0.0002
X14	16-Jun-08	< 0.00025	0.042	< 0.001	0.024	< 0.05	< 0.001	< 0.001	27.8	< 0.0002
X14	17-Jun-08	< 0.00025	0.045	< 0.001	0.024	< 0.05	< 0.001	< 0.001	24.3	< 0.0002
X14	24-Jun-08	< 0.00025	0.022	< 0.001	0.018	< 0.05	< 0.001	< 0.001	15.6	< 0.0002
X14	24-Jun-08	< 0.000005	0.0571	0.00049	0.0238	< 0.05	0.00002	0.000005	20.2	0.000049
X14	01-Jul-08	< 0.00025	0.018	< 0.001	0.03	< 0.05	< 0.001	< 0.001	38.5	< 0.0002
X14	08-Jul-08	< 0.00025	0.025	< 0.001	0.031	< 0.05	< 0.001	< 0.001	32	< 0.0002
X14	14-Jul-08	< 0.00025	0.024	< 0.001	0.03	< 0.05	< 0.001	< 0.001	27.8	< 0.0002
X14	16-Jul-08	< 0.00025	0.035	< 0.001	0.024	< 0.05	< 0.001	< 0.001	24.9	< 0.0002
X14	22-Jul-08	< 0.00025	0.01	< 0.001	0.036	< 0.05	< 0.001	< 0.001	34.3	< 0.0002
X14	30-Jul-08	< 0.000005	0.0162	0.0004	0.0445	< 0.05	< 0.00001	0.000005	46.7	0.000018
X14	31-Jul-08	< 0.00025	0.01	< 0.001	0.031	< 0.05	< 0.001	< 0.001	37.2	< 0.0002
X14	05-Aug-08	< 0.00025	0.005	< 0.001	0.043	< 0.05	< 0.001	< 0.001	48.3	< 0.0002
X14	11-Aug-08	< 0.00025	0.016	< 0.001	0.041	< 0.05	< 0.001	< 0.001	42.6	< 0.0002

Station	Date	CO-D mg/L	CR-D mg/L	CU-D mg/L	FE-D mg/L	K-D mg/L	LI-D mg/L	MG-D mg/L	MN-D mg/L	MO-D mg/L	NA-D mg/L	NI-D mg/L	PB-D mg/L	P-D mg/L	SB-D mg/L	SE-D mg/L
X10	15-Apr-08	< 0.001	< 0.001	< 0.001	0.08	1	0.007	10.8	0.029	0.0007	3.12	0.001	< 0.001	< 0.15	< 0.001	< 0.001
X10	29-Apr-08	0.000065	< 0.0001	0.00085	0.12	1.26	0.0066	9.23	0.0336	0.00072	2.55	0.00122	0.000342		0.00008	0.00034
X10	15-May-08	< 0.001	< 0.001	0.002	0.2	1.1	0.002	3.04	0.041	< 0.0005	1.09	0.001	< 0.001	< 0.15	< 0.001	< 0.001
X10	22-May-08	0.000075	0.0001	0.00197	0.226	1.08	0.0012	2.71	0.0119	0.00023	0.76	0.00118	0.00138		0.00008	0.0001
X10	16-Jun-08	< 0.001	< 0.001	< 0.001	0.07	0.4	< 0.001	3.54	0.013	< 0.0005	1.17	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001
X10	24-Jun-08	0.000081	0.0002	0.00132	0.185	0.53	0.0015	2.29	0.0168	0.00026	1.09	0.00083	0.000674		0.00009	0.00009
X10	14-Jul-08	< 0.001	< 0.001	0.001	0.12	0.5	< 0.001	4.88	0.013	< 0.0005	1.37	0.001	< 0.001	< 0.15	< 0.001	< 0.001
X10	30-Jul-08	0.000066	< 0.0001	0.00081	0.173	0.6	0.0023	6.11	0.0284	0.00042	2.48	0.00055	0.000274		0.00007	0.00023
X10	11-Aug-08	< 0.001	< 0.001	< 0.001	0.18	0.6	0.002	6.91	0.022	< 0.0005	1.77	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001
X10	15-Sep-08	< 0.001	< 0.001	< 0.001	0.14	0.5	0.002	5.43	0.029	< 0.0005	1.52	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001
X10	18-Sep-08	0.000059	< 0.0001	0.00062	0.146	0.63	0.0022	6.01	0.0256	0.0004	1.67	0.00056	0.00021		0.00007	0.00029
X10	07-Oct-08	0.000119	0.0001	0.00083	0.229	0.74	0.0027	7.52	0.0547	0.00044	1.96	0.00068	0.000296		0.00007	0.00033
X10	15-Oct-08	< 0.001	< 0.001	< 0.001	0.13	0.6	0.002	6.18	0.043	< 0.0005	1.64	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001
X10	04-Nov-08	< 0.001	< 0.001	0.001	0.06	0.9	0.003	7.76	0.081	< 0.0005	2.69	< 0.001	< 0.001	< 0.15	< 0.001	0.001
X10	01-Dec-08	< 0.001	< 0.001	< 0.001	0.09	0.9	0.004	9.97	0.077	< 0.0005	2.84	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001
X10	10-Dec-08	0.000117	0.0002	0.00104	0.095	0.99	0.0047	9.52	0.0706	0.0006	2.59	0.00089	0.000144		0.00008	0.00042
X10	MEAN	0.0005777	0.0006	0.000977	0.11509	0.8659091	0.0036182	7.7881818	0.036118	0.0005268	2.275909	0.0009986	0.0007025	0.15	0.0005786	0.000685
X10	MINIMUM	0.000034	< 0.0001	0.0003	0.034	0.4	< 0.001	2.29	0.0119	0.00023	0.76	0.00055	0.000026	< 0.15	0.00006	0.00009
X10	MAXIMUM	< 0.001	< 0.001	0.002	0.229	1.29	0.0082	13.6	0.081	0.00077	4	0.002	0.00138	< 0.15	< 0.001	< 0.001
X10	N > DL	10	4	13	20	22	20	22	22	13	22	15	10	0	10	11
X10	Median	0.001	0.001	0.001	0.1075	0.945	0.00285	7.64	0.0318	0.0005	2.515	0.001	0.001	0.15	0.001	0.001
X11	03-Mar-08	0.022	< 0.001	0.001	0.07	6.8	0.015	94.2	22.5	0.0023	40.1	0.025	< 0.001	< 0.15	< 0.001	0.004
X11	19-Aug-08	0.022	< 0.001	0.001	< 0.05	6.8	0.016	89.8	22.6	0.0014	43	0.025	< 0.001	< 0.15	< 0.001	< 0.001
X12	03-Mar-08	< 0.001	< 0.001	< 0.001	< 0.05	5.4	0.005	47.1	0.5	0.0006	21.8	< 0.001	< 0.001	< 0.15	< 0.001	0.003
X12	19-Aug-08	< 0.001	< 0.001	< 0.001	< 0.05	5.8	0.007	43.2	0.27	< 0.0005	19.5	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001
X13	08-Jan-08	0.006	< 0.001	0.001	0.07	4.8	0.01	56.2	11.8	0.002	29.9	0.017	< 0.001	< 0.15	< 0.001	0.001
X13	19-Feb-08	0.012	< 0.001	0.001	0.24	5.1	0.011	72.1	17.1	0.0023	35.1	0.02	< 0.001	< 0.15	< 0.001	< 0.001
X13	18-Mar-08	0.011	< 0.001	0.001	< 0.05	4.9	0.008	74.3	14	0.0021	41.5	0.021	< 0.001	< 0.15	< 0.001	0.001
X13	15-Apr-08	0.009	< 0.001	0.001	0.11	4.9	0.012	63.2	13.5	0.0021	32.3	0.019	< 0.001	< 0.15	< 0.001	< 0.001
X13	15-May-08	0.012	< 0.001	0.001	< 0.05	4.8	0.012	63.3	14.9	0.0022	30.5	0.019	< 0.001	< 0.15	< 0.001	0.001
X13	16-Jun-08	0.01	< 0.001	< 0.001	< 0.05	4.9	0.011	63.1	14.8	0.0021	30.7	0.018	< 0.001	< 0.15	< 0.001	0.002
X13	14-Jul-08	0.008	< 0.001	0.001	0.84	4.6	0.014	65.4	12.9	0.0008	29.6	0.016	< 0.001	< 0.15	< 0.001	< 0.001
X13	11-Aug-08	0.007	< 0.001	0.001	0.58	4.7	0.012	61.4	11.7	0.0011	29.7	0.015	< 0.001	< 0.15	< 0.001	0.002
X13	15-Sep-08	0.013	< 0.001	< 0.001	0.18	5.1	0.011	65.8	13.8	0.0017	29.4	0.018	< 0.001	< 0.15	< 0.001	< 0.001
X13	15-Oct-08	0.006	< 0.001	< 0.001	< 0.05	3.9	0.009	45.2	10.2	0.002	22.8	0.014	< 0.001	< 0.15	< 0.001	0.002
X13	04-Nov-08	0.004	< 0.001	< 0.001	< 0.05	3.9	0.007	46.2	7.7	0.0022	25.1	0.013	< 0.001	< 0.15	< 0.001	< 0.001
X13	01-Dec-08	0.012	< 0.001	< 0.001	0.37	5.6	0.013	76	17.4	0.0017	39.1	0.025	< 0.001	< 0.15	< 0.001	< 0.001
X13	MEAN	0.009	0.001	0.001	0.22	4.7666667	0.0108333	62.683333	13.31667	0.0018583	31.30833	0.0179167	0.001	0.15	0.001	0.00125
X13	MINIMUM	0.004	< 0.001	< 0.001	< 0.05	3.9	0.007	45.2	7.7	0.0008	22.8	0.013	< 0.001	< 0.15	< 0.001	< 0.001
X13	MAXIMUM	0.013	< 0.001	< 0.001	0.84	5.6	0.014	76	17.4	0.0023	41.5	0.025	< 0.001	< 0.15	< 0.001	0.002
X13	N > DL	12	0	7	7	12	12	12	12	12	12	12	0	0	0	6
X13	Median	0.0095	0.001	0.001	0.09	4.85	0.011	63.25	13.65	0.00205	30.2	0.018	0.001	0.15	0.001	0.001
X14	08-Jan-08	0.001	< 0.001	< 0.001	0.09	1.6	0.006	17.3	1.77	0.0007	6.78	0.003	< 0.001	< 0.15	< 0.001	< 0.001
X14	24-Jan-08	0.00158	< 0.0001	0.00029	0.026	1.91	0.0075	21.3	2.37	0.00079	8.4	0.00405	0.000011		0.00006	0.00034
X14	19-Feb-08	0.002	< 0.001	< 0.001	0.13	2	0.007	22.6	2.84	0.001	9.41	0.006	< 0.001	< 0.15	< 0.001	< 0.001
X14	20-Feb-08	0.00205	0.0002	0.00042	0.013	2.37	0.0088	26	3.27	0.00081	11.1	0.00539	0.000028		0.00007	0.00034
X14	11-Mar-08	0.00237	< 0.0001	0.00031	0.275	2.47	0.009	27.2	3.61	0.00084	11.5	0.0058	0.000063		0.00006	0.00034
X14	18-Mar-08	0.002	< 0.001	< 0.001	< 0.05	2	0.004	26.6	2.97	0.001	13.5	0.006	< 0.001	< 0.15	< 0.001	0.001
X14	14-Apr-08	0.006	< 0.001	< 0.001	0.11	3.2	0.011	36	6.31	0.0014	16.5	0.014	< 0.001	< 0.15	< 0.001	0.002
X14	15-Apr-08	0.006	< 0.001	< 0.001	0.08	3.3	0.011	36.9	6.56	0.0013	16.7	0.014	< 0.001	< 0.15	< 0.001	< 0.001
X14	22-Apr-08	0.007	< 0.001	0.001	< 0.05	3.1	0.011	33.2	7.72	0.0012	15.7	0.016	< 0.001	< 0.15	< 0.001	< 0.001
X14	29-Apr-08	0.005	< 0.001	< 0.001	< 0.05	3.3	0.01	31.3	5.61	0.0012	13.2	0.011	< 0.001	< 0.15	< 0.001	< 0.001
X14	29-Apr-08	0.006	0.0001	0.00075	0.112	3.48	0.0112	32.7	6.33	0.00085	13.9	0.0129	0.000201		0.00014	0.00025
X14	06-May-08	0.002	< 0.001	0.002	0.18	2.5	0.007	19.4	2.1	0.0008	8.2	0.006	< 0.001	< 0.15	< 0.001	< 0.001
X14	13-May-08	< 0.001	< 0.001	0.002	0.32	1.6	0.003	6.97	0.91	< 0.0005	3.02	0.003	< 0.001	< 0.15	< 0.001	< 0.001
X14	15-May-08	< 0.001	< 0.001	0.002	0.16	1.6	0.004	7.43	0.8	0.0006	3.16	0.002	< 0.001	< 0.15	< 0.001	< 0.001
X14	20-May-08	< 0.001	< 0.001	0.002	0.19	1.3	0.002	4.68	0.26	< 0.0005	1.72	0.002	< 0.001	< 0.15	< 0.001	< 0.001
X14	22-May-08	0.000345	0.0002	0.00211	0.209	1.37	0.0023	5.15	0.288	0.00027	1.88	0.00168	0.00117		0.00009	0.00012
X14	26-May-08													0.021		
X14	26-May-08													0.021		
X14	27-May-08	< 0.001	< 0.001	0.001	0.11	0.8	< 0.001	2.92	0.11	< 0.0005	1.27	0.001	< 0.001	< 0.15	< 0.001	< 0.001
X14	03-Jun-08	< 0.001	< 0.001	< 0.001	0.08	0.7	0.002	4.44	0.19	< 0.0005	1.88	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001
X14	10-Jun-08	< 0.001	< 0.001	0.001	0.09	0.7	0.002	6.78	0.44	< 0.0005	2.73	0.002	< 0.001	< 0.15	< 0.001	< 0.001
X14	16-Jun-08	< 0.001	< 0.001	< 0.001	0.16	0.9	< 0.001	7.53	0.26	< 0.0005	3	0.001	< 0.001	< 0.15	< 0.001	< 0.001
X14	17-Jun-08	< 0.001	< 0.001	< 0.001	< 0.05	0.7	0.003	5.88	0.27	< 0.0005	2.59	0.001	< 0.001	< 0.15	< 0.001	0.001
X14	24-Jun-08	< 0.001	< 0.001	0.001	0.07	0.6	0.002	3.39	0.37	0.0006	1.57	0.001	< 0.001	< 0.15	< 0.001	< 0.001
X14	24-Jun-08	0.000684	0.0002	0.0012	0.144	0.71	0.0022	4.34	0.539	0.00029	1.99	0.00198	0.000545		0.00009	0.00006
X14	01-Jul-08	0.001	0.001	0.001	0.13	0.9	0.003	8.68	1.01	< 0.0005	3.36	0.005	< 0.001	< 0.15	< 0.001	< 0.001
X14	08-Jul-08	< 0.001	< 0.001	< 0.001	0.05	0.8	0.003	6.84	0.57	< 0.0005	2.52	0.002	< 0.001	< 0.15	< 0.001	< 0.001
X14	14-Jul-08	< 0.001	< 0.001	0.001	0.16	0.7	0.005	6.43	0.41	< 0.0005	2.32	0.002	< 0.001	< 0.15	< 0.001	< 0.001
X14	16-Jul-08	< 0.001	< 0.001	0.002	0.14	0.7	0.001	5.37	0.38	< 0.0005	2.13	0.002	< 0.001	< 0.15	< 0.001	< 0.001
X14	22-Jul-08	< 0.001	< 0.001	0.001	0.12	0.8	0.003	7.92	0.43	< 0.0005	2.8	0.002	< 0.001	< 0.15	< 0.001	< 0.001
X14	30-Jul-08	0.000881	0.0001	0.00083	0.171	1.05	0.0045	9.57	0.76	0.00049	4.19	0.00222	0.000363		0.00009	0.00024
X14	31-Jul-08	< 0.001	< 0.001	< 0.001	0.1	0.8	0.003	7.73	0.66	< 0.0005	3.36	0.002	< 0.001	< 0.15	< 0.001	0.001
X14	05-Aug-08	< 0.001	< 0.001	< 0.001	0.08	1.2	0.005	10.7	0.9	< 0.0005	4	0.002	< 0.001	< 0.15	< 0.001	0.001
X14	11-Aug-08	0.001	< 0.001	< 0.001	0.16	1.1	0.004	10.8	0.98	< 0.0005	3.81	0.003	< 0.001	< 0.15	< 0.001	< 0.001

Station	Date	SI-D mg/L	SN-D mg/L	SR-D mg/L	TE-D mg/L	TH-D mg/L	TI-D mg/L	TL-D mg/L	U-D mg/L	V-D mg/L	ZN-D mg/L	ZR-D mg/L
X10	15-Apr-08	4.8	< 0.001	0.19	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0024	< 0.001	0.044	< 0.01
X10	29-Apr-08	4.72	0.00001	0.196			0.0009	< 0.000002	0.00255	0.0003	0.0946	< 0.0001
X10	15-May-08	2.6	< 0.001	0.056	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.031	< 0.01
X10	22-May-08	2.28	0.00001	0.0538			0.0015	< 0.000002	0.000452	0.0002	0.0184	0.0002
X10	16-Jun-08	3	< 0.001	0.059	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0005	< 0.001	0.008	< 0.01
X10	24-Jun-08	3.79	0.00001	0.0492			0.0013	0.000005	0.000393	0.0002	0.0096	0.0002
X10	14-Jul-08	4.5	< 0.001	0.073	< 0.001	< 0.0005	0.001	< 0.0001	0.0006	< 0.001	0.011	< 0.01
X10	30-Jul-08	4.57	0.00001	0.116			< 0.0005	0.000003	0.00116	< 0.0002	0.0189	< 0.0001
X10	11-Aug-08	7.6	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001	0.014	< 0.01
X10	15-Sep-08	4	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001	0.014	< 0.01
X10	18-Sep-08	4.49	0.00001	0.113			< 0.0005	< 0.000002	0.00113	< 0.0002	0.0179	< 0.0001
X10	07-Oct-08	4.58	0.00001	0.133			< 0.0005	0.000002	0.0015	< 0.0002	0.0302	< 0.0001
X10	15-Oct-08	4.8	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001	0.049	< 0.01
X10	04-Nov-08	5.1	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001	0.045	< 0.01
X10	01-Dec-08	6	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001	0.065	< 0.01
X10	10-Dec-08	5.2	0.00002	0.178			0.0006	0.000002	0.0022	< 0.0002	0.0685	< 0.0001
X10	MEAN	4.7672727	0.00055	0.13564	0.001	0.0005	0.0008773	5.564E-05	0.0015393	0.0006409	0.040468182	0.005509091
X10	MINIMUM	2.28	0.00001	0.0492	< 0.001	< 0.0005	< 0.0005	< 0.000002	0.000393	< 0.0002	0.008	< 0.0001
X10	MAXIMUM	7.6	< 0.001	0.229	< 0.001	< 0.0005	0.0015	< 0.0001	0.00304	< 0.001	0.0946	< 0.01
X10	N > DL	22	1	22	0	0	5	5	21	3	22	2
X10	Median	4.76	0.001	0.1265	0.001	0.0005	0.001	0.0001	0.0013	0.001	0.0405	0.01
X11	03-Mar-08	7.3	< 0.001	1.18	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0049	< 0.001	0.006	< 0.01
X11	19-Aug-08	8.6	< 0.001	1.06	< 0.001	< 0.0005	< 0.001	< 0.0001	0.005	< 0.001	0.013	< 0.01
X12	03-Mar-08	3.9	< 0.001	0.62	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0078	< 0.001	< 0.005	< 0.01
X12	19-Aug-08	5.8	< 0.001	0.54	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0093	< 0.001	0.006	< 0.01
X13	08-Jan-08	6.7	< 0.001	0.72	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0056	< 0.001	0.008	< 0.01
X13	19-Feb-08	9.1	< 0.001	0.86	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0039	< 0.001	0.008	< 0.01
X13	18-Mar-08	8.3	< 0.001	0.82	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0085	< 0.001	0.007	< 0.01
X13	15-Apr-08	6.6	< 0.001	0.85	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0061	< 0.001	0.006	< 0.01
X13	15-May-08	6.7	< 0.001	0.82	< 0.001	< 0.0005	< 0.001	< 0.0001	0.005	< 0.001	0.007	< 0.01
X13	16-Jun-08	7	< 0.001	0.8	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0053	< 0.001	0.007	< 0.01
X13	14-Jul-08	6.9	< 0.001	0.67	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0056	< 0.001	0.009	< 0.01
X13	11-Aug-08	10.4	< 0.001	0.65	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0065	< 0.001	0.008	< 0.01
X13	15-Sep-08	6.9	< 0.001	0.74	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0074	< 0.001	0.01	< 0.01
X13	15-Oct-08	7.1	< 0.001	0.63	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0054	< 0.001	0.005	< 0.01
X13	04-Nov-08	6.7	< 0.001	0.55	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0058	< 0.001	< 0.005	< 0.01
X13	01-Dec-08	8.5	< 0.001	0.86	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0051	< 0.001	0.009	< 0.01
X13	MEAN	7.575	0.001	0.7475	0.001	0.0005	0.001	0.0001	0.00585	0.001	0.007416667	0.01
X13	MINIMUM	6.6	< 0.001	0.55	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0039	< 0.001	< 0.005	< 0.01
X13	MAXIMUM	10.4	< 0.001	0.86	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0085	< 0.001	0.01	< 0.01
X13	N > DL	12	0	12	0	0	0	0	12	0	11	0
X13	Median	6.95	0.001	0.77	0.001	0.0005	0.001	0.0001	0.0056	0.001	0.0075	0.01
X14	08-Jan-08	4.8	< 0.001	0.28	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0021	< 0.001	0.032	< 0.01
X14	24-Jan-08	5.51	0.00001	0.328			< 0.0005	0.000005	0.0033	< 0.0002	0.0468	< 0.0001
X14	19-Feb-08	5.8	< 0.001	0.35	< 0.001	< 0.0005	< 0.001	< 0.0001	0.002	< 0.001	0.032	< 0.01
X14	20-Feb-08	6.01	0.00001	0.37			< 0.0005	0.000009	0.00372	< 0.0002	0.0464	< 0.0001
X14	11-Mar-08	6.18	0.00001	0.387			< 0.0005	0.000008	0.00367	< 0.0002	0.0554	< 0.0001
X14	18-Mar-08	5.7	< 0.001	0.33	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0039	< 0.001	0.029	< 0.01
X14	14-Apr-08	5.4	< 0.001	0.5	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0037	< 0.001	0.046	< 0.01
X14	15-Apr-08	5.5	< 0.001	0.53	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0039	< 0.001	0.083	< 0.01
X14	22-Apr-08	5.4	< 0.001	0.6	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0034	< 0.001	0.04	< 0.01
X14	29-Apr-08	4.9	< 0.001	0.5	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0027	< 0.001	0.076	< 0.01
X14	29-Apr-08	5.12	0.00001	0.563			0.0012	0.000109	0.00363	0.0003	0.118	< 0.0001
X14	06-May-08	3.8	< 0.001	0.29	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	< 0.001	0.069	< 0.01
X14	13-May-08	2	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0006	< 0.001	0.043	< 0.01
X14	15-May-08	2.6	< 0.001	0.13	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0007	< 0.001	0.045	< 0.01
X14	20-May-08	2.3	< 0.001	0.076	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.02	< 0.01
X14	22-May-08	2.58	0.00001	0.0903			0.0014	0.000015	0.000545	< 0.0002	0.0211	0.0002
X14	26-May-08											
X14	26-May-08											
X14	27-May-08	2.2	< 0.001	0.047	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.009	< 0.01
X14	03-Jun-08	2.7	< 0.001	0.074	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.007	< 0.01
X14	10-Jun-08	4.4	< 0.001	0.077	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.013	< 0.01
X14	16-Jun-08	3.6	< 0.001	0.099	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0007	< 0.001	0.021	< 0.01
X14	17-Jun-08	3.4	< 0.001	0.084	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.009	< 0.01
X14	24-Jun-08	2.9	< 0.001	0.055	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.008	< 0.01
X14	24-Jun-08	3.45	0.00001	0.0752			0.0013	0.000009	0.000501	< 0.0002	0.0145	0.0002
X14	01-Jul-08	3.6	< 0.001	0.13	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0008	< 0.001	0.025	< 0.01
X14	08-Jul-08	3.8	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0008	< 0.001	0.014	< 0.01
X14	14-Jul-08	4.3	< 0.001	0.1	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0007	< 0.001	0.14	< 0.01
X14	16-Jul-08	4.8	< 0.001	0.093	< 0.001	< 0.0005	0.001	< 0.0001	< 0.0005	< 0.001	0.012	< 0.01
X14	22-Jul-08	4.5	< 0.001	0.13	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001	0.01	< 0.01
X14	30-Jul-08	4.71	0.00001	0.174			< 0.0005	0.000021	0.00133	< 0.0002	0.0237	< 0.0001
X14	31-Jul-08	3.4	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001	0.017	< 0.01
X14	05-Aug-08	4.1	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001	0.014	< 0.01
X14	11-Aug-08	7.5	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001	0.018	< 0.01

AECOM

Appendix 3
2008 Surface Water Quality Data
Rose Creek Drainage

Table 3. Surface Water Dissolved Metals

Station	Date	AG-D mg/L	AL-D mg/L	AS-D mg/L	BA-D mg/L	B-D mg/L	BE-D mg/L	BI-D mg/L	CA-D mg/L	CD-D mg/L	CO-D mg/L	CR-D mg/L	CU-D mg/L	FE-D mg/L	K-D mg/L	LI-D mg/L	MG-D mg/L	MN-D mg/L	MO-D mg/L	NA-D mg/L	NI-D mg/L	PB-D mg/L	P-D mg/L	SB-D mg/L	SE-D mg/L	SI-D mg/L	SN-D mg/L	SR-D mg/L	TE-D mg/L	TH-D mg/L	TI-D mg/L	TL-D mg/L	U-D mg/L	V-D mg/L	ZN-D mg/L	ZR-D mg/L
X14	12-Aug-08	< 0.00025	0.013	< 0.001	0.043	< 0.05	< 0.001	< 0.001	45.4	< 0.0002	< 0.001	< 0.001	< 0.001	0.18	1.2	0.006	11.5	0.73	< 0.0005	4.05	0.002	< 0.001	< 0.15	< 0.001	< 0.001	7.4	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0013	< 0.001	0.016	< 0.01
X14	19-Aug-08	< 0.00025	0.007	< 0.001	0.036	< 0.05	< 0.001	< 0.001	43.4	< 0.0002	< 0.001	< 0.001	0.001	0.17	1.1	0.004	10.6	0.87	0.001	4.06	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001	0.016	< 0.01
X14	28-Aug-08	< 0.00025	0.033	< 0.001	0.032	< 0.05	< 0.001	< 0.001	27.9	< 0.0002	< 0.001	< 0.001	0.001	0.11	0.7	0.002	6.4	0.31	< 0.0005	2.08	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4.5	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0007	< 0.001	0.009	< 0.01
X14	02-Sep-08	< 0.00025	0.016	< 0.001	0.037	< 0.05	< 0.001	< 0.001	39.1	< 0.0002	< 0.001	< 0.001	0.001	0.1	0.9	0.003	8.03	0.48	< 0.0005	2.72	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4.1	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0008	< 0.001	0.025	< 0.01
X14	09-Sep-08	< 0.00025	0.017	< 0.001	0.03	< 0.05	< 0.001	< 0.001	29	< 0.0002	< 0.001	< 0.001	< 0.001	0.06	0.7	0.003	6.65	0.27	< 0.0005	2.4	0.001	< 0.001	< 0.15	< 0.001	0.002	4.5	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0007	< 0.001	0.008	< 0.01
X14	15-Sep-08	< 0.00025	< 0.005	< 0.001	0.037	< 0.05	< 0.001	< 0.001	38.3	< 0.0002	< 0.001	< 0.001	< 0.001	0.11	0.9	0.004	8.07	0.46	< 0.0005	2.85	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001	0.013	< 0.01
X14	16-Sep-08	< 0.00025	0.005	< 0.001	0.036	< 0.05	< 0.001	< 0.001	37.5	< 0.0002	< 0.001	< 0.001	0.001	0.13	0.8	0.004	7.74	0.43	0.0005	2.84	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4.1	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001	0.012	< 0.01
X14	18-Sep-08	< 0.000005	0.0165	0.00036	0.0427	< 0.05	< 0.00001	0.000005	46.2	0.000025	0.000601	< 0.0001	0.00075	0.132	1.08	0.0044	8.94	0.48	0.00046	3.12	0.00156	0.000156		0.00008	0.00027	4.51	0.00001	0.176			< 0.0005	0.000028	0.00121	< 0.0002	0.023	< 0.0001
X14	23-Sep-08	< 0.00025	0.012	< 0.001	0.035	< 0.05	< 0.001	< 0.001	41.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.15	0.9	0.004	8.35	0.53	< 0.0005	2.99	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4.1	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0013	< 0.001	0.017	< 0.01
X14	30-Sep-08	< 0.00025	0.011	0.001	0.041	< 0.05	< 0.001	< 0.001	47.4	< 0.0002	< 0.001	< 0.001	< 0.001	0.11	1	0.004	8.01	0.68	0.0005	2.76	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4.3	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001	0.032	< 0.01
X14	07-Oct-08	< 0.00025	0.014	< 0.001	0.039	< 0.05	< 0.001	< 0.001	42.1	< 0.0002	< 0.001	< 0.001	< 0.001	0.12	0.9	0.004	9.09	0.63	< 0.0005	3.22	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4.8	< 0.001	0.15	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001	0.019	< 0.01
X14	07-Oct-08	< 0.000005	0.0244	0.00038	0.0496	< 0.05	< 0.00001	0.000005	47.8	0.000038	0.000696	0.0002	0.00107	0.233	1.06	0.0042	10.2	0.566	0.0005	3.25	0.00176	0.000549		0.00009	0.00033	4.84	0.00003	0.183			< 0.0005	0.000018	0.00165	< 0.0002	0.0362	< 0.0001
X14	14-Oct-08	< 0.00025	0.025	< 0.001	0.041	< 0.05	< 0.001	< 0.001	56.5	< 0.0002	0.002	< 0.001	< 0.001	< 0.05	1.2	0.004	11.5	1.41	0.0006	4.87	0.004	< 0.001	< 0.15	< 0.001	0.001	4.9	< 0.001	0.2	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0013	< 0.001	0.025	< 0.01
X14	15-Oct-08	< 0.00025	0.054	< 0.001	0.041	< 0.05	< 0.001	< 0.001	53.2	< 0.0002	0.002	< 0.001	0.003	< 0.05	1.1	0.005	10.7	1.24	0.0011	3.77	0.004	< 0.001	< 0.15	< 0.001	< 0.001	4.7	< 0.001	0.2	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001	0.045	< 0.01
X14	21-Oct-08	< 0.00025	0.016	< 0.001	0.043	< 0.05	< 0.001	< 0.001	55.3	< 0.0002	0.002	0.004	0.001	0.08	1	0.005	11.8	1.85	0.001	4.25	0.008	< 0.001	< 0.15	< 0.001	0.002	4.3	< 0.001	0.21	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0015	< 0.001	0.035	< 0.01
X14	04-Nov-08	< 0.00025	0.015	< 0.001	0.047	< 0.05	< 0.001	< 0.001	39.6	< 0.0002	< 0.001	< 0.001	< 0.001	0.12	0.9	0.003	10.1	0.43	< 0.0005	3.28	0.002	< 0.001	< 0.15	< 0.001	< 0.001	5.2	< 0.001	0.15	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0015	< 0.001	0.036	< 0.01
X14	01-Dec-08	< 0.00025	0.014	< 0.001	0.058	< 0.05	< 0.001	< 0.001	55	< 0.0002	< 0.001	< 0.001	< 0.001	0.06	1.2	0.004	13.5	0.93	< 0.0005	4.72	0.002	< 0.001	< 0.15	< 0.001	< 0.001	5.8	< 0.001	0.2	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	< 0.001	0.058	< 0.01
X14	10-Dec-08	< 0.000005	0.0137	0.00025	0.0657	< 0.05	< 0.00001	0.000005	65.9	0.000035	0.00077	0.0002	0.00051	0.16	1.41	0.0055	14.4	1.02	0.00065	4.78	0.0023	0.000327		0.00008	0.00043	5.35	0.00001	0.234			0.0007	0.000004	0.00256	< 0.0002	0.0611	< 0.0001
X14	MEAN	0.000201	0.019932	0.000873	0.040122	0.0473	0.0008024	0.000801	60.004	0.0001691	0.0016395	0.00089	0.001105	0.1197	1.3662	0.004652	12.7926	1.50626	0.000649	5.204	0.0037728	0.0008683	0.14386	0.000817	0.000914	4.4652	0.0008	0.20591	0.001	0.0005	0.000952	8.452E-05	0.0015083	0.000842	0.032884	0.008024
X14	MINIMUM	< 0.000005	0.0008	0.00024	0.016	< 0.005	< 0.00001	0.000005	12.2	0.000018	0.000345	< 0.0001	0.00029	0.013	0.6	< 0.001	2.92	0.11	0.00027	1.27	< 0.001	0.000011	0.021	0.00006	0.00006	2	0.00001	0.047	< 0.001	< 0.0005	< 0.0005	0.000004	< 0.0005	< 0.0002	0.007	< 0.0001
X14	MAXIMUM	< 0.00025	0.0759	< 0.001	0.0741	< 0.05	< 0.001	< 0.001	188	< 0.0002	0.007	0.004	0.003	0.32	3.48	0.0112	36.9	7.72	0.0014	16.7	0.016	0.00117	< 0.15	< 0.001	0.002	7.5	< 0.001	0.6	< 0.001	< 0.0005	0.0014	0.000109	0.0039	< 0.001	0.14	< 0.01
X14	N > DL	0	42	12	50	0	2	0	50	10	23	9	28	44	50	48	50	50	26	50	49	10	2	10	18	50	3	50	0	0	5	10	43	1	50	2
X14	Median	0.00025	0.0155	0.001	0.038	0.05	0.001	0.001	42.35	0.0002	0.001	0.001	0.001	0.111	1.07	0.004	9.015	0.705	0.0005	3.265	0.002	0.001	0.15	0.001	0.001	4.5	0.001	0.17	0.001	0.0005	0.001	0.0001	0.0012	0.001	0.02435	0.01
X22B	07-Jan-08	< 0.00025	0.022	< 0.001	0.015	< 0.05	< 0.001	< 0.001	127	0.015	0.032	< 0.001	0.021	0.07	6.9	0.044	60.2	2.1	0.001	15.2	0.11	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.51	< 0.001	< 0.0005	< 0.001	0.0003	0.0015	< 0.001	19.8	< 0.01
X22B	18-Feb-08	< 0.00025	< 0.005	< 0.001	0.013	< 0.05	< 0.001	< 0.001	118	0.0071	0.035	< 0.001	0.006	0.15	6.8	0.043	53.4	2.11	0.0014	16.4	0.097	< 0.001	< 0.15	< 0.001	< 0.001	3.8	< 0.001	0.51	< 0.001	< 0.0005	< 0.001	0.0004	0.0012	< 0.001	13.5	< 0.01
X22B	17-Mar-08	< 0.00025	< 0.005	< 0.001	0.015	< 0.05	< 0.001	< 0.001	108	0.025	0.035	< 0.001	0.05	< 0.05	5.1	0.03	66.8	1.95	0.0006	15.7	0.12	< 0.001	< 0.15	< 0.001	0.001	7.3	< 0.001	0.39	< 0.001	< 0.0005	< 0.001	0.0003	0.0015	< 0.001	27.6	< 0.01
X22B	15-Apr-08	< 0.00025	0.008	< 0.001	0.014	< 0.05	< 0.001	< 0.001	103	0.032	0.031	< 0.001	0.079	0.08	4.4	0.038	62.7	1.77	0.0005	10.5	0.12	< 0.001	< 0.15	< 0.001	< 0.001	7.1	< 0.001	0.41	< 0.001	< 0.0005	< 0.001	0.0003	0.0008	< 0.001	28.3	< 0.01
X22B	14-May-08	< 0.00025	0.019	< 0.001	0.015	< 0.05	< 0.001	< 0.001	135	0.0087	0.041	< 0.001	0.011	< 0.05	8.3	0.053	61.7	2.41	0.0014	18.3	0.11	< 0.001	< 0.15	< 0.001	< 0.001	3.3	< 0.001	0.57	< 0.001	< 0.0005	< 0.001	0.0005	0.0018	< 0.001	15.6	< 0.01
X22B	16-Jun-08	< 0.00025	< 0.005	< 0.001	0.013	< 0.05	< 0.001	< 0.001	129	0.0086	0.038	< 0.001	0.01	< 0.05	7.4	0.044	65.9	2.24	0.0012	19.5	0.098	< 0.001	< 0.15	< 0.001	< 0.001	3.5	< 0.001	0.53	< 0.001	< 0.0005	< 0.001	0.0005	0.0017	< 0.001	16.8	< 0.01
X22B	14-Jul-08	< 0.00025	0.011	< 0.001	0.014	< 0.05	< 0.001	< 0.001	127	0.0088	0.04	< 0.001	0.007	0.36	7.1	0.06	64.2	2.21	0.0009	16.6	0.098	< 0.001	< 0.15	< 0.001	< 0.001	3.4	< 0.001	0.48	< 0.001	< 0.0005	< 0.001	0.0004	0.0013	< 0.001	14.2	< 0.01
X22B	12-Aug-08	< 0.00025	0.008	< 0.001	0.016	< 0.05	< 0.001	< 0.001	117	0.0093	0.04	< 0.001	0.006	0.28	7.1	0.056	69.6	2.43	0.0007	18.2	0.097	< 0.001	< 0.15	< 0.001	0.001	5.4	< 0.001	0.49	< 0.001	< 0.0005	< 0.001	0.0004	0.001	< 0.001	14.1	< 0.01
X22B	15-Sep-08	< 0.00025	< 0.005	< 0.001	0.015	< 0.05	< 0.001	< 0.001	118	0.012	0.049	< 0.001	0.005	< 0.05	6.8	0.046	58.6	2.15	0.001	15.8	0.1	< 0.001	< 0.15	< 0.001	< 0.001	3.2	< 0.001	0.5	< 0.001	< 0.0005	< 0.001	0.0006	0.001	< 0.001	12.2	< 0.01
X22B	15-Oct-08	< 0.00025	0.009	< 0.001	0.015	< 0.05	< 0.001	< 0.001	123	0.012	0.041	< 0.001	0.009	< 0.05	7.1	0.049	55.2	2.18	0.0013	15	0.1	< 0.001	< 0.15	< 0.001	< 0.001	3.5	< 0.001	0.54	< 0.001	< 0.0005	< 0.001	0.0004	0.0009	< 0.001	15.4	< 0.01
X22B	04-Nov-08	< 0.00025	0.034	< 0.001	0.015	< 0.05	< 0.001	< 0.001	125	0.013	0.044	< 0.001	0.013	0.06	7.4	0.044	70.3	2.49	0.0012	20.5	0.11	< 0.001	< 0.15	< 0.001	< 0.001	4	< 0.001	0.54	< 0.001	< 0.0005	< 0.001	0.0004	0.0012	< 0.001	16.8	< 0.01
X22B	02-Dec-08	< 0.00025	0.013	< 0.001	0.018	< 0.05	< 0.001	< 0.001	156	0.014	0.05	< 0.001	0.017	0.15	8.4	0.055	76.8	3.12	0.0011	22.1	0.14	< 0.001	< 0.15	< 0.001	< 0.001	4.3	< 0.001	0.6	< 0.001	< 0.0005	< 0.001	0.0004	0.001	< 0.001	23.3	< 0.01
X22B	MEAN	0.00025	0.012	0.001	0.0148	0.05	0.001	0.001	123.8	0.0138	0.040	0.001	0.0195	0.11667	6.9	0.0468333	63.783333	2.263333	0.001025	16.98333	0.1083333	0.001	0.15	0.001	0.001	4.475	0.001	0.50583	0.001	0.0005	0.001	0.0004083	0.0012417	0.001	18.1	0.01
X22B	MINIMUM	< 0.00025	< 0.005	< 0.001	0.013	< 0.05	< 0.001	< 0.001	103	0.0071	0.031	< 0.001	0.005	< 0.05	4.4	0.03	53.4	1.77	0.0005	10.5	0.097	< 0.001	< 0.15	< 0.001	< 0.001	3.2	< 0.001	0.39	< 0.001	< 0.0005	< 0.001	0.0003	0.0008	< 0.001	12.2	< 0.01
X22B	MAXIMUM	< 0.00025	0.034	< 0.001	0.018	< 0.05	< 0.001	< 0.001	156	0.032	0.05	< 0.001	0.079	0.36	8.4	0.06	76.8	3.12	0.0014	22.1	0.14	< 0.001	< 0.15	< 0.001	< 0.001	7.3	< 0.001	0.6	< 0.001	< 0.0005	< 0.001	0.0006	0.0018	< 0.001	28.3	< 0.01
X22B	N > DL	0	8	0	12	0	0	0	12	12	12	0	12	7	12	12	12	12	12	12	12	0	0	0	2	12	0	12	0	0	0	12	12	0	12	0
X22B	Median	0.00025	0.0085	0.001	0.015	0.05	0.001	0.001	124	0.012	0.04	0.001	0.0105	0.065	7.1	0.045	63.45	2.195	0.00105	16.5	0.105	0.001	0.15	0.001	0.001	3.9	0.001	0.51	0.001	0.0005	0.001	0.0004	0.0012	0.001	16.2	0.01
X23	08-Jan-08	0.0004	< 0.005	0.001	0.013	< 0.05	< 0.001	< 0.001	452	0.024	0.66	< 0.001	0.006	0.33	15.7	0.14	730	61.8	0.0064	54.8	0.74	< 0.001	< 0.15	< 0.001	0.005	5.6	< 0.001	3.95	< 0.001	< 0.0005	< 0.001	0.0011	0.011	< 0.001	195	< 0.01
X23	19-Feb-08	0.0007	< 0.005	0.002	0.012	< 0.05	< 0.001	< 0.001	430	0.019	0.58	< 0.001	0.005	0.48	12.5	0.11	754	63.9	0.0081	48.8	0.62	< 0.001	< 0.15	< 0.001	0.005	5.5	< 0.001	3.61	< 0.001	< 0.0005	< 0.001	0.0011	0.0071	< 0.001	205	< 0.01
X23	18-Mar-08	0.0004	< 0.005	0.002	0.013	< 0.05	< 0.001	< 0.001	403	0.016	0.64	< 0.001	0.006	< 0.05	14	0.12	910	69.1	0.0067	67	0.65	< 0.001	< 0.15	< 0.001	0.006	5	< 0.001	3.46	< 0.001	< 0.0005	< 0.001	0.0011	0.012	< 0.001	219	< 0.01
X23	14-May-08	0.0017	0.14	0.003	0.017	< 0.05	< 0.001	< 0.001	401	0.718	1.03	< 0.001	2.19	13.7	12.5	0.14	627	68.4	0.0075	35.8	1.18	< 0.001	< 0.15	< 0.001	0.01	6.9	< 0.001	3.69	< 0.001	< 0.0005	< 0.001	0.0014	0.0052	< 0.001	680	< 0.01
X23	17-Jun-08	0.0007	< 0.005	0.002	0.013	< 0.05	< 0.001	< 0.001	425	0.142	0.84	< 0.001	0.031	< 0.05	14	0.15	830	66.9	0.0071	55.5	0.97	< 0.001	< 0.15	< 0.001	0.006	6.6	< 0.001	3.69	< 0.001	< 0.0005	< 0.001	0.0015	0.0077	< 0.001	329	< 0.01
X23	15-Jul-08	0.0004	34.6	0.14	0.009	< 0.05	0.006	< 0.001	260	0.775	0.61	0.12	6.1	279	1.9	0.097	251	38.3	< 0.0005	11.8	0.49	0.97	0.3	< 0.001	0.014	5.5	< 0.001	0.82	< 0.001	0.011	0.005	0.0007	0.021	0.008	728	< 0.01
X23	12-Aug-08	< 0.00025	0.008	0.002	0.014	< 0.05	< 0.001	< 0.001	466	0.061	0.76	< 0.001	0.018	6.22	13.6	0.18	882	70.7	< 0.0005	48.5	0.91	< 0.001	< 0.15	< 0.001	0.009	7.4	< 0.001	3.3	< 0.001	< 0.0005	0.001	0.0013	0.0047	< 0.001	365	< 0.01
X23	15-Sep-08	0.0009	0.016	0.001	0.017	< 0.05	< 0.001	< 0.001	459	0.139	1.05	< 0.001	0.028	51.8	14.9	0.16	894	80	0.0056	50.3	1.2	< 0.001	< 0.15	< 0.001	0.004	6.4	< 0.001	3.4	< 0.001	< 0.0005	< 0.001	0.0021	0.0058	< 0.001	541	< 0.01
X23	15-Oct-08	0.0012	0.009	0.002	0.014	< 0.05	< 0.001	< 0.001	429	0.178	1.1	< 0.001	0.023	110	14.6	0.18	889	84.6	0.0065	40.1	1.26	< 0.001	< 0.15	< 0.001	0.009	6.6	< 0.001	3.66	< 0.001	< 0.0005	< 0.001	0.0014	0.0018	< 0.001	663	< 0.01
X23	04-Nov-08	0.0039	0.018	0.001	0.016	< 0.05	< 0.001	< 0.001	485	0.188	1.41	< 0.001	0.018	154	15	0.15	1030	95.5	0.0061	80.3	1.45	< 0.001	< 0.15	< 0.001	0.006	7.7	< 0.001	3.55	< 0.001	< 0.0005	< 0.001	0.0016	0.0026	< 0.001	754	< 0.01
X23	02-Dec-08	0.0013	0.007	< 0.001	0.016	< 0.05	< 0.001	< 0.001	479	0.177	1.54	< 0.001	0.018	157	17.4	0.21	1050	102	0.0064	67.8	1.66	< 0.001	< 0.15	< 0.001	0.003	8	< 0.001	4.19	< 0.001	< 0.0005	< 0.001	0.0015	0.0016	< 0.001	781	< 0.01
X23	MEAN	0.0011	3.1653	0.0143	0.014	0.05	0.0015	0.001	426.3	0.222	0.93	0.0118182	0.767545	70.2391	13.281818	0.1488182	804.27273	72.83636	0.0055818	50.97273	1.0118182	0.0890909	0.16364	0.001	0.007	6.4727273	0.001	3.39273	0.001	0.00145	0.0013636	0.0013455	0.0073182	0.0016364	496.3636364	0.01
X23	MINIMUM	< 0.00025	< 0.005	< 0.001	0.009	< 0.05	< 0.001	< 0.001	260	0.016	0.58	< 0.001	0.005	< 0.05	1.9	0.097	251	38.3	< 0.0005	11.8	0.49	< 0.001	< 0.15	< 0.001	0.003	5	< 0.001	0.82	< 0.001	< 0.0005	< 0.001	0.0007	0.0016	< 0.001	195	< 0.01
X23	MAXIMUM	0.0039	34.6	0.14	0.017	< 0.05	0.006	< 0.001	485	0.775	1.54	0.12	6.1	279	17.4	0.21	1050	102	0.0081	80.3	1.66	0.97	0.3	< 0.001	0.014	8	< 0.001	4.19	< 0.001	0.011	0.005	0.0021	0.021	0.008	781	< 0.01
X23	N > DL	10	7	10	11	0	1	0	11	11	11	1	11	9	11	11	11	11	9	11	11	1	1	0	11	11	0	11	0	1	2	11	11	1	11	0
X23	Median	0.0007	0.008	0.002	0.014	0.05	0.001	0.001	430	0.142	0.84	0.001	0.018	13.7	14	0.15	882	69.1	0.0064	50.3	0.97	0.001	0.15	0.001	0.006	6.6	0.001	3.61	0.001	0.0005	0.001	0.0014	0.0058	0.001	541	0.01
X26	16-Jun-08	< 0.00025	< 0.005	0.002	0.006	< 0.05	< 0.001	< 0.001	449	0.015	0.34	< 0.001	0.003	14	11.5	0.16	233	8.59	0.001	44.3	1.02	< 0.001	< 0.15	< 0.001	0.003	6	< 0.001	2.55	< 0.001	< 0.0005	< 0.001	0.0009	0.012	< 0.001	43.7	< 0.01
X26	15-Jul-08	< 0.00025	0.008	0.002	0.006	< 0.05	< 0.001	< 0.001	504	0.015	0.41	< 0.001	0.008	31.1	13.2	0.24	287	11.4	< 0.0005	50.9	1.13	0.013	< 0.15	< 0.001	0.003	6	< 0.001	2.58	< 0.001	< 0.0005	0.001	0.001	0.012	< 0.001	66.3	< 0.01
X26	12-Aug-08	< 0.00025	0.011	0.002	0.006	< 0.05	< 0.001	< 0.001	476	0.013	0.41	< 0.001	0.005	51.9	13.6	0.25	294	13.2	< 0.0005	52	1.12	< 0.001	< 0.15	< 0.001	0.005	9.8	< 0.001	2.67	< 0.001	< 0.0005	0.001	0.0011	0.014	< 0.001	73.8	< 0.01
X26	15-Sep-08	< 0.00025	< 0.005	0.001	0.006	< 0.05	< 0.001	< 0.001	463	0.02	0.45	< 0.001	0.003	64.1	13.3	0.19	312	13.8	0.0009	50.5	1.05	< 0.001	< 0.15	< 0.001	0.001	5.6	< 0.001	2.57	< 0.001	< 0.0005	< 0.001	0.0016	0.017	< 0.001	81.8	< 0.01
X26	MEAN	0.00025	0.00725	0.00175	0.006	0.05	0.001	0.001	473	0.01575	0.4025	0.001	0.00475	40.275	12.9	0.21	281.5	11.7475	0.000725	49.425	1.08	0.004	0.15	0.001	0.003	6.85	0.001	2.5925	0.001	0.0005	0.001	0.00115	0.01375	0.001	66.4	0.01
X26	MINIMUM	< 0.00025	< 0.005	0.001	0.006	< 0.05	< 0.001	< 0.001	449	0.013	0.34	< 0.001	0.003	14	11.5	0.16	233	8.59	< 0.0005	44.3	1.02	< 0.001	< 0.15	< 0.001	0.001	5.6	< 0.001	2.55	< 0.001	< 0.0005	< 0.001	0.0009	0.012	< 0.001	43.7	< 0.01
X26	MAXIMUM	< 0.00025	0.011	0.002	0.006	< 0.05	< 0.001	< 0.001	504	0.02	0.45	< 0.001	0.008	64.1	13.6	0.25	312	13.8	0.001	52	1.13	0.013	< 0.15	< 0.001	0.005	9.8	< 0.001	2.67	< 0.001	< 0.0005	< 0.001	0.0016	0.017	< 0.001	81.8	< 0.01
X26	N > DL	0	2	4	4	0	0	0	4	4	4	0	4	4	4	4	4	4	2	4	4	1	0	0	4	4	0	4	0	0	2	4	4	0	4	0
X26	Median	0.00025	0.0065	0.002	0.006	0.05	0.001	0.001	469.5	0.015	0.41	0.001	0.004	41.5	13.25	0.215	290.5	12.3	0.0007	50.7	1.085	0.001	0.15	0.001	0.003	6	0.001	2.575	0.001	0.0005	0.001	0.00105	0.013	0.001	70.05	0.01

NOTE:

Statistics only generated where there are more than 2 values in a data set

average	*average of values, including values less than detection limit as set to DL value*
	if it is the DL value will be shown without the < symbol
minimum	*lowest value and will be least DL value if these are present in the data set*
maximum	*highest vale*
N > DL	*number of values measured that are above detection limits*
median	*the median value of the data set - if it is a DL value will be shown without the < symbol*

Detection Limit values used as the DL value in statistics contrasts with conversion to 0 for charts

Appendix 4

2008 Groundwater Quality Data – Rose Creek and Vangorda Creek Drainage

AECOM

Appendix 4
2008 Groundwater Quality Data
Rose Creek and Vangorda Creek Drainage

Table 1. Groundwater Routine Parameters

Station	Date	ALK-T mg/L	COND-F µS/cm	COND-L µS/cm	PH-F pH unit	PH-L pH unit	SO4 mg/L	TEMP-F °C	WL-M m
BH1	27-May-08	143	344	424	6.05	6.63	73.6	5.7	4.08
BH1	18-Sep-08	130	558	530	5.89	6.8	130	2.8	3.786
BH2	27-May-08	59	693	802	6.15	6.56	357	2.3	4.607
BH2	18-Sep-08	82	587	550	5.87	7	180	4.6	
BH4	27-May-08	44	374	457	5.58	6.2	172	7	1.99
BH4	18-Sep-08	8.7	886	930	5.4	5.7	460	4.6	2.294
BH12B	27-May-08	211	1436	1730	7.13	7.6	765	6	3.05
BH12B	18-Sep-08	170		1000		7.8	350		2.942
BH13B	18-Sep-08	75		1700		7.6	890		2.602
BH14A	27-May-08	395	3092	3720	6.88	7.71	1810	6	3.87
BH14A	18-Sep-08	380	3.9	4700	6.8	7.7	3200		2.977
BH14B	27-May-08	377	2846	3550	7.04	7.82	1770	6.1	4.35
BH14B	18-Sep-08	380	4.1	4000	7.06	7.8	2400		3.601
P01-01A	29-May-08	249	1457	1610	6.99	7.74	696	3.9	3.412
P01-01A	16-Sep-08	260	1650	1600	7.16	8	750	3.2	3.785
P01-01B	29-May-08	269	1141	1210	7.11	7.92	435	4.7	3.37
P01-01B	16-Sep-08	260	1197	1200	7.3	8.1	440	3.2	3.486
P01-02A	27-May-08	245	530	678	7.76	8.13	133	5	2.24
P01-02A	16-Sep-08	250	714	710	7.61	8.2	150	4.8	2.015
P01-02B	27-May-08	214	437	534	7.88	8.13	92.2	6.5	0.36
P01-02B	27-May-08	191		535		8.14	92.8		
P01-03	17-Sep-08	370	3080	3100	6.4	7.5	1700	3.9	3.046
P01-04A	17-Sep-08	570	1000	480	41	4.4	6.67	7.8	1.582
P01-04B	17-Sep-08	300	1600	885	750	3.8	7.06	7.9	2.191
P01-11	27-May-08	352	2430	2460	7.22	7.64	1280	5.6	0.774
P01-11	16-Sep-08	350	2620	2500	7.05	7.7	1300	4.6	0.799
P2001-02A	04-Jun-08	442	1260	790	318	3.9	7.62	7.8	3.518
P2001-02A	18-Sep-08	410	1200	801	310	4.5	7.56	8	3.782
P2001-02B	04-Jun-08	447	1240	771	302	2.8	7.43	7.76	3.545
P2001-02B	18-Sep-08	400	1200	784	330	4.8	7.31	8	3.784
P2001-03	04-Jun-08	411	949	494	150	4	7.56	7.93	>30
P96-6	05-Jun-08	414	906	1330	5.84	6.5	374	3.9	11.22
P96-6	18-Sep-08	300		1600		7.3	700		10.758
P96-7	28-May-08	269	2720	2880	7.31	7.87	1680	3.7	8.373
P96-7	19-Sep-08	190	3354	3300	6.98	7.9	2200	3.1	2.185
P96-7	19-Sep-08	190	3354	3400	6.98	7.9	2400	3.1	2.185
P96-7	MEAN	216	3143	3193	7.09	7.89	2093	3.30	4.25
P96-7	MINIMUM	190	2720	2880	6.98	7.87	1680	3.1	2.185
P96-7	MAXIMUM	269	3354	3400	7.31	7.9	2400	3.7	8.373
P96-7	N > DL	3	3	3	3	3	3	3	3
P96-7	Median	190	3354	3300	6.98	7.9	2200	3.1	2.185

Appendix 4
2008 Groundwater Quality Data
Rose Creek and Vangorda Creek Drainage

Table 1. Groundwater Routine Parameters

Station	Date	ALK-T mg/L	COND-F µS/cm	COND-L µS/cm	PH-F pH unit	PH-L pH unit	SO4 mg/L	TEMP-F °C	WL-M m
P96-8A	29-May-08	251		6120		6.58	4840		
P96-8A	19-Sep-08	220		6900	5.91	7	5500	6.2	2.395
P96-8B	29-May-08	152		6370		6.7	5060		
P96-8B	19-Sep-08	130		6800	5.91	7	5300	7.3	2.488
P96-9A	04-Jun-08	261	2120	2490	7.46	7.34	1360	2.4	5.195
P96-9A	18-Sep-08	380	1971	2900	6.45	7.8	1700	7.8	5.514
S1A	28-May-08	225	61200	6560		6.91	5420	5.2	3.765
S1A	13-Aug-08	190	6460	6500	6.24	7	4600	5.5	4.16
S1A	13-Aug-08	210	6460	6500	6.24	6.9	5200	5.5	4.16
S1A	03-Nov-08	150	6475	6600	6.06	6.9	6100	1.9	3.497
S1A	MEAN	194	20149	6540	6.18	6.93	5330	4.5	3.816
S1A	MINIMUM	150	6460	6500	6.06	6.9	4600	1.9	3.497
S1A	MAXIMUM	225	61200	6600	6.24	7	6100	5.5	4.16
S1A	N > DL	4	4	4	3	4	4	4	5
S1A	Median	200	6467.5	6530	6.24	6.905	5310	5.35	3.765
S1B	28-May-08	208	1462	1540		7.94	689	6.8	3.498
S1B	03-Nov-08	93		1100		7.1	500	1.2	2.945
S2A	28-May-08	227	4450	5280		6.93	4160	3	4.066
S2A	03-Nov-08	180	6085	6500	6.74	6.9	5700	2.4	3.882
S2A	03-Nov-08	190	6085	6400	6.74	6.9	5000	2.4	3.882
S2A	MEAN	199	5540	6060	6.74	6.91	4953	2.60	3.94
S2A	MINIMUM	180	4450	5280	6.74	6.9	4160	2.4	3.882
S2A	MAXIMUM	227	6085	6500	6.74	6.93	5700	3	4.066
S2A	N > DL	3	3	3	2	3	3	3	3
S2A	Median	190	6085	6400	6.74	6.9	5000	2.4	3.882
S2B	28-May-08	147	5850	5500		6.58	4710	2.5	4.276
S2B	13-Aug-08	130	5630	5700	6.71	6.8	4800	5.7	4.81
S2B	03-Nov-08	140	5877	6600	6.62	6.7	5900	2.5	3.125
S2B	MEAN	139	5786	5933	6.67	6.69	5137	3.57	4.07
S2B	MINIMUM	130	5630	5500	6.62	6.58	4710	2.5	3.125
S2B	MAXIMUM	147	5877	6600	6.71	6.8	5900	5.7	4.81
S2B	N > DL	3	3	3	2	3	3	3	3
S2B	Median	140	5850	5700	6.66	6.7	4800	2.5	4.276
S3	28-May-08	205	6040	6440	6.07	6.69	5270	1.9	2.43
S3	13-Aug-08	150	6889	6900	6	6.9	5300	6.2	2.591
S3	03-Nov-08	170	6380	6600	7.1	6.9	5900	2.3	2.494
S3	MEAN	175	6436	6647	6.39	6.83	5490	3.5	2.505
S3	MINIMUM	150	6040	6440	6	6.69	5270	1.9	2.43
S3	MAXIMUM	205	6889	6900	7.1	6.9	5900	6.2	2.591
S3	N > DL	3	3	3	3	3	3	3	3
S3	Median	170	6380	6600	6.07	6.9	5300	2.3	2.494

Appendix 4
2008 Groundwater Quality Data
Rose Creek and Vangorda Creek Drainage

Table 1. Groundwater Routine Parameters

Station	Date	ALK-T mg/L	COND-F µS/cm	COND-L µS/cm	PH-F pH unit	PH-L pH unit	SO4 mg/L	TEMP-F °C	WL-M m
TH86-17	30-May-08	70.2	160	161	7.8	7.76	12	2.1	6.97
TH86-17	17-Sep-08	68	191	160	6.4	7.7	15	6.6	7.427
V34	04-Jun-08	600	1175	1220	7.02	7.96	166	4.2	6.037
V34	18-Sep-08	550	1385	1200	7.58	8.1	180	4.2	5.079
V35	04-Jun-08	595	2071	2590	7.04	7.65	1170	4.5	7.44
V35	18-Sep-08	390	8350	1400	7.46	8.2	450	4.1	5.1
V36	04-Jun-08	403	1131	1190	7.52	7.72	315	3	7.802
V36	18-Sep-08	360	1381	1500	7.18	8	550	5.2	8.352
V37	04-Jun-08	421	795	824	7.31	8.02	68.8	3	8.754
V37	18-Sep-08	420	871	880	7.53	8.4	110	3.3	8.303
X16A	29-May-08	143	338	341	7.51	8.07	27.6	5	3.131
X16A	16-Sep-08	160	402	390	7.82	8.3	49	4.1	3.438
X16B	29-May-08	182	387	406	7.66	8.21	25.8	4.6	3.227
X16B	16-Sep-08	190	388	400	7.6	8.3	27	6.3	3.404
X17A	29-May-08	270	555	587	7.34	8.15	47.1	3.6	2.103
X17A	16-Sep-08	230	485	480	7.77	8.4	39	3.1	2.014
X17B	29-May-08	436	997	1050	7.1	7.8	183	3.4	2.63
X17B	16-Sep-08	290	639	630	7.23	8.3	62	3.8	2.56
X18A	28-May-08	247	1438	1560	7.04	7.83	654	5.2	3.977
X18A	16-Sep-08	260	1422	1400	7.27	8.2	560	3.9	3.465
X18B	28-May-08	272	1385	1510	7.01	7.84	619	4.4	
X18B	16-Sep-08	270	823	830	7.22	8.3	180	2.9	3.346
X21A-96	05-Jun-08	< 2	10580	10800	5.9	4.48	9800	4.1	4.574
X21A-96	05-Jun-08	< 2	10580	10500	5.9	4.35	10100	4.1	4.574
X21A-96	17-Sep-08	< 0.5	1276	12000	5.85	3.4	13000	5.1	3.154
X21A-96	17-Sep-08	< 0.5	1276	12000	5.85	3.3	12000	5.1	3.154
X21A-96	MEAN	1.25	5928	11325	5.875	3.88	11225	4.6	3.864
X21A-96	MINIMUM	< 0.5	1276	10500	5.85	3.3	9800	4.1	3.154
X21A-96	MAXIMUM	< 2	10580	12000	5.9	4.48	13000	5.1	4.574
X21A-96	N > DL	0	4	4	4	4	4	4	4
X21A-96	Median	1.25	5928	11400	5.875	3.875	11050	4.6	3.864
X21B-96	05-Jun-08	136	1373	1760	6.8	6.73	867	3.6	4.592
X21B-96	17-Sep-08	66	1960	1800	6.69	7.3	940	3.8	4.126
X24D-96	12-Aug-08	410	2420	3400	6.36	7.4	2100	5	4.486
X24D-96	17-Sep-08	400	3430	3400	6.45	7.9	1900	3.8	3.948
X24D-96	04-Nov-08	410	3281	3400	6.46	7.5	2200	1.8	4.952
X24D-96	MEAN	407	3044	3400	6.42	7.60	2067	3.53	4.462
X24D-96	MINIMUM	400	2420	3400	6.36	7.4	1900	1.8	3.948
X24D-96	MAXIMUM	410	3430	3400	6.46	7.9	2200	5	4.952
X24D-96	N > DL	3	3	3	3	3	3	3	3
X24D-96	Median	410	3281	3400	6.45	7.5	2100	3.8	4.486

Appendix 4
2008 Groundwater Quality Data
Rose Creek and Vangorda Creek Drainage

Table 1. Groundwater Routine Parameters

Station	Date	ALK-T mg/L	COND-F µS/cm	COND-L µS/cm	PH-F pH unit	PH-L pH unit	SO4 mg/L	TEMP-F °C	WL-M m
X25A-96	29-May-08	259	980	1060	7.13	7.92	327	4.1	2.668
X25A-96	12-Aug-08	270	1130	1100	7.13	7.9	360	5.5	3.878
X25A-96	12-Aug-08	260		1100		7.8	350		
X25A-96	16-Sep-08	270	1110	1100	7.19	8.3	370	4.2	3.304
X25A-96	04-Nov-08	260	1174	1200	7.19	7.9	410	2	4.318
X25A-96	MEAN	264	1099	1112	7.16	7.96	363	3.95	3.542
X25A-96	MINIMUM	259	980	1060	7.13	7.8	327	2	2.668
X25A-96	MAXIMUM	270	1174	1200	7.19	8.3	410	5.5	4.318
X25A-96	N > DL	5	4	5	4	5	5	4	4
X25A-96	Median	260	1120	1100	7.16	7.9	360	4.15	3.591
X25B-96	29-May-08	275	1093	1170	7.37	8.07	383	4	2.59
X25B-96	12-Aug-08	270	1182	1200	7.4	8	410	4.9	3.71
X25B-96	16-Sep-08	250	1184	1200	7.45	8.2	430	4	3.185
X25B-96	16-Sep-08	250	1184	1200	7.45	8.2	430	4	3.185
X25B-96	04-Nov-08	270	1154	1200	7.37	8	420	2.4	4.187
X25B-96	MEAN	263	1159	1194	7.41	8.09	415	3.9	3.371
X25B-96	MINIMUM	250	1093	1170	7.37	8	383	2.4	2.59
X25B-96	MAXIMUM	275	1184	1200	7.45	8.2	430	4.9	4.187
X25B-96	N > DL	5	5	5	5	5	5	5	5
X25B-96	Median	270	1182	1200	7.4	8.07	420	4	3.185

Note:
Statistics only generated where there are more than 2 values in a data set

average	*average of values, including values less than detection limit as set to DL value if it is the DL value will be shown without the < symbol*
minimum	*lowest value and will be least DL value if these are present in the data set*
maximum	*highest vale*
N > DL	*number of values measured that are above detection limits*
median	*the median value of the data set - if it is a DL value will be shown without the < symbol*

Detection Limit values used as the DL value in statistics contrasts with conversion to 0 for charts

AECOM

Appendix 4
2008 Groundwater Quality Data
Rose Creek and Vangorda Creek Drainage

Table 2. Groundwater Dissolved Metals

Statoin	Date	AG-D mg/L	AL-D mg/L	AS-D mg/L	BA-D mg/L	B-D mg/L	BE-D mg/L	BI-D mg/L	CA-D mg/L	CD-D mg/L	CO-D mg/L	CR-D mg/L	CU-D mg/L	FE-D mg/L	HG-D mg/L	K-D mg/L	LI-D mg/L	MG-D mg/L	MN-D mg/L	MO-D mg/L	NA-D mg/L	NI-D mg/L	PB-D mg/L	SB-D mg/L	SE-D mg/L	SR-D mg/L	TL-D mg/L	U-D mg/L	V-D mg/L	ZN-D mg/L	ZR-D mg/L
BH1	27-May-08	< 0.00002	0.0714	< 0.0005	0.064	< 0.1	< 0.001		62.4	0.00468	0.00204	< 0.001	0.0055	< 0.03	< 0.00002	< 2	0.0136	14.4	0.129	< 0.001	4.6	0.0095	0.00278	< 0.0005	< 0.001		< 0.0002	0.00129	< 0.001	2.01	
BH1	18-Sep-08	0.000005	0.0712	0.00008	0.0371	< 0.05	0.00013	0.000005	81.7	0.00391	0.00124	0.0001	0.00605	0.007	< 0.00001	1.69	0.0139	18.2	0.129	0.00005	5.27	0.00743	0.00418	0.00008	0.0003	0.345	0.000054	0.0014	< 0.0002	1.09	< 0.0001
BH2	27-May-08	< 0.0001	0.626	< 0.0025	0.064	< 0.1	< 0.005		101	0.0448	0.0059	< 0.005	< 0.005	0.079	< 0.00002	2.6	< 0.025	26.7	0.755	< 0.005	4.9	0.107	< 0.0025	< 0.0025	< 0.005		< 0.001	< 0.001	< 0.005	21.6	
BH2	18-Sep-08	0.000005	0.646	0.00008	0.0456	< 0.05	0.00014	0.000005	70.9	0.0337	0.00536	0.0001	0.00126	0.019	< 0.00001	2.12	0.0166	20.2	0.285	0.00006	4.25	0.0675	0.000934	0.00005	0.00033	0.323	0.000058	0.0001	< 0.0002	14.6	< 0.0001
BH4	27-May-08	< 0.00002	2.08	< 0.0005	< 0.02	< 0.1	< 0.001		61.9	0.00903	0.039	< 0.001	0.0675	0.03	< 0.00002	< 2	0.0319	16	0.534	< 0.001	4.9	0.0462	0.00506	< 0.0005	< 0.001		< 0.0002	< 0.0002	< 0.001	4.67	
BH4	18-Sep-08	0.000005	11.3	0.00023	0.0233	< 0.05	0.0043	0.000005	159	0.0188	0.0947	0.0004	0.0938	0.219	< 0.00001	2.15	0.0627	31.1	1.03	< 0.00005	7.04	0.129	0.00772	0.0001	0.00015	0.604	0.000108	0.00085	< 0.0002	8.27	< 0.0001
BH12B	27-May-08	< 0.0001	< 0.025	< 0.0025	0.059	< 0.1	< 0.005		220	0.000489	< 0.0015	< 0.005	< 0.005	< 0.03	< 0.00002	4	< 0.025	127	< 0.0015	< 0.005	8.1	0.0163	< 0.0025	< 0.0025	< 0.005		< 0.001	0.0081	< 0.005	0.398	
BH12B	18-Sep-08	0.000005	0.0028	0.00013	0.034	< 0.05	< 0.00001	0.000005	112	0.000334	0.000071	0.0001	0.00214	0.005	< 0.00001	3.01	0.0198	70.3	0.00168	0.00028	5.4	0.011	0.0014	0.00013	0.00163	0.501	0.000015	0.00553	< 0.0002	0.288	< 0.0001
BH13B	18-Sep-08	0.000005	0.0043	0.00007	0.0446	< 0.05	< 0.00001	0.000005	262	0.000065	0.00264	< 0.0001	0.00457	0.01	< 0.00001	3.64	0.0177	99.8	0.00107	0.0036	9.21	0.0101	0.000075	0.00003	0.0196	1.38	0.000017	0.00237	< 0.0002	0.002	< 0.0001
BH14A	27-May-08	< 0.0002	< 0.05	< 0.005	< 0.02	< 0.1	< 0.01		634	0.00018	< 0.003	< 0.01	< 0.01	< 0.03	< 0.00002	3.5	0.052	239	< 0.003	< 0.01	15.9	< 0.01	< 0.005	< 0.005	< 0.01		< 0.002	0.133	< 0.01	0.342	
BH14A	18-Sep-08	0.00006	0.003	0.0003	0.0231	< 0.3	< 0.00005	< 0.00003	892	0.00214	0.00008	< 0.0005	0.0015	0.021	< 0.00005	4.18	0.073	370	0.0093	0.0004	18	0.0881	0.00207	0.0002	0.0012	4.05	< 0.00001	0.153	< 0.001	11.9	< 0.0005
BH14B	27-May-08	< 0.0002	< 0.05	< 0.005	< 0.02	< 0.1	< 0.01		583	< 0.00017	< 0.003	< 0.01	< 0.01	< 0.03	< 0.00002	3.8	0.05	226	< 0.003	< 0.01	13.7	< 0.01	< 0.005	< 0.005	< 0.01		< 0.002	0.151	< 0.01	0.27	
BH14B	18-Sep-08	0.00006	< 0.001	0.0003	0.0228	< 0.3	< 0.00005	< 0.00003	744	0.00144	0.00006	< 0.0005	0.001	0.008	< 0.00005	3.96	0.06	288	0.0043	0.0004	16.3	0.0505	0.00071	0.0002	0.0008	3.44	< 0.00001	0.147	< 0.001	7.08	< 0.0005
P01-01A	29-May-08	< 0.0001	< 0.025	< 0.0025	0.063	< 0.1	< 0.005		265	0.000655	< 0.0015	< 0.005	< 0.005	< 0.03	< 0.00002	6.1	< 0.025	62.5	4.58	< 0.005	25.2	0.0055	< 0.0025	< 0.0025	< 0.005		< 0.001	0.0069	< 0.005	0.0064	
P01-01A	16-Sep-08	0.00004	< 0.001	0.0003	0.0578	< 0.3	< 0.00005	< 0.00003	273	0.00074	0.00116	< 0.0005	< 0.0003	0.005	< 0.00005	5.96	0.012	59.8	4.91	0.0012	24.4	0.0064	0.00005	0.0002	< 0.0002	0.909	0.00001	0.00805	< 0.001	0.0037	< 0.0005
P01-01B	29-May-08	< 0.00004	< 0.01	0.0031	0.07	< 0.1	< 0.002		196	0.000034	< 0.0006	< 0.002	< 0.002	0.687	< 0.00002	4	0.013	41.2	0.0873	< 0.002	24.1	< 0.002	< 0.001	< 0.001	< 0.002		< 0.0004	0.00662	< 0.002	< 0.005	
P01-01B	16-Sep-08	0.000005	0.0006	0.00303	0.0683	< 0.05	0.00003	0.000005	208	0.000005	0.000128	< 0.0001	< 0.00005	0.77	< 0.00001	4.14	0.0118	38.6	0.0919	0.0011	23.4	0.00044	0.000016	0.00005	< 0.00004	0.813	0.000002	0.00789	< 0.0002	0.0006	0.0007
P01-02A	27-May-08	< 0.00004	< 0.01	< 0.001	0.067	< 0.1	< 0.002		103	0.000082	< 0.0006	< 0.002	< 0.002	0.037	< 0.00002	2.8	< 0.01	25.3	1.16	< 0.002	10.4	0.0024	< 0.001	< 0.001	< 0.002		< 0.0004	0.00253	< 0.002	< 0.005	
P01-02A	16-Sep-08	0.000005	0.0003	0.00062	0.0664	< 0.05	< 0.00001	0.000005	111	0.000083	0.000542	< 0.0001	0.00029	0.016	< 0.00001	2.9	0.0064	25.7	1.19	0.00177	9.18	0.00239	0.000031	0.00004	< 0.00004	0.328	0.000012	0.00298	< 0.0002	0.0011	< 0.0001
P01-02B	27-May-08	< 0.00002	< 0.005	0.00485	0.035	< 0.1	< 0.001		67.7	0.000017	< 0.0003	< 0.001	< 0.001	0.771	< 0.00002	2.2	0.0055	25.6	0.111	< 0.001	9.2	< 0.001	< 0.0005	< 0.0005	< 0.001		< 0.0002	0.00229	< 0.001	0.0057	
P01-02B	27-May-08	< 0.00002	< 0.005	0.00484	0.034	< 0.1	< 0.001		66.9	0.000017	< 0.0003	< 0.001	< 0.001	0.761	< 0.00002	2.1	0.0061	25.5	0.111	< 0.001	9.1	< 0.001	< 0.0005	< 0.0005	< 0.001		< 0.0002	0.00221	< 0.001	< 0.005	
P01-03	17-Sep-08	< 0.00003	< 0.001	0.0004	0.0135	< 0.3	< 0.00005	< 0.00003	605	0.00136	0.106	< 0.0005	< 0.0003	0.32	< 0.00005	7.02	0.019	125	60.2	< 0.0003	39.8	0.162	0.0001	0.0002	< 0.0002	1.56	0.00001	0.00709	< 0.001	0.0201	< 0.0005
P01-11	27-May-08	< 0.0001	< 0.025	0.0306	0.045	< 0.1	< 0.005		451	0.000085	0.0027	< 0.005	< 0.005	32.4	< 0.00002	7.1	< 0.025	91.3	18.2	< 0.005	45.7	< 0.005	< 0.0025	< 0.0025	< 0.005		< 0.001	0.0052	< 0.005	< 0.005	
P01-11	16-Sep-08	0.0001	< 0.001	0.0315	0.0397	< 0.3	< 0.00005	< 0.00003	494	< 0.00003	0.00368	< 0.0005	< 0.0003	36.2	< 0.00005	7.24	0.017	87	19.8	0.0011	43.2	0.0074	0.0001	0.0001	< 0.0002	1.13	< 0.00001	0.00668	< 0.001	0.0036	< 0.0005
P2001-02A	04-Jun-08	< 0.00004	< 0.01	0.0148	0.02	< 0.1	< 0.002		178	0.000034	0.00079	< 0.002	< 0.002	0.58	< 0.00002	3.9	0.028	83.7	0.121	< 0.002	5.9	0.0062	< 0.001	< 0.001	< 0.002		< 0.0004	0.0201	< 0.002	< 0.005	
P2001-02A	18-Sep-08	0.000014	0.004	0.0151	0.0195	< 0.05	< 0.00001	0.000005	182	0.000005	0.000545	< 0.0001	< 0.00005	0.404	< 0.00001	3.95	0.0302	83.9	0.103	0.00218	6.41	0.00374	0.000308	0.00048	0.00005	0.963	0.000002	0.0231	0.0003	0.0058	0.0002
P2001-02B	04-Jun-08	< 0.00004	< 0.01	0.0155	0.024	< 0.1	< 0.002		174	0.000034	< 0.0006	< 0.002	< 0.002	2.28	< 0.00002	4.4	0.027	82	0.236	< 0.002	9	< 0.002	< 0.001	< 0.001	< 0.002		< 0.0004	0.0147	< 0.002	0.0075	
P2001-02B	18-Sep-08	0.00001	0.0052	0.00729	0.0219	< 0.05	< 0.00001	0.000005	180	0.000005	0.000581	< 0.0001	< 0.00005	0.546	< 0.00001	3.86	0.0278	81.5	0.207	0.0013	7.91	0.00199	0.000223	0.00022	< 0.00004	0.935	0.000003	0.0197	< 0.0002	0.0072	0.0002
P2001-03	04-Jun-08	< 0.00004	< 0.01	0.0029	0.034	< 0.1	< 0.002		99.5	0.00143	0.00063	< 0.002	0.0036	< 0.03	< 0.00002	3.6	0.014	59.5	0.276	0.0164	36.1	0.0033	< 0.001	< 0.001	< 0.002		< 0.0004	0.00976	< 0.002	0.0086	
P96-6	05-Jun-08	< 0.0001	< 0.025	< 0.0025	0.027	< 0.1	< 0.005		208	0.000447	< 0.0015	< 0.005	< 0.005	< 0.03	< 0.00002	4.6	0.049	67.6	0.0215	< 0.005	8.7	0.0352	< 0.0025	< 0.0025	< 0.005		< 0.001	0.0205	< 0.005	1.14	
P96-6	18-Sep-08	0.00011	< 0.001	0.0004	0.0274	< 0.3	0.0001	< 0.00003	259	0.0004	0.00005	< 0.0005	0.0004	0.009	< 0.00005	4.29	0.041	77.4	0.0059	< 0.0003	7.18	0.0229	0.00006	0.0001	0.0051	0.832	< 0.00001	0.0381	< 0.001	0.745	< 0.0005
P96-7	28-May-08	< 0.0002	< 0.05	< 0.005	< 0.02	< 0.1	< 0.01		564	< 0.00017	< 0.003	< 0.01	< 0.01	< 0.03	< 0.00002	5.6	< 0.05	154	< 0.003	< 0.01	16.2	< 0.01	< 0.005	< 0.005	< 0.01		< 0.002	0.0236	< 0.01	< 0.005	
P96-7	19-Sep-08	0.00005	0.003	0.0003	0.0148	< 0.3	< 0.00005	< 0.00003	690	0.00005	0.00005	< 0.0005	0.0005	0.012	< 0.00005	5.95	0.032	183	0.0004	0.0008	20.1	0.001	0.0001	0.0001	0.0006	0.766	< 0.00001	0.0314	< 0.001	0.0072	< 0.0005
P96-7	19-Sep-08	0.00005	0.001	0.0004	0.0149	< 0.3	< 0.00005	< 0.00003	700	0.00004	0.00004	< 0.0005	0.0005	0.008	< 0.00005	6.07	0.032	184	0.0005	0.0008	19.2	0.0011	0.00003	0.0001	0.0007	0.767	< 0.00001	0.0306	< 0.001	0.0061	< 0.0005
P96-7	MEAN	0.0001	0.018	0.0019	0.0166	0.23	0.0034	0.00003	651	8.67E-05	0.00103	0.004	0.004	0.017	0.00004	5.87	0.038	174	0.0013	0.0039	18.5	0.0040	0.0017	0.0017	0.0038	0.767	0.00067	0.029	0.004	0.0061	0.0005
P96-7	MINIMUM	0.00005	0.001	0.0003	0.0148	< 0.1	< 0.00005	< 0.00003	564	0.00004	0.00004	< 0.0005	0.0005	0.008	< 0.00002	5.6	0.032	154	0.0004	0.0008	16.2	0.001	0.00003	0.0001	0.0006	0.766	< 0.00001	0.0236	< 0.001	< 0.005	< 0.0005
P96-7	MAXIMUM	< 0.0002	< 0.05	< 0.005	< 0.02	< 0.3	< 0.01	< 0.00003	700	< 0.00017	< 0.003	< 0.01	< 0.01	< 0.03	< 0.00005	6.07	< 0.05	184	< 0.003	< 0.01	20.1	< 0.01	< 0.005	< 0.005	< 0.01	0.767	< 0.002	0.0314	< 0.01	0.0072	< 0.0005
P96-7	N > DL	2	2	2	2	0	0	0	3	2	2	0	2	2	0	3	2	3	2	2	3	2	2	2	2	2	0	3	0	2	0
P96-7	Median	0.00005	0.003	0.0004	0.0149	0.3	0.00005	3E-05	690	0.00005	0.00005	0.0005	0.0005	0.012	0.00005	5.95	0.032	183	0.0005	0.0008	19.2	0.0011	0.0001	0.0001	0.0007	0.766	0.00001	0.0306	0.001	0.0061	0.0005
P96-8A	29-May-08	< 0.001	< 0.25	< 0.025	< 0.04	< 0.2	< 0.05		461	0.0302	0.488	< 0.05	< 0.05	< 0.06	< 0.00002	14.4	< 0.25	856	78.4	< 0.05	52.9	0.681	< 0.025	< 0.025	< 0.05		< 0.01	0.012	< 0.05	168	
P96-8A	19-Sep-08	< 0.0001	0.073	0.0011	0.0251	< 1	0.0002	< 0.0001	531	0.0489	0.629	< 0.002	0.004	11.1	< 0.0002	17.3	0.16	961	73.7	< 0.001	53	0.809	0.0066	0.0005	< 0.0008	4.18	0.00012	0.00649	< 0.004	267	< 0.002
P96-8B	29-May-08	< 0.002	< 0.5	< 0.05	< 0.04	< 0.2	< 0.1		517	0.0669	0.586	< 0.1	< 0.1	< 0.06	< 0.00002	14.3	< 0.5	835	85.4	< 0.1	44.3	1.22	< 0.05	< 0.05	< 0.1		< 0.02	< 0.02	< 0.1	351	
P96-8B	19-Sep-08	0.0001	0.006	0.0009	0.0192	< 1	< 0.0002	< 0.0001	500	0.195	0.359	< 0.002	0.004	0.04	< 0.0002	16.8	0.19	892	75.6	< 0.001	52.2	1.22	0.0011	0.0021	< 0.0008	4	0.00004	0.00328	< 0.004	442	< 0.002
P96-9A	04-Jun-08	< 0.0001	< 0.025	< 0.0025	0.042	< 0.1	< 0.005		303	0.000814	0.0034	< 0.005	< 0.005	0.165	< 0.00002	4.2	< 0.025	235	0.859	< 0.005	11.3	0.0122	< 0.0025	< 0.0025	< 0.005		< 0.001	0.0163	< 0.005	0.0136	
P96-9A	18-Sep-08	0.00006	0.003	0.0005	0.0551	< 0.3	< 0.00005	< 0.00003	343	0.00116	0.00262	< 0.0005	0.0029	0.063	< 0.00005	4.95	0.007	293	0.42	0.001	12	0.0142	0.00009	0.0003	0.0005	1.14	0.00005	0.0329	0.001	0.0158	< 0.0005
S1A	28-May-08	< 0.002	< 0.5	< 0.05	< 0.04	< 0.2	< 0.1		531	0.0234	0.034	< 0.1	< 0.1	< 0.06	< 0.00002	12.2	< 0.5	914	97.2	< 0.1	35.5	1.95	< 0.05	< 0.05	< 0.1		< 0.02	< 0.02	< 0.1	238	
S1A	13-Aug-08	0.0001	0.021	0.0003	0.0187	< 0.3	0.0002	< 0.00003	694	0.0236	0.0358	0.0006	0.0017	0.066	< 0.00005	15.3	0.164	1060	95.3	< 0.0003	39.2	1.87	0.00012	< 0.0001	0.0002	2.37	0.00002	0.00871	< 0.001	254	< 0.0005
S1A	13-Aug-08	0.0002	0.021	< 0.0004	0.0171	< 1	< 0.0002	< 0.0001	572	0.0238	0.0365	< 0.002	0.005	0.15	< 0.0002	12.4	0.16	967	85.2	< 0.001	40.2	1.81	< 0.0001	< 0.0004	< 0.0008	2.1	< 0.00004	0.00901	< 0.004	270	< 0.002
S1A	03-Nov-08	< 0.0003	0.05	0.002	0.02	< 3	< 0.0005	< 0.0003	565	0.0257	0.03	< 0.005	0.004	0.07	< 0.0005	12.4	0.18	971	67.3	< 0.003	46.8	2	0.0004	< 0.001	< 0.002	2.28	< 0.0001	0.0061	< 0.01	288	< 0.005
S1A	MEAN	0.00065	0.148	0.013	0.024	1.13	0.025	0.00014	591	0.0241	0.0341	0.0269	0.0277	0.0865	0.0001925	13.1	0.251	978	86.3	0.026075	40.4	1.91	0.0127	0.013	0.026	2.25	0.0050	0.011	0.029	263	0.0025
S1A	MINIMUM	0.0001	0.021	0.0003	0.0171	< 0.2	< 0.0002	< 0.00003	531	0.0234	0.03	0.0006	0.0017	< 0.06	< 0.00002	12.2	0.16	914	67.3	< 0.0003	35.5	1.81	< 0.0001	< 0.0001	0.0002	2.1	0.00002	0.0061	< 0.001	238	< 0.0005
S1A	MAXIMUM	< 0.002	< 0.5	< 0.05	< 0.04	< 3	< 0.1	< 0.0003	694	0.0257	0.0365	< 0.1	< 0.1	0.15	< 0.0005	15.3	< 0.5	1060	97.2	< 0.1	46.8	2	< 0.05	< 0.05	< 0.1	2.37	< 0.02	< 0.02	< 0.1	288	< 0.005
S1A	N > DL	2	3	2	3	0	1	0	4	4	4	1	3	3	0	4	3	4	4	0	4	4	2	0	1	3	1	3	0	4	0
S1A	Median	0.00025	0.0355	0.0012	0.01935	0.65	0.00035	0.0001	568.5	0.0237	0.0349	0.0035	0.0045	0.068	0.000125	12.4	0.172	969	90.25	0.002	39.7	1.91	0.00026	0.0007	0.0014	2.28	0.00007	0.00886	0.007	262	0.002
S1B	28-May-08	< 0.0001	< 0.025	< 0.0025	0.025	< 0.1	< 0.005		239	0.000424	< 0.0015	< 0.005	< 0.005	0.062	< 0.00002	3.2	< 0.025	68	0.561	< 0.005	33.8	0.0083	< 0.0025	< 0.0025	< 0.005		< 0.001	0.002	< 0.005	0.113	
S1B	03-Nov-08	< 0.00003	0.022	0.0004	0.023	< 0.3	< 0.00005	< 0.00003	156	0.00031	0.0001	< 0.0005	0.0038	0.025	< 0.00005	1.9	0.011	40.9	0.0199	< 0.0003	33.5	0.0089	0.00015	0.0002	< 0.0002	0.44	< 0.00001	0.00014	< 0.001	0.0528	< 0.0005

Appendix 4
2008 Groundwater Quality Data
Rose Creek and Vangorda Creek Drainage

Table 2. Groundwater Dissolved Metals

Statoin	Date	AG-D mg/L	AL-D mg/L	AS-D mg/L	BA-D mg/L	B-D mg/L	BE-D mg/L	BI-D mg/L	CA-D mg/L	CD-D mg/L	CO-D mg/L	CR-D mg/L	CU-D mg/L	FE-D mg/L	HG-D mg/L	K-D mg/L	LI-D mg/L	MG-D mg/L	MN-D mg/L	MO-D mg/L	NA-D mg/L	NI-D mg/L	PB-D mg/L	SB-D mg/L	SE-D mg/L	SR-D mg/L	TL-D mg/L	U-D mg/L	V-D mg/L	ZN-D mg/L	ZR-D mg/L
S2A	28-May-08	< 0.001	< 0.25	< 0.025	< 0.04	< 0.2	< 0.05		437	0.0214	0.026	< 0.05	< 0.05	0.502	< 0.00002	11.4	< 0.25	654	75.3	< 0.05	26.1	1.46	< 0.025	< 0.025	< 0.05		< 0.01	< 0.01	< 0.05	184	
S2A	03-Nov-08	< 0.0003	0.04	0.002	0.015	< 3	< 0.0005	< 0.0003	501	0.0327	0.0275	< 0.005	0.005	0.95	< 0.0005	11.3	0.14	885	83	0.003	29.7	2.1	< 0.0003	< 0.001	< 0.002	1.95	< 0.0001	0.0051	< 0.01	329	< 0.005
S2A	03-Nov-08	< 0.0003	0.05	0.002	0.016	< 3	< 0.0005	< 0.0003	514	0.0348	0.0279	0.048	0.007	2.82	< 0.0005	11.7	0.14	901	84	0.023	30.2	3.84	0.0005	< 0.001	0.002	1.99	< 0.0001	0.0056	< 0.01	325	< 0.005
S2A	MEAN	0.00053	0.113	0.00967	0.024	2.1	0.017	0.0003	484	0.0296	0.0271	0.034	0.021	1.42	0.00034	11.5	0.18	813	80.8	0.0253	28.7	2.47	0.0086	0.009	0.018	1.97	0.0034	0.0069	0.023	279	0.005
S2A	MINIMUM	< 0.0003	0.04	0.002	0.015	< 0.2	< 0.0005	< 0.0003	437	0.0214	0.026	< 0.005	0.005	0.502	< 0.00002	11.3	0.14	654	75.3	0.003	26.1	1.46	< 0.0003	< 0.001	< 0.002	1.95	< 0.0001	0.0051	< 0.01	184	< 0.005
S2A	MAXIMUM	< 0.001	< 0.25	< 0.025	< 0.04	< 3	< 0.05	< 0.0003	514	0.0348	0.0279	< 0.05	< 0.05	2.82	< 0.0005	11.7	< 0.25	901	84	< 0.05	30.2	3.84	< 0.025	< 0.025	< 0.05	1.99	< 0.01	< 0.01	< 0.05	329	< 0.005
S2A	N > DL	0	2	2	2	0	0	0	3	3	3	1	2	3	0	3	2	3	3	2	3	3	1	0	1	2	0	2	0	3	0
S2A	Median	0.0003	0.05	0.002	0.016	3	0.0005	0.0003	501	0.0327	0.0275	0.048	0.007	0.95	0.0005	11.4	0.14	885	83	0.023	29.7	2.1	0.0005	0.001	0.002	1.97	0.0001	0.0056	0.01	325	0.005
S2B	28-May-08	< 0.001	< 0.25	< 0.025	0.046	< 0.2	< 0.05		857	0.00909	0.053	< 0.05	< 0.05	191	0.000029	7.9	< 0.25	651	71	< 0.05	32.4	0.889	< 0.025	< 0.025	< 0.05		< 0.01	< 0.01	< 0.05	127	
S2B	13-Aug-08	0.00011	0.009	0.004	0.052	< 0.3	< 0.00005	< 0.00003	1050	0.00794	0.0524	0.0006	0.0008	202	< 0.00005	8.88	0.078	686	63.2	< 0.0003	34.8	0.849	0.00013	< 0.0001	< 0.0002	2.75	< 0.00001	0.00103	< 0.001	122	0.0006
S2B	03-Nov-08	< 0.0003	0.04	0.002	0.03	< 3	< 0.0005	< 0.0003	519	0.0323	0.0326	< 0.005	< 0.003	36.7	< 0.0005	11.3	0.14	954	88.8	< 0.003	34.6	2.2	< 0.0003	< 0.001	< 0.002	2.15	< 0.0001	0.0006	< 0.01	375	< 0.005
S2B	MEAN	0.00047	0.100	0.0103	0.0427	1.17	0.017	0.00017	809	0.016	0.046	0.019	0.018	143	0.00019	9.36	0.156	764	74.3	0.018	33.9	1.31	0.0085	0.0087	0.0174	2.45	0.0034	0.0039	0.0203	208	0.0028
S2B	MINIMUM	0.00011	0.009	0.002	0.03	< 0.2	< 0.00005	< 0.00003	519	0.00794	0.0326	0.0006	0.0008	36.7	0.000029	7.9	0.078	651	63.2	< 0.0003	32.4	0.849	0.00013	< 0.0001	< 0.0002	2.15	< 0.00001	0.0006	< 0.001	122	0.0006
S2B	MAXIMUM	< 0.001	< 0.25	< 0.025	0.052	< 3	< 0.05	< 0.0003	1050	0.0323	0.053	< 0.05	< 0.05	202	< 0.0005	11.3	< 0.25	954	88.8	< 0.05	34.8	2.2	< 0.025	< 0.025	< 0.05	2.75	< 0.01	< 0.01	< 0.05	375	< 0.005
S2B	N > DL	1	2	2	3	0	0	0	3	3	3	1	1	3	1	3	2	3	3	0	3	3	1	0	0	2	0	2	0	3	1
S2B	Median	0.0003	0.04	0.004	0.046	0.3	0.0005	0.000165	857	0.00909	0.0524	0.005	0.003	191	0.00005	8.88	0.14	686	71	0.003	34.6	0.889	0.0003	0.001	0.002	2.45	0.0001	0.00103	0.01	127	0.0028
S3	28-May-08	< 0.002	< 0.5	< 0.05	< 0.04	< 0.2	< 0.1		425	0.014	0.034	< 0.1	< 0.1	0.773	< 0.00002	12.1	< 0.5	913	130	< 0.1	22.5	2.42	< 0.05	< 0.05	< 0.1		< 0.02	< 0.02	< 0.1	353	
S3	13-Aug-08	0.00018	0.058	0.0037	0.0309	< 0.5	0.0001	< 0.00005	537	0.0161	0.0379	< 0.001	0.0006	1.05	0.0001	14.8	0.161	1100	123	0.0013	33.1	2.62	0.00111	0.0005	< 0.0004	2.04	< 0.00002	0.00083	0.005	429	0.001
S3	03-Nov-08	< 0.0003	0.08	0.005	0.027	< 3	< 0.0005	< 0.0003	462	0.015	0.0349	< 0.005	< 0.003	1.03	< 0.0005	12.3	0.16	984	107	< 0.003	28.8	2.51	0.0012	< 0.001	0.002	1.89	< 0.0001	0.001	< 0.01	422	< 0.005
S3	MEAN	0.00083	0.21	0.020	0.0326	1.23	0.0335	0.00018	475	0.0150	0.0356	0.035	0.0345	0.951	0.0002067	13.1	0.274	999	120	0.035	28.1	2.52	0.0174	0.017	0.034	1.965	0.0067	0.0073	0.038	401	0.003
S3	MINIMUM	0.00018	0.058	0.0037	0.027	< 0.2	0.0001	< 0.00005	425	0.014	0.034	< 0.001	0.0006	0.773	< 0.00002	12.1	0.16	913	107	0.0013	22.5	2.42	0.00111	0.0005	< 0.0004	1.89	< 0.00002	0.00083	0.005	353	0.001
S3	MAXIMUM	< 0.002	< 0.5	< 0.05	< 0.04	< 3	< 0.1	< 0.0003	537	0.0161	0.0379	< 0.1	< 0.1	1.05	< 0.0005	14.8	< 0.5	1100	130	< 0.1	33.1	2.62	< 0.05	< 0.05	< 0.1	2.04	< 0.02	< 0.02	< 0.1	429	< 0.005
S3	N > DL	1	2	2	2	0	1	0	3	3	3	0	1	3	1	3	2	3	3	1	3	3	2	1	1	2	0	2	1	3	1
S3	Median	0.0003	0.08	0.005	0.0309	0.5	0.0005	0.000175	462	0.015	0.0349	0.005	0.003	1.03	0.0001	12.3	0.161	984	123	0.003	28.8	2.51	0.0012	0.001	0.002	1.965	0.0001	0.001	0.01	422	0.003
TH86-17	30-May-08	< 0.0001	< 0.025	< 0.0025	0.04	< 0.1	< 0.005		22.9	0.000085	< 0.0015	< 0.005	< 0.005	0.412	< 0.00002	< 2	< 0.025	5.17	0.0248	< 0.005	2.2	0.0086	< 0.0025	< 0.0025	< 0.005		< 0.001	< 0.001	< 0.005	0.0144	
TH86-17	17-Sep-08	0.000005	0.0025	0.00028	0.0462	< 0.05	< 0.00001	0.000005	22.8	0.000014	0.000067	< 0.0001	0.00094	0.145	< 0.00001	0.72	0.0047	5.07	0.0028	0.00054	1.86	0.00151	0.000025	0.00011	0.00019	0.0949	0.000002	0.000383	< 0.0002	0.0116	< 0.0001
V34	04-Jun-08	< 0.0001	< 0.025	< 0.0025	0.156	< 0.1	< 0.005		112	0.000085	< 0.0015	< 0.005	< 0.005	< 0.03	< 0.00002	4	< 0.025	119	0.0885	< 0.005	6.8	< 0.005	< 0.0025	< 0.0025	< 0.005		< 0.001	0.0135	< 0.005	< 0.005	
V34	18-Sep-08	0.000012	0.0051	0.00217	0.15	< 0.05	< 0.00001	0.000005	119	0.000008	0.000924	< 0.0001	0.00009	0.977	< 0.00001	3.73	0.0183	121	0.0847	0.003	6.62	0.00138	0.000626	0.00007	< 0.00004	1.18	0.000002	0.0148	< 0.0002	0.0022	0.0003
V35	04-Jun-08	< 0.0001	< 0.025	< 0.0025	< 0.02	< 0.1	< 0.005		350	0.000085	< 0.0015	< 0.005	< 0.005	< 0.03	< 0.00002	4.4	< 0.025	200	0.029	< 0.005	8.1	0.0061	< 0.0025	< 0.0025	< 0.005		< 0.001	0.081	< 0.005	0.0063	
V35	18-Sep-08	0.000008	0.0008	0.00059	0.0145	< 0.05	< 0.00001	0.000005	196	0.000038	0.000066	0.0007	0.0003	0.007	< 0.00001	3.22	0.0178	93.5	0.00353	0.00147	5.88	0.00169	0.000203	0.00029	0.00271	0.576	0.000014	0.0329	< 0.0002	0.0014	0.0002
V36	04-Jun-08	< 0.00004	< 0.01	0.0025	< 0.02	< 0.1	< 0.002		157	0.000117	< 0.0006	< 0.002	< 0.002	< 0.03	< 0.00002	3.4	0.03	84.5	0.00212	< 0.002	6.2	0.0036	< 0.001	< 0.001	0.0064		< 0.0004	0.0131	< 0.002	0.024	
V36	18-Sep-08	0.000005	0.0006	0.00208	0.00904	< 0.05	< 0.00001	0.000005	205	0.000182	0.00101	< 0.0001	0.00157	0.005	< 0.00001	3.85	0.034	109	0.0146	0.00043	6.61	0.00684	0.00124	0.00026	0.00329	1.01	0.000026	0.0203	< 0.0002	0.0365	< 0.0001
V37	04-Jun-08	< 0.00004	< 0.01	0.0015	0.143	< 0.1	< 0.002		60.2	0.000056	< 0.0006	< 0.002	< 0.002	0.382	< 0.00002	6.2	0.025	71.5	0.0658	0.0184	22.5	< 0.002	< 0.001	< 0.001	< 0.002		< 0.0004	0.00058	< 0.002	0.0055	
V37	18-Sep-08	0.000005	0.0022	0.00256	0.129	< 0.05	< 0.00001	0.000005	67.5	0.000013	0.000288	< 0.0001	0.00011	0.665	< 0.00001	5.93	0.0248	76.1	0.0896	0.0226	23.1	0.00091	0.000267	0.00005	< 0.00004	0.534	0.000002	0.0013	< 0.0002	0.0014	0.0002
X16A	29-May-08	< 0.00002	< 0.005	< 0.0005	0.085	< 0.1	< 0.001		51.9	0.000055	< 0.0003	< 0.001	< 0.001	< 0.03	< 0.00002	< 2	< 0.005	12	0.00321	0.0022	< 2	< 0.001	< 0.0005	< 0.0005	< 0.001		< 0.0002	0.00162	< 0.001	0.0071	
X16A	16-Sep-08	0.000005	0.0018	0.00022	0.1	< 0.05	< 0.00001	0.000005	58.9	0.000073	0.000023	0.0001	0.00032	0.008	< 0.00001	1.29	0.0026	13.3	0.00399	0.00217	2.14	0.00035	0.000052	0.00022	0.00104	0.165	0.000003	0.0022	< 0.0002	0.0049	< 0.0001
X16B	29-May-08	< 0.00002	< 0.005	< 0.0005	0.133	< 0.1	< 0.001		61.5	0.000017	< 0.0003	< 0.001	< 0.001	< 0.03	< 0.00002	< 2	< 0.005	15.7	0.00043	0.0017	< 2	< 0.001	< 0.0005	< 0.0005	0.0018		< 0.0002	0.00178	< 0.001	0.0478	
X16B	16-Sep-08	0.000005	0.0009	0.00015	0.129	< 0.05	< 0.00001	0.000005	61.4	0.000011	0.000013	0.0001	0.0002	0.003	< 0.00001	1.2	0.0029	16.1	0.00036	0.00175	1.97	0.00044	0.000051	0.00012	0.00177	0.179	0.000002	0.00205	< 0.0002	0.0006	< 0.0001
X17A	29-May-08	< 0.00002	< 0.005	< 0.0005	0.203	< 0.1	< 0.001		92.1	0.000042	< 0.0003	< 0.001	< 0.001	< 0.03	< 0.00002	< 2	< 0.005	23.4	0.0174	< 0.001	2.9	< 0.001	< 0.0005	< 0.0005	< 0.001		< 0.0002	0.00272	< 0.001	0.0118	
X17A	16-Sep-08	0.000005	0.0005	0.00048	0.151	< 0.05	< 0.00001	0.000005	72	0.00003	0.000013	< 0.0001	0.00033	0.002	< 0.00001	1.27	0.0035	19.4	0.0112	0.00118	2.69	0.00033	0.00006	0.00009	0.0006	0.205	0.000002	0.00305	< 0.0002	0.0031	< 0.0001
X17B	29-May-08	< 0.00004	< 0.01	< 0.001	0.187	< 0.1	< 0.002		146	0.000034	< 0.0006	< 0.002	< 0.002	3.1	< 0.00002	3.2	0.031	41	0.466	< 0.002	35.7	< 0.002	< 0.001	< 0.001	< 0.002		< 0.0004	0.00175	< 0.002	< 0.005	
X17B	16-Sep-08	0.000011	0.0005	0.00024	0.233	< 0.05	0.00001	0.000005	93.1	0.000005	0.000022	< 0.0001	< 0.00005	0.81	< 0.00001	2.51	0.0252	25.6	0.256	0.00109	14.9	0.00007	0.000011	< 0.00002	< 0.00004	0.416	0.000002	0.00261	< 0.0002	0.0002	0.0017
X18A	28-May-08	< 0.0001	0.03	0.0093	0.181	< 0.1	< 0.005		259	0.000085	< 0.0015	< 0.005	< 0.005	2.55	< 0.00002	6	< 0.025	64.1	3.37	< 0.005	25.2	< 0.005	< 0.0025	< 0.0025	< 0.005		< 0.001	0.0069	< 0.005	< 0.005	
X18A	16-Sep-08	0.000005	0.0017	0.00907	0.161	< 0.05	< 0.00001	0.000005	234	0.000005	0.000286	< 0.0001	< 0.00005	2.23	< 0.00001	5.99	0.0104	55	1.25	0.00105	22.7	0.00078	0.000042	0.00003	< 0.00004	0.978	0.000002	0.00778	< 0.0002	0.0008	0.0001
X18B	28-May-08	< 0.0001	< 0.025	< 0.0025	0.116	< 0.1	< 0.005		250	0.000293	< 0.0015	< 0.005	< 0.005	0.263	< 0.00002	6.5	< 0.025	59.1	2.77	< 0.005	21.5	0.015	< 0.0025	< 0.0025	< 0.005		< 0.001	0.009	< 0.005	0.0053	
X18B	16-Sep-08	0.000005	0.0004	0.00031	0.0613	< 0.05	< 0.00001	0.000005	134	0.000261	0.000459	< 0.0001	0.00062	0.009	< 0.00001	5.15	0.008	29.8	1.74	0.00124	11.6	0.00945	0.000047	0.00006	0.00119	0.427	0.000006	0.00582	< 0.0002	0.002	< 0.0001
X21A-96	05-Jun-08	< 0.002	< 0.5	< 0.05	< 0.1	< 0.5	< 0.1		275	< 0.0017	< 0.03	< 0.1	< 0.1	4720	< 0.00002	< 10	< 0.5	416	278	< 0.1	64	< 0.1	< 0.05	< 0.05	< 0.1		< 0.02	< 0.02	< 0.1	29.5	
X21A-96	05-Jun-08	< 0.002	< 0.5	< 0.05	< 0.1	< 0.5	< 0.1		273	< 0.0017	< 0.03	< 0.1	< 0.1	4760	< 0.00002	< 10	< 0.5	413	270	< 0.1	64	< 0.1	< 0.05	< 0.05	< 0.1		< 0.02	< 0.02	< 0.1	28	
X21A-96	17-Sep-08	0.0006	0.1	0.009	0.004	< 5	0.002	< 0.0005	296	0.0006	0.0708	< 0.01	< 0.005	6010	< 0.001	11	0.11	454	300	< 0.005	54	0.031	0.0119	< 0.002	< 0.004	0.587	< 0.0002	0.0009	< 0.02	60.9	< 0.01
X21A-96	17-Sep-08	0.0011	0.09	0.008	0.004	< 5	0.003	< 0.0005	296	0.0007	0.0723	< 0.01	< 0.005	5780	< 0.001	11	0.12	453	302	< 0.005	55	0.037	0.0063	< 0.002	< 0.004	0.587	< 0.0002	0.0008	< 0.02	60.9	< 0.01
X21A-96	MEAN	0.00143	0.30	0.029	0.052	2.75	0.051	0.0005	285	0.0012	0.0508	0.055	0.0525	5318	0.00051	10.5	0.31	434	288	0.0525	59.3	0.067	0.030	0.026	0.052	0.587	0.0101	0.0104	0.06	44.8	0.01
X21A-96	MINIMUM	0.0006	0.09	0.008	0.004	< 0.5	0.002	< 0.0005	273	0.0006	< 0.03	< 0.01	< 0.005	4720	< 0.00002	< 10	0.11	413	270	< 0.005	54	0.031	0.0063	< 0.002	< 0.004	0.587	< 0.0002	0.0008	< 0.02	28	< 0.01
X21A-96	MAXIMUM	< 0.002	< 0.5	< 0.05	< 0.1	< 5	< 0.1	< 0.0005	296	< 0.0017	0.0723	< 0.1	< 0.1	6010	< 0.001	11	< 0.5	454	302	< 0.1	64	< 0.1	< 0.05	< 0.05	< 0.1	0.587	< 0.02	< 0.02	< 0.1	60.9	< 0.01
X21A-96	N > DL	2	2	2	2	0	2	0	4	2	2	0	0	4	0	2	2	4	4	0	4	2	2	0	0	2	0	2	0	4	0
X21A-96	Median	0.00155	0.3	0.0295	0.052	2.75	0.0515	0.0005	286	0.0012	0.0504	0.055	0.0525	5270	0.00051	10.5	0.31	434.5	289	0.0525	59.5	0.0685	0.0310	0.026	0.052	0.587	0.0101	0.01045	0.06	45.2	0.01
X21B-96	05-Jun-08	< 0.0001	< 0.025	0.0062	< 0.02	< 0.1	< 0.005		238	0.000109	0.0109	< 0.005	< 0.005	90.6	< 0.00002	4.5	< 0.025	48.6	23.3	< 0.005	63.7	0.0164	< 0.0025	< 0.0025	< 0.005		< 0.001	0.0028	< 0.005	0.206	
X21B-96	17-Sep-08	0.00011	0.003	0.0055	0.0207	< 0.3	< 0.00005	< 0.00003	253	0.00017	0.0126	< 0.0005	< 0.0003	82.3	< 0.00005	4.27	0.013	47.7	26.8	0.0009	53.3	0.0175	0.00005	0.0001	< 0.0002	0.651	0.00003	0.00322	< 0.001	0.28	< 0.0005

Appendix 4
2008 Groundwater Quality Data
Rose Creek and Vangorda Creek Drainage

Table 2. Groundwater Dissolved Metals

Statoin	Date	AG-D mg/L	AL-D mg/L	AS-D mg/L	BA-D mg/L	B-D mg/L	BE-D mg/L	BI-D mg/L	CA-D mg/L	CD-D mg/L	CO-D mg/L	CR-D mg/L	CU-D mg/L	FE-D mg/L	HG-D mg/L	K-D mg/L	LI-D mg/L	MG-D mg/L	MN-D mg/L	MO-D mg/L	NA-D mg/L	NI-D mg/L	PB-D mg/L	SB-D mg/L	SE-D mg/L	SR-D mg/L	TL-D mg/L	U-D mg/L	V-D mg/L	ZN-D mg/L	ZR-D mg/L
X24D-96	12-Aug-08	< 0.00003	0.005	0.0004	0.0209	< 0.3	< 0.00005	< 0.00003	750	0.00291	0.0765	< 0.0005	0.002	0.045	< 0.00005	7.9	0.026	148	66.4	0.0005	49.2	0.266	< 0.00003	< 0.0001	< 0.0002	1.81	0.00019	0.006	< 0.001	0.0829	< 0.0005
X24D-96	17-Sep-08	0.00004	< 0.001	0.0004	0.0205	< 0.3	< 0.00005	< 0.00003	710	0.00288	0.0785	< 0.0005	0.0017	0.11	< 0.00005	8.07	0.026	150	61.8	0.0005	47.6	0.271	0.00004	0.0001	< 0.0002	1.67	0.00019	0.00603	< 0.001	0.0822	< 0.0005
X24D-96	04-Nov-08	< 0.00003	0.004	0.0003	0.0207	< 0.3	< 0.00005	< 0.00003	659	0.00292	0.0858	< 0.0005	0.0022	0.011	< 0.00005	7.35	0.027	140	62.4	0.0004	45.3	0.278	0.00009	< 0.0001	< 0.0002	1.83	0.00018	0.0061	< 0.001	0.0846	< 0.0005
X24D-96	MEAN	3.33E-05	0.0033	0.00037	0.0207	0.3	0.00005	0.00003	706	0.0029	0.0803	0.0005	0.0020	0.055	0.00005	7.77	0.026	146	63.5	0.00047	47.4	0.272	5.33E-05	0.0001	0.0002	1.77	0.00019	0.0060	0.001	0.083	0.0005
X24D-96	MINIMUM	< 0.00003	< 0.001	0.0003	0.0205	< 0.3	< 0.00005	< 0.00003	659	0.00288	0.0765	< 0.0005	0.0017	0.011	< 0.00005	7.35	0.026	140	61.8	0.0004	45.3	0.266	< 0.00003	< 0.0001	< 0.0002	1.67	0.00018	0.006	< 0.001	0.0822	< 0.0005
X24D-96	MAXIMUM	0.00004	0.005	0.0004	0.0209	< 0.3	< 0.00005	< 0.00003	750	0.00292	0.0858	< 0.0005	0.0022	0.11	< 0.00005	8.07	0.027	150	66.4	0.0005	49.2	0.278	0.00009	< 0.0001	< 0.0002	1.83	0.00019	0.0061	< 0.001	0.0846	< 0.0005
X24D-96	N > DL	1	2	3	3	0	0	0	3	3	3	0	3	3	0	3	3	3	3	3	3	3	2	1	0	3	3	3	0	3	0
X24D-96	Median	0.00003	0.004	0.0004	0.0207	0.3	0.00005	0.00003	710	0.00291	0.0785	0.0005	0.002	0.045	0.00005	7.9	0.026	148	62.4	0.0005	47.6	0.271	0.00004	0.0001	0.0002	1.81	0.00019	0.00603	0.001	0.0829	0.0005
X25A-96	29-May-08	< 0.00004	< 0.01	< 0.001	0.046	< 0.1	< 0.002		160	0.000117	0.00642	< 0.002	< 0.002	< 0.03	< 0.00002	4.3	< 0.01	38.1	6.15	0.0022	25.3	0.0045	< 0.001	< 0.001	< 0.002		< 0.0004	0.00911	< 0.002	< 0.005	
X25A-96	12-Aug-08	0.000005	0.0026	0.00023	0.0424	< 0.05	< 0.00001	0.000005	186	0.000124	0.00528	< 0.0001	0.0006	0.024	< 0.00001	4.58	0.0035	40.3	6.99	0.00216	27.4	0.00425	0.000115	0.00005	< 0.00004	0.453	0.000016	0.0104	< 0.0002	0.0019	0.0001
X25A-96	12-Aug-08	0.000005	0.0024	0.00024	0.0418	< 0.05	< 0.00001	0.000005	175	0.000126	0.00554	< 0.0001	0.00063	0.028	< 0.00001	4.65	0.0035	38.3	7.05	0.00218	25.7	0.00446	0.000023	0.00005	0.00004	0.461	0.000016	0.0103	< 0.0002	0.002	0.0001
X25A-96	16-Sep-08	0.000005	0.0013	0.00025	0.0458	< 0.05	< 0.00001	0.000005	178	0.000092	0.00545	< 0.0001	0.00053	0.036	< 0.00001	4.68	0.0036	38.1	6.85	0.00221	25.7	0.00421	0.000034	0.00005	< 0.00004	0.451	0.000013	0.0103	< 0.0002	0.0014	0.0001
X25A-96	04-Nov-08	0.000005	0.002	0.00017	0.0457	< 0.05	< 0.00001	0.000005	170	0.000151	0.00659	< 0.0001	0.00209	0.006	< 0.00001	4.02	0.0036	37.7	7.1	0.00149	23.7	0.00534	0.000034	0.00005	0.00004	0.464	0.000016	0.00905	< 0.0002	0.002	< 0.0001
X25A-96	MEAN	0.000012	0.0037	0.00038	0.0443	0.06	0.000408	0.000005	174	0.000122	0.0059	0.00048	0.00117	0.025	0.000012	4.45	0.0048	38.5	6.83	0.00205	25.6	0.00455	0.00024	0.00024	0.00043	0.457	0.000092	0.0098	0.00056	0.0025	0.0001
X25A-96	MINIMUM	0.000005	0.0013	0.00017	0.0418	< 0.05	< 0.00001	0.000005	160	0.000092	0.00528	< 0.0001	0.00053	0.006	< 0.00001	4.02	0.0035	37.7	6.15	0.00149	23.7	0.00421	0.000023	0.00005	< 0.00004	0.451	0.000013	0.00905	< 0.0002	0.0014	< 0.0001
X25A-96	MAXIMUM	< 0.00004	< 0.01	< 0.001	0.046	< 0.1	< 0.002	0.000005	186	0.000151	0.00659	< 0.002	0.00209	0.036	< 0.00002	4.68	< 0.01	40.3	7.1	0.00221	27.4	0.00534	< 0.001	< 0.001	< 0.002	0.464	< 0.0004	0.0104	< 0.002	< 0.005	< 0.0001
X25A-96	N > DL	0	4	4	5	0	0	0	5	5	5	0	4	4	0	5	4	5	5	5	5	5	4	4	2	4	4	5	0	4	3
X25A-96	Median	0.000005	0.0024	0.00024	0.0457	0.05	0.00001	0.000005	175	0.000124	0.00554	0.0001	0.00063	0.028	0.00001	4.58	0.0036	38.1	6.99	0.00218	25.7	0.00446	0.000034	0.00005	0.00004	0.457	0.000016	0.0103	0.0002	0.002	0.0001
X25B-96	29-May-08	< 0.00004	< 0.01	< 0.001	0.03	< 0.1	< 0.002		180	0.000034	< 0.0006	< 0.002	< 0.002	0.68	< 0.00002	3.2	< 0.01	31	0.169	< 0.002	46.5	< 0.002	< 0.001	< 0.001	< 0.002		< 0.0004	0.00535	< 0.002	< 0.005	
X25B-96	12-Aug-08	0.000005	0.0011	0.00056	0.028	< 0.05	< 0.00001	0.000005	214	0.000019	0.000224	< 0.0001	0.00011	0.776	< 0.00001	3.6	0.0091	32.9	0.205	0.00043	52.5	0.00074	0.000006	0.00002	< 0.00004	0.46	0.000008	0.00603	< 0.0002	0.0004	< 0.0001
X25B-96	16-Sep-08	0.000005	0.0007	0.00059	0.0281	< 0.05	< 0.00001	0.000005	190	0.000024	0.000229	< 0.0001	0.00014	0.87	< 0.00001	3.43	0.0089	29.4	0.18	0.0004	47.3	0.00075	0.000033	0.00003	< 0.00004	0.418	0.000006	0.00557	< 0.0002	0.0006	< 0.0001
X25B-96	16-Sep-08	0.000005	0.001	0.00058	0.0267	< 0.05	< 0.00001	0.000005	200	0.000022	0.000223	< 0.0001	0.00012	0.781	< 0.00001	3.57	0.0086	30.7	0.189	0.00038	49.7	0.00072	0.000012	0.00002	< 0.00004	0.42	0.000005	0.00539	< 0.0002	0.0002	< 0.0001
X25B-96	04-Nov-08	0.000005	0.0009	0.00053	0.0273	< 0.05	< 0.00001	0.000005	174	0.000021	0.000212	< 0.0001	0.00011	0.77	< 0.00001	3.21	0.009	29.1	0.186	0.0004	45.5	0.00063	0.000014	< 0.00002	< 0.00004	0.444	0.000006	0.00583	< 0.0002	0.0002	< 0.0001
X25B-96	MEAN	0.000012	0.0027	0.00065	0.0280	0.06	0.00041	0.000005	192	0.000024	0.00030	0.00048	0.00050	0.775	0.000012	3.40	0.0091	30.6	0.186	0.00072	48.3	0.00097	0.00021	0.00022	0.00043	0.436	0.000085	0.00563	0.00056	0.00128	0.0001
X25B-96	MINIMUM	< 0.000005	0.0007	0.00053	0.0267	< 0.05	< 0.00001	< 0.000005	174	0.000019	0.000212	< 0.0001	0.00011	0.68	< 0.00001	3.2	0.0086	29.1	0.169	0.00038	45.5	0.00063	0.000006	< 0.00002	< 0.00004	0.418	0.000005	0.00535	< 0.0002	0.0002	< 0.0001
X25B-96	MAXIMUM	< 0.00004	< 0.01	< 0.001	0.03	< 0.1	< 0.002	< 0.000005	214	< 0.000034	< 0.0006	< 0.002	< 0.002	0.87	< 0.00002	3.6	< 0.01	32.9	0.205	< 0.002	52.5	< 0.002	< 0.001	< 0.001	< 0.002	0.46	< 0.0004	0.00603	< 0.002	< 0.005	< 0.0001
X25B-96	N > DL	0	4	4	5	0	0	0	5	4	4	0	4	5	0	5	4	5	5	4	5	4	4	3	0	4	4	5	0	4	0
X25B-96	Median	0.000005	0.001	0.00058	0.028	0.05	0.00001	0.000005	190	0.000022	0.000224	0.0001	0.00012	0.776	0.00001	3.43	0.009	30.7	0.186	0.0004	47.3	0.00074	0.000014	0.00002	0.00004	0.432	0.000006	0.00557	0.0002	0.0004	0.0001

Note:
Statistics only generated where there are more than 2 values in a data set

average	*average of values, including values less than detection limit as set to DL value if it is the DL value will be shown without the < symbol*
minimum	*lowest value and will be least DL value if these are present in the data set*
maximum	*highest vale*
N > DL	*number of values measured that are above detection limits*
median	*the median value of the data set - if it is a DL value will be shown without the < symbol*

NOTE:
Detection Limit values used as the DL value in statistics contrasts with conversion to 0 for charts

Appendix 5

2008 Bioassay Results – Rose Creek Drainage

Anvil Range Mining Corporation
X5P - Grab

Rainbow Trout Bioassay
96-h LC50 %v/v: >100%

CANTEST Ltd.
4606 Canada Way
Burnaby, BC
Canada V5G 1K5
tel: 604 734-7276
fax: 604 731-2386
web: http://cantest.com

Cantest Sample # : 803130430 G# 90313110 Report # : 2-11-200-196-08-001

Sample Taken:	Mar. 11, 2008 11:50 AM	Sample pH:	7.5
Sample Collected By:	C. McKinnon, R. Meers	Sample Dissolved Oxygen:	11.5 mg/L
Sample Received:	Mar. 13, 2008	Sample Temperature:	7.3 °C
Start Date/Time:	Mar. 14, 2008 1:30 PM	Sample Conductance:	1214 µmho/cm

Conc. (%v/v)	Cond. (µmho/cm)	Temp. Initial (°C)	Temp. Final (°C)	pH Initial	pH Final	D.O. Initial (mg/L)	D.O. Final (mg/L)	Percent Mortality 24 hr	48 hr	72 hr	96 hr	Number of Mortalities
0	60	14.7	14.8	8.2	7.6	9.9	9.8	0	0	0	0	0
100	1527	16.0	14.9	7.6	8.3	9.2	9.9	0	0	0	0	0

Comments:
All fish appeared and behaved normally during the test.

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	31 min.
Test Volume:	12 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.41 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

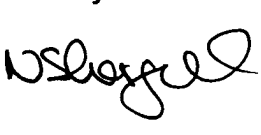
Weight (Mean + SD):	0.49 ± 0.18 g	Length (Mean + SD):	3.9 ± 0.4 cm
Weight (Range):	0.3– 0.82 g	Length (Range):	3.4– 4.5 cm

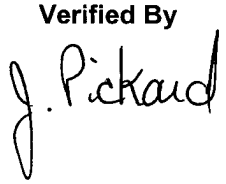
Reference Toxicant: Phenol
Test was conducted on: 03/12/2008
Test gave a 96-h LC50 of 9.66 (8.27, 11.25) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 20 mg $CaCO_3$/L Other parameters available on request

Test Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluent to Rainbow Trout, EPS 1/RM/13, Second Edition, December 2000. Results contained in this report refer only to the testing of samples as submitted.

Analyst **Verified By**





Anvil Range Mining Corporation
X5 - Grab

Rainbow Trout Bioassay
96-h LC50 %v/v: >100%

CANTEST Ltd.
4606 Canada Way
Burnaby, BC
Canada V5G 1K5
tel: 604 734-7276
fax: 604 731-2386
web: http://cantest.com

Cantest Sample # : 806120274 G# 90612090 Report # : 2-11-200-196-08-006

Sample Taken:	Jun. 10, 2008 1:55 PM	Sample pH:	7.2
Sample Collected By:	C. McKinnon, R. Meers	Sample Dissolved Oxygen:	9.7 mg/L
Sample Received:	Jun. 12, 2008	Sample Temperature:	15.2 °C
Start Date/Time:	Jun. 13, 2008 12:15 PM	Sample Conductance:	1363 µmho/cm

Conc. (%v/v)	Cond. (µmho/cm)	Temp. Initial (°C)	Temp. Final (°C)	pH Initial	pH Final	D.O. Initial (mg/L)	D.O. Final (mg/L)	Percent Mortality 24 hr	48 hr	72 hr	96 hr	Number of Mortalities
0	65	15.3	16.0	8.2	8.3	10.0	9.6	0	0	0	0	0
100	1408	15.0	16.0	7.0	7.9	10.2	9.8	0	0	0	0	0

Comments:
All fish appeared and behaved normally during the test.

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	30 min.
Test Volume:	18 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.24 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

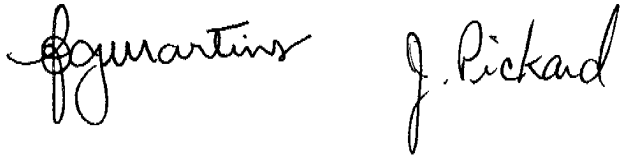
Weight (Mean + SD):	0.43 ± 0.11 g	Length (Mean + SD):	3.7 ± 0.3 cm
Weight (Range):	0.27– 0.63 g	Length (Range):	3.1– 4.2 cm

Reference Toxicant: Phenol
Test was conducted on: 06/04/2008
Test gave a 96-h LC50 of 11.4 (10.37, 12.53) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 16 mg $CaCO_3$/L Other parameters available on request

Test Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluent to Rainbow Trout, EPS 1/RM/13, Second Edition, December 2000. Results contained in this report refer only to the testing of samples as submitted.

Analyst **Verified By**



Anvil Range Mining Corporation
X5-Grab

Rainbow Trout Bioassay
96-h LC50 %v/v: >100%

CANTEST Ltd.
4606 Canada Way
Burnaby, BC
Canada V5G 1K5
tel: 604 734-7276
fax: 604 731-2386
web: http://cantest.com

Cantest Sample # : 809040539 G# 90904128 — Report # : 2-11-200-196-08-010

Sample Taken:	Sep. 2, 2008 1:25 PM	Sample pH:	7.8
Sample Collected By:	C. McKinnon & R. Meers	Sample Dissolved Oxygen:	10.4 mg/L
Sample Received:	Sep. 4, 2008	Sample Temperature:	14.2 °C
Start Date/Time:	Sep. 5, 2008 2:31 PM	Sample Conductance:	1358 µmho/cm

Conc. (%v/v)	Cond. (µmho/cm)	Temp. Initial (°C)	Temp. Final (°C)	pH Initial	pH Final	D.O. Initial (mg/L)	D.O. Final (mg/L)	Percent Mortality 24 hr	48 hr	72 hr	96 hr	Number of Mortalities
0	26	14.5	14.6	7.3	7.0	10.1	10.2	0	0	0	0	0
100	1322	14.3	14.5	7.9	7.9	10.1	10.2	0	0	0	0	0

Comments:
All fish appeared and behaved normally during the test.

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	30 min.
Test Volume:	15 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.40 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

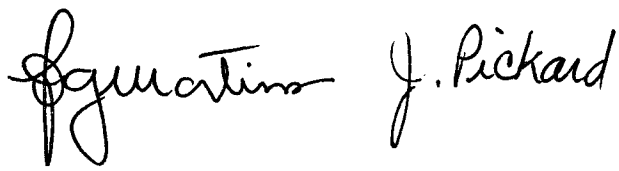
Weight (Mean + SD):	0.6 ± 0.12 g	Length (Mean + SD):	4.1 ± 0.2 cm
Weight (Range):	0.41– 0.82 g	Length (Range):	3.7– 4.4 cm

Reference Toxicant: Phenol
Test was conducted on: 08/08/2008
Test gave a 96-h LC50 of 12.71 (10.91, 15.66) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 24 mg $CaCO_3$/L Other parameters available on request

Test Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluent to Rainbow Trout, EPS 1/RM/13, Second Edition, December 2000. Results contained in this report refer only to the testing of samples as submitted.

Analyst **Verified By**



Anvil Range Mining Corporation
X5-Grab

Rainbow Trout Bioassay
96-h LC50 %v/v: >100%

CANTEST Ltd.
4606 Canada Way
Burnaby, BC
Canada V5G 1K5
tel: 604 734-7276
fax: 604 731-2386
web: http://cantest.com

Cantest Sample # : 812050252 G# 91205070 ANV100 — Report # : 2-11-200-196-08-012

Sample Taken:	Dec. 3, 2008 11:10 AM	Sample pH:	7.3
Sample Collected By:	C. McKinnon, R. Meers	Sample Dissolved Oxygen:	10.4 mg/L
Sample Received:	Dec. 5, 2008	Sample Temperature:	14.1 °C
Start Date/Time:	Dec. 8, 2008 9:15 AM	Sample Conductance:	1502 µmho/cm

Conc. (%v/v)	Cond. (µmho/cm)	Temp. Initial (°C)	Temp. Final (°C)	pH Initial	pH Final	D.O. Initial (mg/L)	D.O. Final (mg/L)	Percent Mortality 24 hr	48 hr	72 hr	96 hr	Number of Mortalities
0	47	14.0	14.2	6.7	7.3	10.4	10.3	0	0	0	0	0
100	1483	14.2	14.2	7.3	8.2	10.3	10.3	0	0	0	0	0

Comments:
All fish appeared and behaved normally during the test.

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	30 min.
Test Volume:	10 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.32 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

Weight (Mean + SD):	0.32 ± 0.03 g	Length (Mean + SD):	3.3 ± 0.1 cm
Weight (Range):	0.26– 0.4 g	Length (Range):	3.1– 3.6 cm

Reference Toxicant: Zinc
Test was conducted on: 12/08/2008
Test gave a 96-h LC50 of 0.09 (0.07, 0.11) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 11 mg $CaCO_3$/L Other parameters available on request

Test Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluent to Rainbow Trout, EPS 1/RM/13, Second Edition, December 2000. Results contained in this report refer only to the testing of samples as submitted.

Analyst **Verified By**

2008 Dec 18

Anvil Range Mining Corporation

X13 - Grab

Rainbow Trout Bioassay

96-h LC50 %v/v: >100%

CANTEST Ltd.

4606 Canada Way
Burnaby, BC
Canada V5G 1K5
tel: 604 734-7276
fax: 604 731-2386
web: http://cantest.com

Cantest Sample # : 803130432 G# 90313110 Report # : 2-11-200-196-08-002

Sample Taken:	Mar. 11, 2008 12:00 PM	Sample pH:	7.4
Sample Collected By:	C. McKinnon, R. Meers	Sample Dissolved Oxygen:	12.0 mg/L
Sample Received:	Mar. 13, 2008	Sample Temperature:	7.1 °C
Start Date/Time:	Mar. 14, 2008 1:32 PM	Sample Conductance:	1624 µmho/cm

Conc. (%v/v)	Cond. (µmho/cm)	Temp. Initial (°C)	Temp. Final (°C)	pH Initial	pH Final	D.O. Initial (mg/L)	D.O. Final (mg/L)	Percent Mortality 24 hr	48 hr	72 hr	96 hr	Number of Mortalities
0	60	14.7	14.9	8.2	7.5	9.9	9.8	0	0	0	0	0
100	2030	15.9	15.0	7.5	8.2	9.5	9.8	0	0	0	0	0

Comments:
All fish appeared and behaved normally during the test.

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	30 min.
Test Volume:	12 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.41 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

Weight (Mean + SD):	0.49 ± 0.18 g	Length (Mean + SD):	3.9 ± 0.4 cm
Weight (Range):	0.3– 0.82 g	Length (Range):	3.4– 4.5 cm

Reference Toxicant: Phenol
Test was conducted on: 03/12/2008
Test gave a 96-h LC50 of 9.66 (8.27, 11.25) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 20 mg $CaCO_3$/L Other parameters available on request

Test Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluent to Rainbow Trout, EPS 1/RM/13, Second Edition, December 2000. Results contained in this report refer only to the testing of samples as submitted.

Analyst **Verified By**

J. Pickard

Anvil Range Mining Corporation
X13 - Grab

Rainbow Trout Bioassay
96-h LC50 %v/v: >100%

CANTEST Ltd.
4606 Canada Way
Burnaby, BC
Canada V5G 1K5
tel: 604 734-7276
fax: 604 731-2386
web: http://cantest.com

Cantest Sample # : 806120275 G# 90612090 Report # : 2-11-200-196-08-007

Sample Taken:	Jun. 10, 2008 1:45 PM	Sample pH:	7.1
Sample Collected By:	C. McKinnon, R. Meers	Sample Dissolved Oxygen:	9.7 mg/L
Sample Received:	Jun. 12, 2008	Sample Temperature:	15.1 °C
Start Date/Time:	Jun. 13, 2008 12:15 PM	Sample Conductance:	1993 µmho/cm

Conc. (%v/v)	Cond. (µmho/cm)	Temp. Initial (°C)	Temp. Final (°C)	pH Initial	pH Final	D.O. Initial (mg/L)	D.O. Final (mg/L)	Percent Mortality 24 hr	48 hr	72 hr	96 hr	Number of Mortalities
0	65	15.3	16.0	8.2	8.3	10.0	9.6	0	0	0	0	0
100	1991	15.0	16.0	7.1	7.9	10.0	9.8	0	0	0	0	0

Comments:
All fish appeared and behaved normally during the test.

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	30 min.
Test Volume:	18 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.24 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

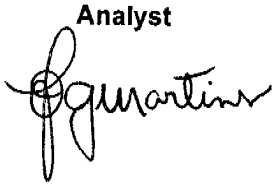
Weight (Mean + SD):	0.43 ± 0.11 g	Length (Mean + SD):	3.7 ± 0.3 cm
Weight (Range):	0.27– 0.63 g	Length (Range):	3.1– 4.2 cm

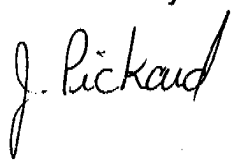
Reference Toxicant: Phenol
Test was conducted on: 06/04/2008
Test gave a 96-h LC50 of 11.4 (10.37, 12.53) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 16 mg $CaCO_3$/L Other parameters available on request

Test Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluent to Rainbow Trout, EPS 1/RM/13, Second Edition, December 2000. Results contained in this report refer only to the testing of samples as submitted.

Analyst **Verified By**





Anvil Range Mining Corporation
X13-Grab

Rainbow Trout Bioassay
96-h LC50 %v/v: >100%

CANTEST Ltd.
4606 Canada Way
Burnaby, BC
Canada V5G 1K5
tel: 604 734-7276
fax: 604 731-2386
web: http://cantest.com

Cantest Sample # : 809040541 G# 90904128 — Report # : 2-11-200-196-08-011

Sample Taken:	Sep. 2, 2008 1:15 PM	Sample pH:	7.0
Sample Collected By:	C. McKinnon & R. Meers	Sample Dissolved Oxygen:	10.2 mg/L
Sample Received:	Sep. 4, 2008	Sample Temperature:	14.6 °C
Start Date/Time:	Sep. 5, 2008 2:31 PM	Sample Conductance:	1886 µmho/cm

Conc. (%v/v)	Cond. (µmho/cm)	Temp. Initial (°C)	Temp. Final (°C)	pH Initial	pH Final	D.O. Initial (mg/L)	D.O. Final (mg/L)	Percent Mortality 24 hr	48 hr	72 hr	96 hr	Number of Mortalities
0	25	14.6	14.5	7.2	7.1	10.0	10.2	0	0	0	0	0
100	1827	14.3	14.4	7.3	8.3	10.1	10.2	0	0	0	0	0

Comments:
All fish appeared and behaved normally during the test.

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	30 min.
Test Volume:	15 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.42 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

Weight (Mean + SD):	0.63 ± 0.18 g	Length (Mean + SD):	4 ± 0.4 cm
Weight (Range):	0.28– 0.99 g	Length (Range):	3.3– 4.6 cm

Reference Toxicant: Phenol
Test was conducted on: 08/08/2008
Test gave a 96-h LC50 of 10.8 (9.42, 12.11) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 24 mg $CaCO_3$/L Other parameters available on request

Test Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluent to Rainbow Trout, EPS 1/RM/13, Second Edition, December 2000. Results contained in this report refer only to the testing of samples as submitted.

Analyst **Verified By**

L. Martin J. Pickard

Anvil Range Mining Corporation

X13-Grab

Rainbow Trout Bioassay

96-h LC50 %v/v: >100%

CANTEST Ltd.

4606 Canada Way
Burnaby, BC
Canada V5G 1K5
tel: 604 734-7276
fax: 604 731-2386
web: http://cantest.com

Cantest Sample # : 812050255 G#91205070 ANV100 Report # : 2-11-200-196-08-013

Sample Taken:	Dec. 3, 2008 10:50 AM	Sample pH:	7.0
Sample Collected By:	C. McKinnon, R. Meers	Sample Dissolved Oxygen:	10.4 mg/L
Sample Received:	Dec. 5, 2008	Sample Temperature:	13.6 °C
Start Date/Time:	Dec. 8, 2008 9:15 AM	Sample Conductance:	1883 µmho/cm

Conc. (%v/v)	Cond. (µmho/cm)	Temp. Initial (°C)	Temp. Final (°C)	pH Initial	pH Final	D.O. Initial (mg/L)	D.O. Final (mg/L)	Percent Mortality 24 hr	48 hr	72 hr	96 hr	Number of Mortalities
0	38	14.0	14.1	6.7	7.5	10.4	10.4	0	0	0	0	0
100	1868	14.0	14.1	7.1	8.1	10.3	10.4	0	0	0	0	0

Comments:
All fish appeared and behaved normally during the test.

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	30 min.
Test Volume:	10 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.32 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

Weight (Mean + SD):	0.32 ± 0.03 g	Length (Mean + SD):	3.3 ± 0.1 cm
Weight (Range):	0.26– 0.4 g	Length (Range):	3.1– 3.6 cm

Reference Toxicant: Zinc
Test was conducted on: 12/08/2008
Test gave a 96-h LC50 of 0.09 (0.07, 0.11) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 11 mg $CaCO_3$/L Other parameters available on request

Test Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluent to Rainbow Trout, EPS 1/RM/13, Second Edition, December 2000. Results contained in this report refer only to the testing of samples as submitted.

Analyst **Verified By**

2008 Dec 18

Appendix 6

2008 Water Quality Data – Vangorda Creek Drainage

AECOM

Appendix 6
2008 Surface Water Quality Data
Vangorda Creek Drainage

Table 1. Surface Water Routine Parameters

Station	Date	ALK-T mg/L	COND-L µS/cm	HARD mg/L	NH3 mg/L	PH-F pH unit	SO4 mg/L	TEMP °C	TSS mg/L
LCD	01-Jun-08		1840	905	0.15	6.7	1140	12.6	7
LCD	29-Sep-08		5380	2050	0.69	5.6	3150	4.1	8
MOOSESP	06-May-08	227	1620	1000		7.6	648	5	
MOOSESP	14-May-08	230	1760	925		8	720	1.7	
MOOSESP	04-Jun-08	220	1320	788		8.1	596	3.8	
MOOSESP	17-Jun-08	236	1930	1050		7.9	862	5.1	
MOOSESP	03-Jul-08	304	2140	1190		7.9	907	6.8	
MOOSESP	15-Jul-08	325	1870	1180		7.6	821	6.5	
MOOSESP	04-Aug-08	331	2070	1190		7.6	882	8.5	
MOOSESP	12-Aug-08	351	1860	1320		7.6	987	9.3	
MOOSESP	09-Sep-08	399	2000	1280		7.7	949	8	
MOOSESP	15-Sep-08	348	1980	1170		7.5	986	8.5	
MOOSESP	01-Oct-08	324	2110	1360		7.7	986	7	
MOOSESP	15-Oct-08	373	2330	1280		7.5	984	4.7	
MOOSESP	03-Nov-08	315	2260	1550		7.5	1070	3.3	
MOOSESP	13-Nov-08	319	2310	1450		7.7	1080	2	
MOOSESP	MEAN	307	1969	1195.21		7.71	891	5.73	
MOOSESP	MINIMUM	220	1320	788		7.5	596	1.7	
MOOSESP	MAXIMUM	399	2330	1550		8.1	1080	9.3	
MOOSESP	N > DL	14	14	14		14	14	14	
MOOSESP	Median	321.5	1990	1190		7.65	928	5.8	
V1	23-Jan-08	42	110	51.3	< 0.005	7.28	12.2		< 1
V1	21-Feb-08	48	120	54.6	< 0.005	6.86	12.2	-0.5	< 1
V1	10-Mar-08	49.4	116	59	< 0.01	7.2	12.3	0.5	< 1
V1	11-Mar-08	47	120	54.1	< 0.005	6.3	11.9	-0.5	< 1
V1	29-Apr-08	45	120	51.2	< 0.005	7.82	11	-0.5	< 1
V1	22-May-08	22	62	29.4	< 0.005	7.7	1.4	0	< 1
V1	24-May-08	15		23.1	0.13		1.6		16
V1	10-Jun-08	16.2	42	17	0.02	7.5	4.25	3.9	< 1
V1	25-Jun-08	12	43	16.5	< 0.005	6.76	3.8	4.5	2
V1	29-Jul-08	27	78	32.2	< 0.005	7.45	7.3	6.1	< 1
V1	02-Sep-08	28.2	62	24	< 0.01	8.3	7.22	6.4	6
V1	17-Sep-08	29	73	30.3	< 0.005	6.93	7.7	4	< 1
V1	07-Oct-08	29	75	29.9	< 0.005		9.6		3
V1	02-Dec-08	40.8	107	54	0.02	8.2	10.8	0	< 1
V1	11-Dec-08	44	110	51.3	< 0.005		11	0.1	1
V1	MEAN	33.0	88.4	38.5	0.02	7.36	8.28	2	2.5
V1	MINIMUM	12	42	16.5	< 0.005	6.3	1.4	-0.5	< 1
V1	MAXIMUM	49.4	120	59	0.13	8.3	12.3	6.4	16
V1	N > DL	15	14	15	3	12	15	12	5
V1	Median	29	92.5	32.2	0.005	7.365	9.6	0.3	1

Appendix 6
2008 Surface Water Quality Data
Vangorda Creek Drainage

Table 1. Surface Water Routine Parameters

Station	Date	ALK-T mg/L	COND-L µS/cm	HARD mg/L	NH3 mg/L	PH-F pH unit	SO4 mg/L	TEMP °C	TSS mg/L
V2	07-Jan-08	264	1750	1010	0.02	7.9	763	0.1	2
V2	14-Feb-08	344	1900	977		7.4	760	1.1	< 1
V2	19-Feb-08	309	1870	969	0.04	7.8	693	1.4	< 1
V2	06-May-08	250	1750	1030		8.1	729	2.4	2
V2	14-May-08	316	1620	866	0.02	8.1	650	1.6	4
V2	04-Jun-08	222	1390	892		8.2	654	3.4	< 1
V2	17-Jun-08	229	1400	940	< 0.01	8	650	4.7	< 1
V2	03-Jul-08	281	1670	988		8	717	5.5	< 1
V2	15-Jul-08	234	1200	788	0.01	7.9	519	6.1	115
V2	04-Aug-08	304	1770	966		7.8	698	5.5	< 1
V2	12-Aug-08	272	1600	1040	0.01	7.8	693	7.4	1
V2	02-Sep-08					7.7		5.5	
V2	09-Sep-08	343	1560	1070		7.8	697	5.7	1
V2	15-Sep-08	308	1580	918	0.02	7.8	704	5.6	< 1
V2	01-Oct-08	288	1700	984		7.9	728	5.2	< 1
V2	15-Oct-08	335	1770	949	0.03	7.6	743	3.3	< 1
V2	03-Nov-08	289	1920	1240	0.03	7.9	818	2.1	< 1
V2	13-Nov-08	294	1740	1120		7.7	839	1.3	< 1
V2	02-Dec-08	297	1990	1260	0.04	7.9	859	0	6
V2	03-Dec-08					7.8		0	
V2	10-Dec-08	300	1950	1270		8	870	0.2	1
V2	MEAN	288	1691	1015	0.02	7.9	725	3.2	7.5
V2	MINIMUM	222	1200	788	< 0.01	7.4	519	0	< 1
V2	MAXIMUM	344	1990	1270	0.04	8.2	870	7.4	115
V2	N > DL	19	19	19	9	21	19	21	8
V2	Median	294	1740	984	0.02	7.9	717	3.3	1
V2A	06-May-08	230	1600	887		8.4	609	2.9	1
V2A	14-May-08	214	1470	882	0.01	8.5	657	0.7	3
V2A	04-Jun-08	282	2250	1340		8.5	1050	3.3	< 1
V2A	17-Jun-08	295	2160	1590	< 0.01	8.3	1020	5.9	< 1
V2A	03-Jul-08	349	2340	1370		8.6	996	4.7	< 1
V2A	15-Jul-08	341	1880	1190	0.04	8.2	791	4.9	7
V2A	04-Aug-08	373	2480	1320		8.1	969	6.8	< 1
V2A	12-Aug-08	332	2280	1450	0.01	8.2	972	7.1	< 1
V2A	09-Sep-08	424	2250	1430		8.2	1050	5.3	< 1
V2A	15-Sep-08	381	2170	1340	0.02	8.1	1050	5.7	1
V2A	01-Oct-08	364	2250	1490		8.3	1060	4.3	< 1
V2A	15-Oct-08	436	2590	1380	0.03	8	1090	2.9	< 1
V2A	03-Nov-08	370	2620	1770	0.03	8.2	1170	2.1	< 1
V2A	13-Nov-08	377	2560	1660		8.1	1200	0.6	< 1
V2A	02-Dec-08	383	2840	1760	0.02	8.1	1210	0.2	1
V2A	10-Dec-08	388	3040	1800		8.1	1230	0	< 1

Appendix 6
2008 Surface Water Quality Data
Vangorda Creek Drainage

Table 1. Surface Water Routine Parameters

Station	Date	ALK-T mg/L	COND-L µS/cm	HARD mg/L	NH3 mg/L	PH-F pH unit	SO4 mg/L	TEMP °C	TSS mg/L
V2A	MEAN	346	2299	1416	0.02	8.2	1008	3.6	1.5
V2A	MINIMUM	214	1470	882	< 0.01	8	609	0	< 1
V2A	MAXIMUM	436	3040	1800	0.04	8.6	1230	7.1	7
V2A	N > DL	16	16	16	7	16	16	16	5
V2A	Median	367	2265	1405	0.02	8.2	1050	3.8	1
V4	23-Jan-08	310	680	406	0.015	7.19	72.1		< 1
V4	20-Feb-08	340	720	429	< 0.005	7.2	79.6	-0.5	2
V4	13-Mar-08	320	680	410	0.025	6.4	72	-0.5	< 1
V4	28-Apr-08	280	600	345	< 0.005	7.76	60	-0.5	2
V4	21-May-08	83	180	106	< 0.005	8.16	3.4	1	120
V4	19-Jun-08		418	237	0.01	8.3	37.3	8.6	< 1
V4	24-Jun-08	170	370	192	< 0.005	8.06	30	6	17
V4	29-Jul-08	220	470	260	< 0.005	8.45	36	6.7	1
V4	19-Aug-08		472	292	0.01	8	38.1	8.8	< 1
V4	23-Sep-08		474	267	0.02	8	38.8	2.5	< 1
V4	07-Oct-08	250	510	13.3	< 0.005	7.2	45	-1	1
V4	10-Dec-08	290	600	363	0.011		53	0.2	2
V4	MEAN	251	515	277	0.01	7.70	47.1	2.85	12.5
V4	MINIMUM	83	180	13.3	< 0.005	6.4	3.4	-1	< 1
V4	MAXIMUM	340	720	429	0.025	8.45	79.6	8.8	120
V4	N > DL	9	12	12	6	11	12	11	7
V4	Median	280	492	279.5	0.0075	8	41.9	1	1
V5	07-Jan-08	226	681	333	0.02	8.2	132	0.1	7
V5	14-May-08	97.7	302	181	0.05	8.4	45.2	2.4	137
V5	16-Jun-08	101	278	144	< 0.01	8.3	38.8	6	34
V5	14-Jul-08	134	281	160	< 0.01	8.2	33.8	7.5	95
V5	11-Aug-08	224	436	258	0.02	8.3	65.1	7.2	48
V5	15-Sep-08	178	390	229	0.04	8.1	55.1	5.6	191
V5	15-Oct-08	228	487	249	0.02	8	73.3	2.3	12
V5	03-Nov-08	210	545	321	0.02	8.3	85.6	2.3	19
V5	01-Dec-08	227	603	369	0.01	8.1	102	0	6
V5	MEAN	181	445	249	0.02	8.21	70.1	3.71	61
V5	MINIMUM	97.7	278	144	< 0.01	8	33.8	0	6
V5	MAXIMUM	228	681	369	0.05	8.4	132	7.5	191
V5	N > DL	9	9	9	7	9	9	9	9
V5	Median	210	436	249	0.02	8.2	65.1	2.4	34

Appendix 6
2008 Surface Water Quality Data
Vangorda Creek Drainage

Table 1. Surface Water Routine Parameters

Station	Date	ALK-T mg/L	COND-L µS/cm	HARD mg/L	NH3 mg/L	PH-F pH unit	SO4 mg/L	TEMP °C	TSS mg/L
V6A	24-Jan-08	110	310	162	< 0.005	7.9	50.9		2
V6A	21-Feb-08	140	360	184	< 0.005	7.4	53.1	-0.5	2
V6A	10-Mar-08	143	354	176	< 0.01	8	56.1	1.5	1
V6A	11-Mar-08	130	350	184	< 0.005	6.38	50.3	-0.5	< 1
V6A	28-Apr-08	120	350	181	< 0.005	6.72	55	-0.5	2
V6A	21-May-08	39	150	75.2	< 0.005	7.05	30	-0.5	87
V6A	10-Jun-08	35	116	63	0.05	7.3	19.3	3.2	2
V6A	24-Jun-08	27	96	44.2	< 0.005	7.33	14		8
V6A	30-Jul-08	68	220	101	< 0.005	7.77	35	5.4	2
V6A	02-Sep-08	65.4	174	84	0.01	8.1	32.8	6.4	3
V6A	17-Sep-08	59	200	96.2	< 0.005	7.41	40	4.5	1
V6A	08-Oct-08	69	240	112	< 0.005		39	-0.5	1
V6A	02-Dec-08	94.8	346	217	0.04	7.7	79.2	0.7	< 1
V6A	10-Dec-08	100	330	187	< 0.005	7.28	67	0.3	4
V6A	MEAN	85.7	257	133	0.0	7.4	44.4	1.6	8.4
V6A	MINIMUM	27	96	44.2	< 0.005	6.38	14	-0.5	< 1
V6A	MAXIMUM	143	360	217	0.05	8.1	79.2	6.4	87
V6A	N > DL	14	14	14	3	13	14	12	12
V6A	Median	81.9	275	137	0.005	7.4	45.15	0.5	2
V8	07-Jan-08	182	610	298	< 0.01	7.8	137	0.2	1
V8	18-Feb-08	225	675	368	0.02	7.7	150	1.2	2
V8	17-Mar-08	248	691	398	< 0.01	8	168	0.5	2
V8	14-Apr-08	224	712	390	0.03	8	165	1.9	< 1
V8	14-May-08	96.8	345	180	0.02	8.3	69.6	2.6	54
V8	26-May-08	53		88.8	0.19		23		120
V8	16-Jun-08	60.2	295	143	< 0.01	8.1	86.7	6.3	4
V8	14-Jul-08	106	326	169	0.04	8	78.7	9.1	30
V8	11-Aug-08	119	503	278	< 0.01	8.1	149	9	8
V8	15-Sep-08	127	324	175	0.04	8.1	56.8	6.8	49
V8	15-Oct-08	179	446	227	0.02	7.9	83.8	3.5	4
V8	03-Nov-08	168	510	300	0.02	8.3	104	2.8	6
V8	01-Dec-08	194	603	392	< 0.01	8.3	134	1.1	2
V8	MEAN	152	503	262	0.0331	8.05	108	3.75	21.8
V8	MINIMUM	53	295	88.8	< 0.01	7.7	23	0.2	< 1
V8	MAXIMUM	248	712	398	0.19	8.3	168	9.1	120
V8	N > DL	13	12	13	8	12	13	12	12
V8	Median	168	506.5	278	0.02	8.05	104	2.7	4

Appendix 6
2008 Surface Water Quality Data
Vangorda Creek Drainage

Table 1. Surface Water Routine Parameters

Station	Date	ALK-T mg/L	COND-L µS/cm	HARD mg/L	NH3 mg/L	PH-F pH unit	SO4 mg/L	TEMP °C	TSS mg/L
V15	07-Jan-08	448	4020	2000	0.02	6.7	1610	1.4	< 1
V15	20-Jan-08	479	3790	2010		6.9	1680	2.7	< 1
V15	14-Feb-08	541	3800	2040		6.7	1590	2.3	< 1
V15	19-Feb-08	499	3700	2030	0.02	6.8	1530	3.1	< 1
V15	10-Mar-08	594	5280	1920		6.7	1690	1.1	1
V15	17-Mar-08	584	3900	2410	0.02	6.7	1690	2.2	29
V15	02-Apr-08	553	3800	2270	< 0.01	7	1700	2.8	< 1
V15	15-Apr-08	500	3550	2220	0.01	6.7	1630	2.6	< 1
V15	06-May-08	248	2280	1460		7.8	948	4.9	6
V15	14-May-08	228	2160	1250	0.02	7.5	861	3.4	3
V15	04-Jun-08	406	3160	1880		7.6	1410	6	< 1
V15	17-Jun-08	433	3300	2020	< 0.01	7.2	1450	6.7	< 1
V15	03-Jul-08	533	3740	2180		7.4	1570	8.1	< 1
V15	15-Jul-08	564	3530	1990	0.02	7.4	1490	5.1	13
V15	04-Aug-08	602	4120	2330		7.1	1730	6.4	1
V15	12-Aug-08	495	3600	2410	0.01	7.1	1630	7.9	< 1
V15	09-Sep-08	650	3720	2260		7.1	1680	5.8	1
V15	15-Sep-08	579	3680	2250	0.03	7	1690	6	< 1
V15	01-Oct-08	541	3520	2420		7.2	1740	4.4	< 1
V15	15-Oct-08	638	4130	2400	0.05	7.4	1770	3.4	< 1
V15	03-Nov-08	503	4040	2610	0.04	7.3	1930	1.9	< 1
V15	13-Nov-08	552	3990	2520		6.9	1900	1.1	11
V15	02-Dec-08	520	4420	2700	0.04	7.4	1940	0.9	< 1
V15	10-Dec-08	546	4290	2830		7.4	1980	0.1	1
V15	MEAN	510	3730	2184	0.02	7.13	1618	3.76	3.38
V15	MINIMUM	228	2160	1250	< 0.01	6.7	861	0.1	< 1
V15	MAXIMUM	650	5280	2830	0.05	7.8	1980	8.1	29
V15	N > DL	24	24	24	11	24	24	24	9
V15	Median	537	3765	2235	0.02	7.1	1680	3.25	1
V16	01-Jun-08		4050	2470	0.02	7.5	2060	11	3
V16	29-Sep-08		5220	2770	0.03	7.6	2220	3.6	4
V17A	01-Jun-08	25.1	93	40	0.02	8.1	18	5.8	3
V17A	29-Sep-08	45.6	194	100	0.04	7.4	49.8	2.2	< 1
V19	01-Jun-08		102	50	0.01	8.4	2.41	4.7	< 1
V19	29-Sep-08		194	109	0.02	7.5	3.6	2.8	< 1

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2008 Surface Water Quality Data
Vangorda Creek Drainage

Table 1. Surface Water Routine Parameters

Station	Date	ALK-T mg/L	COND-L µS/cm	HARD mg/L	NH3 mg/L	PH-F pH unit	SO4 mg/L	TEMP °C	TSS mg/L
V20	01-Jun-08		114	57	0.02	8.2	4.82	5.4	< 1
V20	29-Sep-08		198	109	0.02	7.4	6.68	2	< 1
V22	07-Jan-08					3.2		1.6	
V22	18-Feb-08					5.9		2.2	
V22	10-Mar-08		1650	693	0.13	3	1100	0.3	3
V22	17-Mar-08					3		0.9	
V22	15-Apr-08					3.4		2.5	
V22	14-May-08					3.8		3.7	
V22	10-Jun-08		1670	571	0.12	3.4	588	10	8
V22	17-Jun-08					3.6		12.7	
V22	14-Jul-08					3.8		17	
V22	12-Aug-08					3.2		12.7	
V22	02-Sep-08		2610	988	0.35	3.2	1450	10	23
V22	15-Sep-08					3.4		9.3	
V22	15-Oct-08					3.5		2.3	
V22	03-Nov-08					6.4		1.8	
V22	02-Dec-08		672	416	0.11	6.5	293	0.5	< 1
V22	MEAN		1651	667	0.178	4.0	858	5.8	11.3
V22	MINIMUM		672	416	0.11	3	293	0.3	<1
V22	MAXIMUM		2610	988	0.35	6.5	1450	17	23
V22	N > DL		4	5	6	7	8	9	10
V22	Median		1660	632	0.125	3.4	844	2.5	8
V23	07-Jan-08					7.8		0.1	
V23	18-Feb-08					7.1		1.7	
V23	10-Mar-08		1080	599	0.04	7.3	494	0.2	3
V23	17-Mar-08					7.4		0.5	
V23	15-Apr-08					7.6		1.9	
V23	14-May-08					8		2.7	
V23	10-Jun-08		851	476	0.02	7.3	348	7.3	1
V23	17-Jun-08					7.8		12.6	
V23	14-Jul-08					9		17.1	
V23	12-Aug-08					8.6		14.3	
V23	02-Sep-08		1010	572	0.07	7.4	442	8.8	5
V23	15-Sep-08					7.4		8	
V23	15-Oct-08					7.8		5.2	
V23	03-Nov-08					7.7		1.1	
V23	02-Dec-08		908	731	0.08	7.8	324	0	3
V23	MEAN		962	595	0.053	7.7	402	5.4	3
V23	MINIMUM		851	476	0.02	7.1	324	0	1
V23	MAXIMUM		1080	731	0.08	9	494	17.1	5
V23	N > DL		4	4	4	15	3	15	4
V23	Median		959	585.5	0.055	7.7	395	2.7	3

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2008 Surface Water Quality Data
Vangorda Creek Drainage

Table 1. Surface Water Routine Parameters

Station	Date	ALK-T mg/L	COND-L µS/cm	HARD mg/L	NH3 mg/L	PH-F pH unit	SO4 mg/L	TEMP °C	TSS mg/L
V25BSP	07-Jan-08	61.9	555	264	< 0.01	7.6	219	1	< 1
V25BSP	14-May-08	46.3	280	135	0.02	7.8	86.4	3.4	2
V25BSP	10-Jun-08	36.2	1080	649	0.05	8.2	592	9.8	< 1
V25BSP	16-Jun-08	30.4	1220	740	0.04	7.8	718	12.1	< 1
V25BSP	17-Jun-08	30.3	1210	721	0.05	7.8	720	12.3	< 1
V25BSP	24-Jun-08	32.6	1120	684	0.1	7.7	628	10.9	7
V25BSP	01-Jul-08	35.3	887	503	0.04	8	458	13.2	< 1
V25BSP	08-Jul-08	41.3	1140	709	0.03	8.3	590	14	< 1
V25BSP	14-Jul-08	40.8	1180	751	0.05	7.9	645	14.5	2
V25BSP	16-Jul-08	42.5	1020	637	0.05	7.9	559	12.9	11
V25BSP	22-Jul-08	42.7	1220	793	0.06	7.7	722	10	2
V25BSP	05-Aug-08	39.8	1950	997	0.04	7.6	938	14.1	< 1
V25BSP	11-Aug-08	41.5	1770	1090	0.04	7.9	1050	14	< 1
V25BSP	12-Aug-08	39.7	1830	1030	0.04	8.1	985	13.8	2
V25BSP	19-Aug-08	44.2	1890	1040	0.08	7.6	1050	12.6	< 1
V25BSP	02-Sep-08					7.8		10.2	
V25BSP	15-Sep-08	78.4	585	303	0.02	7.8	240	8.8	< 1
V25BSP	15-Oct-08	106	538	256	0.03	7.4	187	3.2	< 1
V25BSP	03-Nov-08	85.4	626	342	0.03	7.7	247	2.3	< 1
V25BSP	02-Dec-08	94.5	709	384	0.01	7.8	286	0	< 1
V25BSP	03-Dec-08					7.7		0	
V25BSP	MEAN	51.0	1095	633	0.04	7.81	575	9.20	2.05
V25BSP	MINIMUM	30.3	280	135	< 0.01	7.4	86.4	0	< 1
V25BSP	MAXIMUM	106	1950	1090	0.1	8.3	1050	14.5	11
V25BSP	N > DL	19	19	19	18	21	19	21	6
V25BSP	Median	41.5	1120	684	0.04	7.8	592	10.9	1
V27	23-Jan-08	100	460	241	< 0.005	7.39	130		< 1
V27	20-Feb-08	110	490	254	< 0.005	8.4	132	-0.5	< 1
V27	13-Mar-08	120	530	286	< 0.005	6.4	170	-0.5	< 1
V27	28-Apr-08	100	560	302	< 0.005	8	170	-0.5	6
V27	21-May-08	41	180	90.7	< 0.005	7.22	47	2.5	61
V27	19-Jun-08		233	121	0.01	8.1	88.5	6.3	3
V27	24-Jun-08	21	180	76	< 0.005	7.19	50	5.5	12
V27	29-Jul-08	54	560	283	< 0.005	8.13	220	7.3	< 1
V27	19-Aug-08		574	323	0.02	7.7	249	10	< 1
V27	23-Sep-08		244	116	0.01	8	65	2.3	< 1
V27	07-Oct-08	72	340	34.9	< 0.005	7.06	85	-1	1
V27	10-Dec-08	120	580	326	< 0.005	7.6	170	0.2	1
V27	MEAN	82	411	204	0.007	7.60	131	2.9	7.5
V27	MINIMUM	21	180	34.9	< 0.005	6.4	47	-1	< 1
V27	MAXIMUM	120	580	326	0.02	8.4	249	10	61
V27	N > DL	9	12	12	3	12	12	11	6
V27	Median	100	475	247.5	0.005	7.65	131	2.3	1

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Vangorda Creek Drainage

Table 1. Surface Water Routine Parameters

Station	Date	ALK-T mg/L	COND-L µS/cm	HARD mg/L	NH3 mg/L	PH-F pH unit	SO4 mg/L	TEMP °C	TSS mg/L
V30	01-Jun-08		11200		4.27	6580	52	7.6	6.3
V30	29-Sep-08		13300		6.33	6730	47	4.5	6
V31	01-Jun-08		8480		3.76	4.5	5070	8.2	9
V31	29-Sep-08		31500		7.42	6	20300	4.3	240
V32	01-Jun-08		129000		5.38	2.7	78200	8.6	29
V32	29-Sep-08		77500		2.73	3.7	53700	4	78
V33	29-Sep-08		152000		8.12	4.9	87900	6.1	520
VGMAIN	07-Jan-08	144	550	298	< 0.01	8.1	136	0	< 1
VGMAIN	18-Feb-08	180	586	296	< 0.01	7.6	136	1.1	< 1
VGMAIN	17-Mar-08	201	614	347	< 0.01	8	162	0.7	< 1
VGMAIN	14-Apr-08	183	640	346	0.03	8	163	1.9	< 1
VGMAIN	14-May-08	93.5	372	196	0.03	8.4	88.9	2.3	< 1
VGMAIN	16-Jun-08	47.4	297	143	< 0.01	8.1	98.9	6.6	2
VGMAIN	14-Jul-08	91.9	344	175	< 0.01	8.1	99	8.7	3
VGMAIN	11-Aug-08	125	526	289	0.02	8.1	180	9.3	< 1
VGMAIN	15-Sep-08	100	281	142	0.04	8	56.7	6.2	< 1
VGMAIN	15-Oct-08	147	408	200	< 0.01	7.9	88.6	2.8	1
VGMAIN	03-Nov-08	143	484	269	0.02	8.2	116	2.2	< 1
VGMAIN	01-Dec-08	167	587	367	0.01	8.3	150	0.5	1
VGMAIN	MEAN	135	474	256	0.02	8.1	123	3.5	1.25
VGMAIN	MINIMUM	47.4	281	142	< 0.01	7.6	56.7	0	< 1
VGMAIN	MAXIMUM	201	640	367	0.04	8.4	180	9.3	3
VGMAIN	N > DL	12	12	12	6	12	12	12	4
VGMAIN	Median	143.5	505	279	0.01	8.1	126	2.25	1

Note:
Statistics only generated where there are more than 2 values in a data set

average	*average of values, including values less than detection limit as set to DL value if it is the DL value will be shown without the < symbol*
minimum	*lowest value and will be least DL value if these are present in the data set*
maximum	*highest vale*
N > DL	*number of values measured that are above detection limits*
median	*the median value of the data set - if it is a DL value will be shown without the < symbol*

Detection Limit values used as the DL value in statistics contrasts with conversion to 0 for charts

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Appendix 6
2008 Surface Water Quality Data
Vangorda Creek Drainage

Table 2. Surface Water Total Metals Parameters

Station	Date	AG-T mg/L	AL-T mg/L	AS-T mg/L	BA-T mg/L	BE-T mg/L	BI-T mg/L	B-T mg/L	CA-T mg/L	CD-T mg/L	CO-T mg/L	CR-T mg/L	CU-T mg/L	FE-T mg/L	HG-T mg/L	K-T mg/L	LI-T mg/L	MG-T mg/L	MN-T mg/L	MO-T mg/L	NA-T mg/L	NI-T mg/L	PB-T mg/L	P-T mg/L	SB-T mg/L	SE-T mg/L	SR-T mg/L	TL-T mg/L	U-T mg/L	V-T mg/L	ZN-T mg/L	ZR-T mg/L
LCD	01-Jun-08	0.0003	0.066	< 0.001	0.03	< 0.001	< 0.001	< 0.05	115	0.084	0.34	< 0.001	0.004	2.5	< 0.00002	2.2	0.013	150	49.5	0.0053	2.66	0.33	0.002	< 0.15	< 0.001	0.001	0.4	0.0001	< 0.0005	< 0.001	134	< 0.01
LCD	29-Sep-08	0.0011	3.09	0.002	0.029	< 0.001	< 0.001	< 0.05	205	0.311	1.34	< 0.001	0.068	82.9	< 0.00002	3.3	0.041	374	177	0.015	5.99	1.03	0.01	< 0.15	< 0.001	0.008	0.85	0.0005	0.014	< 0.001	449	< 0.01
MOOSESP	06-May-08	< 0.00025	0.008	0.001	0.044	< 0.001	< 0.001	< 0.05	218	< 0.0002	< 0.001	< 0.001	0.001	0.08	< 0.00002	2.7	0.004	111	0.002	0.0019	8.42	< 0.001	< 0.001	< 0.15	< 0.001	0.001	0.65	< 0.0001	0.016	< 0.001	0.007	< 0.01
MOOSESP	14-May-08	< 0.00025	< 0.005	0.001	0.044	< 0.001	< 0.001	< 0.05	209	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	2.6	0.005	98.1	0.004	0.0018	7.18	< 0.001	< 0.001	< 0.15	< 0.001	0.001	0.66	< 0.0001	0.015	< 0.001	0.005	< 0.01
MOOSESP	04-Jun-08	< 0.00025	0.014	0.001	0.039	< 0.001	< 0.001	< 0.05	167	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	2	0.004	90.1	< 0.001	0.0019	7.56	< 0.001	< 0.001	< 0.15	< 0.001	0.002	0.51	< 0.0001	0.014	< 0.001	< 0.005	< 0.01
MOOSESP	17-Jun-08	< 0.00025	0.007	0.002	0.053	< 0.001	< 0.001	< 0.05	248	< 0.0002	< 0.001	< 0.001	0.001	0.05	< 0.00002	2.5	0.005	118	0.001	0.0019	7.66	< 0.001	< 0.001	< 0.15	< 0.001	0.003	0.74	< 0.0001	0.017	< 0.001	0.007	< 0.01
MOOSESP	03-Jul-08	< 0.00025	0.015	0.001	0.06	< 0.001	< 0.001	1.32	264	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	2.7	0.006	138	0.002	0.0026	7.79	0.001	0.002	< 0.15	< 0.001	0.001	0.79	< 0.0001	0.027	< 0.001	0.012	< 0.01
MOOSESP	15-Jul-08	< 0.00025	0.01	0.001	0.052	< 0.001	< 0.001	< 0.05	237	< 0.0002	< 0.001	< 0.001	0.002	0.83	< 0.00002	2.4	0.006	133	< 0.001	0.0018	7.55	0.001	< 0.001	< 0.15	< 0.001	0.001	0.64	< 0.0001	0.019	< 0.001	0.01	< 0.01
MOOSESP	04-Aug-08	< 0.00025	< 0.005	0.002	0.06	< 0.001	< 0.001	< 0.05	248	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	2.8	0.006	138	0.009	0.0022	8.1	0.001	< 0.001	< 0.15	< 0.001	0.003	0.77	< 0.0001	0.023	< 0.001	0.008	< 0.01
MOOSESP	12-Aug-08	< 0.00025	0.009	0.001	0.056	< 0.001	< 0.001	< 0.05	273	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	3.1	0.004	154	0.003	0.0019	9.22	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.77	< 0.0001	0.021	< 0.001	0.008	< 0.01
MOOSESP	09-Sep-08	< 0.00025	0.015	< 0.001	0.075	< 0.001	< 0.001	< 0.05	259	< 0.0002	< 0.001	< 0.001	0.001	0.25	< 0.00002	3.2	0.007	152	0.004	0.0021	12.6	0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.81	< 0.0001	0.026	< 0.001	0.007	< 0.01
MOOSESP	15-Sep-08	< 0.00025	< 0.005	0.001	0.063	< 0.001	< 0.001	< 0.05	235	< 0.0002	< 0.001	< 0.001	0.002	0.08	< 0.00002	3	0.005	142	0.003	0.002	8.01	< 0.001	< 0.001	< 0.15	< 0.001	0.001	0.75	< 0.0001	0.032	< 0.001	0.008	< 0.01
MOOSESP	01-Oct-08	< 0.00025	0.011	0.002	0.061	< 0.001	< 0.001	< 0.05	266	< 0.0002	< 0.001	< 0.001	0.001	0.06	< 0.00002	3.2	0.006	169	< 0.001	0.0023	9.18	0.001	< 0.001	< 0.15	< 0.001	0.002	0.87	< 0.0001	0.026	< 0.001	0.007	< 0.01
MOOSESP	15-Oct-08	< 0.00025	0.007	0.002	0.057	< 0.001	< 0.001	< 0.05	273	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	3.2	0.006	146	0.002	0.0021	7.6	< 0.001	< 0.001	< 0.15	< 0.001	0.002	0.89	< 0.0001	0.026	< 0.001	0.008	< 0.01
MOOSESP	03-Nov-08	< 0.00025	0.016	0.001	0.059	< 0.001	< 0.001	< 0.05	295	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	3.1	0.004	188	< 0.001	0.0019	9.69	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.86	< 0.0001	0.03	< 0.001	0.006	< 0.01
MOOSESP	13-Nov-08	< 0.00025	0.041	0.002	0.059	< 0.001	< 0.001	< 0.05	287	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	3.2	0.007	178	0.005	0.0024	9.41	0.001	0.001	< 0.15	< 0.001	0.002	0.94	< 0.0001	0.031	< 0.001	0.008	< 0.01
MOOSESP	MEAN	0.00025	0.012	0.001	0.056	0.001	0.001	0.141	249	0.0002	0.001	0.001	0.0011	0.125	0.00002	2.8	0.0054	140	0.0028	0.0021	8.57	0.001	0.0011	0.15	0.001	0.0016	0.76	0.0001	0.0231	0.001	0.0076	0.01
MOOSESP	MINIMUM	< 0.00025	< 0.005	< 0.001	0.039	< 0.001	< 0.001	< 0.05	167	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	2	0.004	90.1	< 0.001	0.0018	7.18	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.51	< 0.0001	0.014	< 0.001	< 0.005	< 0.01
MOOSESP	MAXIMUM	< 0.00025	0.041	0.002	0.075	< 0.001	< 0.001	1.32	295	< 0.0002	< 0.001	< 0.001	0.002	0.83	< 0.00002	3.2	0.007	188	0.009	0.0026	12.6	< 0.001	0.002	< 0.15	< 0.001	0.003	0.94	< 0.0001	0.032	< 0.001	0.012	< 0.01
MOOSESP	N > DL	0	11	13	14	0	0	1	14	0	0	0	10	6	0	14	14	14	10	14	14	6	2	0	0	11	14	0	14	0	13	0
MOOSESP	Median	0.00025	0.0095	0.001	0.058	0.001	0.001	0.05	253.5	0.0002	0.001	0.001	0.001	0.05	0.00002	2.9	0.0055	140	0.002	0.00195	8.055	0.001	0.001	0.15	0.001	0.001	0.77	0.0001	0.0245	0.001	0.0075	0.01
V1	23-Jan-08	< 0.000005	0.0048	0.00029	0.0416	< 0.00001	< 0.005	< 0.05	16.1	0.000008	0.000013	< 0.0001	0.00026	0.007		0.52	0.0013	2.68	0.00056	0.00063	2.08	0.0002	0.000027	< 0.005	0.00004	0.00019	0.0843	< 0.000002	0.0012	< 0.0002	0.0005	< 0.0001
V1	21-Feb-08	< 0.000005	0.0052	0.00031	0.0409	< 0.00001	< 0.005	< 0.05	17.4	0.000006	0.000011	0.0001	0.0002	0.006		0.58	0.0014	2.69	0.00062	0.00066	2.31	0.00021	0.00001	< 0.005	0.00004	0.0002	0.0823	< 0.000002	0.00135	< 0.0002	0.0005	< 0.0001
V1	10-Mar-08	< 0.00025	< 0.005	< 0.001	0.044	< 0.001	< 0.001	< 0.05	18.5	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.7	0.002	3.06	< 0.001	0.0007	2.58	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.094	< 0.0001	0.0014	< 0.001	< 0.005	< 0.01
V1	11-Mar-08	< 0.000005	0.0041	0.00029	0.0403	< 0.00001	< 0.005	< 0.05	17.1	0.000006	0.000013	< 0.0001	0.00025	0.005		0.59	0.0013	2.77	0.00062	0.0007	2.28	0.00024	0.000035	< 0.005	0.00004	0.00014	0.0819	< 0.000002	0.00147	< 0.0002	0.0041	< 0.0001
V1	29-Apr-08	< 0.000005	0.0039	0.0003	0.0392	< 0.00001	< 0.005	< 0.05	16.3	0.000007	0.000012	< 0.0001	0.00016	0.005		0.58	0.0013	2.54	0.00061	0.0007	2.08	0.00025	0.000059	0.006	0.00004	0.00019	0.0817	0.000002	0.00144	< 0.0002	0.004	< 0.0001
V1	22-May-08	0.000007	0.0928	0.00039	0.0257	0.00002	< 0.005	< 0.05	9.36	0.000114	0.000116	0.0002	0.00159	0.168		1.43	0.0009	1.46	0.0228	0.00014	1.35	0.00099	0.00123	0.088	0.00004	0.00008	0.0444	0.000003	0.000459	< 0.0002	0.0166	0.0002
V1	24-May-08	0.000009	0.137	0.00063	0.0248	0.00003	< 0.000005	< 0.05	7.4	0.000047	0.000255	0.0001	0.00123	0.344		0.98		1.12	0.0471	0.0001	0.96	0.00082	0.000748		0.00003	0.00008	0.0378	0.000005	0.000613	< 0.0002	0.0058	0.0001
V1	10-Jun-08	0.0005	0.068	< 0.001	0.015	< 0.001	< 0.001	< 0.05	5.56	< 0.0002	< 0.001	< 0.001	0.002	0.09	< 0.00002	0.4	< 0.001	0.87	0.023	< 0.0005	1.05	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.028	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
V1	25-Jun-08	< 0.000005	0.0605	0.0002	0.0144	0.00002	< 0.005	< 0.05	5.38	< 0.000005	0.000038	0.0001	0.00053	0.055		0.31	0.0008	0.75	0.00259	0.00007	0.96	0.0003	0.000136	< 0.005	0.00003	< 0.00004	0.0289	0.000002	0.000399	< 0.0002	0.0012	0.0001
V1	29-Jul-08	< 0.000005	0.0254	0.00023	0.0247	< 0.00001	< 0.005	< 0.05	10.4	0.000011	0.000021	0.0001	0.00056	0.031		0.37	0.0009	1.5	0.00083	0.00016	2.32	0.00028	0.000112	< 0.005	0.00003		0.0515	< 0.000002	0.000374	< 0.0002	0.0016	< 0.0001
V1	02-Sep-08	< 0.00025	0.028	< 0.001	0.02	< 0.001	< 0.001	< 0.05	7.89	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.3	< 0.001	1.11	0.001	< 0.0005	1.48	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.042	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
V1	17-Sep-08	< 0.000005	0.0225	0.00021	0.0239	0.00001	< 0.005	< 0.05	9.76	0.000009	0.000023	< 0.0001	0.00059	0.027		0.38	0.0008	1.44	0.00116	0.00014	1.53	0.00025	0.000195	< 0.005	0.00002	0.00008	0.0496	0.000004	0.000343	< 0.0002	0.0032	< 0.0001
V1	07-Oct-08	< 0.00005	0.006	0.0003	0.0265	< 0.00001	< 0.005	< 0.05	11.5	< 0.000005	< 0.000005	0.003	< 0.00005	< 0.001		< 0.05	< 0.0005	0.27	< 0.00005	< 0.00005	2.3	0.0107	< 0.000005	< 0.005	< 0.00002	< 0.00004	0.0561	0.0001	< 0.000002	< 0.0002	< 0.0001	0.00113
V1	02-Dec-08	< 0.00025	0.019	< 0.001	0.038	< 0.001	< 0.001	< 0.05	16.8	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.6	0.001	2.88	0.001	< 0.0005	2.3	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.072	< 0.0001	0.0007	< 0.001	< 0.005	< 0.01
V1	11-Dec-08	< 0.000005	0.018	0.00025	0.0367	< 0.00001	< 0.000005	< 0.05	16.2	0.000009	0.000014	0.0001	0.00112	0.008		0.53	0.0012	2.62	0.00021	0.00047	1.95	0.00025	0.000192		0.00004	0.00018	0.077	< 0.000002	0.000918	< 0.0002	0.0015	< 0.0001
V1	MEAN	0.00383	0.0333	0.00049	0.03038	0.000277	0.00327	0.05	12.4	6.85E-05	0.000301	0.00054	0.00077	0.0598	0.00002	0.55	0.0011	1.85	0.0069	0.000401	2.3	0.00123	0.000450	0.0561	0.000291	< 0.00004	0.0570	3.51E-05	0.00078	0.00041	0.00394	0.00282
V1	MINIMUM	< 0.000005	0.0039	0.0002	0.0144	< 0.00001	< 0.000005	< 0.05	5.38	< 0.000005	< 0.000005	< 0.0001	< 0.00005	< 0.001	< 0.00002	< 0.05	< 0.0005	0.27	< 0.00005	< 0.00005	0.96	0.0002	< 0.000005	< 0.005	< 0.00002	0.00008	0.028	< 0.000002	< 0.000002	< 0.0002	< 0.0001	< 0.0001
V1	MAXIMUM	0.0005	0.137	< 0.001	0.044	< 0.001	< 0.005	< 0.05	18.5	< 0.0002	< 0.001	0.003	0.002	0.344	< 0.00002	1.43	0.002	3.06	0.0471	0.0007	2.58	0.0107	0.00123	< 0.15	< 0.001	< 0.001	0.094	< 0.0001	0.00147	< 0.001	0.0166	< 0.01
V1	N > DL	4	14	11	15	4	0	0	15	9	10	7	11	11	0	14	11	15	13	11	15	11	10	2	10	9	14	6	12	0	10	4
V1	Median	0.000005	0.019	0.0003	0.0265	0.00001	0.005	0.000005	11.5	0.000009	0.000023	0.0001	0.00059	0.031	0.00002	0.53	0.001	1.5	0.001	0.0005	2.08	0.0003	0.000192	0.005	0.00004	0.00018	0.0515	0.000003	0.000613	0.0002	0.004	0.0001
V2	07-Jan-08	< 0.00025	0.023	0.001	0.081	< 0.001	< 0.001	< 0.05	234	0.0002	< 0.001	< 0.001	0.002	0.13	< 0.00002	2.1	0.003	104	0.02	0.0017	9.24	0.002	< 0.001	< 0.15	< 0.001	0.002	0.77	0.0001	0.019	< 0.001	0.059	< 0.01
V2	14-Feb-08	< 0.00025	< 0.005	< 0.001	0.089	< 0.001	< 0.001	< 0.05	225	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	2	0.002	101	0.002	0.0015	9.47	0.002	< 0.001	< 0.15	< 0.001	< 0.001	0.71	< 0.0001	0.021	< 0.001	0.006	< 0.01
V2	19-Feb-08	< 0.00025	0.01	0.001	0.084	< 0.001	< 0.001	< 0.05	226	< 0.0002	< 0.001	< 0.001	< 0.001	0.13	< 0.00002	2	0.003	97.8	0.015	0.0016	9.06	0.002	< 0.001	< 0.15	< 0.001	0.002	0.79	< 0.0001	0.013	< 0.001	0.041	< 0.01
V2	06-May-08	< 0.00025	0.031	0.001	0.08	< 0.001	< 0.001	< 0.05	220	< 0.0002	< 0.001	< 0.001	0.002	0.13	< 0.00002	2.6	0.003	116	0.005	0.0015	9.44	0.003	0.001	< 0.15	< 0.001	0.001	0.74	< 0.0001	0.018	< 0.001	0.083	< 0.01
V2	14-May-08	< 0.00025	0.056	0.001	0.072	< 0.001	< 0.001	< 0.05	187	< 0.0002	< 0.001	< 0.001	0.002	0.12	< 0.00002	2.6	0.004	96.8	0.012	0.0014	6.97	0.002	0.002	< 0.15	< 0.001	0.002	0.63	< 0.0001	0.014	< 0.001	0.053	< 0.01
V2	04-Jun-08	< 0.00025	0.013	< 0.001	0.075	< 0.001	< 0.001	< 0.05	206	< 0.0002	< 0.001	< 0.001	0.002	0.09	< 0.00002	2.2	0.003	91.8	< 0.001	0.0019	7.63	0.002	< 0.001	< 0.15	< 0.001	0.002	0.71	< 0.0001	0.014	< 0.001	0.013	< 0.01
V2	17-Jun-08	< 0.00025	0.012	0.001	0.074	< 0.001	< 0.001	< 0.05	206	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	< 0.00002	2.2	0.002	103	0.007	0.0015	9.03	0.002	< 0.001	< 0.15	< 0.001	0.002	0.66	< 0.0001	0.013	< 0.001	0.039	< 0.01
V2	03-Jul-08	< 0.00025	0.009	< 0.001	0.072	< 0.001	< 0.001	< 0.05	231	< 0.0002	< 0.001	< 0.001	0.002	0.46	< 0.00002	1.7	0.002	102	< 0.001	0.001	6.41	0.001	< 0.001	< 0.15	< 0.001	0.002	0.65	< 0.0001	0.016	< 0.001	0.022	< 0.01
V2	15-Jul-08	0.0003	2.61	0.011	0.14	< 0.001	< 0.001	0.09	161	0.0004	0.004	0.007	0.02	5.43	< 0.00002	2.7	0.012	87.8	0.096	0.0014	7.14	0.012	0.12	< 0.15	0.002	< 0.001	0.5	0.0002	0.011	0.006	0.2	< 0.01
V2	04-Aug-08	< 0.00025	0.011	0.001	0.087	< 0.001	< 0.001	< 0.05	215	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	2.2	0.003	104	< 0.001	0.0017	8.48	0.001	< 0.001	< 0.15	< 0.001	0.002	0.69	< 0.0001	0.016	< 0.001	0.01	< 0.01
V2	12-Aug-08	< 0.00025	0.017	0.001	0.08	< 0.001	< 0.001	< 0.05	224	< 0.0002	< 0.001	< 0.001	0.001	0.1	< 0.00002	2.3	0.002	116	< 0.001	0.0013	9.12	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.71	< 0.0001	0.016	< 0.001	0.012	< 0.01
V2	09-Sep-08	< 0.00025	0.014	0.002	0.094	< 0.001	< 0.001	< 0.05	229	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	2.4	0.004	120	< 0.001	0.0019	9.8	0.002	< 0.001	< 0.15	< 0.001	0.003	0.76	< 0.0001	0.018	< 0.001	0.01	< 0.01
V2	15-Sep-08	< 0.00025	< 0.005	< 0.001	0.093	< 0.001	< 0.001	< 0.05	200	< 0.0002	< 0.001	< 0.001	0.002	0.1	< 0.00002	2.3	0.003	102	0.001	0.0017	8.21	0.001	< 0.001	< 0.15	< 0.001	0.001	0.68	< 0.0001	0.024	< 0.001	0.01	< 0.01
V2	01-Oct-08	< 0.00025	0.073	< 0.001	0.09	< 0.001	< 0.001	< 0.05	216	< 0.0002	< 0.001	< 0.001	0.002	0.05	< 0.00002	2.2	0.003	108	< 0.001	0.0019	9.25	0.002	< 0.001	< 0.15	< 0.001	< 0.001	0.71	< 0.0001	0.021	< 0.001	0.009	< 0.01
V2	15-Oct-08	< 0.00025	0.007	< 0.001	0.093	< 0.001	< 0.001	< 0.05	226	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	2.2	0.003	93.4	0.001	0.0017	7.29	0.001	< 0.001	< 0.15	< 0.001	0.002	0.76	< 0.0001	0.018	< 0.001	0.014	< 0.01
V2	03-Nov-08	< 0.00025	0.015	< 0.001	0.1	< 0.001	< 0.001	< 0.05	270	0.0002	< 0.001	< 0.001	0.002	0.21	< 0.00002	2.5	0.001	134	0.002	0.0019	11.6	0.002	< 0.001	< 0.15	< 0.001	0.002	0.79	< 0.0001	0.024	< 0.001	0.008	< 0.01
V2	13-Nov-08	< 0.00025	0.029	0.001	0.094	< 0.001	< 0.001	< 0.05	248	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	2.1	0.003	122	< 0.001	0.0017	9.23	0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.77	< 0.0001	0.024	< 0.001	0.009	< 0.01
V2	02-Dec-08	< 0.00025	0.087	0.002	0.11	< 0.001	< 0.001	< 0.05	283	0.0009	< 0.001	< 0.001	0.003	0.16	< 0.00002	2.3	0.003	139	0.014	0.002	11.1	0.003	0.002	< 0.15	< 0.001	0.002	0.87	0.0002	0.021	< 0.001	0.014	< 0.01
V2	10-Dec-08	< 0.00025	0.017	0.001	0.087	< 0.001	< 0.001	< 0.05	281	< 0.0002	< 0.001	< 0.001	0.001	0.06	< 0.00002	2.2	0.003	137	0.001	0.0017	10.3	0.002	< 0.001	< 0.15	< 0.001	0.002	0.83	< 0.0001	0.024	< 0.001	0.011	< 0.01
V2	MEAN	0.00025	0.160	0.00163	0.089	0.001	0.001	0.052	226	0.00025	0.0012	0.0013	0.0026	0.39	0.00002	2.3	0.0033	109	0.0096	0.0016	8.88	0.0023	0.0074	0.15	0.0011	0.0017	0.72	0.00011	0.018	0.0013	0.033	0.01
V2	MINIMUM	< 0.00025	< 0.005	< 0.001	0.072	< 0.001	< 0.001	< 0.05	161	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	1.7	0.001	87.8	< 0.001	0.001	6.41	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.5	< 0.0001	0.011	< 0.001	0.006	< 0.01
V2	MAXIMUM	0.0003	2.61	0.011	0.14	< 0.001	< 0.001	0.09	283	0.0009	0.004	0.007	0.02	5.43	< 0.00002	2.7	0.012	139	0.096	0.002	11.6	0.012	0.12	< 0.15	0.002	0.003	0.87	0.0002	0.024	0.006	0.2	< 0.01
V2	N > DL	1	17	12	19	0	0	1	19	4	1	1	18	13	0	19	19	19	12	19	19	18	4	0	1	14	19	3	19	1	19	0
V2	Median	0.00025	0.015	0.001	0.087	0.001	0.001	0.05	225	0.0002	0.001	0.001	0.002	0.1	0.00002	2.2	0.003	104	0.001	0.0017	9.12	0.002	0.001	0.15	0.001	0.002	0.71	0.0001	0.018	0.001	0.013	0.01

Appendix 6
2008 Surface Water Quality Data
Vangorda Creek Drainage

Table 2. Surface Water Total Metals Parameters

Station	Date	AG-T mg/L	AL-T mg/L	AS-T mg/L	BA-T mg/L	BE-T mg/L	BI-T mg/L	B-T mg/L	CA-T mg/L	CD-T mg/L	CO-T mg/L	CR-T mg/L	CU-T mg/L	FE-T mg/L	HG-T mg/L	K-T mg/L	LI-T mg/L	MG-T mg/L	MN-T mg/L	MO-T mg/L	NA-T mg/L	NI-T mg/L	PB-T mg/L	P-T mg/L	SB-T mg/L	SE-T mg/L	SR-T mg/L	TL-T mg/L	U-T mg/L	V-T mg/L	ZN-T mg/L	ZR-T mg/L
V2A	06-May-08	< 0.00025	0.007	0.002	0.068	< 0.001	< 0.001	< 0.05	182	< 0.0002	< 0.001	< 0.001	0.001	0.06	< 0.00002	3.2	0.004	105	0.02	0.0036	7.27	0.005	< 0.001	< 0.15	< 0.001	0.001	0.61	< 0.0001	0.018	< 0.001	0.03	< 0.01
V2A	14-May-08	< 0.00025	0.026	0.002	0.062	< 0.001	< 0.001	< 0.05	181	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	< 0.00002	3.8	0.008	104	0.026	0.0027	5.98	0.013	0.002	< 0.15	< 0.001	0.002	0.65	< 0.0001	0.017	< 0.001	0.15	< 0.01
V2A	04-Jun-08	< 0.00025	0.008	0.001	0.043	< 0.001	< 0.001	< 0.05	247	0.0005	< 0.001	< 0.001	0.001	0.1	< 0.00002	4.8	0.019	175	0.003	0.0017	6.67	0.13	< 0.001	< 0.15	< 0.001	0.002	0.9	< 0.0001	0.022	< 0.001	2.82	< 0.01
V2A	17-Jun-08	< 0.00025	0.007	0.001	0.046	< 0.001	< 0.001	< 0.05	276	0.0005	< 0.001	< 0.001	0.002	< 0.05	< 0.00002	4.9	0.015	220	0.006	0.002	8.76	0.12	< 0.001	< 0.15	< 0.001	0.002	0.94	< 0.0001	0.025	< 0.001	2.36	< 0.01
V2A	03-Jul-08	< 0.00025	0.01	0.001	0.04	< 0.001	< 0.001	< 0.05	263	0.0002	< 0.001	< 0.001	0.001	0.51	< 0.00002	3.2	0.014	176	< 0.001	0.0014	5.96	0.094	< 0.001	< 0.15	< 0.001	0.003	0.76	< 0.0001	0.027	< 0.001	1.86	< 0.01
V2A	15-Jul-08	< 0.00025	0.086	0.001	0.041	< 0.001	< 0.001	< 0.05	210	0.0005	< 0.001	< 0.001	0.002	0.94	< 0.00002	3.7	0.018	152	0.009	0.0018	6.37	0.1	0.002	< 0.15	< 0.001	0.001	0.68	0.0001	0.022	< 0.001	2	< 0.01
V2A	04-Aug-08	< 0.00025	< 0.005	0.001	0.047	< 0.001	< 0.001	< 0.05	239	0.0005	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	4	0.014	176	0.005	0.0021	7.52	0.1	< 0.001	< 0.15	< 0.001	0.002	0.8	< 0.0001	0.025	< 0.001	1.87	< 0.01
V2A	12-Aug-08	< 0.00025	< 0.005	0.001	0.044	< 0.001	< 0.001	< 0.05	260	0.0003	< 0.001	< 0.001	0.001	0.12	< 0.00002	4.4	0.013	189	< 0.001	0.0019	8.06	0.097	< 0.001	< 0.15	< 0.001	0.002	0.84	< 0.0001	0.026	< 0.001	1.68	< 0.01
V2A	09-Sep-08	< 0.00025	0.012	0.002	0.055	< 0.001	< 0.001	< 0.05	264	0.0006	< 0.001	< 0.001	0.001	0.14	< 0.00002	4.7	0.018	188	< 0.001	0.002	10.3	0.15	< 0.001	< 0.15	< 0.001	0.003	0.93	< 0.0001	0.029	< 0.001	2.32	< 0.01
V2A	15-Sep-08	< 0.00025	< 0.005	< 0.001	0.051	< 0.001	< 0.001	< 0.05	241	0.0006	< 0.001	< 0.001	0.002	0.08	< 0.00002	4.3	0.015	179	0.003	0.0019	7.46	0.12	< 0.001	< 0.15	< 0.001	0.001	0.83	< 0.0001	0.037	< 0.001	1.58	< 0.01
V2A	01-Oct-08	< 0.00025	0.01	0.001	0.047	< 0.001	< 0.001	< 0.05	267	0.0006	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	4.4	0.016	199	< 0.001	0.002	8.52	0.12	< 0.001	< 0.15	< 0.001	0.002	0.9	< 0.0001	0.03	< 0.001	1.92	< 0.01
V2A	15-Oct-08	< 0.00025	0.007	0.001	0.047	< 0.001	< 0.001	< 0.05	272.5	0.0005	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	4.5	0.016	201	< 0.001	0.0021	6.55	0.1	< 0.001	< 0.15	< 0.001	0.002	0.94	< 0.0001	0.028	< 0.001	1.56	< 0.01
V2A	03-Nov-08	< 0.00025	0.13	0.001	0.052	< 0.001	< 0.001	< 0.05	297	0.0005	< 0.001	< 0.001	0.001	0.28	< 0.00002	4.7	0.013	239	0.002	0.002	11.3	0.12	< 0.001	< 0.15	< 0.001	0.002	0.93	< 0.0001	0.037	< 0.001	1.63	< 0.01
V2A	13-Nov-08	< 0.00025	0.021	0.001	0.05	< 0.001	< 0.001	< 0.05	288	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	4.5	0.016	226	< 0.001	0.0022	9.09	0.1	< 0.001	< 0.15	< 0.001	< 0.001	0.95	< 0.0001	0.037	< 0.001	1.38	< 0.01
V2A	02-Dec-08	< 0.00025	0.019	0.001	0.055	< 0.001	< 0.001	< 0.05	316	< 0.0002	< 0.001	< 0.001	0.001	0.32	< 0.00002	4.8	0.017	240	0.01	0.0023	10.7	0.11	< 0.001	< 0.15	< 0.001	< 0.001	1.07	< 0.0001	0.031	< 0.001	1.42	< 0.01
V2A	10-Dec-08	< 0.00025	0.009	0.002	0.045	< 0.001	< 0.001	< 0.05	319	0.0003	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	4.5	0.016	244	< 0.001	0.0023	8.81	0.1	< 0.001	< 0.15	< 0.001	0.002	1.02	< 0.0001	0.037	< 0.001	1.27	< 0.01
V2A	MEAN	0.00025	0.023	0.0013	0.050	0.001	0.001	0.05	258	0.0004	0.001	0.001	0.0013	0.18	0.00002	4.28	0.0145	188	0.0057	0.0021	8.08	0.099	0.0011	0.15	0.001	0.0018	0.86	0.0001	0.028	0.001	1.62	0.01
V2A	MINIMUM	< 0.00025	< 0.005	< 0.001	0.04	< 0.001	< 0.001	< 0.05	181	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	3.2	0.004	104	< 0.001	0.0014	5.96	0.005	< 0.001	< 0.15	< 0.001	< 0.001	0.61	< 0.0001	0.017	< 0.001	0.03	< 0.01
V2A	MAXIMUM	< 0.00025	0.13	0.002	0.068	< 0.001	< 0.001	< 0.05	319	0.0006	< 0.001	< 0.001	0.002	0.94	< 0.00002	4.9	0.019	244	0.026	0.0036	11.3	0.15	0.002	< 0.15	< 0.001	0.003	1.07	< 0.0001	0.037	< 0.001	2.82	< 0.01
V2A	N > DL	0	13	15	16	0	0	0	16	12	0	0	16	9	0	16	16	16	9	16	16	16	2	0	0	14	16	1	16	0	16	0
V2A	Median	0.00025	0.0095	0.001	0.047	0.001	0.001	0.05	263.5	0.0005	0.001	0.001	0.001	0.07	0.00002	4.45	0.0155	188.5	0.0025	0.002	7.79	0.1	0.001	0.15	0.001	0.002	0.9	0.0001	0.0275	0.001	1.655	0.01
V4	23-Jan-08	< 0.000005	0.0028	0.00049	0.0939	< 0.00001	0.000009	< 0.005	102	0.000018	0.000061	< 0.0001	0.00047	0.04		1.26	0.0054	36.5	0.083	0.00107	4.04	0.00073	0.000023	< 0.005	0.00009	0.00058	0.411	< 0.000002	0.0147	< 0.0002	0.0014	< 0.0001
V4	20-Feb-08	< 0.000005	0.0023	0.00051	0.0877	< 0.00001	< 0.000005	< 0.005	107	0.000017	0.000036	< 0.0001	0.00046	0.033		1.49	0.0056	39.4	0.0353	0.00112	4.87	0.00067	0.000032	< 0.005	0.0001	0.00068	0.395	< 0.000002	0.016	< 0.0002	0.0016	< 0.0001
V4	13-Mar-08	< 0.000005	0.0025	0.00045	0.0964	< 0.00001	< 0.000005	< 0.005	101	0.000025	0.000043	< 0.0001	0.00054	0.029		1.34	0.006	38.3	0.0449	0.00113	4.63	0.00068	0.000048	< 0.005	0.0001	0.00056	0.417	< 0.000002	0.0173	< 0.0002	0.0049	< 0.0001
V4	28-Apr-08	< 0.000005	0.0051	0.00073	0.0748	< 0.00001	< 0.000005	< 0.005	86.4	0.000028	0.000062	0.0001	0.00071	0.244		1.35	0.0048	31.4	0.0602	0.00105	3.4	0.00075	0.000177	0.01	0.00012	0.00048	0.358	< 0.000002	0.0132	0.0004	0.0062	0.0001
V4	21-May-08	0.00001	0.132	0.00078	0.0366	0.00001	< 0.000005	< 0.005	27	0.000048	0.000193	0.0003	0.00226	1.28		1.2	0.0014	9.29	0.0596	0.00064	0.97	0.00157	0.000307	0.016	0.00017	0.00043	0.0993	0.000004	0.00122	0.0005	0.0043	0.0004
V4	19-Jun-08	< 0.00025	0.019	< 0.001	0.062	< 0.001	< 0.001	0.06	62.5	< 0.0002	< 0.001	< 0.001	0.001	0.22	< 0.00002	0.9	0.003	19.6	0.016	0.001	2.03	0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.25	< 0.0001	0.0052	< 0.001	< 0.005	< 0.01
V4	24-Jun-08	< 0.000005	0.0144	0.00069	0.0555	< 0.00001	< 0.000005	< 0.005	49.4	0.000045	0.000045	0.0002	0.0016	0.295		0.64	0.0033	16.6	0.0143	0.00109	1.79	0.00128	0.000129	0.016	0.0002	0.00043	0.206	< 0.000002	0.0042	< 0.0002	0.0028	0.0002
V4	29-Jul-08	< 0.000005	0.0077		0.0672	< 0.00001	< 0.000005	< 0.005	66.9	0.000016	0.000044	0.0001	0.00096	0.132		0.75	0.004	22.4	0.0165	0.00102	3.12	0.00084	0.000052	< 0.005	0.00013	0.00047	0.28	0.000003	0.00558	< 0.0002	0.0037	0.0001
V4	19-Aug-08	< 0.00025	0.017	0.001	0.064	< 0.001	< 0.001	< 0.05	68.7	< 0.0002	< 0.001	< 0.001	0.001	0.33	< 0.00002	1	0.005	29.2	0.032	0.0012	2.96	< 0.001	< 0.001	< 0.15	< 0.001	0.001	0.33	< 0.0001	0.0056	< 0.001	< 0.005	< 0.01
V4	23-Sep-08	< 0.00025	< 0.005	< 0.001	0.065	< 0.001	< 0.001	< 0.05	66.1	< 0.0002	< 0.001	< 0.001	0.001	0.15	< 0.00002	0.8	0.004	24.8	0.027	0.0011	2.42	< 0.001	< 0.001	< 0.15	< 0.001	0.001	0.33	< 0.0001	0.008	< 0.001	< 0.005	< 0.01
V4	07-Oct-08	< 0.000005	0.007	0.0004	0.0163	< 0.00001	< 0.000005	< 0.005	4.58	< 0.00005	< 0.000005	0.003	< 0.00005	0.013		0.9	< 0.0005	0.45	< 0.00005	0.0014	2.1	0.0075	< 0.000005	0.006	< 0.00002	0.0011	0.124	< 0.000002	0.00106	< 0.0002	< 0.0001	< 0.0001
V4	10-Dec-08	< 0.000005	0.027	0.0008	0.0787	< 0.00001	< 0.000005	< 0.05	88	0.000024	0.000074	0.0004	0.00186	0.255		1.12	0.0051	34.8	0.0524	0.00114	3.38	0.00084	0.000188		0.00017	0.00128	0.366	< 0.000002	0.00958	< 0.0002	0.0035	0.0001
V4	MEAN	6.67E-05	0.0202	0.00065	0.0665	0.00026	0.00025	0.021	69.1	7.26E-05	0.00030	0.00062	0.00099	0.252	0.00002	1.06	0.0040	25.2	0.0368	0.00108	3.0	0.0015	0.00033	0.0471	0.00034	0.00075	0.297	0.000027	0.00847	0.00044	0.0036	0.0026
V4	MINIMUM	< 0.000005	0.0023	0.0004	0.0163	< 0.00001	< 0.000005	< 0.005	4.58	0.000016	< 0.000005	< 0.0001	< 0.00005	0.013	< 0.00002	0.64	< 0.0005	0.45	< 0.00005	0.00064	0.97	0.00067	< 0.000005	< 0.005	< 0.00002	0.00043	0.0993	< 0.000002	0.00106	< 0.0002	< 0.0001	< 0.0001
V4	MAXIMUM	< 0.00025	0.132	< 0.001	0.0964	< 0.001	< 0.001	0.06	107	< 0.0002	< 0.001	0.003	0.00226	1.28	< 0.00002	1.49	0.006	39.4	0.083	0.0014	4.87	0.0075	< 0.001	< 0.15	< 0.001	0.00128	0.417	< 0.0001	0.0173	< 0.001	0.0062	< 0.01
V4	N > DL	1	11	10	12	1	1	1	12	8	8	6	11	12	0	12	11	12	11	12	12	10	8	4	8	11	12	2	12	2	8	5
V4	Median	0.000005	0.00735	0.00071	0.0661	0.00001	0.000005	0.005	67.8	0.000037	0.0000615	0.00025	0.00098	0.185	0.00002	1.06	0.0044	27	0.03365	0.001095	3.25	0.00092	0.00015	0.01	0.00015	0.00063	0.33	0.000002	0.0068	0.0002	0.004	0.0001
V5	07-Jan-08	< 0.00025	0.093	< 0.001	0.07	< 0.001	< 0.001	< 0.05	79.4	< 0.0002	< 0.001	< 0.001	< 0.001	0.26	< 0.00002	1.2	0.004	32.6	0.015	0.0016	3.95	0.001	< 0.001	< 0.15	< 0.001	0.002	0.32	< 0.0001	0.0041	< 0.001	0.02	< 0.01
V5	14-May-08	< 0.00025	1.69	0.002	0.12	< 0.001	< 0.001	< 0.05	43.2	0.0002	0.002	0.006	0.009	2.91	< 0.00002	1.9	0.005	17.7	0.13	0.0007	2.15	0.012	0.009	0.2	< 0.001	0.001	0.16	< 0.0001	0.002	0.005	0.026	< 0.01
V5	16-Jun-08	< 0.00025	0.37	0.001	0.055	< 0.001	< 0.001	< 0.05	35.3	< 0.0002	< 0.001	< 0.001	0.002	0.59	< 0.00002	0.8	0.002	13.5	0.029	0.0007	2.32	0.003	0.001	< 0.15	< 0.001	< 0.001	0.14	< 0.0001	0.0016	< 0.001	0.015	< 0.01
V5	14-Jul-08	< 0.00025	1.97	0.002	0.085	< 0.001	< 0.001	0.12	39.1	< 0.0002	0.002	0.005	0.007	3.19	< 0.00002	1.1	0.009	15.2	0.081	0.0009	2.62	0.009	0.004	0.2	< 0.001	< 0.001	0.15	< 0.0001	0.0016	0.005	0.023	< 0.01
V5	11-Aug-08	< 0.00025	1.58	0.002	0.091	< 0.001	< 0.001	< 0.05	62.2	< 0.0002	0.001	0.004	0.004	2.42	< 0.00002	1.2	0.005	25	0.065	0.001	3.2	0.005	0.002	< 0.15	< 0.001	0.002	0.24	< 0.0001	0.0031	0.003	0.014	< 0.01
V5	15-Sep-08	< 0.00025	5.22	0.005	0.16	< 0.001	< 0.001	< 0.05	54.2	< 0.0002	0.005	0.013	0.014	8.34	< 0.00002	1.9	0.011	22.7	0.17	0.0011	2.89	0.017	0.008	0.2	< 0.001	0.003	0.28	< 0.0001	0.0037	0.014	0.038	< 0.01
V5	15-Oct-08	< 0.00025	0.073	< 0.001	0.07	< 0.001	< 0.001	< 0.05	63.1	< 0.0002	< 0.001	< 0.001	0.001	0.14	< 0.00002	0.9	0.004	22.1	0.038	0.0014	2.75	0.002	< 0.001	< 0.15	< 0.001	0.002	0.26	< 0.0001	0.0033	< 0.001	0.006	< 0.01
V5	03-Nov-08	0.0003	0.1	< 0.001	0.086	< 0.001	< 0.001	< 0.05	76.9	< 0.0002	< 0.001	< 0.001	0.003	0.25	< 0.00002	1.2	0.003	31.2	0.04	0.0014	3.93	0.003	< 0.001	< 0.15	< 0.001	0.003	0.31	< 0.0001	0.0042	< 0.001	0.011	< 0.01
V5	01-Dec-08	< 0.00025	0.086	< 0.001	0.087	< 0.001	< 0.001	< 0.05	85.9	< 0.0002	< 0.001	< 0.001	< 0.001	0.16	< 0.00002	1.3	0.005	37.4	0.028	0.0013	4.55	0.002	< 0.001	< 0.15	< 0.001	0.001	0.35	< 0.0001	0.004	< 0.001	0.039	< 0.01
V5	MEAN	0.00026	1.24	0.0018	0.092	0.001	0.001	0.0578	59.92	0.0002	0.0017	0.0037	0.0047	2.03	0.00002	1.28	0.005	24.2	0.066	0.0011	3.15	0.006	0.0031	0.167	0.001	0.0018	0.25	0.0001	0.0031	0.0036	0.021	0.01
V5	MINIMUM	< 0.00025	0.073	< 0.001	0.055	< 0.001	< 0.001	< 0.05	35.3	< 0.0002	< 0.001	< 0.001	< 0.001	0.14	< 0.00002	0.8	0.002	13.5	0.015	0.0007	2.15	0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.14	< 0.0001	0.0016	< 0.001	0.006	< 0.01
V5	MAXIMUM	0.0003	5.22	0.005	0.16	< 0.001	< 0.001	0.12	85.9	< 0.0002	0.005	0.013	0.014	8.34	< 0.00002	1.9	0.011	37.4	0.17	0.0016	4.55	0.017	0.009	0.2	< 0.001	0.003	0.35	< 0.0001	0.0042	0.014	0.039	< 0.01
V5	N > DL	1	9	5	9	0	0	1	9	1	4	4	7	9	0	9	9	9	9	9	9	9	5	3	0	7	9	0	9	4	9	0
V5	Median	0.00025	0.37	0.001	0.086	0.001	0.001	0.05	62.2	0.0002	0.001	0.001	0.003	0.59	0.00002	1.2	0.005	22.7	0.04	0.0011	2.89	0.003	0.001	0.15	0.001	0.002	0.26	0.0001	0.0033	0.001	0.02	0.01
V6A	24-Jan-08	< 0.000005	0.0373	0.00101	0.0453	< 0.00001	< 0.000005	< 0.005	48	0.000042	0.000054	< 0.0001	0.00043	0.116		0.53	0.0013	10.2	0.00737	0.00016	2	0.00033	0.000634	< 0.005	0.00006	0.00016	0.208	0.000004	0.00437	< 0.0002	0.0157	< 0.0001
V6A	21-Feb-08	< 0.000005	0.0271	0.00071	0.0506	< 0.00001	< 0.000005	< 0.005	54.8	0.000051	0.000048	< 0.0001	0.00039	0.06		0.65	0.0019	11.4	0.0057	0.00023	2.05	0.00026	0.000173	0.005	0.00005	0.00029	0.243	0.000003	0.00916	< 0.0002	0.0186	< 0.0001
V6A	10-Mar-08	< 0.00025	< 0.005	< 0.001	0.051	< 0.001	< 0.001	< 0.05	52	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.6	0.002	11.1	0.007	< 0.0005	2.13	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.25	< 0.0001	0.0065	< 0.001	0.03	< 0.01
V6A	11-Mar-08	< 0.000005	0.0062	0.00071	0.0534	< 0.00001	< 0.000005	< 0.005	55.1	0.000065	0.000021	< 0.0001	0.00034	0.038		0.6	0.0019	11.3	0.00409	0.0002	2.02	0.00027	0.000109	< 0.005	0.00006	0.00022	0.251	0.000003	0.00753	< 0.0002	0.0251	< 0.0001
V6A	28-Apr-08	< 0.000005	0.0263	0.00081	0.0522	< 0.00001	< 0.000005	< 0.05	54.1	0.000093	0.000045	< 0.0001	0.0004	0.048		0.65	0.0016	11.1	0.00594	0.00023	2.01	0.00028	0.000311	0.005	0.00008	0.00021	0.256	0.000003	0.00654	< 0.0002	0.0182	< 0.0001
V6A	21-May-08	0.000008	0.608	0.00391	0.0493	0.00013	0.000014	< 0.05	20.5	0.000623	0.00153	0.0007	0.00381	1.02		1.15	0.0017	5.81	0.195	0.00012	11	0.00285	0.0109	0.013	0.00012	0.0001	0.0802	0.000023	0.00152	0.0007	0.375	0.0005
V6A	10-Jun-08	0.0004	0.11	< 0.001	0.022	< 0.001	< 0.001	< 0.05	17.9	< 0.0002	< 0.001	< 0.001	0.001	0.21	< 0.00002	0.4	< 0.001	4.39	0.012	< 0.0005	1.59	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.071	< 0.0001	0.0012	< 0.001	0.03	< 0.01
V6A	24-Jun-08	0.00001	0.196	0.00141	0.0251	0.00005	0.000005	< 0.05	13.1	0.000112	0.000183	0.0003	0.00162	0.256		0.31	0.0011	2.76	0.0127	0.00008	1.2	0.00084	0.00324	0.011	0.00008	< 0.00004	0.0601	0.00001	0.000912	< 0.0002	0.0509	0.0003
V6A	30-Jul-08	< 0.000005	0.0553	0.00123	0.0313	0.00002	< 0.000005	< 0.05	28.9	0.000059	0.000057	0.0001	0.00088	0.133		0.35	0.0011	6.94	0.00761	0.00012	2.4	0.00046	0.00083	< 0.005	0.00007	0.00012	0.128	0.000007	0.00217	< 0.0002	0.0273	0.0002
V6A	02-Sep-08	< 0.00025	0.06	< 0.001	0.027	< 0.001	< 0.001	< 0.05	23.9	< 0.0002	< 0.001	< 0.001	< 0.001	0.11	< 0.00002	0.4	< 0.001	5.95	0.007	< 0.0005	1.52	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.1	< 0.0001	0.0013	< 0.001	0.056	< 0.01
V6A	17-Sep-08	< 0.000005	0.0429	0.00099	0.0287	0.00002	< 0.000005	< 0.05	26.9	0.000058	0.000041	< 0.0001	0.00072	0.097		0.39	0.0011	7.07	0.00675	0.00011	1.59	0.0004	0.000488	< 0.005	0.00004	0.00012	0.117	0.000006	0.00189	< 0.0002	0.0416	0.0002
V6A	08-Oct-08	0.000004	0.0378	0.001	0.0288	0.00001	< 0.000005	< 0.05	30.5	0.000103	0.000067	0.0002	0.00077	0.1		0.12	0.0012	8.69	0.00964	0.00013	1.65	0.00054	0.000829	0.006	0.00006	< 0.00004	0.127	0.00005	< 0.000002	0.0499	0.0001	0.0004
V6A	02-Dec-08	< 0.00025	0.035	< 0.001	0.054	< 0.001	< 0.001	< 0.05	58.6	< 0.0002	< 0.001	< 0.001	< 0.001	0.18	< 0.00002	0.6	0.002	17	0.015	< 0.0005	2.6	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.25	< 0.0001	0.0036	< 0.001	0.054	< 0.01
V6A	10-Dec-08	< 0.000005	0.0412	0.00108	0.048	0.01	< 0.000005	< 0.05	52.2	0.000064	0.000064	0.0002	0.00045	0.118		0.52	0.0015	13.7	0.0119	0.00017	2.01	0.00045	0.00076		0.00006	0.00019	0.215	0.000004	0.00385	< 0.0002	0.0469	< 0.0001
V6A	MEAN	0.00014	0.092	0.0012	0.040	0.00102	0.00029	0.0404	38.3	0.00015	0.00044	0.00043	0.00099	0.181	0.00002	0.52	0.0015	9.10	0.0220	0.00025	2.56	0.00076	0.0016	0.0508	0.00033	0.00039	0.159	3.66E-05	0.00361	0.00401	0.0564	0.0030
V6A	MINIMUM	< 0.000005	< 0.005	0.00071	0.022	< 0.00001	< 0.000005	< 0.005	13.1	0.000042	0.000021	< 0.0001	0.00034	0.038	< 0.00002	0.12	< 0.001	2.76	0.00409	0.00008	1.2	0.00026	0.000109	< 0.005	0.00004	< 0.00004	0.0601	0.000003	< 0.000002	< 0.0002	0.0001	< 0.0001
V6A	MAXIMUM	0.0004	0.608	0.00391	0.054	0.01	< 0.001	< 0.05	58.6	0.000623	0.00153	< 0.001	0.00381	1.02	< 0.00002	1.15	0.002	17	0.195	< 0.0005	11	0.00285	0.0109	< 0.15	< 0.001	< 0.001	0.256	< 0.0001	0.00916	0.0499	0.375	< 0.01
V6A	N > DL	4	13	10	14	6	2	0	14	10	10	5	11	13	0	14	12	14	14	10	14	10	10	5	10	8	14	10	13	2	14	5
V6A	Median	0.0000065	0.0395	0.001	0.0467	0.000035	0.000005	0.05	39.3	0.000098	0.000066	0.0002	0.00083	0.113	0.00002	0.53	0.0014	9.45	0.00749	0.00019	2.01	0.0005	0.00083	0.006	0.000075	0.0002	0.168	0.0000085	0.002885	0.0002	0.03	0.00025
V8	07-Jan-08	< 0.00025	0.035	< 0.001	0.063	< 0.001	< 0.001	< 0.05	70.5	< 0.0002	< 0.001	< 0.001	< 0.001	0.12	< 0.00002	1.2	0.004	29.6	0.014	0.0011	3.79	0.002	< 0.001	< 0.15	< 0.001	0.002	0.3	0.0001	0.0056	< 0.001	0.016	< 0.01
V8	18-Feb-08	< 0.00025	0.022	< 0.001	0.075	< 0.001	< 0.001	< 0.05	85.6	< 0.0002	< 0.001	0.001	0.001	< 0.05	< 0.00002	1.2	0.005	37.4	0.019	0.0012	4.74	0.002	< 0.001	< 0.15	< 0.001	< 0.001	0.37	< 0.0001	0.0054	0.003	0.015	< 0.01
V8	17-Mar-08	< 0.00025	0.017	< 0.001	0.083	< 0.001	< 0.001	< 0.05	85.6	< 0.0002	< 0.001	< 0.001	< 0.001	0.1	< 0.00002	1.4	0.005	44.5	0.016	0.0013	5.72	0.002	< 0.001	< 0.15	< 0.001	0.002	0.35	< 0.0001	0.0082	< 0.001	0.011	< 0.01
V8	14-Apr-08	< 0.00025	0.016	0.001	0.08	< 0.001	< 0.001	< 0.05	86.4	< 0.0002	< 0.001	< 0.001	< 0.001	0.12	< 0.00002	1.5	0.006	42.2	0.016	0.0015	5.67	0.002	< 0.001	< 0.15	< 0.001	0.002	0.4	< 0.0001	0.0083	< 0.001	0.011	< 0.01
V8	14-May-08	< 0.00025	0.78	< 0.001	0.068	< 0.001	< 0.001	< 0.05	42.7	< 0.0002	< 0.001	0.002	0.005	1.33	< 0.00002	1.6	0.003	17.8	0.06	0.0006	2.18	0.006	0.002	< 0.15	< 0.001	< 0.001	0.16	< 0.0001	0.0027	0.002	0.022	< 0.01
V8	26-May-08	0.00001	0.454	0.00152	0.0604	0.00006	0.000009	< 0.05	22.8	0.000219	0.00135	0.0009	0.00549	1.02		0.98		7.75	0.141	0.00036	1.21	0.00454	0.00769		0.00012	0.00027	0.0903	0.00002	0.00129	0.0011	0.0412	0.0005
V8	16-Jun-08	< 0.00025	0.11	< 0.001	0.037	< 0.001	< 0.001	< 0.05	37.4	< 0.0002	< 0.001	< 0.001	0.001	0.15	< 0.00002	0.7	0.002	12.1	0.11	< 0.0005	1.8	0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.14	< 0.0001	0.0014	< 0.001	0.035	< 0.01
V8	14-Jul-08	< 0.00025	0.42	< 0.001	0.051	< 0.001	< 0.001	< 0.05	44	< 0.0002	< 0.001	< 0.001	0.003	0.86	< 0.00002	0.7	0.005	14.4	0.039	< 0.0005	2.06	0.003	0.002	< 0.15	< 0.001	< 0.001	0.17	< 0.0001	0.0019	< 0.001	0.025	< 0.01

Appendix 6
2008 Surface Water Quality Data
Vangorda Creek Drainage

Table 2. Surface Water Total Metals Parameters

Station	Date	AG-T mg/L	AL-T mg/L	AS-T mg/L	BA-T mg/L	BE-T mg/L	BI-T mg/L	B-T mg/L	CA-T mg/L	CD-T mg/L	CO-T mg/L	CR-T mg/L	CU-T mg/L	FE-T mg/L	HG-T mg/L	K-T mg/L	LI-T mg/L	MG-T mg/L	MN-T mg/L	MO-T mg/L	NA-T mg/L	NI-T mg/L	PB-T mg/L	P-T mg/L	SB-T mg/L	SE-T mg/L	SR-T mg/L	TL-T mg/L	U-T mg/L	V-T mg/L	ZN-T mg/L	ZR-T mg/L
V8	11-Aug-08	< 0.00025	0.12	< 0.001	0.061	< 0.001	< 0.001	< 0.05	74.8	< 0.0002	< 0.001	< 0.001	0.001	0.3	< 0.00002	0.9	0.004	22.1	0.016	0.0007	2.8	0.001	< 0.001	< 0.15	< 0.001	0.001	0.27	< 0.0001	0.003	< 0.001	0.019	< 0.01
V8	15-Sep-08	< 0.00025	1.21	0.002	0.071	< 0.001	< 0.001	< 0.05	42.8	< 0.0002	0.001	0.003	0.004	2.01	< 0.00002	1	0.004	16.6	0.053	0.0008	2.44	0.005	0.002	< 0.15	< 0.001	0.001	0.21	< 0.0001	0.0034	0.003	0.02	< 0.01
V8	15-Oct-08	< 0.00025	0.043	< 0.001	0.055	< 0.001	< 0.001	< 0.05	57	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	0.9	0.003	20.6	0.016	0.0009	2.67	0.001	< 0.001	< 0.15	< 0.001	0.002	0.23	< 0.0001	0.0037	< 0.001	0.013	< 0.01
V8	03-Nov-08	0.0004	0.3	< 0.001	0.078	< 0.001	< 0.001	< 0.05	71.6	0.0002	< 0.001	0.001	0.002	0.54	< 0.00002	1.2	0.003	29.4	0.032	0.0011	3.8	0.003	0.002	< 0.15	< 0.001	0.002	0.3	< 0.0001	0.0054	< 0.001	0.019	< 0.01
V8	01-Dec-08	< 0.00025	0.037	< 0.001	0.079	< 0.001	< 0.001	< 0.05	90.5	< 0.0002	< 0.001	< 0.001	0.001	0.06	< 0.00002	1.3	0.005	40.3	0.014	0.0012	4.65	0.002	< 0.001	< 0.15	< 0.001	< 0.001	0.37	< 0.0001	0.0063	< 0.001	0.035	< 0.01
V8	MEAN	0.00024	0.274	0.0011	0.0663	0.00093	0.00092	0.05	62.4	0.00020	0.00103	0.0012	0.0021	0.52	0.00002	1.12	0.00408	25.8	0.042	0.00090	3.35	0.0027	0.00182	0.15	0.00093	0.00133	0.258	9.38E-05	0.0044	0.0014	0.022	0.0093
V8	MINIMUM	0.00001	0.016	< 0.001	0.037	0.00006	0.000009	< 0.05	22.8	< 0.0002	< 0.001	0.0009	< 0.001	< 0.05	< 0.00002	0.7	0.002	7.75	0.014	0.00036	1.21	0.001	< 0.001	< 0.15	0.00012	0.00027	0.0903	0.00002	0.00129	< 0.001	0.011	0.0005
V8	MAXIMUM	0.0004	1.21	0.002	0.083	< 0.001	< 0.001	< 0.05	90.5	0.000219	0.00135	0.003	0.00549	2.01	< 0.00002	1.6	0.006	44.5	0.141	0.0015	5.72	0.006	0.00769	< 0.15	< 0.001	0.002	0.4	< 0.0001	0.0083	0.003	0.0412	< 0.01
V8	N > DL	2	13	3	13	1	1	0	13	2	2	5	10	11	0	13	12	13	13	11	13	13	5	0	1	8	13	2	13	4	13	1
V8	Median	0.00025	0.11	0.001	0.068	0.001	0.001	0.05	70.5	0.0002	0.001	0.001	0.001	0.15	0.00002	1.2	0.004	22.1	0.019	0.0009	2.8	0.002	0.001	0.15	0.001	0.001	0.27	0.0001	0.0037	0.001	0.019	0.01
V15	07-Jan-08	< 0.00025	0.011	< 0.001	0.049	< 0.001	< 0.001	< 0.05	361	0.001	< 0.001	< 0.001	0.002	0.11	< 0.00002	5.1	0.014	267	0.003	0.0007	11.7	0.053	< 0.001	< 0.15	< 0.001	0.003	1.26	< 0.0001	0.04	< 0.001	0.88	< 0.01
V15	20-Jan-08	< 0.00025	0.012	< 0.001	0.053	< 0.001	< 0.001	< 0.05	351	0.0012	< 0.001	< 0.001	0.003	0.84	< 0.00002	5.7	0.021	275	0.002	0.0008	12.3	0.07	< 0.001	< 0.15	< 0.001	0.002	1.47	< 0.0001	0.039	< 0.001	1.11	< 0.01
V15	14-Feb-08	< 0.00025	< 0.005	< 0.001	0.047	< 0.001	< 0.001	< 0.05	346	0.0011	< 0.001	< 0.001	0.002	< 0.05	< 0.00002	4.7	0.014	285	0.002	0.0012	12.5	0.055	< 0.001	< 0.15	< 0.001	0.001	1.19	0.0001	0.052	< 0.001	0.93	< 0.01
V15	19-Feb-08	< 0.00025	0.005	< 0.001	0.043	< 0.001	< 0.001	< 0.05	359	0.0008	< 0.001	0.001	0.002	< 0.05	< 0.00002	4.6	0.013	276	< 0.001	0.0012	11.8	0.051	< 0.001	< 0.15	< 0.001	0.001	1.22	< 0.0001	0.031	0.003	0.79	< 0.01
V15	10-Mar-08	< 0.00025	< 0.005	< 0.001	0.056	< 0.001	< 0.001	< 0.05	327	0.0013	< 0.001	< 0.001	0.003	< 0.05	< 0.00002	6	0.022	268	0.002	0.0013	15.6	0.075	< 0.001	< 0.15	< 0.001	0.002	1.43	< 0.0001	0.053	< 0.001	1.2	< 0.01
V15	17-Mar-08	< 0.00025	0.49	0.002	0.061	< 0.001	< 0.001	< 0.05	375	0.0011	< 0.001	< 0.001	0.004	0.93	< 0.00002	5.6	0.018	358	0.017	0.0009	14.9	0.062	0.004	< 0.15	< 0.001	0.003	1.28	< 0.0001	0.047	< 0.001	0.97	< 0.01
V15	02-Apr-08	< 0.00025	< 0.005	< 0.001	0.05	< 0.001	< 0.001	< 0.05	370	0.0012	< 0.001	< 0.001	0.002	0.1	< 0.00002	5.3	0.018	325	< 0.001	0.001	13.2	0.061	< 0.001	< 0.15	< 0.001	0.002	1.42	< 0.0001	0.045	< 0.001	1.06	< 0.01
V15	15-Apr-08	< 0.00025	< 0.005	0.001	0.05	< 0.001	< 0.001	< 0.05	366	0.0011	< 0.001	< 0.001	0.002	0.13	< 0.00002	5.2	0.018	318	< 0.001	0.0009	13.9	0.057	< 0.001	< 0.15	< 0.001	0.002	1.42	< 0.0001	0.044	< 0.001	0.93	< 0.01
V15	06-May-08	< 0.00025	0.12	0.001	0.046	< 0.001	< 0.001	< 0.05	245	0.0004	< 0.001	< 0.001	0.002	0.22	< 0.00002	4	0.012	206	0.018	0.0011	9.7	0.017	0.003	< 0.15	< 0.001	0.003	0.84	< 0.0001	0.018	< 0.001	0.27	< 0.01
V15	14-May-08	< 0.00025	0.046	0.001	0.045	< 0.001	< 0.001	< 0.05	200	0.0003	< 0.001	< 0.001	0.002	0.07	< 0.00002	4.4	0.012	182	0.006	0.001	7.77	0.021	0.001	< 0.15	< 0.001	0.004	0.95	< 0.0001	0.019	< 0.001	0.5	< 0.01
V15	04-Jun-08	< 0.00025	0.031	0.001	0.049	< 0.001	< 0.001	< 0.05	324	0.0009	< 0.001	< 0.001	0.002	0.08	< 0.00002	4.7	0.014	259	0.002	0.0011	11.1	0.044	0.002	< 0.15	< 0.001	0.004	1.22	< 0.0001	0.031	< 0.001	0.88	< 0.01
V15	17-Jun-08	< 0.00025	0.005	0.001	0.048	< 0.001	< 0.001	< 0.05	350	0.0008	< 0.001	< 0.001	0.002	< 0.05	< 0.00002	4.8	0.012	284	0.002	0.0009	11.9	0.037	< 0.001	< 0.15	< 0.001	0.003	1.2	< 0.0001	0.032	< 0.001	0.84	< 0.01
V15	03-Jul-08	< 0.00025	0.018	< 0.001	0.048	< 0.001	< 0.001	< 0.05	382	0.0007	< 0.001	< 0.001	0.002	0.73	< 0.00002	3.8	0.013	312	0.002	< 0.0005	9	0.042	0.001	< 0.15	< 0.001	0.003	1.12	< 0.0001	0.037	< 0.001	1.07	< 0.01
V15	15-Jul-08	< 0.00025	0.54	0.002	0.058	< 0.001	< 0.001	< 0.05	339	0.0007	< 0.001	0.001	0.003	1.86	< 0.00002	4.4	0.02	271	0.013	0.001	11.2	0.038	0.004	< 0.15	< 0.001	0.002	1.04	< 0.0001	0.033	0.001	0.91	< 0.01
V15	04-Aug-08	< 0.00025	0.05	0.002	0.057	< 0.001	< 0.001	< 0.05	406	0.001	< 0.001	< 0.001	0.002	0.08	< 0.00002	5.3	0.016	319	0.005	0.0008	13.4	0.049	< 0.001	< 0.15	< 0.001	0.003	1.35	< 0.0001	0.041	< 0.001	1.13	< 0.01
V15	12-Aug-08	< 0.00025	0.006	< 0.001	0.052	< 0.001	< 0.001	< 0.05	410	0.0008	< 0.001	< 0.001	0.002	0.09	< 0.00002	5.6	0.014	331	0.001	0.0007	13.2	0.045	< 0.001	< 0.15	< 0.001	0.001	1.36	< 0.0001	0.041	< 0.001	1.06	< 0.01
V15	09-Sep-08	< 0.00025	0.013	0.002	0.064	< 0.001	< 0.001	< 0.05	394	0.0012	< 0.001	< 0.001	0.002	0.2	< 0.00002	5.6	0.019	310	0.001	0.0008	17.9	0.066	< 0.001	< 0.15	< 0.001	0.005	1.42	< 0.0001	0.042	< 0.001	1.4	< 0.01
V15	15-Sep-08	< 0.00025	0.005	< 0.001	0.055	< 0.001	< 0.001	< 0.05	390	0.001	< 0.001	< 0.001	0.002	0.06	< 0.00002	5	0.016	310	0.002	0.0013	12.5	0.053	< 0.001	< 0.15	< 0.001	< 0.001	1.25	< 0.0001	0.057	< 0.001	1.22	< 0.01
V15	01-Oct-08	< 0.00025	0.014	< 0.001	0.054	< 0.001	< 0.001	< 0.05	406	0.0012	< 0.001	< 0.001	0.002	0.05	< 0.00002	5.4	0.018	341	< 0.001	0.0008	13.9	0.06	< 0.001	< 0.15	< 0.001	0.002	1.44	< 0.0001	0.041	< 0.001	1.52	< 0.01
V15	15-Oct-08	< 0.00025	0.034	< 0.001	0.054	< 0.001	< 0.001	< 0.05	422.5	0.0012	< 0.001	< 0.001	0.002	< 0.05	< 0.00002	6	0.019	332	0.008	0.0008	10.9	0.057	< 0.001	< 0.15	< 0.001	0.004	1.55	< 0.0001	0.038	< 0.001	1.42	< 0.01
V15	03-Nov-08	< 0.00025	0.019	< 0.001	0.053	< 0.001	< 0.001	< 0.05	435	0.0012	< 0.001	< 0.001	0.002	0.25	< 0.00002	5.8	0.017	365	0.005	0.0009	16	0.073	< 0.001	< 0.15	< 0.001	0.002	1.44	< 0.0001	0.041	< 0.001	1.79	< 0.01
V15	13-Nov-08	< 0.00025	0.17	0.001	0.065	< 0.001	< 0.001	< 0.05	429	0.0012	< 0.001	< 0.001	0.004	0.13	< 0.00002	6.1	0.02	352	0.006	0.0006	14.5	0.065	0.002	< 0.15	< 0.001	0.002	1.68	< 0.0001	0.046	< 0.001	1.28	< 0.01
V15	02-Dec-08	< 0.00025	0.018	< 0.001	0.062	< 0.001	< 0.001	< 0.05	467	< 0.0002	< 0.001	< 0.001	0.003	0.51	< 0.00002	6.2	0.021	383	0.007	0.0007	16.7	0.072	< 0.001	< 0.15	< 0.001	< 0.001	1.74	< 0.0001	0.04	< 0.001	1.45	< 0.01
V15	10-Dec-08	< 0.00025	0.013	< 0.001	0.05	< 0.001	< 0.001	< 0.05	472	0.0012	< 0.001	< 0.001	0.004	0.06	< 0.00002	6.1	0.019	399	0.003	< 0.0005	12.9	0.061	0.002	< 0.15	< 0.001	0.002	1.55	< 0.0001	0.043	< 0.001	1.25	< 0.01
V15	MEAN	0.00025	0.0683	0.0012	0.053	0.001	0.001	0.05	372	0.00095	0.001	0.001	0.0024	0.281	0.00002	5.2	0.017	305	0.00463	0.00090	12.9	0.054	0.0015	0.15	0.001	0.0024	1.33	0.0001	0.0396	0.0011	1.08	0.01
V15	MINIMUM	< 0.00025	< 0.005	< 0.001	0.043	< 0.001	< 0.001	< 0.05	200	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	< 0.00002	3.8	0.012	182	< 0.001	< 0.0005	7.77	0.017	< 0.001	< 0.15	< 0.001	< 0.001	0.84	< 0.0001	0.018	< 0.001	0.27	< 0.01
V15	MAXIMUM	< 0.00025	0.54	0.002	0.065	< 0.001	< 0.001	< 0.05	472	0.0013	< 0.001	< 0.001	0.004	1.86	< 0.00002	6.2	0.022	399	0.018	0.0013	17.9	0.075	0.004	< 0.15	< 0.001	0.005	1.74	< 0.0001	0.057	0.003	1.79	< 0.01
V15	N > DL	0	20	10	24	0	0	0	24	23	0	2	24	19	0	24	24	24	20	22	24	24	8	0	0	22	24	1	24	2	24	0
V15	Median	0.00025	0.0135	0.001	0.053	0.001	0.001	0.05	372.5	0.0011	0.001	0.001	0.002	0.095	0.00002	5.3	0.018	311	0.002	0.0009	12.7	0.056	0.001	0.15	0.001	0.002	1.355	0.0001	0.041	0.001	1.065	0.01
V16	01-Jun-08	< 0.00025	0.11	0.002	0.055	< 0.001	< 0.001	< 0.05	342	< 0.0002	< 0.001	< 0.001	0.003	0.2	< 0.00002	6.4	0.009	391	0.042	0.0005	12.1	0.004	0.006	< 0.15	< 0.001	0.003	1.35	< 0.0001	0.022	< 0.001	0.02	< 0.01
V16	29-Sep-08	< 0.00025	0.049	0.001	0.058	< 0.001	< 0.001	< 0.05	377	< 0.0002	< 0.001	< 0.001	0.003	0.08	< 0.00002	6.6	0.011	444	0.026	0.0005	19.7	0.004	0.004	< 0.15	< 0.001	0.004	1.22	< 0.0001	0.049	< 0.001	0.01	< 0.01
V17A	01-Jun-08	< 0.00025	0.13	0.001	0.018	< 0.001	< 0.001	< 0.05	11	< 0.0002	< 0.001	< 0.001	0.001	0.19	< 0.00002	0.4	< 0.001	3.02	0.021	< 0.0005	1.27	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.045	< 0.0001	0.0008	< 0.001	0.029	< 0.01
V17A	29-Sep-08	< 0.00025	0.042	0.001	0.021	< 0.001	< 0.001	< 0.05	24.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.13	< 0.00002	0.4	0.001	9.37	0.021	< 0.0005	1.85	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.11	< 0.0001	0.0013	< 0.001	0.1	< 0.01
V19	01-Jun-08	< 0.00025	0.015	< 0.001	0.03	< 0.001	< 0.001	< 0.05	12.5	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	0.4	0.001	4.51	< 0.001	< 0.0005	1.47	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.062	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
V19	29-Sep-08	< 0.00025	0.015	< 0.001	0.054	< 0.001	< 0.001	< 0.05	27.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.5	0.001	9.62	< 0.001	< 0.0005	2.29	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.14	< 0.0001	< 0.0005	< 0.001	0.013	< 0.01
V20	01-Jun-08	< 0.00025	0.039	< 0.001	0.028	< 0.001	< 0.001	< 0.05	15.1	< 0.0002	< 0.001	< 0.001	0.002	0.05	< 0.00002	0.4	0.001	4.77	0.006	< 0.0005	1.48	0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.072	< 0.0001	< 0.0005	< 0.001	0.007	< 0.01
V20	29-Sep-08	< 0.00025	0.022	< 0.001	0.042	< 0.001	< 0.001	< 0.05	29.1	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	0.5	0.002	8.76	0.003	< 0.0005	2.18	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.15	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
V22	10-Mar-08	< 0.00025	1.29	0.002	0.023	< 0.001	< 0.001	< 0.05	157	0.114	0.45	< 0.001	0.48	12.6	< 0.00002	2.4	0.036	72.7	29.7	0.0021	4.67	0.41	0.26	< 0.15	< 0.001	0.002	0.86	0.0018	0.0032	< 0.001	108	< 0.01
V22	10-Jun-08	0.0016	2.27	0.003	0.044	< 0.001	< 0.001	< 0.05	122	0.116	0.42	0.001	1.11	19	< 0.00002	1.9	0.029	64.5	26.1	0.0025	2.92	0.36	0.32	< 0.15	< 0.001	0.002	0.64	0.0011	0.0045	< 0.001	106	< 0.01
V22	02-Sep-08	< 0.00025	1.74	0.004	0.02	< 0.001	< 0.001	< 0.05	227	0.137	0.64	0.001	0.71	31.2	< 0.00002	3	0.047	102	45.1	0.0029	4.53	0.55	0.18	< 0.15	< 0.001	< 0.001	1.13	0.002	0.0034	< 0.001	153	< 0.01
V22	02-Dec-08	< 0.00025	0.036	< 0.001	0.061	< 0.001	< 0.001	< 0.05	109	0.026	0.12	< 0.001	0.038	0.77	< 0.00002	2.4	0.02	34.7	9.04	0.0005	5.14	0.16	0.015	< 0.15	0.001	< 0.001	0.51	0.0012	0.0009	< 0.001	27.2	< 0.01
V22	MEAN	0.00052	1.33	0.003	0.037	0.001	0.001	0.05	154	0.098	0.408	0.001	0.585	15.9	0.00002	2.4	0.033	68.5	27.5	0.002	4.32	0.37	0.19	0.15	0.001	0.002	0.785	0.0015	0.003	0.001	98.6	0.01
V22	MINIMUM	< 0.00025	0.036	0.002	0.02	< 0.001	< 0.001	< 0.05	109	0.026	0.12	0.001	0.038	0.77	< 0.00002	1.9	0.02	34.7	9.04	0.0005	2.92	0.16	0.015	< 0.15	0.001	0.002	0.51	0.0011	0.0009	< 0.001	27.2	< 0.01
V22	MAXIMUM	0.0016	2.27	0.004	0.061	< 0.001	< 0.001	< 0.05	227	0.137	0.64	0.001	1.11	31.2	< 0.00002	3	0.047	102	45.1	0.0029	5.14	0.55	0.32	< 0.15	0.001	0.002	1.13	0.002	0.0045	< 0.001	153	< 0.01
V22	N > DL	1	4	3	4	0	0	0	4	4	4	2	4	4	0	4	4	4	4	4	4	4	4	0	1	2	4	4	4	0	4	0
V22	Median	0.00025	1.52	0.003	0.0335	0.001	0.001	0.05	139.5	0.115	0.435	0.001	0.595	15.8	0.00002	2.4	0.0325	68.6	27.9	0.0023	4.6	0.385	0.22	0.15	0.001	0.002	0.75	0.0015	0.0033	0.001	107	0.01
V23	10-Mar-08	< 0.00025	0.031	0.001	0.051	< 0.001	< 0.001	< 0.05	120	0.0019	0.006	< 0.001	0.003	0.06	< 0.00002	3.6	0.026	72.8	0.15	0.0029	12.1	0.17	0.002	< 0.15	0.004	0.002	0.81	0.001	0.0088	< 0.001	5.86	< 0.01
V23	10-Jun-08	< 0.00025	0.038	< 0.001	0.037	< 0.001	< 0.001	< 0.05	92.1	0.0019	0.003	< 0.001	0.002	0.14	< 0.00002	2.6	0.02	59.6	0.061	0.0019	8.63	0.14	0.002	< 0.15	0.003	0.001	0.64	0.0006	0.0071	< 0.001	5.81	< 0.01
V23	02-Sep-08	< 0.00025	0.04	< 0.001	0.068	< 0.001	< 0.001	< 0.05	117	0.0018	0.005	< 0.001	0.003	0.12	< 0.00002	3.2	0.024	67.6	0.16	0.0024	9.66	0.16	0.002	< 0.15	0.004	0.001	0.81	0.0004	0.0092	< 0.001	6.26	< 0.01
V23	02-Dec-08	< 0.00025	0.019	< 0.001	0.093	< 0.001	< 0.001	< 0.05	147	0.0012	0.007	< 0.001	0.002	0.18	< 0.00002	3.9	0.026	88.1	0.3	0.0031	13.8	0.19	< 0.001	< 0.15	0.004	< 0.001	0.9	0.0004	0.011	< 0.001	7.36	< 0.01
V23	MEAN	0.00025	0.032	0.001	0.062	0.001	0.001	0.05	119	0.0017	0.0053	0.001	0.0025	0.125	0.00002	3.3	0.024	72.0	0.168	0.0026	11.0	0.165	0.002	0.15	0.0038	0.0013	0.79	0.0006	0.0090	0.001	6.32	0.01
V23	MINIMUM	< 0.00025	0.019	0.001	0.037	< 0.001	< 0.001	< 0.05	92.1	0.0012	0.003	< 0.001	0.002	0.06	< 0.00002	2.6	0.02	59.6	0.061	0.0019	8.63	0.14	0.002	< 0.15	0.003	<0.001	0.64	0.0004	0.0071	< 0.001	5.81	< 0.01
V23	MAXIMUM	< 0.00025	0.04	0.001	0.093	< 0.001	< 0.001	< 0.05	147	0.0019	0.007	< 0.001	0.003	0.18	< 0.00002	3.9	0.026	88.1	0.3	0.0031	13.8	0.19	0.002	< 0.15	0.004	0.002	0.9	0.001	0.011	< 0.001	7.36	< 0.01
V23	N > DL	0	4	1	4	0	0	0	4	4	4	0	4	4	0	4	4	4	4	4	4	4	3	0	4	3	4	4	4	0	4	0
V23	Median	0.00025	0.0345	0.001	0.0595	0.001	0.001	0.05	118.5	0.00185	0.0055	0.001	0.0025	0.13	0.00002	3.4	0.025	70.2	0.155	0.0027	10.88	0.165	0.002	0.15	0.004	0.001	0.81	0.0005	0.009	0.001	6.06	0.01
V25BSP	07-Jan-08	< 0.00025	< 0.005	< 0.001	0.023	< 0.001	< 0.001	< 0.05	80.2	< 0.0002	< 0.001	< 0.001	0.002	0.06	< 0.00002	1.2	0.002	15.4	0.006	< 0.0005	4.5	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.3	< 0.0001	0.0017	< 0.001	0.05	< 0.01
V25BSP	14-May-08	< 0.00025	0.47	< 0.001	0.029	< 0.001	< 0.001	< 0.05	38.5	0.0002	0.003	< 0.001	0.007	0.58	< 0.00002	1.6	0.003	9.34	0.044	0.0005	2.22	0.002	0.003	< 0.15	< 0.001	< 0.001	0.13	< 0.0001	0.0014	< 0.001	0.095	< 0.01
V25BSP	10-Jun-08	< 0.00025	0.074	< 0.001	0.061	< 0.001	< 0.001	< 0.05	192	0.0034	0.002	< 0.001	0.003	0.18	< 0.00002	1.8	0.02	40.7	3.48	< 0.0005	3.46	0.003	0.001	< 0.15	< 0.001	< 0.001	0.7	0.0003	< 0.0005	< 0.001	0.16	< 0.01
V25BSP	16-Jun-08	< 0.00025	0.04	< 0.001	0.044	< 0.001	< 0.001	< 0.05	220	0.0027	0.002	< 0.001	0.003	< 0.05	< 0.00002	1.8	0.019	46	3.47	0.0007	3.31	0.002	< 0.001	< 0.15	< 0.001	0.001	0.8	0.0005	< 0.0005	< 0.001	0.16	< 0.01
V25BSP	17-Jun-08	< 0.00025	0.025	< 0.001	0.042	< 0.001	< 0.001	< 0.05	218	0.0028	0.002	< 0.001	0.002	0.06	< 0.00002	1.7	0.019	42.7	3.46	0.0005	3.14	0.002	< 0.001	< 0.15	< 0.001	0.002	0.81	0.0005	< 0.0005	< 0.001	0.13	< 0.01
V25BSP	24-Jun-08	< 0.00025	0.22	< 0.001	0.041	< 0.001	< 0.001	< 0.05	203	0.0018	0.002	< 0.001	0.003	0.35	< 0.00002	1.7	0.017	42.9	2.09	< 0.0005	3.24	0.002	0.003	< 0.15	< 0.001	< 0.001	0.76	0.0006	< 0.0005	< 0.001	0.14	< 0.01
V25BSP	01-Jul-08	< 0.00025	0.046	< 0.001	0.032	< 0.001	< 0.001	< 0.05	151	0.001	0.001	< 0.001	0.003	0.25	< 0.00002	1.4	0.015	30.8	1.09	< 0.0005	2.89	0.003	< 0.001	< 0.15	< 0.001	0.001	0.59	0.0003	< 0.0005	< 0.001	0.06	< 0.01
V25BSP	08-Jul-08	< 0.00025	0.02	< 0.001	0.043	< 0.001	< 0.001	< 0.05	218	0.0012	0.001	< 0.001	0.002	< 0.05	< 0.00002	1.8	0.022	39.9	0.88	< 0.0005	3.13	0.002	< 0.001	< 0.15	< 0.001	< 0.001	0.84	0.0005	< 0.0005	< 0.001	0.053	< 0.01
V25BSP	14-Jul-08	< 0.00025	0.087	< 0.001	0.036	< 0.001	< 0.001	< 0.05	214	0.0006	0.001	< 0.001	0.003	0.89	< 0.00002	1.7	0.026	40	0.27	< 0.0005	3.05	0.001	0.001	< 0.15	< 0.001	< 0.001	0.72	0.0005	< 0.0005	< 0.001	0.053	< 0.01
V25BSP	16-Jul-08	< 0.00025	0.42	0.001	0.04	< 0.001	< 0.001	< 0.05	198	0.0008	0.002	< 0.001	0.01	1.09	< 0.00002	1.7	0.027	33.2	0.21	< 0.0005	2.81	0.003	0.004	< 0.15	< 0.001	< 0.001	0.6	0.0005	< 0.0005	< 0.001	0.15	< 0.01
V25BSP	22-Jul-08	< 0.00025	0.092	< 0.001	0.037	< 0.001	< 0.001	< 0.05	239	0.0016	0.001	< 0.001	0.007	0.15	< 0.00002	1.8	0.024	47.4	1.74	< 0.0005	3.7	0.002	0.001	< 0.15	< 0.001	0.001	0.81	0.0006	< 0.0005	< 0.001	0.087	< 0.01
V25BSP	05-Aug-08	< 0.00025	0.022	0.001	0.039	< 0.001	< 0.001	< 0.05	323	0.002	0.002	< 0.001	0.002	0.07	< 0.00002	2.1	0.029	45.7	1.2	< 0.0005	4.08	0.002	< 0.001	< 0.15	< 0.001	0.002	1.07	0.0007	< 0.0005	< 0.001	0.19	< 0.01
V25BSP	11-Aug-08	< 0.00025	0.018	< 0.001	0.037	< 0.001	< 0.001	< 0.05	363	0.0004	< 0.001	< 0.001	0.002	0.21	< 0.00002	2.3	0.028	40.6	0.19	< 0.0005	4.13	0.002	< 0.001	< 0.15	< 0.001	0.002	1.2	0.0006	< 0.0005	< 0.001	0.063	< 0.01
V25BSP	12-Aug-08	< 0.00025	0.036	< 0.001	0.041	< 0.001	< 0.001	< 0.05	345	0.0005	0.001	< 0.001	0.002	0.92	< 0.00002	2.2	0.04	41.6	0.22	< 0.0005	4.2	0.001	< 0.001	< 0.15	< 0.001	0.003	1.22	0.0007	< 0.0005	< 0.001	0.063	< 0.01

Appendix 6
2008 Surface Water Quality Data
Vangorda Creek Drainage

Table 2. Surface Water Total Metals Parameters

Station	Date	AG-T mg/L	AL-T mg/L	AS-T mg/L	BA-T mg/L	BE-T mg/L	BI-T mg/L	B-T mg/L	CA-T mg/L	CD-T mg/L	CO-T mg/L	CR-T mg/L	CU-T mg/L	FE-T mg/L	HG-T mg/L	K-T mg/L	LI-T mg/L	MG-T mg/L	MN-T mg/L	MO-T mg/L	NA-T mg/L	NI-T mg/L	PB-T mg/L	P-T mg/L	SB-T mg/L	SE-T mg/L	SR-T mg/L	TL-T mg/L	U-T mg/L	V-T mg/L	ZN-T mg/L	ZR-T mg/L
V25BSP	19-Aug-08	< 0.00025	0.028	< 0.001	0.038	< 0.001	< 0.001	< 0.05	354	0.0004	0.001	< 0.001	0.002	0.76	< 0.00002	2.5	0.033	37.8	0.09	< 0.0005	4.78	< 0.001	< 0.001	< 0.15	< 0.001	0.002	1.42	0.0006	< 0.0005	< 0.001	0.044	< 0.01
V25BSP	15-Sep-08	< 0.00025	0.048	< 0.001	0.028	< 0.001	< 0.001	< 0.05	95.7	< 0.0002	0.003	< 0.001	0.004	0.09	< 0.00002	1.2	0.006	15.5	0.046	< 0.0005	3.63	0.001	0.001	< 0.15	< 0.001	< 0.001	0.41	0.0003	0.0013	< 0.001	0.034	< 0.01
V25BSP	15-Oct-08	< 0.00025	0.033	< 0.001	0.027	< 0.001	< 0.001	< 0.05	78.1	0.0003	0.003	< 0.001	0.004	< 0.05	< 0.00002	1.2	0.003	14.9	0.055	0.0008	4.33	0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.29	0.0001	0.0013	< 0.001	0.043	< 0.01
V25BSP	03-Nov-08	< 0.00025	0.04	< 0.001	0.031	< 0.001	< 0.001	< 0.05	104	0.0003	0.005	< 0.001	0.006	< 0.05	< 0.00002	1.4	0.004	20	0.046	0.0005	5.6	0.002	< 0.001	< 0.15	< 0.001	< 0.001	0.37	< 0.0001	0.0019	< 0.001	0.057	< 0.01
V25BSP	02-Dec-08	< 0.00025	0.029	< 0.001	0.026	< 0.001	< 0.001	< 0.05	113	< 0.0002	0.003	< 0.001	0.004	0.13	< 0.00002	1.4	0.005	24.4	0.026	0.0006	6.86	0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.41	< 0.0001	0.0025	< 0.001	0.075	< 0.01
V25BSP	MEAN	0.00025	0.092	0.001	0.037	0.001	0.001	0.05	197.24	0.0011	0.0019	0.001	0.00374	0.315	0.00002	1.71	0.018	33.1	0.98	0.00053	3.85	0.0018	0.0014	0.15	0.001	0.0013	0.708	0.00041	0.00087	0.001	0.090	0.01
V25BSP	MINIMUM	< 0.00025	< 0.005	< 0.001	0.023	< 0.001	< 0.001	< 0.05	38.5	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	< 0.00002	1.2	0.002	9.34	0.006	< 0.0005	2.22	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.13	< 0.0001	< 0.0005	< 0.001	0.034	< 0.01
V25BSP	MAXIMUM	< 0.00025	0.47	< 0.001	0.061	< 0.001	< 0.001	< 0.05	363	0.0034	0.005	< 0.001	0.01	1.09	< 0.00002	2.5	0.04	47.4	3.48	0.0008	6.86	0.003	0.004	< 0.15	< 0.001	0.003	1.42	0.0007	0.0025	< 0.001	0.19	< 0.01
V25BSP	N > DL	0	18	2	19	0	0	0	19	16	17	0	19	15	0	19	19	19	19	6	19	17	7	0	0	8	19	15	6	0	19	0
V25BSP	Median	0.00025	0.04	0.001	0.037	0.001	0.001	0.05	203	0.0006	0.002	0.001	0.003	0.15	0.00002	1.7	0.019	39.9	0.22	0.0005	3.63	0.002	0.001	0.15	0.001	0.001	0.72	0.0005	0.0005	0.001	0.063	0.01
V27	23-Jan-08	< 0.000005	0.005	0.00048	0.0613	< 0.00001	< 0.000005	< 0.005	59.8	0.000047	0.00002	< 0.0001	0.00052	0.012		0.78	0.0024	22.3	0.0019	0.00073	3.26	0.00058	0.000212	< 0.005	0.00011	0.00041	0.229	0.000006	0.00528	< 0.0002	0.0254	< 0.0001
V27	20-Feb-08	< 0.000005	0.0053	0.00048	0.0581	< 0.00001	< 0.000005	< 0.005	63.6	0.000047	0.000022	< 0.0001	0.00047	0.012		0.84	0.0024	23.2	0.00214	0.00075	3.64	0.00063	0.000166	< 0.005	0.0001	0.00042	0.23	0.000006	0.00523	< 0.0002	0.0284	< 0.0001
V27	13-Mar-08	< 0.000005	0.0035	0.00051	0.0594	< 0.00001	< 0.000005	< 0.005	70.2	0.000059	0.00002	0.0001	0.00047	0.007		0.9	0.0026	27	0.00134	0.00077	3.96	0.00064	0.00012	< 0.005	0.0001	0.00033	0.241	0.000008	0.0059	< 0.0002	0.0313	< 0.0001
V27	28-Apr-08	< 0.000005	0.0113	0.0006	0.0623	< 0.00001	< 0.000005	< 0.005	76.2	0.000073	0.000044	< 0.0001	0.00077	0.031		1.02	0.0027	27.1	0.00407	0.00059	3.37	0.00085	0.000655	< 0.005	0.00013	0.00043	0.272	0.000009	0.00532	< 0.0002	0.0362	< 0.0001
V27	21-May-08	0.000019	0.427	0.00349	0.0506	0.00006	0.000013	< 0.005	23.3	0.000406	0.00293	0.0007	0.00759	1.33		1.47	0.0017	7.89	0.279	0.00028	1.6	0.00359	0.0244	0.017	0.00012	0.00021	0.0871	0.000044	0.00163	0.0006	0.138	0.0005
V27	19-Jun-08	< 0.00025	0.059	< 0.001	0.022	< 0.001	< 0.001	< 0.05	35.6	0.0003	< 0.001	< 0.001	0.002	0.12	< 0.00002	0.6	0.003	7.76	0.21	< 0.0005	1.38	< 0.001	0.001	< 0.15	< 0.001	< 0.001	0.13	< 0.0001	0.0008	< 0.001	0.046	< 0.01
V27	24-Jun-08	0.000014	0.148	0.00067	0.0254	0.00003	< 0.000005	< 0.005	21.6	0.000182	0.000331	0.0003	0.00166	0.258		0.44	0.0023	5.34	0.123	0.00014	1.1	0.0011	0.00476	0.016	0.00006	0.00004	0.086	0.000035	0.000819	< 0.0002	0.038	0.0002
V27	29-Jul-08	< 0.000005	0.0287	0.00029	0.0458	< 0.00001	< 0.000005	< 0.005	82	0.000439	0.000397	< 0.0001	0.00165	0.051		0.81	0.007	19	0.317	0.0003	3.14	0	0.00052	< 0.005	0.00006	0.00026	0.298	0.000109	0.00184	< 0.0002	0.0707	< 0.0001
V27	19-Aug-08	< 0.00025	0.027	< 0.001	0.045	< 0.001	< 0.001	< 0.05	95.3	< 0.0002	< 0.001	< 0.001	0.002	0.18	< 0.00002	1.1	0.007	20.5	0.013	< 0.0005	2.97	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.37	< 0.0001	0.002	< 0.001	0.053	< 0.01
V27	23-Sep-08	< 0.00025	0.02	< 0.001	0.031	< 0.001	< 0.001	< 0.05	29.3	< 0.0002	< 0.001	< 0.001	0.001	0.06	< 0.00002	0.5	0.001	10.4	0.007	< 0.0005	2.06	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.14	< 0.0001	0.0024	< 0.001	0.032	< 0.01
V27	07-Oct-08	< 0.00005	0.015	< 0.00002	0.0255	< 0.00001	< 0.000005	< 0.005	13.4	< 0.000005	< 0.000005	< 0.0001	< 0.00005	< 0.001		< 0.05	< 0.0005	0.4	< 0.00005	0.001	2.15	0.3	< 0.000005	< 0.005	< 0.00002	< 0.00004	0.119	0.0004	0.119	< 0.0002	< 0.0001	0.00134
V27	10-Dec-08	< 0.000005	0.0161	0.00045	0.0592	< 0.00001	< 0.000005	< 0.05	76.5	0.000068	0.000022	0.0002	0.00109	0.014		0.94	0.0028	32.7	0.00123	0.00071	3.49	0.00092	0.000191		0.00011	0.00062	0.272	0.00001	0.00692	< 0.0002	0.0384	< 0.0001
V27	MEAN	0.00005	0.064	0.00083	0.0455	0.000263	0.000254	0.02	53.9	0.000169	0.000566	0.0004	0.00161	0.173	0.00002	0.788	0.00295	17.0	0.0800	0.00056	3	0.0259	0.00284	0.047	0.00032	0.00048	0.20	0.000077	0.00318	0.00043	0.0489	0.0027
V27	MINIMUM	< 0.000005	0.0035	< 0.00002	0.022	< 0.00001	< 0.000005	< 0.005	13.4	< 0.000005	< 0.000005	< 0.0001	< 0.00005	< 0.001	< 0.00002	< 0.05	< 0.0005	0.4	< 0.00005	0.00014	1.1	0	< 0.000005	< 0.005	< 0.00002	< 0.00004	0.086	0.000006	< 0.000002	< 0.0002	<0.0001	< 0.0001
V27	MAXIMUM	0.00012	0.427	0.00349	0.0623	< 0.001	< 0.001	< 0.05	95.3	0.000439	0.00293	< 0.001	0.00759	1.33	< 0.00002	1.47	0.007	32.7	0.317	0.001	3.96	0.3	0.0244	< 0.15	< 0.001	< 0.001	0.37	0.0004	0.00692	< 0.001	0.138	< 0.01
V27	N > DL	3	12	8	12	2	1	0	12	9	8	4	11	11	0	11	11	12	11	9	12	9	9	2	8	8	11	9	11	1	11	3
V27	Median	0.0000095	0.0181	0.00056	0.0482	0.00001	0.000005	0.005	61.7	0.00013	0.000188	0.00015	0.00105	0.041	0.00002	0.825	0.0025	19.75	0.00554	0.000545	3.2	0.00096	0.00059	0.005	0.00011	0.00042	0.2295	0.000040	0.0022	0.0002	0.0341	0.00015
VGMAIN	07-Jan-08	< 0.00025	0.012	< 0.001	0.067	< 0.001	< 0.001	< 0.05	71.9	< 0.0002	< 0.001	< 0.001	< 0.001	0.09	< 0.00002	1.1	0.003	28.7	0.005	0.0007	3.83	0.002	< 0.001	< 0.15	< 0.001	< 0.001	0.31	< 0.0001	0.0065	< 0.001	0.018	< 0.01
VGMAIN	18-Feb-08	< 0.00025	0.007	< 0.001	0.074	< 0.001	< 0.001	< 0.05	71.4	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	0.9	0.003	28.6	0.007	0.0009	4	0.002	< 0.001	< 0.15	< 0.001	< 0.001	0.31	< 0.0001	0.0051	0.002	0.019	< 0.01
VGMAIN	17-Mar-08	< 0.00025	0.006	< 0.001	0.079	< 0.001	< 0.001	< 0.05	78	< 0.0002	< 0.001	< 0.001	0.001	0.07	< 0.00002	1.2	0.003	37	0.004	0.0008	4.99	0.002	< 0.001	< 0.15	< 0.001	0.001	0.31	< 0.0001	0.0084	< 0.001	0.02	< 0.01
VGMAIN	14-Apr-08	< 0.00025	< 0.005	< 0.001	0.077	< 0.001	< 0.001	< 0.05	79.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.08	< 0.00002	1.2	0.004	35.7	0.004	0.0009	4.76	0.002	< 0.001	< 0.15	< 0.001	0.001	0.33	< 0.0001	0.0087	< 0.001	0.018	< 0.01
VGMAIN	14-May-08	< 0.00025	0.043	< 0.001	0.048	< 0.001	< 0.001	< 0.05	47.4	< 0.0002	< 0.001	< 0.001	0.003	0.15	< 0.00002	1.4	0.002	18.8	0.021	0.0006	2.22	0.002	< 0.001	< 0.15	< 0.001	< 0.001	0.17	< 0.0001	0.0036	< 0.001	0.023	< 0.01
VGMAIN	16-Jun-08	< 0.00025	0.042	< 0.001	0.033	< 0.001	< 0.001	< 0.05	38.2	0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	0.7	0.002	11.6	0.14	< 0.0005	1.64	0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.14	< 0.0001	0.0013	< 0.001	0.041	< 0.01
VGMAIN	14-Jul-08	< 0.00025	0.05	< 0.001	0.039	< 0.001	< 0.001	< 0.05	48.2	< 0.0002	< 0.001	< 0.001	0.002	0.26	< 0.00002	0.7	0.005	13.3	0.014	< 0.0005	1.89	0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.18	< 0.0001	0.0019	< 0.001	0.024	< 0.01
VGMAIN	11-Aug-08	< 0.00025	0.016	< 0.001	0.056	< 0.001	< 0.001	< 0.05	79.9	< 0.0002	< 0.001	< 0.001	0.001	0.05	< 0.00002	0.9	0.004	21.6	0.006	< 0.0005	2.67	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.28	< 0.0001	0.003	< 0.001	0.023	< 0.01
VGMAIN	15-Sep-08	< 0.00025	0.016	< 0.001	0.037	< 0.001	< 0.001	< 0.05	35.5	< 0.0002	< 0.001	< 0.001	0.001	0.09	< 0.00002	0.6	0.002	12.9	0.006	< 0.0005	2.09	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.17	< 0.0001	0.0032	< 0.001	0.017	< 0.01
VGMAIN	15-Oct-08	< 0.00025	0.013	< 0.001	0.044	< 0.001	< 0.001	< 0.05	50.6	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	0.8	0.003	17.9	0.005	0.0007	2.45	0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.2	< 0.0001	0.0039	< 0.001	0.02	< 0.01
VGMAIN	03-Nov-08	< 0.00025	0.022	< 0.001	0.058	< 0.001	< 0.001	< 0.05	64.8	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	1	0.002	26.1	0.004	0.0008	3.18	0.001	< 0.001	< 0.15	< 0.001	0.001	0.26	< 0.0001	0.0056	< 0.001	0.029	< 0.01
VGMAIN	01-Dec-08	< 0.00025	0.017	< 0.001	0.068	< 0.001	< 0.001	< 0.05	85.4	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	1.2	0.004	37.3	0.008	0.0008	4.17	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.34	< 0.0001	0.0073	< 0.001	< 0.005	< 0.01
VGMAIN	MEAN	0.00025	0.0208	0.001	0.057	0.001	0.001	0.05	62.6	0.0002	0.001	0.001	0.00125	0.087	0.00002	0.98	0.0031	24.1	0.0187	0.00068	3.16	0.0014	0.001	0.15	0.001	0.001	0.25	0.0001	0.0049	0.0011	0.0214	0.01
VGMAIN	MINIMUM	< 0.00025	< 0.005	< 0.001	0.033	< 0.001	< 0.001	< 0.05	35.5	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.6	0.002	11.6	0.004	< 0.0005	1.64	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.14	< 0.0001	0.0013	< 0.001	< 0.005	< 0.01
VGMAIN	MAXIMUM	< 0.00025	0.05	< 0.001	0.079	< 0.001	< 0.001	< 0.05	85.4	< 0.0002	< 0.001	< 0.001	0.003	0.26	< 0.00002	1.4	0.005	37.3	0.14	0.0009	4.99	0.002	< 0.001	< 0.15	< 0.001	< 0.001	0.34	< 0.0001	0.0087	0.002	0.041	< 0.01
VGMAIN	N > DL	0	11	0	12	0	0	0	12	1	0	0	10	7	0	12	12	12	12	8	12	9	0	0	0	3	12	0	12	1	11	0
VGMAIN	Median	0.00025	0.016	0.001	0.057	0.001	0.001	0.05	68.1	0.0002	0.001	0.001	0.001	0.06	0.00002	0.95	0.003	23.9	0.006	0.0007	2.925	0.001	0.001	0.15	0.001	0.001	0.27	0.0001	0.0045	0.001	0.02	0.01

Note:
Statistics only generated where there are more than 2 values in a data set

average	*average of values, including values less than detection limit as set to DL value if it is the DL value will be shown without the < symbol*
minimum	*lowest value and will be least DL value if these are present in the data set*
maximum	*highest vale*
N > DL	*number of values measured that are above detection limits*
median	*the median value of the data set - if it is a DL value will be shown without the < symbol*

NOTE:
Detection Limit values used as the DL value in statistics contrasts with conversion to 0 for charts

Appendix 6
2008 Surface Water Quality Data
Vangorda Creek Drainage

Table 3. Surface Water Dissolved Metals

Station	Date	AG-D mg/L	AL-D mg/L	AS-D mg/L	BA-D mg/L	B-D mg/L	BE-D mg/L	BI-D mg/L	CA-D mg/L	CD-D mg/L	CO-D mg/L	CR-D mg/L	CU-D mg/L	FE-D mg/L	K-D mg/L	LI-D mg/L	MG-D mg/L	MN-D mg/L	MO-D mg/L	NA-D mg/L	NI-D mg/L	PB-D mg/L	P-D mg/L	SB-D mg/L	SE-D mg/L	SI-D mg/L	SN-D mg/L	SR-D mg/L	TI-D mg/L	TL-D mg/L	U-D mg/L	V-D mg/L	ZN-D mg/L	ZR-D mg/L
LCD	01-Jun-08	0.0003	0.016	< 0.001	0.028	< 0.05	< 0.001	< 0.001	111	0.082	0.35	< 0.001	0.002	0.2	2.2	0.012	155	46.6	0.0056	2.79	0.33	< 0.001	< 0.15	< 0.001	0.001	3.3	< 0.001	0.4	< 0.001	0.0001	< 0.0005	< 0.001	128	< 0.01
LCD	29-Sep-08	0.0009	2.72	0.001	0.025	< 0.05	< 0.001	< 0.001	181	0.267	1.23	< 0.001	0.057	72.2	2.8	0.036	329	162	0.012	4.99	0.92	0.006	< 0.15	< 0.001	0.005	5.8	< 0.001	0.73	< 0.001	0.0004	0.012	< 0.001	396	< 0.01
MOOSESP	06-May-08	< 0.00025	< 0.005	0.001	0.032	< 0.05	< 0.001	< 0.001	160	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1.8	0.003	83.8	< 0.001	0.0017	6.29	< 0.001	< 0.001	< 0.15	< 0.001	0.001	4.2	< 0.001	0.49	< 0.001	< 0.0001	0.013	< 0.001	< 0.005	< 0.01
MOOSESP	14-May-08	< 0.00025	< 0.005	0.001	0.039	< 0.05	< 0.001	< 0.001	185	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	2.1	0.004	84.9	0.002	0.0015	6.14	< 0.001	< 0.001	< 0.15	< 0.001	0.001	4.2	< 0.001	0.58	< 0.001	< 0.0001	0.014	< 0.001	< 0.005	< 0.01
MOOSESP	04-Jun-08	< 0.00025	< 0.005	< 0.001	0.034	< 0.05	< 0.001	< 0.001	148	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1.7	0.003	77.8	< 0.001	0.002	6.04	< 0.001	< 0.001	< 0.15	< 0.001	0.002	3.5	< 0.001	0.47	< 0.001	< 0.0001	0.012	< 0.001	< 0.005	< 0.01
MOOSESP	17-Jun-08	< 0.00025	0.009	0.002	0.054	< 0.05	< 0.001	< 0.001	191	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	2.3	0.006	123	0.003	0.0023	8.03	< 0.001	< 0.001	< 0.15	< 0.001	0.003	5	< 0.001	0.75	< 0.001	< 0.0001	0.018	< 0.001	0.026	< 0.01
MOOSESP	03-Jul-08	< 0.00025	0.006	0.002	0.058	< 0.05	< 0.001	0.002	230	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	2.7	0.006	124	0.001	0.0078	7.64	< 0.001	< 0.001	< 0.15	< 0.001	0.002	5.3	< 0.001	0.84	< 0.001	< 0.0001	0.026	< 0.001	0.01	< 0.01
MOOSESP	15-Jul-08	< 0.00025	0.011	0.001	0.048	< 0.05	< 0.001	< 0.001	241	< 0.0002	< 0.001	< 0.001	0.002	0.75	2.2	0.006	127	< 0.001	0.0018	7.15	0.002	< 0.001	< 0.15	< 0.001	0.001	5	< 0.001	0.62	< 0.001	< 0.0001	0.019	< 0.001	0.012	< 0.01
MOOSESP	04-Aug-08	< 0.00025	< 0.005	0.002	0.054	< 0.05	< 0.001	< 0.001	223	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	2.5	0.005	130	0.005	0.0018	7.64	< 0.001	< 0.001	< 0.15	< 0.001	0.003	5	< 0.001	0.69	< 0.001	< 0.0001	0.019	< 0.001	< 0.005	< 0.01
MOOSESP	12-Aug-08	< 0.00025	0.006	0.001	0.052	< 0.05	< 0.001	< 0.001	253	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	2.7	0.004	144	0.003	0.0019	8.51	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.9	< 0.001	0.7	< 0.001	< 0.0001	0.02	< 0.001	< 0.005	< 0.01
MOOSESP	09-Sep-08	< 0.00025	0.034	< 0.001	0.057	< 0.05	< 0.001	< 0.001	210	< 0.0002	< 0.001	< 0.001	0.001	0.22	2.4	0.005	159	0.001	0.0018	9.77	0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.1	< 0.001	0.65	< 0.001	< 0.0001	0.021	< 0.001	< 0.005	< 0.01
MOOSESP	15-Sep-08	< 0.00025	< 0.005	0.001	0.059	< 0.05	< 0.001	< 0.001	227	< 0.0002	< 0.001	< 0.001	0.001	0.06	2.8	0.005	137	0.001	0.0021	7.61	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.1	< 0.001	0.73	< 0.001	< 0.0001	0.032	< 0.001	0.005	< 0.01
MOOSESP	01-Oct-08	< 0.00025	0.01	0.001	0.054	< 0.05	< 0.001	< 0.001	236	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	2.8	0.006	151	< 0.001	0.002	8.22	< 0.001	< 0.001	< 0.15	< 0.001	0.001	5.6	< 0.001	0.76	< 0.001	< 0.0001	0.024	< 0.001	0.005	< 0.01
MOOSESP	15-Oct-08	< 0.00025	0.016	0.001	0.048	< 0.05	< 0.001	< 0.001	226	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	2.5	0.005	125	0.001	0.0018	6.49	0.001	< 0.001	< 0.15	< 0.001	0.002	5	< 0.001	0.75	< 0.001	< 0.0001	0.022	< 0.001	0.009	< 0.01
MOOSESP	03-Nov-08	< 0.00025	0.012	0.001	0.058	< 0.05	< 0.001	< 0.001	272	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	3.1	0.005	167	< 0.001	0.0019	9.67	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.86	< 0.001	< 0.0001	0.03	< 0.001	< 0.005	< 0.01
MOOSESP	13-Nov-08	< 0.00025	0.006	0.002	0.055	< 0.05	< 0.001	< 0.001	275	0.0002	< 0.001	< 0.001	0.002	< 0.05	2.9	0.006	173	0.003	0.0023	8.85	< 0.001	< 0.001	< 0.15	< 0.001	0.002	5.5	< 0.001	0.9	< 0.001	< 0.0001	0.03	< 0.001	0.007	< 0.01
MOOSESP	MEAN	0.00025	0.0096	0.0013	0.0501	0.05	0.001	0.0011	220	0.0002	0.001	0.001	0.0012	0.11	2.46	0.0049	129	0.0018	0.0023	7.72	0.0011	0.001	0.15	0.001	0.0016	5.07	0.001	0.70	0.001	0.0001	0.021	0.001	0.0078	0.01
MOOSESP	MINIMUM	< 0.00025	< 0.005	< 0.001	0.032	< 0.05	< 0.001	< 0.001	148	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1.7	0.003	77.8	< 0.001	0.0015	6.04	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.5	< 0.001	0.47	< 0.001	< 0.0001	0.012	< 0.001	< 0.005	< 0.01
MOOSESP	MAXIMUM	< 0.00025	0.034	0.002	0.059	< 0.05	< 0.001	0.002	275	< 0.0002	< 0.001	< 0.001	0.002	0.75	3.1	0.006	173	0.005	0.0078	9.77	0.002	< 0.001	< 0.15	< 0.001	0.003	6.1	< 0.001	0.9	< 0.001	< 0.0001	0.032	< 0.001	0.026	< 0.01
MOOSESP	N > DL	0	9	12	14	0	0	1	14	1	0	0	5	3	14	14	14	9	14	14	3	0	0	0	10	14	0	14	0	0	14	0	7	0
MOOSESP	Median	0.00025	0.006	0.001	0.054	0.05	0.001	0.001	226.5	0.0002	0.001	0.001	0.001	0.05	2.5	0.005	128.5	0.001	0.0019	7.64	0.001	0.001	0.15	0.001	0.001	5.05	0.001	0.715	0.001	0.0001	0.0205	0.001	0.005	0.01
V1	23-Jan-08	< 0.000005	0.0051	0.00029	0.0395	< 0.005	< 0.00001	< 0.000005	16.1	0.000018	0.000013	0.0001	0.0005	0.005	0.53	0.0013	2.67	0.00035	0.00062	2.1	0.0003	0.000107		0.00005	0.0002	4.81	0.00002	0.0818	< 0.0005	< 0.000002	0.00115	< 0.0002	0.0031	< 0.1
V1	21-Feb-08	< 0.000005	0.0035	0.00029	0.0405	< 0.005	< 0.00001	< 0.000005	16.7	< 0.000005	0.000012	< 0.0001	0.00021	0.001	0.57	0.0014	2.6	0.0002	0.00067	2.28	0.00021	< 0.000005		0.00004	0.00022	4.83	0.00001	0.0815	< 0.0005	< 0.000002	0.00131	< 0.0002	0.0004	< 0.1
V1	10-Mar-08	< 0.00025	< 0.005	< 0.001	0.041	< 0.05	< 0.001	< 0.001	17.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.6	0.002	2.9	< 0.001	0.0007	2.46	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.085	< 0.001	< 0.0001	0.0013	< 0.001	< 0.005	< 0.01
V1	11-Mar-08	< 0.000005	0.0035	0.0003	0.0428	< 0.005	< 0.00001	< 0.000005	17.2	0.000009	0.000013	< 0.0001	0.00024	0.003	0.58	0.0015	2.71	0.00042	0.00073	2.22	0.00025	0.000038		0.00004	0.00017	4.81	< 0.00001	0.0868	< 0.0005	< 0.000002	0.00148	< 0.0002	0.0048	< 0.1
V1	29-Apr-08	< 0.000005	0.0033	0.00033	0.0398	< 0.005	< 0.00001	< 0.000005	17	0.000007	0.000013	< 0.0001	0.00026	0.003	0.59	0.0014	2.7	0.0005	0.0007	2.06	0.00028	0.000096		0.00004	0.00019	5.19	< 0.00001	0.0812	< 0.0005	0.000002	0.00148	0.0003	0.0046	< 0.1
V1	22-May-08	< 0.000005	0.0553	0.00033	0.0232	< 0.005	0.00001	< 0.000005	10.7	0.000026	0.000051	0.0002	0.00118	0.102	1.37	0.0009	1.71	0.00303	0.00012	1.19	0.00058	0.000277		0.00005	0.00009	3.85	< 0.00001	0.0475	0.0006	0.000002	0.000337	< 0.0002	0.0058	0.1
V1	10-Jun-08	< 0.00025	0.039	< 0.001	0.012	< 0.05	< 0.001	< 0.001	4.66	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.3	< 0.001	0.79	< 0.001	< 0.0005	0.93	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	2.8	< 0.001	0.023	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
V1	25-Jun-08	< 0.000005	0.0484	0.00016	0.0153	< 0.005	0.00002	< 0.000005	5.85	0.00001	0.000028	0.0001	0.00066	0.029	0.35	0.001	0.82	0.00066	0.00009	1.06	0.00031	0.000153		0.00003	< 0.00004	3.32	< 0.00001	0.0304	< 0.0005	0.000003	0	< 0.0002	0.0021	0.1
V1	29-Jul-08	< 0.000005	0.0193	0.00023	0.0251	< 0.005	0.00001	< 0.000005	10.6	0.000014	0	0.0001	0	0.02	0.38	0.0009	1.52	0.00038	0.00016	2.43	0.0003	0.000066		0.00004	0.00009	4.4	< 0.00001	0.0531	< 0.0005	< 0.000002	0.000378	< 0.0002	0.0023	< 0.1
V1	02-Sep-08	< 0.00025	0.023	< 0.001	0.019	< 0.05	< 0.001	< 0.001	7.79	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.3	< 0.001	1.13	0.009	< 0.0005	1.48	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.1	< 0.001	0.042	< 0.001	< 0.0001	< 0.0005	< 0.001	0.03	< 0.01
V1	17-Sep-08	< 0.000005	0.0201	0.00022	0	< 0.005	0.00001	< 0.000005	10.7	0.000017	0.000023	< 0.0001	0.00052	0.022	0.4	0.0008	1.56	0.00085	0.00014	1.52	0.00025	0.000145		0.00004	0.00008	4.52	< 0.00001	0.1	< 0.0005	< 0.000002	0.000367	< 0.0002	0.0013	< 0.1
V1	07-Oct-08	< 0.000005	0.008	0.0004	0.0259	< 0.005	< 0.00001	< 0.000005	10.8	< 0.000005	0.00005	0.003	0.001	0.018	1.12	< 0.0005	0.19	< 0.00005	0.0006	2230	0.005	< 0.000005		< 0.00002	< 0.00004	4.59	0.0002	0.0558	0.008	< 0.000002	0.00036	< 0.0002	0.002	< 0.1
V1	02-Dec-08	< 0.00025	0.008	< 0.001	0.038	< 0.05	< 0.001	< 0.001	16.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.5	0.001	2.91	0.001	< 0.0005	2.33	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	7	< 0.001	0.071	< 0.001	< 0.0001	0.0007	< 0.001	< 0.005	< 0.01
V1	11-Dec-08	< 0.000005	0.0154	0.00023	0.0376	< 0.05	< 0.00001	< 0.000005	16.3	0.000006	0.000015	0.0002	0.00053	0.008	0.56	0.0012	2.57	0.00016	0.00047	1.92	0.00023	0.000128		0.00005	0.00018	4.97	0.00001	0.0791	< 0.0005	< 0.000002	0.000924	< 0.0002	0.0027	< 0.0001
V1	MEAN	0.000075	0.018	0.00048	0.029	0.021	0.0002936	0.00029	12.7	0.0000655	0.00030	0.00058	0.00065	0.029	0.582	0.0011	1.91	0.00133	0.00046	161	0.00084	0.00036	< 0.15	0.00031	0.00038	4.63	0.00031	0.066	0.0012	3.07E-05	0.0007704	0.00044	0.0053	0.067
V1	MINIMUM	< 0.000005	0.0033	0.00016	0	< 0.005	< 0.00001	< 0.000005	4.66	< 0.000005	0	< 0.0001	0	0.001	0.3	< 0.0005	0.19	< 0.00005	0.00009	0.93	0.00021	< 0.000005	< 0.15	< 0.00002	< 0.00004	2.8	< 0.00001	0.023	< 0.0005	< 0.000002	0	< 0.0002	0.0004	< 0.0001
V1	MAXIMUM	< 0.00025	0.0553	< 0.001	0.0428	< 0.05	< 0.001	< 0.001	17.4	< 0.0002	< 0.001	0.003	0.00118	0.102	1.37	0.002	2.91	0.009	0.00073	2230	0.005	< 0.001	< 0.15	< 0.001	< 0.001	7	< 0.001	0.1	0.008	< 0.0001	0.00148	< 0.001	0.03	< 0.1
V1	N > DL	0	13	10	14	0	4	0	14	8	10	6	10	10	14	11	14	11	11	14	10	8	0	9	8	14	4	14	2	3	12	1	11	2
V1	Median	0.000005	0.0117	0.000315	0.03175	0.005	0.00001	0.000005	13.45	0.0000155	0.0000255	0.00015	0.000595	0.021	0.545	0.001	2.14	0.00058	0.0005	2.08	0.000305	0.0001365	0.15	0.000045	0.000185	4.7	0.00001	0.07505	0.0005	0.000002	0.0006	0.0002	0.00385	0.1
V2	07-Jan-08	< 0.00025	0.017	0.001	0.084	< 0.05	< 0.001	< 0.001	210	< 0.0002	< 0.001	< 0.001	0.002	0.05	2.3	0.003	110	0.005	0.0018	9.81	0.002	< 0.001	< 0.15	< 0.001	0.002	5.5	< 0.001	0.82	< 0.001	< 0.0001	0.02	< 0.001	0.028	< 0.01
V2	14-Feb-08	< 0.00025	< 0.005	< 0.001	0.082	< 0.05	< 0.001	< 0.001	220	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	1.9	0.002	96.2	0.002	0.0015	9.23	0.002	< 0.001	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.69	< 0.001	< 0.0001	0.021	< 0.001	0.005	< 0.01
V2	19-Feb-08	< 0.00025	< 0.005	0.001	0.069	< 0.05	< 0.001	< 0.001	197	< 0.0002	< 0.001	< 0.001	< 0.001	0.09	1.5	0.002	84.3	0.027	0.0015	7.62	0.002	< 0.001	< 0.15	< 0.001	0.002	5.1	< 0.001	0.66	< 0.001	< 0.0001	0.012	< 0.001	< 0.005	< 0.01
V2	06-May-08	< 0.00025	< 0.005	< 0.001	0.064	< 0.05	< 0.001	< 0.001	179	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	1.9	0.003	92.6	0.002	0.0013	7.63	0.003	< 0.001	< 0.15	< 0.001	0.001	4.9	< 0.001	0.6	< 0.001	< 0.0001	0.016	< 0.001	0.033	< 0.01
V2	14-May-08	< 0.00025	0.024	0.001	0.063	< 0.05	< 0.001	< 0.001	161	< 0.0002	< 0.001	< 0.001	0.003	< 0.05	2.1	0.003	82.7	< 0.001	0.0013	5.81	0.002	< 0.001	< 0.15	< 0.001	0.001	4.1	< 0.001	0.56	< 0.001	< 0.0001	0.012	< 0.001	0.047	< 0.01
V2	04-Jun-08	< 0.00025	< 0.005	< 0.001	0.064	< 0.05	< 0.001	< 0.001	178	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	1.8	0.003	79.8	< 0.001	0.0022	6.69	0.002	< 0.001	< 0.15	< 0.001	0.002	3.9	< 0.001	0.58	< 0.001	< 0.0001	0.012	< 0.001	0.005	< 0.01
V2	17-Jun-08	< 0.00025	< 0.005	< 0.001	0.068	< 0.05	< 0.001	< 0.001	187	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	1.9	< 0.001	104	0.006	0.0014	9.02	0.002	< 0.001	< 0.15	< 0.001	0.001	5.5	< 0.001	0.62	< 0.001	< 0.0001	0.013	< 0.001	0.03	< 0.01
V2	03-Jul-08	< 0.00025	0.01	< 0.001	0.07	< 0.05	< 0.001	< 0.001	228	< 0.0002	< 0.001	< 0.001	0.001	0.45	1.7	0.002	101	< 0.001	0.0009	6.57	0.001	< 0.001	< 0.15	< 0.001	0.002	4.8	< 0.001	0.64	< 0.001	< 0.0001	0.016	< 0.001	0.014	< 0.01
V2	15-Jul-08	< 0.00025	0.009	0.001	0.057	< 0.05	< 0.001	< 0.001	160	< 0.0002	< 0.001	< 0.001	0.002	0.57	1.9	0.004	81.5	0.012	0.0012	5.38	0.002	< 0.001	< 0.15	< 0.001	< 0.001	3.9	< 0.001	0.47	< 0.001	< 0.0001	0.01	< 0.001	0.024	< 0.01
V2	04-Aug-08	< 0.00025	0.009	0.001	0.073	< 0.05	< 0.001	< 0.001	192	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	1.8	0.002	96.4	< 0.001	0.0014	7.8	0.001	< 0.001	< 0.15	< 0.001	0.002	4.9	< 0.001	0.62	< 0.001	< 0.0001	0.014	< 0.001	0.011	< 0.01
V2	12-Aug-08	< 0.00025	0.02	< 0.001	0.074	< 0.05	< 0.001	< 0.001	210	< 0.0002	< 0.001	< 0.001	0.001	0.11	2.1	0.002	111	0.005	0.0013	8.67	0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.5	< 0.001	0.67	< 0.001	< 0.0001	0.015	< 0.001	0.012	< 0.01
V2	09-Sep-08	< 0.00025	0.019	0.001	0.081	< 0.05	< 0.001	< 0.001	200	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	2	0.004	107	< 0.001	0.0015	8.89	0.002	< 0.001	< 0.15	< 0.001	0.002	5.9	< 0.001	0.66	< 0.001	< 0.0001	0.016	< 0.001	< 0.005	< 0.01
V2	15-Sep-08	< 0.00025	< 0.005	< 0.001	0.085	< 0.05	< 0.001	< 0.001	182	< 0.0002	< 0.001	< 0.001	0.002	0.06	2	0.003	92.7	0.009	0.0016	7.49	0.002	< 0.001	< 0.15	< 0.001	< 0.001	5	< 0.001	0.63	< 0.001	< 0.0001	0.022	< 0.001	0.019	< 0.01
V2	01-Oct-08	< 0.00025	0.014	< 0.001	0.09	< 0.05	< 0.001	< 0.001	211	< 0.0002	< 0.001	< 0.001	0.001	0.05	2.1	0.004	112	< 0.001	0.0018	9.68	0.003	< 0.001	< 0.15	< 0.001	0.001	6.1	< 0.001	0.72	< 0.001	< 0.0001	0.018	< 0.001	0.006	< 0.01
V2	15-Oct-08	< 0.00025	0.005	< 0.001	0.084	< 0.05	< 0.001	< 0.001	207	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	1.9	0.003	83	0.024	0.0017	6.48	0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.2	< 0.001	0.7	< 0.001	< 0.0001	0.017	< 0.001	0.053	< 0.01
V2	03-Nov-08	< 0.00025	0.015	< 0.001	0.087	< 0.05	< 0.001	< 0.001	239	0.0002	< 0.001	< 0.001	0.002	0.23	1.9	0.001	117	0.07	0.0016	9.86	0.002	0.001	< 0.15	< 0.001	0.001	5.5	< 0.001	0.68	< 0.001	< 0.0001	0.021	< 0.001	0.008	< 0.01
V2	13-Nov-08	< 0.00025	0.01	< 0.001	0.09	< 0.05	< 0.001	< 0.001	236	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	1.9	0.003	118	< 0.001	0.0016	8.77	0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.4	< 0.001	0.74	< 0.001	< 0.0001	0.023	< 0.001	0.009	< 0.01
V2	02-Dec-08	< 0.00025	0.021	0.001	0.096	< 0.05	< 0.001	< 0.001	274	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	2.2	0.003	133	0.004	0.002	10.2	0.002	< 0.001	< 0.15	< 0.001	0.001	5.9	< 0.001	0.84	< 0.001	< 0.0001	0.021	< 0.001	0.01	< 0.01
V2	10-Dec-08	< 0.00025	0.008	0.001	0.084	< 0.05	< 0.001	< 0.001	263	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	2.2	0.004	130	< 0.001	0.0017	9.54	0.002	< 0.001	< 0.15	< 0.001	0.002	5.2	< 0.001	0.83	< 0.001	< 0.0001	0.023	< 0.001	0.011	< 0.01
V2	MEAN	0.00025	0.011	0.001	0.077	0.05	0.001	0.001	207	0.0002	0.001	0.001	0.0015	0.11	1.95	0.0027	102	0.0092	0.0015	8.17	0.0018	0.001	0.15	0.001	0.0014	5.15	0.001	0.67	0.001	0.0001	0.017	0.001	0.018	0.01
V2	MINIMUM	< 0.00025	< 0.005	< 0.001	0.057	< 0.05	< 0.001	< 0.001	160	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1.5	< 0.001	79.8	< 0.001	0.0009	5.38	0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.9	< 0.001	0.47	< 0.001	< 0.0001	0.01	< 0.001	< 0.005	< 0.01
V2	MAXIMUM	< 0.00025	0.024	< 0.001	0.096	< 0.05	< 0.001	< 0.001	274	< 0.0002	< 0.001	< 0.001	0.003	0.57	2.3	0.004	133	0.07	0.0022	10.2	0.003	< 0.001	< 0.15	< 0.001	0.002	6.1	< 0.001	0.84	< 0.001	< 0.0001	0.023	< 0.001	0.053	< 0.01
V2	N > DL	0	13	8	19	0	0	0	19	1	0	0	18	8	19	18	19	11	19	19	19	1	0	0	13	19	0	19	0	0	19	0	17	0
V2	Median	0.00025	0.009	0.001	0.081	0.05	0.001	0.001	207	0.0002	0.001	0.001	0.001	0.05	1.9	0.003	101	0.002	0.0015	8.67	0.002	0.001	0.15	0.001	0.001	5.2	0.001	0.66	0.001	0.0001	0.016	0.001	0.011	0.01

AECOM

Appendix 6
2008 Surface Water Quality Data
Vangorda Creek Drainage

Table 3. Surface Water Dissolved Metals

Station	Date	AG-D mg/L	AL-D mg/L	AS-D mg/L	BA-D mg/L	B-D mg/L	BE-D mg/L	BI-D mg/L	CA-D mg/L	CD-D mg/L	CO-D mg/L	CR-D mg/L	CU-D mg/L	FE-D mg/L	K-D mg/L	LI-D mg/L	MG-D mg/L	MN-D mg/L	MO-D mg/L	NA-D mg/L	NI-D mg/L	PB-D mg/L	P-D mg/L	SB-D mg/L	SE-D mg/L	SI-D mg/L	SN-D mg/L	SR-D mg/L	TI-D mg/L	TL-D mg/L	U-D mg/L	V-D mg/L	ZN-D mg/L	ZR-D mg/L
V2A	06-May-08	< 0.00025	< 0.005	0.002	0.067	< 0.05	< 0.001	< 0.001	180	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	2.9	0.004	108	0.017	0.0036	7.27	0.004	< 0.001	< 0.15	< 0.001	0.001	5	< 0.001	0.6	< 0.001	< 0.0001	0.017	< 0.001	0.013	< 0.01
V2A	14-May-08	< 0.00025	< 0.005	0.001	0.047	< 0.05	< 0.001	< 0.001	139	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	2.7	0.006	79.1	0.014	0.0023	4.5	0.009	< 0.001	< 0.15	< 0.001	0.001	3.2	< 0.001	0.5	< 0.001	< 0.0001	0.013	< 0.001	0.055	< 0.01
V2A	04-Jun-08	< 0.00025	< 0.005	< 0.001	0.037	< 0.05	< 0.001	< 0.001	216	0.0004	< 0.001	< 0.001	0.001	< 0.05	3.7	0.017	148	0.001	0.0016	5.57	0.11	< 0.001	< 0.15	< 0.001	0.002	2.9	< 0.001	0.8	< 0.001	< 0.0001	0.019	< 0.001	1.71	< 0.01
V2A	17-Jun-08	< 0.00025	< 0.005	0.001	0.036	< 0.05	< 0.001	< 0.001	220	0.0003	< 0.001	< 0.001	0.001	< 0.05	3.7	0.012	170	0.006	0.0018	6.91	0.093	< 0.001	< 0.15	< 0.001	0.002	4.1	< 0.001	0.74	< 0.001	< 0.0001	0.02	< 0.001	1.27	< 0.01
V2A	03-Jul-08	< 0.00025	0.006	< 0.001	0.037	< 0.05	< 0.001	< 0.001	247	0.0002	< 0.001	< 0.001	0.002	0.45	2.8	0.013	164	< 0.001	0.0014	4.94	0.084	< 0.001	< 0.15	< 0.001	0.002	2.7	< 0.001	0.69	< 0.001	< 0.0001	0.023	< 0.001	1.12	< 0.01
V2A	15-Jul-08	< 0.00025	0.007	0.001	0.034	< 0.05	< 0.001	< 0.001	210	0.0004	< 0.001	< 0.001	0.001	0.73	3.3	0.016	142	0.006	0.0017	6.03	0.089	< 0.001	< 0.15	< 0.001	0.001	3.9	< 0.001	0.61	< 0.001	< 0.0001	0.02	< 0.001	1.2	< 0.01
V2A	04-Aug-08	< 0.00025	< 0.005	0.001	0.043	< 0.05	< 0.001	< 0.001	222	0.0004	< 0.001	< 0.001	< 0.001	< 0.05	3.6	0.013	161	0.003	0.002	6.89	0.094	< 0.001	< 0.15	< 0.001	0.002	4.2	< 0.001	0.74	< 0.001	< 0.0001	0.024	< 0.001	1.23	< 0.01
V2A	12-Aug-08	< 0.00025	< 0.005	0.001	0.043	< 0.05	< 0.001	< 0.001	255	0.0002	< 0.001	< 0.001	0.001	0.08	4.1	0.012	180	< 0.001	0.0018	7.72	0.095	< 0.001	< 0.15	< 0.001	0.002	4.5	< 0.001	0.79	< 0.001	< 0.0001	0.025	< 0.001	1.21	< 0.01
V2A	09-Sep-08	< 0.00025	0.025	0.001	0.046	< 0.05	< 0.001	< 0.001	233	0.0006	< 0.001	< 0.001	0.001	0.08	3.8	0.016	167	< 0.001	0.0018	8.41	0.12	< 0.001	< 0.15	< 0.001	0.001	5.1	< 0.001	0.81	< 0.001	< 0.0001	0.026	< 0.001	1.02	< 0.01
V2A	15-Sep-08	< 0.00025	< 0.005	< 0.001	0.047	< 0.05	< 0.001	< 0.001	221	0.0005	< 0.001	< 0.001	0.001	0.07	3.8	0.014	167	0.004	0.0017	6.95	0.11	< 0.001	< 0.15	< 0.001	0.001	4.1	< 0.001	0.76	< 0.001	< 0.0001	0.035	< 0.001	0.92	< 0.01
V2A	01-Oct-08	< 0.00025	0.008	0.001	0.044	< 0.05	< 0.001	< 0.001	244	0.0005	< 0.001	< 0.001	< 0.001	< 0.05	3.9	0.015	184	< 0.001	0.0019	7.86	0.11	< 0.001	< 0.15	< 0.001	0.002	4.6	< 0.001	0.83	< 0.001	< 0.0001	0.03	< 0.001	0.94	< 0.01
V2A	15-Oct-08	< 0.00025	< 0.005	0.001	0.039	< 0.05	< 0.001	< 0.001	237	0.0005	< 0.001	< 0.001	< 0.001	< 0.05	3.5	0.014	177	0.047	0.002	5.79	0.091	< 0.001	< 0.15	< 0.001	0.002	4.5	< 0.001	0.82	< 0.001	< 0.0001	0.027	< 0.001	0.73	< 0.01
V2A	03-Nov-08	< 0.00025	0.034	0.001	0.046	< 0.05	< 0.001	< 0.001	286	0.0004	< 0.001	< 0.001	0.001	0.21	4.1	0.012	219	0.002	0.0019	9.85	0.1	< 0.001	< 0.15	< 0.001	0.002	4.8	< 0.001	0.83	< 0.001	< 0.0001	0.034	< 0.001	0.88	< 0.01
V2A	13-Nov-08	< 0.00025	0.011	0.002	0.049	< 0.05	< 0.001	< 0.001	279	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	4.4	0.016	218	< 0.001	0.0022	8.93	0.1	< 0.001	< 0.15	< 0.001	0.001	4.6	< 0.001	0.97	< 0.001	< 0.0001	0.038	< 0.001	1.4	< 0.01
V2A	02-Dec-08	< 0.00025	0.013	< 0.001	0.049	< 0.05	< 0.001	< 0.001	280	< 0.0002	< 0.001	< 0.001	0.001	0.26	4.3	0.013	221	0.012	0.0023	8.57	0.1	< 0.001	< 0.15	< 0.001	< 0.001	3.6	< 0.001	0.89	< 0.001	< 0.0001	0.025	0.001	1.46	< 0.01
V2A	10-Dec-08	< 0.00025	0.015	0.002	0.045	< 0.05	< 0.001	< 0.001	294	0.0003	< 0.001	< 0.001	0.001	< 0.05	4.5	0.017	224	< 0.001	0.0021	9.4	0.1	< 0.001	< 0.15	< 0.001	0.002	4.5	< 0.001	1	< 0.001	< 0.0001	0.037	< 0.001	1.27	< 0.01
V2A	MEAN	0.00025	0.010	0.001	0.044	0.05	0.001	0.001	235	0.00034	0.001	0.001	0.0011	0.15	3.7	0.013	171	0.0074	0.0020	7.22	0.088	0.001	0.15	0.001	0.0016	4.1	0.001	0.77	0.001	0.0001	0.026	0.001	1.03	0.01
V2A	MINIMUM	< 0.00025	< 0.005	< 0.001	0.034	< 0.05	< 0.001	< 0.001	139	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	2.7	0.004	79.1	< 0.001	0.0014	4.5	0.004	< 0.001	< 0.15	< 0.001	< 0.001	2.7	< 0.001	0.5	< 0.001	< 0.0001	0.013	< 0.001	0.013	< 0.01
V2A	MAXIMUM	< 0.00025	0.034	0.002	0.067	< 0.05	< 0.001	< 0.001	294	0.0006	< 0.001	< 0.001	0.002	0.73	4.5	0.017	224	0.047	0.0036	9.85	0.12	< 0.001	< 0.15	< 0.001	0.002	5.1	< 0.001	1	< 0.001	< 0.0001	0.038	< 0.001	1.71	< 0.01
V2A	N > DL	0	8	12	16	0	0	0	16	12	0	0	13	7	16	16	16	10	16	16	16	0	0	0	15	16	0	16	0	0	16	1	16	0
V2A	Median	0.00025	0.0055	0.001	0.0445	0.05	0.001	0.001	235	0.00035	0.001	0.001	0.001	0.05	3.75	0.0135	168.5	0.0025	0.0019	7.11	0.0975	0.001	0.15	0.001	0.002	4.35	0.001	0.795	0.001	0.0001	0.025	0.001	1.16	0.01
V4	23-Jan-08	< 0.000005	0.0028	0.00049	0.0939	< 0.005	< 0.00001	< 0.000005	104	0.000018	0.000061	< 0.0001	0.00047	0.074	1.23	0.0054	37.2	0.083	0.00107	4.04	0.00073	0.000023		0.00009	0.00058	5.49	< 0.00001	0.411	< 0.0005	< 0.000002	0.0147	< 0.0002	0.0014	< 0.1
V4	20-Feb-08	< 0.000005	0.0023	0.00051	0.0877	< 0.005	< 0.00001	< 0.000005	106	0.000017	0.000036	< 0.0001	0.00046	0.016	1.48	0.0056	38.9	0.0353	0.00112	4.79	0.00067	0.000032		0.0001	0.00068	5.75	< 0.00001	0.395	< 0.0005	< 0.000002	0.016	< 0.0002	0.0016	< 0.1
V4	13-Mar-08	< 0.000005	0.0025	0.00045	0.0964	< 0.005	< 0.00001	< 0.000005	101	0.000025	0.000043	< 0.0001	0.00054	0.019	1.33	0.006	37.4	0.0449	0.00113	4.45	0.00068	0.000048		0.0001	0.00056	5.37	< 0.00001	0.417	< 0.0005	< 0.000002	0.0173	< 0.0002	0.0049	< 0.1
V4	28-Apr-08	< 0.000005	0.0051	0.00073	0.0748	< 0.005	< 0.00001	< 0.000005	85.7	0.000028	0.000062	0.0001	0.00071	0.122	1.31	0.0048	29	0.0602	0.00105	3.13	0.00075	0.000177		0.00012	0.00048	4.62	0.00002	0.358	0.0009	< 0.000002	0.0132	0.0004	0.0062	0.1
V4	21-May-08	0.00001	0.132	0.00078	0.0366	< 0.005	< 0.00001	< 0.000005	24.4	0.000048	0.000193	0.0003	0	0.29	1.1	0.0014	8.4	0.0596	0.00064	0.93	0.00157	0.000307		0	0.00043	3.12	0.00001	0.0993	0.0048	0.000004	0.00122	0.0005	0.0043	0.4
V4	19-Jun-08	< 0.00025	< 0.005	< 0.001	0.06	< 0.05	< 0.001	< 0.001	57.2	< 0.0002	< 0.001	< 0.001	0.001	0.1	0.9	0.004	21.2	0.008	0.0009	2.18	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.6	< 0.001	0.25	< 0.001	< 0.0001	0.0055	< 0.001	< 0.005	< 0.01
V4	24-Jun-08	< 0.000005	0.0144	0.00069	0.0555	< 0.005	< 0.00001	< 0.000005	52.5	0.000045	0.000045	0.0002	0.0016	0.098	0.67	0.0033	17.9	0.0143	0.00109	1.9	0.00128	0.000129		0.0002	0.00043	4.36	< 0.00001	0.206	< 0.0005	< 0.000002	0	< 0.0002	0.0028	0.2
V4	29-Jul-08	< 0.000005	0.0077	0.00075	0.0672	< 0.005	< 0.00001	< 0.000005	66.6	0.000016	0.000044	0.0001	0.00096	0.082	0.74	0.004	22.8	0.0165	0.00102	3.17	0.00084	0.000052		0.00013	0.00047	4.18	< 0.00001	0.28	< 0.0005	0.000003	0.00558	< 0.0002	0.0037	0.1
V4	19-Aug-08	< 0.00025	< 0.005	< 0.001	0.056	< 0.05	< 0.001	< 0.001	62.7	< 0.0002	< 0.001	< 0.001	0.001	0.13	0.8	0.004	26.2	0.018	0.0012	2.89	0.001	< 0.001	< 0.15	< 0.001	0.001	5.4	< 0.001	0.29	< 0.001	< 0.0001	0.0051	< 0.001	0.006	< 0.01
V4	23-Sep-08	< 0.00025	< 0.005	< 0.001	0.056	< 0.05	< 0.001	< 0.001	59.8	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.6	0.003	22.4	0.062	0.0011	2.23	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.3	< 0.001	0.3	< 0.001	< 0.0001	0.0072	< 0.001	< 0.005	< 0.01
V4	07-Oct-08	< 0.000005	0.007	0.0004	0.0163	< 0.005	< 0.00001	< 0.000005	3.73	< 0.000005	< 0.000005	0.003	< 0.00005	0.01	1.6	< 0.0005	0.1	< 0.00005	0.0014	2320	0.0075	< 0.000005		< 0.00002	0.0011	4.47	0.0004	0.124	0.011	< 0.000002	0.00106	< 0.0002	< 0.0001	< 0.1
V4	10-Dec-08	0.000005	0.0144	0.00062	0.0782	< 0.05	< 0.00001	< 0.000005	88.4	0.000019	0.000049	0.0003	0.00106	0.105	1.12	0.005	33.9	0.0425	0.00113	3.31	0.00075	0.000119		0.00016	0.00125	5.12	0.00002	0.371	0.001	< 0.000002	0.00962	< 0.0002	0.0027	0.0001
V4	MEAN	6.667E-05	0.0169	0.00070	0.065	0.02	0.00026	0.0002538	67.7	6.842E-05	0.00029	0.00061	0.00074	0.091	1.07	0.00392	24.6	0.0370	0.00107	196	0.0015	0.0003243	0.15	0.0003267	0.00075	4.73	0.00029	0.29	0.00193	2.675E-05	0.0080	0.00044	0.0036	0.103
V4	MINIMUM	< 0.000005	0.0023	0.0004	0.0163	< 0.005	< 0.00001	< 0.000005	3.73	< 0.000005	< 0.000005	< 0.0001	0	0.01	0.6	< 0.0005	0.1	< 0.00005	0.00064	0.93	0.00067	< 0.000005	< 0.15	0	0.00043	3.12	< 0.00001	0.0993	< 0.0005	< 0.000002	0	< 0.0002	< 0.0001	0.0001
V4	MAXIMUM	< 0.00025	0.132	< 0.001	0.0964	< 0.05	< 0.001	< 0.001	106	< 0.0002	< 0.001	0.003	0.0016	0.29	1.6	0.006	38.9	0.083	0.0014	2320	0.0075	< 0.001	< 0.15	< 0.001	0.00125	5.75	< 0.001	0.417	0.011	< 0.0001	0.0173	< 0.001	0.0062	0.4
V4	N > DL	2	9	9	12	0	0	0	12	8	8	6	10	11	12	11	12	11	12	12	10	8	0	8	10	12	4	12	4	2	12	2	9	5
V4	Median	0.000005	0.00505	0.00071	0.0636	0.005	0.00001	0.000005	64.65	0.0000265	0.000055	0.00025	0.000835	0.09	1.11	0.004	24.5	0.0389	0.001095	3.15	0.00092	0.000124	0.15	0.000125	0.00063	4.61	0.000015	0.295	0.00095	0.000002	0.00639	0.0002	0.004	0.1
V5	07-Jan-08	< 0.00025	< 0.005	< 0.001	0.07	< 0.05	< 0.001	< 0.001	82.4	< 0.0002	< 0.001	< 0.001	< 0.001	0.07	1.2	0.004	33.6	0.003	0.0016	4.06	0.001	< 0.001	< 0.15	< 0.001	0.002	4.5	< 0.001	0.33	< 0.001	< 0.0001	0.0043	< 0.001	0.007	< 0.01
V5	14-May-08	< 0.00025	0.045	< 0.001	0.037	< 0.05	< 0.001	< 0.001	32	< 0.0002	< 0.001	< 0.001	0.003	0.09	1.1	0.002	13.1	0.018	0.0006	1.66	0.002	< 0.001	< 0.15	< 0.001	< 0.001	2.9	< 0.001	0.11	0.001	< 0.0001	0.0014	< 0.001	0.005	< 0.01
V5	16-Jun-08	< 0.00025	0.016	< 0.001	0.034	< 0.05	< 0.001	< 0.001	30.7	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	0.6	0.001	11.7	0.007	0.0006	2.04	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4	< 0.001	0.12	< 0.001	< 0.0001	0.0013	< 0.001	0.005	< 0.01
V5	14-Jul-08	< 0.00025	0.049	< 0.001	0.037	< 0.05	< 0.001	< 0.001	33.8	< 0.0002	< 0.001	< 0.001	0.002	0.21	0.6	0.004	13.3	0.013	0.0007	1.97	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4.7	< 0.001	0.13	0.001	< 0.0001	0.0014	< 0.001	< 0.005	< 0.01
V5	11-Aug-08	< 0.00025	0.022	< 0.001	0.059	< 0.05	< 0.001	< 0.001	54.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.08	0.8	0.002	22.5	0.023	0.001	2.87	0.001	< 0.001	< 0.15	< 0.001	0.002	4.6	< 0.001	0.21	< 0.001	< 0.0001	0.0027	< 0.001	< 0.005	< 0.01
V5	15-Sep-08	< 0.00025	0.047	< 0.001	0.055	< 0.05	< 0.001	< 0.001	47.7	< 0.0002	< 0.001	< 0.001	0.002	0.11	0.7	0.003	18.6	0.029	0.001	2.52	0.003	< 0.001	< 0.15	< 0.001	0.002	4.4	< 0.001	0.24	0.001	< 0.0001	0.0032	< 0.001	< 0.005	< 0.01
V5	15-Oct-08	< 0.00025	0.01	< 0.001	0.059	< 0.05	< 0.001	< 0.001	55.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.8	0.003	20.2	0.027	0.0013	2.47	0.002	< 0.001	< 0.15	< 0.001	0.002	4.5	< 0.001	0.23	< 0.001	< 0.0001	0.003	< 0.001	< 0.005	< 0.01
V5	03-Nov-08	< 0.00025	0.013	< 0.001	0.072	< 0.05	< 0.001	< 0.001	68.5	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1	0.003	28.4	0.022	0.0013	3.58	0.002	< 0.001	< 0.15	< 0.001	0.003	4.8	< 0.001	0.27	< 0.001	< 0.0001	0.0039	< 0.001	0.005	< 0.01
V5	01-Dec-08	< 0.00025	0.01	< 0.001	0.075	< 0.05	< 0.001	< 0.001	77.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1.1	0.004	34.2	0.019	0.0013	4.1	0.002	< 0.001	< 0.15	< 0.001	< 0.001	5.7	< 0.001	0.31	< 0.001	< 0.0001	0.0035	< 0.001	0.039	< 0.01
V5	MEAN	0.00025	0.024	0.001	0.055	0.05	0.001	0.001	53.7	0.0002	0.001	0.001	0.0014	0.084	0.88	0.0029	21.7	0.018	0.0010	2.81	0.0018	0.001	0.15	0.001	0.0017	4.46	0.001	0.22	0.001	0.0001	0.0027	0.001	0.009	0.01
V5	MINIMUM	< 0.00025	< 0.005	< 0.001	0.034	< 0.05	< 0.001	< 0.001	30.7	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.6	0.001	11.7	0.003	0.0006	1.66	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	2.9	< 0.001	0.11	< 0.001	< 0.0001	0.0013	< 0.001	< 0.005	< 0.01
V5	MAXIMUM	< 0.00025	0.049	< 0.001	0.075	< 0.05	< 0.001	< 0.001	82.4	< 0.0002	< 0.001	< 0.001	0.003	0.21	1.2	0.004	34.2	0.029	0.0016	4.1	0.003	< 0.001	< 0.15	< 0.001	0.003	5.7	< 0.001	0.33	< 0.001	< 0.0001	0.0043	< 0.001	0.039	< 0.01
V5	N > DL	0	8	0	9	0	0	0	9	0	0	0	4	5	9	9	9	9	9	9	8	0	0	0	5	9	0	9	3	0	9	0	5	0
V5	Median	0.00025	0.016	0.001	0.059	0.05	0.001	0.001	54.7	0.0002	0.001	0.001	0.001	0.07	0.8	0.003	20.2	0.019	0.001	2.52	0.002	0.001	0.15	0.001	0.002	4.5	0.001	0.23	0.001	0.0001	0.003	0.001	0.005	0.01
V6A	24-Jan-08	< 0.000005	0.0051	0.00078	0.0453	< 0.005	< 0.00001	< 0.000005	48.4	0.000034	0.000018	< 0.0001	0.00033	0.04	0.53	0.0013	10.3	0.00193	0.00017	2.04	0.00027	0.000115		0.00005	0.00016	5.43	< 0.00001	0.212	< 0.0005	0.000003	0.00444	< 0.0002	0.0133	< 0.0001
V6A	21-Feb-08	< 0.000005	0.0045	0.00065	0.051	< 0.005	< 0.00001	< 0.000005	57.3	0.000039	0.000028	< 0.0001	0.00037	0.028	0.67	0.0019	11.6	0.00494	0.00018	2.11	0.00022	0.000035		0.00005	0.00033	5.33	< 0.00001	0.253	< 0.0005	0.000003	0.00944	< 0.0002	0.0187	< 0.0001
V6A	10-Mar-08	< 0.00025	< 0.005	< 0.001	0.051	< 0.05	< 0.001	< 0.001	51.6	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	0.6	0.001	11.2	0.004	< 0.0005	2.09	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.4	< 0.001	0.25	< 0.001	< 0.0001	0.0066	< 0.001	0.023	< 0.01
V6A	11-Mar-08	< 0.000005	0.0041	0.00069	0.0527	< 0.005	< 0.00001	< 0.000005	54.6	0.000052	0.000022	< 0.0001	0.00038	0.035	0.64	0.0017	11.2	0.00375	0.0002	2.04	0.00027	0.000085		0.00006	0.00021	4.69	0.00001	0.245	< 0.0005	0.000002	0.0073	< 0.0002	0.0254	< 0.0001
V6A	28-Apr-08	< 0.000005	0.0041	0.00077	0.0524	< 0.05	< 0.00001	< 0.000005	59.8	0.000037	0.000025	< 0.0001	0.00035	0.016	0.64	0.0015	11.3	0.0047	0.00024	1.93	0.00026	0.000092		0.00006	0.0002	5.15	< 0.00001	0.25	0.0007	0.000004	0.00632	0.0004	0.0175	< 0.0001
V6A	21-May-08	0.00001	0.159	0.00146	0.0313	< 0.05	0.00003	0.000006	19.4	0.000313	0.000594	0.0003	0.00221	0.276	1.11	0.0012	5.6	0.119	0.00013	0.83	0.00166	0.00169		0.00012	0.00009	2.59	< 0.00001	0.0795	0.0035	0.000012	0.000914	< 0.0002	0.317	0.0003
V6A	10-Jun-08	< 0.00025	0.043	< 0.001	0.017	< 0.05	< 0.001	< 0.001	14.3	< 0.0002	< 0.001	< 0.001	0.001	0.1	0.3	< 0.001	3.59	0.007	< 0.0005	1.26	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.2	< 0.001	0.056	< 0.001	< 0.0001	0.0009	< 0.001	0.046	< 0.01
V6A	24-Jun-08	0.000007	0.0728	0.00087	0.0205	< 0.05	0.00004	< 0.000005	13.2	0.000076	0.000049	0.0002	0.00132	0.082	0.32	0.0011	2.75	0.00322	0.00008	1.26	0.00062	0.000815		0.00008	< 0.00004	4.1	< 0.00001	0.0596	0.0007	0.000008	0.000746	< 0.0002	0.04	0.0003
V6A	30-Jul-08	< 0.000005	0.0363	0.00113	0.0305	< 0.05	0.00002	< 0.000005	29.1	0.000045	0.000041	0.0001	0.00092	0.095	0.34	0.0011	6.7	0.00507	0.00013	2.36	0.00038	0.000404		0.00005	0.0001	5.41	< 0.00001	0.128	< 0.0005	0.000007	0.00216	< 0.0002	0.0248	0.0002
V6A	02-Sep-08	< 0.00025	0.031	< 0.001	0.022	< 0.05	< 0.001	< 0.001	22.2	< 0.0002	< 0.001	< 0.001	< 0.001	0.06	0.3	< 0.001	5.42	0.005	< 0.0005	1.38	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.6	< 0.001	0.092	< 0.001	< 0.0001	0.0012	< 0.001	0.037	< 0.01
V6A	17-Sep-08	0.000007	0.036	0.00085	0.0273	< 0.05	0.00002	< 0.000005	26.8	0.000048	0.000039	< 0.0001	0.00084	0.077	0.4	0.0011	7	0.00541	0.00011	1.61	0.00042	0.000252		0.00006	0.00012	5.65	< 0.00001	0.119	< 0.0005	0.000005	0.00203	< 0.0002	0.0403	0.0002
V6A	08-Oct-08	< 0.000005	0.0472	0.00088	0.0278	< 0.05	0.00002	< 0.000005	30.6	0.000078	0.000058	0.0002	0.00104	0.083	0.45	0.0012	8.65	0.00811	0.00011	1.68	0.00055	0.000784		0.00005	0.00013	5.11	0.00002	0.125	< 0.0005	0.000004	0.00237	< 0.0002	0.0483	0.0001
V6A	02-Dec-08	< 0.00025	0.015	< 0.001	0.05	< 0.05	< 0.001	< 0.001	55.9	< 0.0002	< 0.001	< 0.001	< 0.001	0.08	0.6	0.002	16.6	0.01	< 0.0005	2.5	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	7.2	< 0.001	0.23	< 0.001	< 0.0001	0.0033	< 0.001	0.049	< 0.01
V6A	10-Dec-08	< 0.000005	0.018	0.00086	0.048	< 0.05	< 0.00001	< 0.000005	53.2	0.000065	0.000037	0.0002	0.00138	0.046	0.69	0.0016	13.8	0.00604	0.00019	3.07	0.00051	0.000322		0.00009	0.00017	5.6	0.00003	0.216	< 0.0005	0.000004	0.00382	< 0.0002	0.0453	< 0.0001
V6A	MEAN	7.564E-05	0.0344	0.00092	0.038	0.040	0.00030	0.00029	38.3	0.00011	0.00035	0.00039	0.00094	0.076	0.54	0.0013	8.98	0.013	0.00025	1.87	0.00065	0.0006139	0.15	0.00033	0.00040	5.03	0.00030	0.17	0.0008857	3.229E-05	0.0037	0.00044	0.0533	0.0030
V6A	MINIMUM	< 0.000005	0.0041	0.00065	0.017	< 0.005	< 0.00001	< 0.000005	13.2	0.000034	0.000018	< 0.0001	0.00033	0.016	0.3	< 0.001	2.75	0.00193	0.00008	0.83	0.00022	0.000035	< 0.15	0.00005	< 0.00004	2.59	< 0.00001	0.056	< 0.0005	0.000002	0.000746	< 0.0002	0.0133	< 0.0001
V6A	MAXIMUM	< 0.00025	0.159	0.00146	0.0527	< 0.05	< 0.001	< 0.001	59.8	0.000313	< 0.001	< 0.001	0.00221	0.276	1.11	0.002	16.6	0.119	< 0.0005	3.07	0.00166	0.00169	< 0.15	< 0.001	< 0.001	7.2	< 0.001	0.253	0.0035	< 0.0001	0.00944	< 0.001	0.317	< 0.01
V6A	N > DL	3	13	10	14	0	5	1	14	10	10	5	12	13	14	12	14	14	10	14	10	10	0	10	9	14	3	14	3	10	14	1	14	5
V6A	Median	0.000006	0.0245	0.000875	0.0383	0.05	0.00002	0.000005	39.5	0.0000705	0.000045	0.0002	0.001	0.0685	0.565	0.0012	9.475	0.005035	0.000185	1.985	0.00053	0.000594	0.15	0.00007	0.000185	5.24	0.00001	0.17	0.0006	0.000006	0.002835	0.0002	0.0385	0.0002

AECOM

Appendix 6
2008 Surface Water Quality Data
Vangorda Creek Drainage

Table 3. Surface Water Dissolved Metals

Station	Date	AG-D mg/L	AL-D mg/L	AS-D mg/L	BA-D mg/L	B-D mg/L	BE-D mg/L	BI-D mg/L	CA-D mg/L	CD-D mg/L	CO-D mg/L	CR-D mg/L	CU-D mg/L	FE-D mg/L	K-D mg/L	LI-D mg/L	MG-D mg/L	MN-D mg/L	MO-D mg/L	NA-D mg/L	NI-D mg/L	PB-D mg/L	P-D mg/L	SB-D mg/L	SE-D mg/L	SI-D mg/L	SN-D mg/L	SR-D mg/L	TI-D mg/L	TL-D mg/L	U-D mg/L	V-D mg/L	ZN-D mg/L	ZR-D mg/L
V8	07-Jan-08	< 0.00025	< 0.005	< 0.001	0.062	< 0.05	< 0.001	< 0.001	70.8	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1.1	0.004	29.5	0.01	0.0009	3.82	0.001	< 0.001	< 0.15	< 0.001	0.001	4.2	< 0.001	0.31	< 0.001	< 0.0001	0.0055	< 0.001	0.017	< 0.01
V8	18-Feb-08	< 0.00025	< 0.005	< 0.001	0.065	< 0.05	< 0.001	< 0.001	73.7	< 0.0002	< 0.001	0.001	< 0.001	< 0.05	0.9	0.004	32.4	0.016	0.0011	4.1	0.002	< 0.001	< 0.15	< 0.001	< 0.001	5.1	< 0.001	0.31	< 0.001	< 0.0001	0.0048	0.003	0.02	< 0.01
V8	17-Mar-08	< 0.00025	< 0.005	< 0.001	0.071	< 0.05	< 0.001	< 0.001	78.6	< 0.0002	< 0.001	< 0.001	< 0.001	0.06	1.2	0.005	39.8	0.014	0.0012	5.2	0.002	< 0.001	< 0.15	< 0.001	0.002	5.2	< 0.001	0.32	< 0.001	< 0.0001	0.0075	< 0.001	0.011	< 0.01
V8	14-Apr-08	< 0.00025	< 0.005	< 0.001	0.072	< 0.05	< 0.001	< 0.001	78.8	< 0.0002	< 0.001	< 0.001	< 0.001	0.08	1.3	0.005	37.9	0.012	0.0013	5.05	0.002	< 0.001	< 0.15	< 0.001	0.001	4.3	< 0.001	0.35	< 0.001	< 0.0001	0.0076	< 0.001	0.005	< 0.01
V8	14-May-08	< 0.00025	0.013	< 0.001	0.037	< 0.05	< 0.001	< 0.001	37.1	< 0.0002	< 0.001	< 0.001	0.003	0.09	1.1	0.002	15.2	0.014	0.0006	1.84	0.002	< 0.001	< 0.15	< 0.001	< 0.001	3.1	< 0.001	0.13	< 0.001	< 0.0001	0.0024	< 0.001	0.009	< 0.01
V8	16-Jun-08	< 0.00025	0.009	< 0.001	0.029	< 0.05	< 0.001	< 0.001	32	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.5	0.001	10.6	0.086	< 0.0005	1.55	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.2	< 0.001	0.12	< 0.001	< 0.0001	0.0012	< 0.001	0.018	< 0.01
V8	14-Jul-08	< 0.00025	0.023	< 0.001	0.036	< 0.05	< 0.001	< 0.001	39.8	< 0.0002	< 0.001	< 0.001	0.002	0.18	0.6	0.004	12.5	0.007	< 0.0005	1.86	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4.1	< 0.001	0.15	< 0.001	< 0.0001	0.0017	< 0.001	0.007	< 0.01
V8	11-Aug-08	< 0.00025	< 0.005	< 0.001	0.053	< 0.05	< 0.001	< 0.001	68.1	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.8	0.003	20.3	0.01	0.0005	2.59	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.1	< 0.001	0.25	< 0.001	< 0.0001	0.0027	< 0.001	0.011	< 0.01
V8	15-Sep-08	< 0.00025	0.009	< 0.001	0.04	< 0.05	< 0.001	< 0.001	38.1	< 0.0002	< 0.001	< 0.001	0.001	0.07	0.6	0.002	14.5	0.011	0.0005	2.15	0.001	< 0.001	< 0.15	< 0.001	< 0.001	4	< 0.001	0.19	< 0.001	< 0.0001	0.003	< 0.001	0.005	< 0.01
V8	15-Oct-08	< 0.00025	0.01	< 0.001	0.044	< 0.05	< 0.001	< 0.001	46.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.6	0.003	16.5	0.01	0.0009	2.15	0.001	< 0.001	< 0.15	< 0.001	< 0.001	4	< 0.001	0.19	< 0.001	< 0.0001	0.0032	< 0.001	0.007	< 0.01
V8	03-Nov-08	< 0.00025	0.051	< 0.001	0.057	< 0.05	< 0.001	< 0.001	60.2	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	0.9	0.003	25.9	0.006	0.0008	3.27	0.002	< 0.001	< 0.15	< 0.001	0.002	4.5	< 0.001	0.26	< 0.001	< 0.0001	0.0047	< 0.001	0.006	< 0.01
V8	01-Dec-08	< 0.00025	0.015	< 0.001	0.065	< 0.05	< 0.001	< 0.001	76.7	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1.1	0.004	33.1	0.01	0.0011	3.88	0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.5	< 0.001	0.31	< 0.001	< 0.0001	0.0054	< 0.001	0.033	< 0.01
V8	MEAN	0.00025	0.013	0.001	0.053	0.05	0.001	0.001	58.4	0.0002	0.001	0.001	0.0013	0.069	0.89	0.0033	24.0	0.017	0.00083	3.12	0.0015	0.001	< 0.15	0.001	0.0012	4.3	0.001	0.24	0.001	0.0001	0.0041	0.0012	0.012	0.01
V8	MINIMUM	< 0.00025	< 0.005	< 0.001	0.029	< 0.05	< 0.001	< 0.001	32	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.5	0.001	10.6	0.006	< 0.0005	1.55	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.1	< 0.001	0.12	< 0.001	< 0.0001	0.0012	< 0.001	0.005	< 0.01
V8	MAXIMUM	< 0.00025	0.051	< 0.001	0.072	< 0.05	< 0.001	< 0.001	78.8	< 0.0002	< 0.001	< 0.001	0.003	0.18	1.3	0.005	39.8	0.086	0.0013	5.2	0.002	< 0.001	< 0.15	< 0.001	0.002	5.5	< 0.001	0.35	< 0.001	< 0.0001	0.0076	0.003	0.033	< 0.01
V8	N > DL	0	7	0	12	0	0	0	12	0	0	1	4	5	12	12	12	12	10	12	10	0	0	0	4	12	0	12	0	0	12	1	12	0
V8	Median	0.00025	0.009	0.001	0.055	0.05	0.001	0.001	64.15	0.0002	0.001	0.001	0.001	0.05	0.9	0.0035	23.1	0.0105	0.00085	2.93	0.0015	0.001	0.15	0.001	0.001	4.15	0.001	0.255	0.001	0.0001	0.00395	0.001	0.01	0.01
V15	07-Jan-08	< 0.00025	< 0.005	0.001	0.048	< 0.05	< 0.001	< 0.001	315	0.0009	< 0.001	< 0.001	0.002	0.15	4.9	0.014	242	0.009	0.0007	11.5	0.051	< 0.001	< 0.15	< 0.001	0.003	5.7	< 0.001	1.24	< 0.001	< 0.0001	0.04	0.001	0.85	< 0.01
V15	20-Jan-08	< 0.00025	< 0.005	< 0.001	0.051	< 0.05	< 0.001	< 0.001	338	0.0012	< 0.001	< 0.001	0.003	0.18	5.5	0.022	253	0.002	0.0008	12	0.069	< 0.001	< 0.15	< 0.001	0.003	7.3	< 0.001	1.44	< 0.001	< 0.0001	0.039	0.002	1.11	< 0.01
V15	14-Feb-08	< 0.00025	< 0.005	< 0.001	0.045	< 0.05	< 0.001	< 0.001	331	0.001	< 0.001	< 0.001	0.003	< 0.05	4.3	0.014	276	0.002	0.0014	12.1	0.052	< 0.001	< 0.15	< 0.001	0.001	5.8	< 0.001	1.13	< 0.001	0.0001	0.051	< 0.001	0.9	< 0.01
V15	19-Feb-08	< 0.00025	0.005	< 0.001	0.044	< 0.05	< 0.001	< 0.001	375	0.0007	< 0.001	0.001	0.003	< 0.05	4.8	0.014	299	< 0.001	0.0011	11.8	0.05	< 0.001	< 0.15	< 0.001	< 0.001	6.8	< 0.001	1.25	< 0.001	< 0.0001	0.031	0.001	0.8	< 0.01
V15	10-Mar-08	< 0.00025	< 0.005	< 0.001	0.047	< 0.05	< 0.001	< 0.001	380	0.0011	< 0.001	< 0.001	0.004	< 0.05	5.2	0.018	310	0.001	0.0011	13.5	0.062	< 0.001	< 0.15	< 0.001	0.002	6.8	< 0.001	1.22	< 0.001	< 0.0001	0.045	< 0.001	1.04	< 0.01
V15	17-Mar-08	< 0.00025	< 0.005	0.001	0.047	< 0.05	< 0.001	< 0.001	314	0.0009	< 0.001	< 0.001	0.003	< 0.05	4.5	0.011	321	0.005	0.0008	14.3	0.054	< 0.001	< 0.15	< 0.001	0.002	6.3	< 0.001	1.16	< 0.001	< 0.0001	0.051	< 0.001	0.83	< 0.01
V15	02-Apr-08	< 0.00025	< 0.005	< 0.001	0.049	< 0.05	< 0.001	< 0.001	333	0.0011	< 0.001	< 0.001	0.002	< 0.05	5.3	0.017	276	< 0.001	0.001	12	0.058	< 0.001	< 0.15	< 0.001	0.002	6.2	< 0.001	1.36	< 0.001	< 0.0001	0.047	< 0.001	0.9	< 0.01
V15	15-Apr-08	< 0.00025	< 0.005	0.001	0.052	< 0.05	< 0.001	< 0.001	331	0.0011	< 0.001	< 0.001	0.002	0.09	5.2	0.018	291	< 0.001	0.0011	13.9	0.058	< 0.001	< 0.15	< 0.001	0.002	6.5	< 0.001	1.48	< 0.001	< 0.0001	0.046	< 0.001	0.95	< 0.01
V15	06-May-08	< 0.00025	< 0.005	< 0.001	0.037	< 0.05	< 0.001	< 0.001	174	0.0002	< 0.001	< 0.001	< 0.001	< 0.05	2.9	0.008	145	0.011	0.0009	6.72	0.012	< 0.001	< 0.15	< 0.001	0.003	4	< 0.001	0.6	< 0.001	< 0.0001	0.014	< 0.001	0.17	< 0.01
V15	14-May-08	< 0.00025	< 0.005	< 0.001	0.03	< 0.05	< 0.001	< 0.001	187	0.0003	< 0.001	< 0.001	0.001	< 0.05	3	0.009	134	0.004	0.0008	5.6	0.015	< 0.001	< 0.15	< 0.001	0.002	4.1	< 0.001	0.69	< 0.001	< 0.0001	0.015	< 0.001	0.33	< 0.01
V15	04-Jun-08	< 0.00025	< 0.005	< 0.001	0.041	< 0.05	< 0.001	< 0.001	260	0.0007	< 0.001	< 0.001	0.002	< 0.05	3.9	0.012	225	0.001	0.0009	9.69	0.039	< 0.001	< 0.15	< 0.001	0.003	4.9	< 0.001	1.04	< 0.001	< 0.0001	0.024	< 0.001	0.75	< 0.01
V15	17-Jun-08	< 0.00025	< 0.005	< 0.001	0.044	< 0.05	< 0.001	< 0.001	309	0.0007	< 0.001	< 0.001	0.002	< 0.05	4.4	0.012	250	0.002	0.0009	11.3	0.035	< 0.001	< 0.15	< 0.001	0.002	7.1	< 0.001	1.09	< 0.001	< 0.0001	0.028	< 0.001	0.79	< 0.01
V15	03-Jul-08	< 0.00025	0.007	< 0.001	0.043	< 0.05	< 0.001	< 0.001	350	0.0006	< 0.001	< 0.001	0.002	< 0.05	3.5	0.013	301	< 0.001	< 0.0005	8.53	0.04	< 0.001	< 0.15	< 0.001	0.003	4.5	< 0.001	1.04	< 0.001	< 0.0001	0.032	< 0.001	1.01	< 0.01
V15	15-Jul-08	< 0.00025	0.009	< 0.001	0.042	< 0.05	< 0.001	< 0.001	317	0.0006	< 0.001	< 0.001	0.002	1.07	3.9	0.017	249	0.003	0.0009	9.72	0.034	< 0.001	< 0.15	< 0.001	0.002	5.9	< 0.001	0.98	< 0.001	< 0.0001	0.03	< 0.001	0.76	< 0.01
V15	04-Aug-08	< 0.00025	0.008	0.001	0.046	< 0.05	< 0.001	< 0.001	368	0.0009	< 0.001	< 0.001	0.002	< 0.05	4.6	0.013	288	0.004	0.0007	12.3	0.042	< 0.001	< 0.15	< 0.001	0.002	6.2	< 0.001	1.18	< 0.001	< 0.0001	0.034	< 0.001	0.98	< 0.01
V15	12-Aug-08	< 0.00025	< 0.005	< 0.001	0.046	< 0.05	< 0.001	< 0.001	391	0.0008	< 0.001	< 0.001	0.002	0.07	4.9	0.012	312	0.001	0.0007	12	0.042	< 0.001	< 0.15	< 0.001	0.001	6.4	< 0.001	1.24	< 0.001	< 0.0001	0.038	< 0.001	0.95	< 0.01
V15	09-Sep-08	< 0.00025	0.018	< 0.001	0.054	< 0.05	< 0.001	< 0.001	374	0.0009	< 0.001	< 0.001	0.002	0.19	4.6	0.016	292	0.007	0.0008	15.4	0.058	< 0.001	< 0.15	< 0.001	0.002	8.3	< 0.001	1.19	< 0.001	< 0.0001	0.037	< 0.001	1.19	< 0.01
V15	15-Sep-08	< 0.00025	< 0.005	< 0.001	0.055	< 0.05	< 0.001	< 0.001	365	0.001	< 0.001	< 0.001	0.002	0.06	4.5	0.014	292	0.002	0.001	11.4	0.049	< 0.001	< 0.15	< 0.001	0.001	6.3	< 0.001	1.15	< 0.001	< 0.0001	0.05	< 0.001	1.08	< 0.01
V15	01-Oct-08	< 0.00025	0.026	< 0.001	0.051	< 0.05	< 0.001	< 0.001	389	0.0011	< 0.001	< 0.001	0.002	< 0.05	4.8	0.018	286	< 0.001	0.0007	11.5	0.06	< 0.001	< 0.15	< 0.001	0.002	7.2	< 0.001	1.43	< 0.001	< 0.0001	0.04	< 0.001	1.43	< 0.01
V15	15-Oct-08	< 0.00025	0.012	< 0.001	0.045	< 0.05	< 0.001	< 0.001	374	0.001	< 0.001	< 0.001	0.002	< 0.05	4.8	0.016	303	0.004	0.0007	9.23	0.05	< 0.001	< 0.15	< 0.001	0.003	6.9	< 0.001	1.3	< 0.001	< 0.0001	0.033	< 0.001	1.23	< 0.01
V15	03-Nov-08	< 0.00025	0.12	< 0.001	0.046	< 0.05	< 0.001	< 0.001	405	0.0012	< 0.001	< 0.001	0.002	0.2	4.6	0.015	341	0.004	0.0008	14.1	0.06	< 0.001	< 0.15	< 0.001	0.002	7.3	< 0.001	1.17	< 0.001	< 0.0001	0.038	< 0.001	1.5	< 0.01
V15	13-Nov-08	< 0.00025	0.009	< 0.001	0.058	< 0.05	< 0.001	< 0.001	419	0.0012	< 0.001	< 0.001	0.004	< 0.05	5.7	0.018	347	0.002	0.0006	13.2	0.06	< 0.001	< 0.15	< 0.001	0.002	6.9	< 0.001	1.6	< 0.001	< 0.0001	0.045	< 0.001	1.22	< 0.01
V15	02-Dec-08	< 0.00025	0.013	< 0.001	0.06	< 0.05	< 0.001	< 0.001	420	< 0.0002	< 0.001	< 0.001	0.002	0.42	5.6	0.019	360	0.009	0.0005	15.5	0.072	< 0.001	< 0.15	< 0.001	< 0.001	7.7	< 0.001	1.51	< 0.001	< 0.0001	0.035	0.001	1.53	< 0.01
V15	10-Dec-08	< 0.00025	0.008	< 0.001	0.054	< 0.05	< 0.001	< 0.001	437	0.0012	< 0.001	< 0.001	0.004	< 0.05	6	0.019	375	0.003	0.0006	14	0.067	0.001	< 0.15	< 0.001	0.003	6.7	< 0.001	1.52	< 0.001	< 0.0001	0.044	< 0.001	1.29	< 0.01
V15	MEAN	0.00025	0.013	0.001	0.047	0.05	0.001	0.001	344	0.0009	0.001	0.001	0.0023	0.13	4.64	0.015	282	0.0034	0.00083	11.7	0.050	0.001	0.15	0.001	0.0021	6.33	0.001	1.21	0.001	0.0001	0.037	0.0010	0.98	0.01
V15	MINIMUM	< 0.00025	< 0.005	< 0.001	0.03	< 0.05	< 0.001	< 0.001	174	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	2.9	0.008	134	< 0.001	< 0.0005	5.6	0.012	< 0.001	< 0.15	< 0.001	< 0.001	4	< 0.001	0.6	< 0.001	< 0.0001	0.014	< 0.001	0.17	< 0.01
V15	MAXIMUM	< 0.00025	0.12	< 0.001	0.06	< 0.05	< 0.001	< 0.001	437	0.0012	< 0.001	< 0.001	0.004	1.07	6	0.022	375	0.011	0.0014	15.5	0.072	< 0.001	< 0.15	< 0.001	0.003	8.3	< 0.001	1.6	< 0.001	< 0.0001	0.051	0.002	1.53	< 0.01
V15	N > DL	0	11	4	24	0	0	0	24	23	0	1	23	9	24	24	24	19	23	24	24	1	0	0	22	24	0	24	0	1	24	4	24	0
V15	Median	0.00025	0.005	0.001	0.0465	0.05	0.001	0.001	357.5	0.0009	0.001	0.001	0.002	0.05	4.7	0.0145	291.5	0.002	0.0008	12	0.0515	0.001	0.15	0.001	0.002	6.45	0.001	1.205	0.001	0.0001	0.038	0.001	0.965	0.01
V16	01-Jun-08	< 0.00025	< 0.005	< 0.001	0.042	< 0.05	< 0.001	< 0.001	286	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	5	0.007	332	0.039	0.0005	10	0.003	< 0.001	< 0.15	< 0.001	0.003	4.1	< 0.001	1.14	< 0.001	< 0.0001	0.02	< 0.001	0.026	< 0.01
V16	29-Sep-08	< 0.00025	0.01	< 0.001	0.047	< 0.05	< 0.001	< 0.001	353	0.0002	< 0.001	< 0.001	0.003	0.01	5.7	0.011	413	0.029	< 0.0005	17.1	0.003	0.002	< 0.15	< 0.001	0.004	5.2	< 0.001	1.14	< 0.001	< 0.0001	0.044	< 0.001	0.01	< 0.01
V17A	01-Jun-08	< 0.00025	0.049	0.001	0.014	< 0.05	< 0.001	< 0.001	9.39	< 0.0002	< 0.001	< 0.001	< 0.001	0.06	0.3	< 0.001	2.57	0.015	< 0.0005	1.08	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3.6	< 0.001	0.039	< 0.001	< 0.0001	0.0006	< 0.001	0.026	< 0.01
V17A	29-Sep-08	< 0.00025	0.037	< 0.001	0.018	< 0.05	< 0.001	< 0.001	21.8	< 0.0002	< 0.001	< 0.001	< 0.001	0.09	0.3	< 0.001	9.17	0.026	< 0.0005	1.69	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.2	< 0.001	0.092	< 0.001	< 0.0001	0.0011	< 0.001	0.11	< 0.01
V19	01-Jun-08	< 0.00025	< 0.005	< 0.001	0.025	< 0.05	< 0.001	< 0.001	10.7	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.3	< 0.001	3.87	< 0.001	< 0.0005	1.23	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.4	< 0.001	0.052	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
V19	29-Sep-08	< 0.00025	< 0.005	< 0.001	0.05	< 0.05	< 0.001	< 0.001	24.9	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	0.5	0.001	8.67	< 0.001	< 0.0005	2.09	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.6	< 0.001	0.13	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
V20	01-Jun-08	< 0.00025	0.01	< 0.001	0.024	< 0.05	< 0.001	< 0.001	13.1	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	0.3	0.001	4.24	0.004	< 0.0005	1.31	0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.4	< 0.001	0.062	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
V20	29-Sep-08	< 0.00025	0.022	< 0.001	0.035	< 0.05	< 0.001	< 0.001	24.3	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	0.4	0.002	7.65	0.003	< 0.0005	1.9	< 0.001	< 0.001	< 0.15	< 0.001	0.001	5.6	< 0.001	0.13	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
V22	10-Mar-08	< 0.00025	1.31	0.001	0.023	< 0.05	< 0.001	< 0.001	157	0.115	0.46	< 0.001	0.51	10.2	2.5	0.036	74.6	30.4	0.0022	4.75	0.42	0.26	< 0.15	< 0.001	0.002	4.9	< 0.001	0.83	< 0.001	0.0018	0.0032	< 0.001	111	< 0.01
V22	10-Jun-08	0.0016	1.99	0.001	0.023	< 0.05	< 0.001	< 0.001	105	0.101	0.37	< 0.001	0.97	15.6	1.6	0.025	56.6	23.1	0.0021	2.44	0.31	0.26	< 0.15	< 0.001	0.001	3	< 0.001	0.54	< 0.001	0.0008	0.0038	< 0.001	93.6	< 0.01
V22	02-Sep-08	< 0.00025	1.65	< 0.001	0.017	< 0.05	< 0.001	< 0.001	212	0.126	0.6	< 0.001	0.66	9.13	2.8	0.044	94.9	41.7	0.0025	4.2	0.51	0.16	< 0.15	< 0.001	< 0.001	3.6	< 0.001	1.06	< 0.001	0.0017	0.0031	< 0.001	139	< 0.01
V22	02-Dec-08	< 0.00025	0.012	< 0.001	0.055	< 0.05	< 0.001	< 0.001	94.5	0.023	0.11	< 0.001	0.026	0.09	2	0.018	30.8	7.64	< 0.0005	4.5	0.14	< 0.001	< 0.15	0.001	< 0.001	8.1	< 0.001	0.46	< 0.001	0.0011	0.0008	< 0.001	26.5	< 0.01
V22	MEAN	0.0016	1.24	0.001	0.030	0.05	0.001	0.001	142	0.091	0.385	0.001	0.54	8.76	2.23	0.031	64.2	25.7	0.0023	3.97	0.35	0.23	0.15	0.001	0.0015	4.9	0.001	0.72	0.001	0.00135	0.0027	0.001	92.5	0.01
V22	MINIMUM	< 0.00025	0.012	< 0.001	0.017	< 0.05	< 0.001	< 0.001	94.5	0.023	0.11	< 0.001	0.026	0.09	1.6	0.018	30.8	7.64	< 0.0005	2.44	0.14	0.16	< 0.15	0.001	< 0.001	3	< 0.001	0.46	< 0.001	0.0008	0.0008	< 0.001	26.5	< 0.01
V22	MAXIMUM	0.0016	1.99	0.001	0.055	< 0.05	< 0.001	< 0.001	212	0.126	0.6	< 0.001	0.97	15.6	2.8	0.044	94.9	41.7	0.0025	4.75	0.51	0.26	< 0.15	0.001	0.002	8.1	< 0.001	1.06	< 0.001	0.0018	0.0038	< 0.001	139	< 0.01
V22	N > DL	1	4	2	4	0	0	0	4	4	4	0	4	4	4	4	4	4	3	4	4	3	0	1	2	4	0	4	0	4	4	0	4	0
V22	Median	0.00025	1.48	0.001	0.023	0.05	0.001	0.001	131	0.108	0.415	0.001	0.585	9.67	2.25	0.0305	65.6	26.75	0.0022	4.35	0.365	0.26	0.15	0.001	0.0015	4.25	0.001	0.685	0.001	0.0014	0.00315	0.001	102.3	0.01
V23	10-Mar-08	< 0.00025	< 0.005	< 0.001	0.049	< 0.05	< 0.001	< 0.001	119	0.002	0.006	< 0.001	0.004	< 0.05	3.6	0.025	72	0.15	0.0029	12.3	0.17	< 0.001	< 0.15	0.004	0.002	3.7	< 0.001	0.8	< 0.001	0.001	0.0087	< 0.001	5.9	< 0.01
V23	10-Jun-08	< 0.00025	0.008	< 0.001	0.031	< 0.05	< 0.001	< 0.001	78	0.0016	0.003	< 0.001	0.002	< 0.05	2.1	0.017	50.4	0.07	0.0017	7.1	0.12	< 0.001	< 0.15	0.003	0.001	2.3	< 0.001	0.53	< 0.001	0.0005	0.0062	< 0.001	4.66	< 0.01
V23	02-Sep-08	< 0.00025	0.008	< 0.001	0.063	< 0.05	< 0.001	< 0.001	108	0.0017	0.004	< 0.001	0.002	< 0.05	2.9	0.022	62.6	0.15	0.0024	8.92	0.14	< 0.001	< 0.15	0.003	< 0.001	2.8	< 0.001	0.75	< 0.001	0.0004	0.0085	< 0.001	5.51	< 0.01
V23	02-Dec-08	< 0.00025	0.025	< 0.001	0.07	< 0.05	< 0.001	< 0.001	110	0.0005	0.005	< 0.001	0.001	0.12	2.8	0.021	66.1	0.22	0.0023	10.9	0.14	< 0.001	< 0.15	0.003	< 0.001	4	< 0.001	0.69	< 0.001	0.0003	0.0091	< 0.001	5.71	< 0.01
V23	MEAN	0.00025	0.014	0.001	0.053	0.05	0.001	0.001	104	0.0015	0.0045	0.001	0.0023	0.12	2.85	0.021	62.8	0.15	0.0023	9.81	0.14	0.001	0.15	0.0033	0.0015	3.2	0.001	0.69	0.001	0.00055	0.0081	0.001	5.45	0.01
V23	MINIMUM	< 0.00025	< 0.005	< 0.001	0.031	< 0.05	< 0.001	< 0.001	78	0.0005	0.003	< 0.001	0.001	< 0.05	2.1	0.017	50.4	0.07	0.0017	7.1	0.12	< 0.001	< 0.15	0.003	< 0.001	2.3	< 0.001	0.53	< 0.001	0.0003	0.0062	< 0.001	4.66	< 0.01
V23	MAXIMUM	< 0.00025	0.025	< 0.001	0.07	< 0.05	< 0.001	< 0.001	119	0.002	0.006	< 0.001	0.004	0.12	3.6	0.025	72	0.22	0.0029	12.3	0.17	< 0.001	< 0.15	0.004	0.002	4	< 0.001	0.8	< 0.001	0.001	0.0091	< 0.001	5.9	< 0.01
V23	N > DL	0	3	0	4	0	0	0	4	4	4	0	4	1	4	4	4	4	4	4	4	0	0	4	2	4	0	4	0	4	4	0	4	0
V23	Median	0.00025	0.008	0.001	0.056	0.05	0.001	0.001	109	0.00165	0.0045	0.001	0.002	0.12	2.85	0.0215	64.35	0.15	0.00235	9.91	0.14	0.001	0.15	0.003	0.0015	3.25	0.001	0.72	0.001	0.00045	0.0086	0.001	5.61	0.01

Appendix 6
2008 Surface Water Quality Data
Vangorda Creek Drainage

Table 3. Surface Water Dissolved Metals

Station	Date	AG-D mg/L	AL-D mg/L	AS-D mg/L	BA-D mg/L	B-D mg/L	BE-D mg/L	BI-D mg/L	CA-D mg/L	CD-D mg/L	CO-D mg/L	CR-D mg/L	CU-D mg/L	FE-D mg/L	K-D mg/L	LI-D mg/L	MG-D mg/L	MN-D mg/L	MO-D mg/L	NA-D mg/L	NI-D mg/L	PB-D mg/L	P-D mg/L	SB-D mg/L	SE-D mg/L	SI-D mg/L	SN-D mg/L	SR-D mg/L	TI-D mg/L	TL-D mg/L	U-D mg/L	V-D mg/L	ZN-D mg/L	ZR-D mg/L
V25BSP	07-Jan-08	< 0.00025	< 0.005	< 0.001	0.022	< 0.05	< 0.001	< 0.001	78.5	< 0.0002	< 0.001	< 0.001	0.002	0.08	1.1	0.002	15	0.005	< 0.0005	4.31	< 0.001	< 0.001	< 0.15	< 0.001	0.001	4.7	< 0.001	0.29	< 0.001	< 0.0001	0.0016	< 0.001	0.046	< 0.01
V25BSP	14-May-08	< 0.00025	0.026	< 0.001	0.019	< 0.05	< 0.001	< 0.001	32.9	< 0.0002	0.002	< 0.001	0.004	< 0.05	1.2	0.002	7.5	0.025	< 0.0005	1.69	0.001	< 0.001	< 0.15	< 0.001	< 0.001	2.3	< 0.001	0.11	< 0.001	< 0.0001	0.001	< 0.001	0.056	< 0.01
V25BSP	10-Jun-08	< 0.00025	0.01	< 0.001	0.05	< 0.05	< 0.001	< 0.001	158	0.0027	0.002	< 0.001	0.001	< 0.05	1.4	0.015	34.7	2.82	< 0.0005	2.92	0.002	< 0.001	< 0.15	< 0.001	< 0.001	2.1	< 0.001	0.6	< 0.001	0.0002	< 0.0005	< 0.001	0.096	< 0.01
V25BSP	16-Jun-08	< 0.00025	< 0.005	< 0.001	0.038	< 0.05	< 0.001	< 0.001	191	0.0023	0.001	< 0.001	0.002	< 0.05	1.4	0.016	41.4	2.92	< 0.0005	2.97	0.002	< 0.001	< 0.15	< 0.001	0.001	2.1	< 0.001	0.71	< 0.001	0.0004	< 0.0005	< 0.001	0.095	< 0.01
V25BSP	17-Jun-08	< 0.00025	< 0.005	< 0.001	0.035	< 0.05	< 0.001	< 0.001	180	0.0022	0.001	< 0.001	0.002	0.06	1.3	0.02	35.5	2.89	< 0.0005	2.67	0.002	< 0.001	< 0.15	< 0.001	0.001	1.7	< 0.001	0.64	< 0.001	0.0003	< 0.0005	< 0.001	0.079	< 0.01
V25BSP	24-Jun-08	< 0.00025	< 0.005	< 0.001	0.036	< 0.05	< 0.001	< 0.001	194	0.0015	< 0.001	< 0.001	0.002	< 0.05	1.5	0.018	38	1.83	< 0.0005	2.86	0.001	< 0.001	< 0.15	< 0.001	< 0.001	2.3	< 0.001	0.72	< 0.001	0.0004	< 0.0005	< 0.001	0.04	< 0.01
V25BSP	01-Jul-08	< 0.00025	0.013	< 0.001	0.032	< 0.05	< 0.001	< 0.001	146	0.0009	< 0.001	< 0.001	0.002	0.22	1.3	0.014	28.6	1.03	< 0.0005	2.72	0.002	< 0.001	< 0.15	< 0.001	0.001	2.9	< 0.001	0.55	< 0.001	0.0003	< 0.0005	< 0.001	0.033	< 0.01
V25BSP	08-Jul-08	< 0.00025	0.012	< 0.001	0.028	< 0.05	< 0.001	< 0.001	314	0.0015	< 0.001	< 0.001	< 0.001	< 0.05	2.2	0.034	53.8	1.03	< 0.0005	3.22	0.001	< 0.001	< 0.15	< 0.001	0.002	0.5	< 0.001	1.19	< 0.001	0.001	< 0.0005	< 0.001	0.01	< 0.01
V25BSP	14-Jul-08	< 0.00025	0.014	< 0.001	0.032	< 0.05	< 0.001	< 0.001	212	0.0005	< 0.001	< 0.001	0.002	0.71	1.5	0.024	36.1	0.2	< 0.0005	2.86	0.001	< 0.001	< 0.15	< 0.001	< 0.001	2.4	< 0.001	0.66	< 0.001	0.0003	< 0.0005	< 0.001	0.025	< 0.01
V25BSP	16-Jul-08	< 0.00025	0.016	< 0.001	0.032	< 0.05	< 0.001	< 0.001	183	0.0007	< 0.001	< 0.001	0.005	0.5	1.3	0.019	30.5	0.092	< 0.0005	2.68	0.002	< 0.001	< 0.15	< 0.001	< 0.001	3.1	< 0.001	0.55	< 0.001	0.0003	< 0.0005	< 0.001	0.079	< 0.01
V25BSP	22-Jul-08	< 0.00025	0.012	< 0.001	0.031	< 0.05	< 0.001	< 0.001	211	0.0014	0.001	< 0.001	0.005	< 0.05	1.5	0.02	41.1	1.46	< 0.0005	3.17	0.002	< 0.001	< 0.15	< 0.001	0.001	2.6	< 0.001	0.71	< 0.001	0.0005	< 0.0005	< 0.001	0.064	< 0.01
V25BSP	05-Aug-08	< 0.00025	0.007	< 0.001	0.036	< 0.05	< 0.001	< 0.001	299	0.0018	0.002	< 0.001	0.001	< 0.05	1.9	0.027	41.7	1.11	< 0.0005	3.77	0.002	< 0.001	< 0.15	< 0.001	0.002	1.8	< 0.001	0.98	< 0.001	0.0005	< 0.0005	< 0.001	0.15	< 0.01
V25BSP	11-Aug-08	< 0.00025	0.012	< 0.001	0.032	< 0.05	< 0.001	< 0.001	346	0.0003	< 0.001	< 0.001	< 0.001	0.11	2.1	0.025	38.2	0.16	< 0.0005	3.84	< 0.001	< 0.001	< 0.15	< 0.001	0.002	1.7	< 0.001	1.1	< 0.001	0.0004	< 0.0005	< 0.001	0.047	< 0.01
V25BSP	12-Aug-08	< 0.00025	0.01	< 0.001	0.036	< 0.05	< 0.001	< 0.001	310	0.0004	< 0.001	< 0.001	0.001	0.75	1.9	0.034	37.2	0.17	< 0.0005	3.69	0.001	< 0.001	< 0.15	< 0.001	0.003	2.3	< 0.001	1.08	< 0.001	0.0006	< 0.0005	< 0.001	0.042	< 0.01
V25BSP	19-Aug-08	< 0.00025	0.007	< 0.001	0.036	< 0.05	< 0.001	< 0.001	332	0.0002	< 0.001	< 0.001	0.001	0.71	2.3	0.032	35.3	0.069	< 0.0005	4.74	0.001	< 0.001	< 0.15	< 0.001	0.003	1.9	< 0.001	1.34	< 0.001	0.0005	< 0.0005	< 0.001	0.03	< 0.01
V25BSP	15-Sep-08	< 0.00025	0.01	< 0.001	0.024	< 0.05	< 0.001	< 0.001	85.9	< 0.0002	0.002	< 0.001	0.003	< 0.05	1	0.006	14	0.035	< 0.0005	3.21	0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.4	< 0.001	0.36	< 0.001	0.0002	0.0012	< 0.001	0.019	< 0.01
V25BSP	15-Oct-08	< 0.00025	0.019	< 0.001	0.025	< 0.05	< 0.001	< 0.001	70.7	< 0.0002	0.003	< 0.001	0.003	< 0.05	0.9	0.003	12.7	0.043	< 0.0005	3.51	0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.9	< 0.001	0.25	< 0.001	< 0.0001	0.0011	< 0.001	0.022	< 0.01
V25BSP	03-Nov-08	< 0.00025	0.024	< 0.001	0.026	< 0.05	< 0.001	< 0.001	88.7	0.0002	0.004	< 0.001	0.005	0.08	1.1	0.004	18.4	0.038	< 0.0005	4.82	0.002	< 0.001	< 0.15	< 0.001	0.001	5.8	< 0.001	0.31	< 0.001	< 0.0001	0.0017	< 0.001	0.033	< 0.01
V25BSP	02-Dec-08	< 0.00025	0.023	< 0.001	0.023	< 0.05	< 0.001	< 0.001	110	< 0.0002	0.002	< 0.001	0.004	0.12	1.2	0.004	23.9	0.024	0.0006	6.72	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.8	< 0.001	0.37	< 0.001	< 0.0001	0.0022	< 0.001	0.087	< 0.01
V25BSP	MEAN	0.00025	0.0124	0.0010	0.0312	0.05	0.001	0.001	186	0.0009	0.002	0.001	0.0025	0.20	1.48	0.017	30.7	0.84	0.00051	3.49	0.0014	0.001	0.15	0.001	0.0014	3.02	0.001	0.66	0.001	0.00034	0.00081	0.001	0.055	0.01
V25BSP	MINIMUM	< 0.00025	< 0.005	< 0.001	0.019	< 0.05	< 0.001	< 0.001	32.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.9	0.002	7.5	0.005	< 0.0005	1.69	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.5	< 0.001	0.11	< 0.001	< 0.0001	< 0.0005	< 0.001	0.01	< 0.01
V25BSP	MAXIMUM	< 0.00025	0.026	< 0.001	0.05	< 0.05	< 0.001	< 0.001	346	0.0027	0.004	< 0.001	0.005	0.75	2.3	0.034	53.8	2.92	0.0006	6.72	0.002	< 0.001	< 0.15	< 0.001	0.003	6.8	< 0.001	1.34	< 0.001	0.001	0.0022	< 0.001	0.15	< 0.01
V25BSP	N > DL	0	15	0	19	0	0	0	19	14	10	0	17	10	19	19	19	19	1	19	16	0	0	0	11	19	0	19	0	14	6	0	19	0
V25BSP	Median	0.00025	0.012	0.001	0.032	0.05	0.001	0.001	183	0.0005	0.001	0.001	0.002	0.06	1.4	0.018	35.3	0.17	0.0005	3.21	0.001	0.001	0.15	0.001	0.001	2.3	0.001	0.64	0.001	0.0003	0.0005	0.001	0.046	0.01
V27	23-Jan-08	< 0.000005	0.0028	0.00047	0.0584	< 0.005	< 0.00001	< 0.000005	63.8	0.000045	0.000013	< 0.0001	0.00052	0.007	0.78	0.0023	22.3	0.00101	0.00069	3.26	0.00059	0.000051		0.00011	0.0004	4.67	< 0.00001	0.222	< 0.0005	0.000008	0.00504	< 0.0002	0.0248	< 0.1
V27	20-Feb-08	< 0.000005	0.0033	0.00048	0.0592	< 0.005	< 0.00001	< 0.000005	64	0.000042	0.000012	< 0.0001	0.00038	0.003	0.84	0.0024	23.1	0.00033	0.00074	3.63	0.00066	0.000025		0.0001	0.00043	5	< 0.00001	0.23	< 0.0005	0.000006	0.00531	< 0.0002	0.0283	< 0.1
V27	13-Mar-08	< 0.000005	0.0029	0.0005	0.0633	< 0.005	< 0.00001	< 0.000005	69.5	0.000057	0.000013	0.0001	0.00047	0.003	0.89	0.0026	26.1	0.00038	0.00084	3.81	0.00065	0.000062		0.00011	0.00043	4.94	< 0.00001	0.256	< 0.0005	0.000008	0.00598	< 0.0002	0.0314	< 0.1
V27	28-Apr-08	< 0.000005	0.0057	0.00058	0.0595	< 0.005	< 0.00001	< 0.000005	77	0.000059	0.000017	< 0.0001	0.00056	0.01	1.01	0.0028	25.7	0.00093	0.00067	3.1	0.00073	0.000192		0.00013	0.00044	4.35	< 0.00001	0.275	0.0008	0.000009	0.00546	0.0003	0.0313	< 0.1
V27	21-May-08	< 0.000005	0.109	0.00076	0.0294	< 0.005	0.00002	0.00002	22.9	0.0001	0.000184	0.0002	0.0033	0.196	1.39	0.0014	7.87	0.00989	0.00031	1.62	0.00174	0.00164		0.00009	0.0002	4.07	0.00001	0.0885	0.0019	0.000021	0.0014	< 0.0002	0.0424	0.2
V27	19-Jun-08	< 0.000005	0.022	< 0.001	0.02	< 0.05	< 0.001	< 0.001	30.5	0.0002	< 0.001	< 0.001	0.001	0.05	0.5	0.002	6.6	0.17	< 0.0005	1.18	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	2.5	< 0.001	0.11	< 0.001	< 0.0001	0.0006	< 0.001	0.03	< 0.01
V27	24-Jun-08	< 0.000005	0.0588	0.00026	0.0202	< 0.005	0.00002	< 0.000005	22.1	0.000236	0.000098	0.0002	0.00146	0.056	0.49	0.0024	5.39	0.1	0.00015	1.19	0.00079	0.000566		0.00005	< 0.00004	2.99	< 0.00001	0.0872	0.0007	0.000029	0.000727	< 0.0002	0.0267	0.1
V27	29-Jul-08	< 0.000005	0.0202	0.00027	0.0456	< 0.005	< 0.00001	< 0.000005	83.1	0.000419	0	0.0001	0.00167	0.035	0.81	0.0069	19.4	0.317	0.00031	3.13	0.00137	0.000406		0.00007	0.00026	4.14	< 0.00001	0.297	< 0.0005	0.000109	0	< 0.0002	0.0706	< 0.1
V27	19-Aug-08	< 0.00025	0.011	< 0.001	0.041	< 0.05	< 0.001	< 0.001	84.5	< 0.0002	< 0.001	< 0.001	0.001	0.14	0.9	0.007	18.3	0.008	< 0.0005	2.77	< 0.001	< 0.001	< 0.15	< 0.001	0.001	4.3	< 0.001	0.33	< 0.001	< 0.0001	0.0017	< 0.001	0.025	< 0.01
V27	23-Sep-08	< 0.00025	0.01	< 0.001	0.026	< 0.05	< 0.001	< 0.001	26.5	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.4	0.001	9.68	0.006	< 0.0005	1.78	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.1	< 0.001	0.12	< 0.001	< 0.0001	0.002	< 0.001	0.021	< 0.01
V27	07-Oct-08	< 0.000005	0.015	0.0003	0.0231	< 0.005	< 0.00001	< 0.000005	10.2	< 0.000005	< 0.000005	0.003	< 0.00005	0.034	1.47	< 0.0005	0.06	< 0.00005	0.0011	2500	0.0091	0.00007		0.0003	0.0006	4.34	0.0002	0.129	0.02	< 0.000002	0	< 0.0002	0.001	< 0.1
V27	10-Dec-08	< 0.000005	0.0175	0.00043	0.0582	< 0.05	< 0.00001	< 0.000005	76.5	0.000065	0.000019	0.0002	0.00121	0.008	0.94	0.0027	32.5	0.00075	0.00071	3.45	0.00091	0.000145		0.00011	0.00063	4.96	0.01	0.269	< 0.0005	0.00001	0.00684	< 0.0002	0.038	< 0.0001
V27	MEAN	6.625E-05	0.023	0.0005875	0.042	0.02	0.0002592	0.000255	52.6	0.0001357	0.0002801	0.0005917	0.00105	0.0493	0.87	0.00283	16.4	0.0512	0.000585	211	0.00163	0.0005131	0.15	0.0003392	0.0005358	4.20	0.00111	0.201	0.00241	4.183E-05	0.0029	0.0004083	0.031	0.078
V27	MINIMUM	< 0.000005	0.0028	0.00026	0.02	< 0.005	< 0.00001	< 0.000005	10.2	< 0.000005	0	< 0.0001	< 0.00005	0.003	0.4	< 0.0005	0.06	< 0.00005	0.00015	1.18	0.00059	0.000025	< 0.15	0.00005	< 0.00004	2.5	< 0.00001	0.0872	< 0.0005	< 0.000002	0	< 0.0002	0.001	< 0.0001
V27	MAXIMUM	< 0.00025	0.109	< 0.001	0.0633	< 0.05	< 0.001	< 0.001	84.5	0.000419	< 0.001	0.003	0.0033	0.196	1.47	0.007	32.5	0.317	0.0011	2500	0.0091	0.00164	< 0.15	< 0.001	< 0.001	5	0.01	0.33	0.02	0.000109	0.00684	< 0.001	0.0706	0.2
V27	N > DL	0	12	9	12	0	2	1	12	9	8	6	10	11	12	11	12	11	9	12	9	9	0	9	9	12	3	12	4	8	12	1	12	2
V27	Median	0.000005	0.013	0.00049	0.0433	0.005	0.00001	0.000005	63.9	0.0000825	0.000018	0.0002	0.001	0.0345	0.865	0.0024	18.85	0.003505	0.000585	3.115	0.000955	0.000299	0.15	0.00011	0.000435	4.32	0.00001	0.226	0.00075	0.0000155	0.00185	0.0002	0.02915	0.1
V30	01-Jun-08	0.0016	0.006	0.003	0.015	< 0.05	< 0.001	< 0.001	393	0.143	3.12	< 0.001	0.003	211	8.9	0.068	658	203	0.024	8.98	4.9	< 0.001	< 0.15	< 0.001	0.008	9	< 0.001	1.51	< 0.001	0.0011	0.0046	< 0.001	655	< 0.01
V30	29-Sep-08	0.0011	0.02	0.002	0.012	< 0.05	< 0.001	< 0.001	370	0.125	3.61	< 0.001	0.002	190	11	0.091	857	189	0.016	15.4	6.96	< 0.001	< 0.15	< 0.001	0.008	8.4	< 0.001	1.65	< 0.001	0.0013	0.0047	< 0.001	564	< 0.01
V31	01-Jun-08	0.0012	0.75	0.002	0.01	< 0.05	< 0.001	< 0.001	349	0.121	1.86	< 0.001	0.008	108	8	0.033	459	126	0.014	10.1	2.45	0.007	< 0.15	< 0.001	0.006	8.9	< 0.001	1.13	< 0.001	0.001	0.0014	< 0.001	470	< 0.01
V31	29-Sep-08	0.0047	0.89	0.004	0.018	< 0.05	< 0.001	< 0.001	439	0.193	8.05	0.002	0.005	1630	14	0.13	1990	1070	0.103	14.1	5.91	0.003	< 0.15	< 0.001	0.014	10.9	< 0.001	1.57	< 0.001	0.0025	0.0044	< 0.001	2260	< 0.01
V32	01-Jun-08	0.027	691	0.017	0.005	< 0.05	0.02	< 0.001	437	6.36	26.6	0.018	0.035	5080	1.3	0.62	5770	4310	0.555	12	15	0.35	< 0.15	0.001	0.11	16	< 0.001	1.04	0.006	0.011	0.75	0.006	12500	< 0.01
V32	29-Sep-08	0.02	482	0.013	0.007	< 0.05	0.025	< 0.001	374	9.88	19.6	0.025	0.32	2710	0.6	0.88	3790	2320	0.281	7	16.7	1	< 0.15	0.002	0.074	13	< 0.001	0.75	0.005	0.0078	1.06	0.005	7380	< 0.01
V33	29-Sep-08	0.023	168	0.012	0.019	< 0.05	0.018	< 0.001	482	9.7	24.2	0.011	3.91	6090	5.8	0.76	6950	3360	0.431	7.4	22.2	0.76	< 0.15	< 0.001	0.072	6.5	< 0.001	2.86	0.002	0.0068	0.627	< 0.001	8280	0.02
VGMAIN	07-Jan-08	< 0.00025	0.005	< 0.001	0.053	< 0.05	< 0.001	< 0.001	58.1	< 0.0002	< 0.001	< 0.001	< 0.001	0.06	0.8	0.002	23	0.004	0.0006	3.1	0.001	< 0.001	< 0.15	< 0.001	0.001	3.7	< 0.001	0.25	< 0.001	< 0.0001	0.0052	< 0.001	0.012	< 0.01
VGMAIN	18-Feb-08	< 0.00025	< 0.005	< 0.001	0.06	< 0.05	< 0.001	< 0.001	62.9	< 0.0002	< 0.001	0.001	< 0.001	< 0.05	0.7	0.003	25.1	0.004	0.0007	3.48	0.002	< 0.001	< 0.15	< 0.001	< 0.001	5	< 0.001	0.25	< 0.001	< 0.0001	0.0045	0.003	0.01	< 0.01
VGMAIN	17-Mar-08	< 0.00025	< 0.005	< 0.001	0.069	< 0.05	< 0.001	< 0.001	70.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	1	0.003	33.5	0.003	0.0008	4.34	0.002	< 0.001	< 0.15	< 0.001	0.001	5	< 0.001	0.29	< 0.001	< 0.0001	0.0076	< 0.001	0.007	< 0.01
VGMAIN	14-Apr-08	< 0.00025	< 0.005	< 0.001	0.071	< 0.05	< 0.001	< 0.001	78.6	< 0.0002	< 0.001	< 0.001	< 0.001	0.13	1.1	0.003	36.8	0.004	0.0008	5	0.002	< 0.001	< 0.15	< 0.001	< 0.001	4.7	< 0.001	0.31	< 0.001	< 0.0001	0.0077	< 0.001	0.008	< 0.01
VGMAIN	14-May-08	< 0.00025	0.009	< 0.001	0.039	< 0.05	< 0.001	< 0.001	39.5	< 0.0002	< 0.001	< 0.001	0.002	< 0.05	1	0.002	16.2	0.025	< 0.0005	1.9	0.002	< 0.001	< 0.15	< 0.001	< 0.001	3.2	< 0.001	0.14	< 0.001	< 0.0001	0.003	< 0.001	0.013	< 0.01
VGMAIN	16-Jun-08	< 0.00025	0.012	< 0.001	0.028	< 0.05	< 0.001	< 0.001	33.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.5	0.002	10.3	0.12	< 0.0005	1.45	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3	< 0.001	0.13	< 0.001	< 0.0001	0.0011	< 0.001	0.024	< 0.01
VGMAIN	14-Jul-08	< 0.00025	0.013	< 0.001	0.035	< 0.05	< 0.001	< 0.001	43.5	< 0.0002	< 0.001	< 0.001	0.001	0.19	0.5	0.004	12.5	0.014	< 0.0005	1.72	0.001	< 0.001	< 0.15	< 0.001	< 0.001	4	< 0.001	0.16	< 0.001	< 0.0001	0.0017	< 0.001	0.01	< 0.01
VGMAIN	11-Aug-08	< 0.00025	< 0.005	< 0.001	0.052	< 0.05	< 0.001	< 0.001	75.6	< 0.0002	< 0.001	< 0.001	< 0.001	0.05	0.8	0.003	19.4	0.008	< 0.0005	2.42	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4	< 0.001	0.26	< 0.001	< 0.0001	0.0028	< 0.001	0.012	< 0.01
VGMAIN	15-Sep-08	< 0.00025	< 0.005	< 0.001	0.034	< 0.05	< 0.001	< 0.001	33.5	< 0.0002	< 0.001	< 0.001	0.001	< 0.05	0.5	0.002	12.1	0.01	< 0.0005	1.94	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4	< 0.001	0.16	< 0.001	< 0.0001	0.003	< 0.001	0.009	< 0.01
VGMAIN	15-Oct-08	< 0.00025	0.008	< 0.001	0.037	< 0.05	< 0.001	< 0.001	43.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.6	0.002	15.1	0.011	< 0.0005	2.01	< 0.001	< 0.001	< 0.15	< 0.001	0.001	4.1	< 0.001	0.17	< 0.001	< 0.0001	0.0033	< 0.001	0.008	< 0.01
VGMAIN	03-Nov-08	< 0.00025	0.011	< 0.001	0.049	< 0.05	< 0.001	< 0.001	55.1	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.7	0.002	22.5	0.018	0.0008	2.85	0.001	< 0.001	< 0.15	< 0.001	0.001	4.5	< 0.001	0.21	< 0.001	< 0.0001	0.0048	< 0.001	0.007	< 0.01
VGMAIN	01-Dec-08	< 0.00025	0.018	< 0.001	0.055	< 0.05	< 0.001	< 0.001	70	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.9	0.003	30.3	0.007	0.0007	3.5	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.9	< 0.001	0.27	< 0.001	< 0.0001	0.0059	< 0.001	< 0.005	< 0.01
VGMAIN	MEAN	0.00025	0.008	0.001	0.0485	0.05	0.001	0.001	55.3	0.0002	0.001	0.001	0.0010833	0.069	0.76	0.0026	21.4	0.019	0.0006167	2.81	0.0013	0.001	0.15	0.001	0.001	4.26	0.001	0.22	0.001	0.0001	0.0042	0.0012	0.010	0.01
VGMAIN	MINIMUM	< 0.00025	< 0.005	< 0.001	0.028	< 0.05	< 0.001	< 0.001	33.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	0.5	0.002	10.3	0.003	< 0.0005	1.45	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	3	< 0.001	0.13	< 0.001	< 0.0001	0.0011	< 0.001	< 0.005	< 0.01
VGMAIN	MAXIMUM	< 0.00025	0.018	< 0.001	0.071	< 0.05	< 0.001	< 0.001	78.6	< 0.0002	< 0.001	< 0.001	0.002	0.19	1.1	0.004	36.8	0.12	0.0008	5	0.002	< 0.001	< 0.15	< 0.001	< 0.001	5.9	< 0.001	0.31	< 0.001	< 0.0001	0.0077	0.003	0.024	< 0.01
VGMAIN	N > DL	0	7	0	12	0	0	0	12	0	0	1	3	4	12	12	12	12	6	12	7	0	0	0	4	12	0	12	0	0	12	1	11	0
VGMAIN	Median	0.00025	0.0065	0.001	0.0505	0.05	0.001	0.001	56.6	0.0002	0.001	0.001	0.001	0.05	0.75	0.0025	20.95	0.009	0.00055	2.635	0.001	0.001	0.15	0.001	0.001	4.05	0.001	0.23	0.001	0.0001	0.0039	0.001	0.0095	0.01

Notes:
Statistics only generated where there are more than 2 values in a data set

average average of values, including values less than detection limit as set to DL value if it is the DL value will be shown without the < symbol
minimum lowest value and will be least DL value if these are present in the data set
maximum highest vale
N > DL number of values measured that are above detection limits
median the median value of the data set - if it is a DL value will be shown without the < symbol
Detection Limit values used as the DL value in statistics contrasts with conversion to 0 for charts

Appendix 7

2008 Bioassay Results – Vangorda Creek Drainage

Anvil Range Mining Corporation
V2-Grab

ANV100

Rainbow Trout Bioassay
96-h LC50 %v/v: >100%

CANTEST Ltd.
4606 Canada Way
Burnaby, BC
Canada V5G 1K5
tel: 604 734-7276
fax: 604 731-2386
web: http://cantest.com

Cantest Sample # : 806120271 G# 90612090-- ANV100 Report # : 2-11-200-196-08-004

Sample Taken:	Jun. 10, 2008 1:00 PM	Sample pH:	7.8
Sample Collected By:	C. McKinnon, R. Meers	Sample Dissolved Oxygen:	10.1 mg/L
Sample Received:	Jun. 12, 2008	Sample Temperature:	14.5 °C
Start Date/Time:	Jun. 13, 2008 11:40 AM	Sample Conductance:	1402 µmho/cm

Conc. (%v/v)	Cond. (µmho/cm)	Temp. Initial (°C)	Temp. Final (°C)	pH Initial	pH Final	D.O. Initial (mg/L)	D.O. Final (mg/L)	Percent Mortality 24 hr	48 hr	72 hr	96 hr	Number of Mortalities
0	71	15.2	16.0	8.0	7.4	9.9	9.6	0	0	10	10	1
100	1403	14.5	15.6	8.0	8.2	10.2	9.9	0	0	10	10	1

Comments:
All surviving fish appeared and behaved normally during the test.

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	30 min.
Test Volume:	18 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.24 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

Weight (Mean + SD):	0.43 ± 0.11 g	Length (Mean + SD):	3.7 ± 0.3 cm
Weight (Range):	0.27– 0.63 g	Length (Range):	3.1– 4.2 cm

Reference Toxicant: Phenol
Test was conducted on: 06/04/2008
Test gave a 96-h LC50 of 11.4 (10.37, 12.53) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 16 mg $CaCO_3$/L Other parameters available on request

Test Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluent to Rainbow Trout, EPS 1/RM/13, Second Edition, December 2000. Results contained in this report refer only to the testing of samples as submitted.

Analyst **Verified By**

D. Martins J. Pickard

Anvil Range Mining Corporation

V2-Grab

Rainbow Trout Bioassay

96-h LC50 %v/v: >100%

CANTEST Ltd.

4606 Canada Way
Burnaby, BC
Canada V5G 1K5
tel: 604 734-7276
fax: 604 731-2386
web: http://cantest.com

Cantest Sample # : 809040532 G# 90904128 Report # : 2-11-200-196-08-008

Sample Taken:	Sep. 2, 2008 12:15 PM	Sample pH:	7.9
Sample Collected By:	C. McKinnon & R. Meers	Sample Dissolved Oxygen:	10.6 mg/L
Sample Received:	Sep. 4, 2008	Sample Temperature:	14.1 °C
Start Date/Time:	Sep. 5, 2008 2:18 PM	Sample Conductance:	1591 µmho/cm

Conc. (%v/v)	Cond. (µmho/cm)	Temp. Initial (°C)	Temp. Final (°C)	pH Initial	pH Final	D.O. Initial (mg/L)	D.O. Final (mg/L)	Percent Mortality 24 hr	48 hr	72 hr	96 hr	Number of Mortalities
0	25	14.9	14.5	7.3	7.0	10.0	10.2	0	0	0	0	0
100	1546	14.2	14.5	8.0	8.4	10.3	10.2	0	0	0	0	0

Comments:
All fish appeared and behaved normally during the test.

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	30 min.
Test Volume:	15 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.40 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

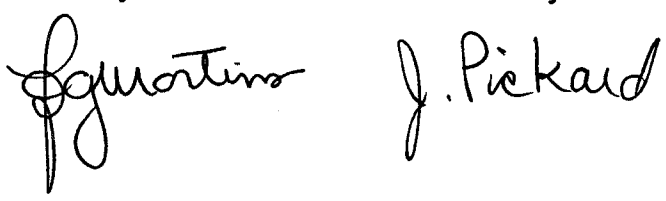
Weight (Mean + SD):	0.6 ± 0.12 g	Length (Mean + SD):	4.1 ± 0.2 cm
Weight (Range):	0.41– 0.82 g	Length (Range):	3.7– 4.4 cm

Reference Toxicant: Phenol
Test was conducted on: 08/08/2008
Test gave a 96-h LC50 of 12.71 (10.91, 15.66) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 24 mg $CaCO_3$/L Other parameters available on request

Test Method:
Biological Test Method: Reference Method for Determining Acute Lethality of Effluent to Rainbow Trout, EPS 1/RM/13, Second Edition, December 2000. Results contained in this report refer only to the testing of samples as submitted.

Analyst **Verified By**



Anvil Range Mining Corporation

V2-Grab

Rainbow Trout Bioassay

96-h LC50 %v/v: >100%

CANTEST Ltd.

4606 Canada Way
Burnaby, BC
Canada V5G 1K5
tel: 604 734-7276
fax: 604 731-2386
web: http://cantest.com

Cantest Sample # : 812050256 G# 91205070 ANV100 Report # : 2-11-200-196-08-014

Sample Taken:	Dec. 3, 2008 9:30 AM	Sample pH:	7.8
Sample Collected By:	C. McKinnon, R. Meers	Sample Dissolved Oxygen:	10.3 mg/L
Sample Received:	Dec. 5, 2008	Sample Temperature:	14.2 °C
Start Date/Time:	Dec. 8, 2008 9:16 AM	Sample Conductance:	1794 µmho/cm

Conc. (%v/v)	Cond. (µmho/cm)	Temp. Initial (°C)	Temp. Final (°C)	pH Initial	pH Final	D.O. Initial (mg/L)	D.O. Final (mg/L)	Percent Mortality 24 hr	48 hr	72 hr	96 hr	Number of Mortalities
0	43	14.0	14.1	7.5	7.6	10.4	10.3	0	0	0	0	0
100	1763	14.2	14.2	7.7	8.2	10.2	10.2	0	0	0	0	0

Comments:
At 48hr check one black fish was found in the 100% concentration. All other fish appeared and behaved normally during the test.

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	30 min.
Test Volume:	10 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.32 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

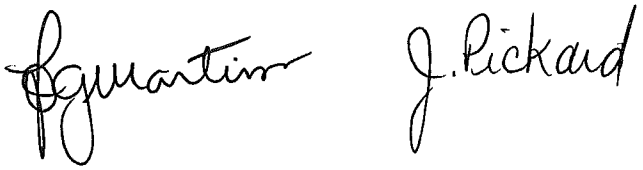
Weight (Mean + SD):	0.32 ± 0.03 g	Length (Mean + SD):	3.3 ± 0.1 cm
Weight (Range):	0.26– 0.4 g	Length (Range):	3.1– 3.6 cm

Reference Toxicant: Zinc
Test was conducted on: 12/08/2008
Test gave a 96-h LC50 of 0.09 (0.07, 0.11) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 11 mg $CaCO_3$/L Other parameters available on request

Test Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluent to Rainbow Trout, EPS 1/RM/13, Second Edition, December 2000. Results contained in this report refer only to the testing of samples as submitted.

Analyst **Verified By**



Anvil Range Mining Corporation
V25 BSP - Grab

Rainbow Trout Bioassay
96-h LC50 %v/v: >100%

CANTEST Ltd.
4606 Canada Way
Burnaby, BC
Canada V5G 1K5
tel: 604 734-7276
fax: 604 731-2386
web: http://cantest.com

Cantest Sample # : 806120273 G# 90612090 Report # : 2-11-200-196-08-005

Sample Taken:	Jun. 10, 2008 1:05 PM	Sample pH:	7.8
Sample Collected By:	C. McKinnon, R. Meers	Sample Dissolved Oxygen:	10.0 mg/L
Sample Received:	Jun. 12, 2008	Sample Temperature:	14.7 °C
Start Date/Time:	Jun. 13, 2008 11:40 AM	Sample Conductance:	1115 µmho/cm

Conc. (%v/v)	Cond. (µmho/cm)	Temp. Initial (°C)	Temp. Final (°C)	pH Initial	pH Final	D.O. Initial (mg/L)	D.O. Final (mg/L)	Percent Mortality 24 hr	48 hr	72 hr	96 hr	Number of Mortalities
0	71	15.2	16.0	8.0	7.4	9.9	9.6	0	0	10	10	1
100	1117	14.7	15.7	7.9	7.9	10.0	9.8	0	0	0	0	0

Comments:
All surviving fish appeared and behaved normally during the test.

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	30 min.
Test Volume:	18 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.24 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

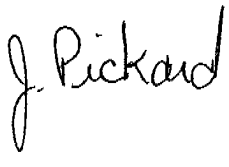
Weight (Mean + SD):	0.43 ± 0.11 g	Length (Mean + SD):	3.7 ± 0.3 cm
Weight (Range):	0.27– 0.63 g	Length (Range):	3.1– 4.2 cm

Reference Toxicant: Phenol
Test was conducted on: 06/04/2008
Test gave a 96-h LC50 of 11.4 (10.37, 12.53) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 16 mg $CaCO_3$/L Other parameters available on request

Test Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluent to Rainbow Trout, EPS 1/RM/13, Second Edition, December 2000. Results contained in this report refer only to the testing of samples as submitted.

Analyst **Verified By**



Anvil Range Mining Corporation

V25 BSP-Grab

Rainbow Trout Bioassay

96-h LC50 %v/v: >100%

CANTEST Ltd.
4606 Canada Way
Burnaby, BC
Canada V5G 1K5
tel: 604 734-7276
fax: 604 731-2386
web: http://cantest.com

Cantest Sample # : 809040536 G# 90904128 Report # : 2-11-200-196-08-009

Sample Taken:	Sep. 2, 2008 12:00 PM	Sample pH:	7.7
Sample Collected By:	C. McKinnon & R. Meers	Sample Dissolved Oxygen:	10.5 mg/L
Sample Received:	Sep. 4, 2008	Sample Temperature:	14.2 °C
Start Date/Time:	Sep. 5, 2008 2:17 PM	Sample Conductance:	576 µmho/cm

Conc. (%v/v)	Cond. (µmho/cm)	Temp. Initial (°C)	Temp. Final (°C)	pH Initial	pH Final	D.O. Initial (mg/L)	D.O. Final (mg/L)	Percent Mortality 24 hr	48 hr	72 hr	96 hr	Number of Mortalities
0	25	14.6	14.5	7.1	7.0	10.2	10.2	0	0	0	0	0
100	573	14.2	14.6	8.0	7.9	10.3	10.2	0	0	0	0	0

Comments:
All fish appeared and behaved normally during the test.

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	30 min.
Test Volume:	15 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.40 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

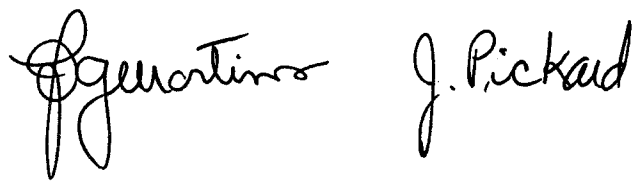
Weight (Mean + SD):	0.6 ± 0.12 g	Length (Mean + SD):	4.1 ± 0.2 cm
Weight (Range):	0.41– 0.82 g	Length (Range):	3.7– 4.4 cm

Reference Toxicant: Phenol
Test was conducted on: 08/08/2008
Test gave a 96-h LC50 of 12.71 (10.91, 15.66) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 24 mg $CaCO_3$/L Other parameters available on request

Test Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluent to Rainbow Trout, EPS 1/RM/13, Second Edition, December 2000. Results contained in this report refer only to the testing of samples as submitted.

Analyst **Verified By**



Anvil Range Mining Corporation

V25-Grab

Rainbow Trout Bioassay

96-h LC50 %v/v: >100%

CANTEST Ltd.

4606 Canada Way
Burnaby, BC
Canada V5G 1K5
tel: 604 734-7276
fax: 604 731-2386
web: http://cantest.com

Cantest Sample # : 812050257 G# 91205070 ANV100 Report # : 2-11-200-196-08-015

Sample Taken:	Dec. 3, 2008 10:00 AM	Sample pH:	7.6
Sample Collected By:	C. McKinnon, R. Meers	Sample Dissolved Oxygen:	10.2 mg/L
Sample Received:	Dec. 5, 2008	Sample Temperature:	14.1 °C
Start Date/Time:	Dec. 8, 2008 9:16 AM	Sample Conductance:	692 µmho/cm

Conc. (%v/v)	Cond. (µmho/cm)	Temp. Initial (°C)	Temp. Final (°C)	pH Initial	pH Final	D.O. Initial (mg/L)	D.O. Final (mg/L)	Percent Mortality 24 hr	48 hr	72 hr	96 hr	Number of Mortalities
0	44	14.0	14.1	7.8	7.8	10.4	10.3	0	0	0	0	0
100	682	14.0	14.1	7.6	8.0	10.4	10.3	0	10	10	10	1

Comments:
On Dec 10, 2008 at 8:50 AM one fish was found dead in the 100% concentration. All other and surviving fish appeared and behaved normally during the test.

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	30 min.
Test Volume:	10 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.32 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

Weight (Mean + SD):	0.32 ± 0.03 g	Length (Mean + SD):	3.3 ± 0.1 cm
Weight (Range):	0.26– 0.4 g	Length (Range):	3.1– 3.6 cm

Reference Toxicant: Zinc
Test was conducted on: 12/08/2008
Test gave a 96-h LC50 of 0.09 (0.07, 0.11) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 11 mg $CaCO_3$/L Other parameters available on request

Test Method:
Biological Test Method: Reference Method for Determining Acute Lethality of Effluent to Rainbow Trout, EPS 1/RM/13, Second Edition, December 2000. Results contained in this report refer only to the testing of samples as submitted.

Analyst **Verified By**

J. Martin 2008 Dec 18 J. Pickard

AECOM

Appendix 8

Biological and Sediment Monitoring Program at Rose and Anvil Creeks, Faro, YT, 2008

Laberge Environmental Services, January 2009

AECOM

Appendix 9

2008 Aquatic Life Sampling and Testing Program for the Anvil Range Minesite, Rose and Vangorda Creek Watersheds, Faro, Yukon

To Meet the Requirements of Water Licence QZ03-059
Conducted: During August 2008

Appendix 10

Anvil Range Mine Adaptive Management Plan – Annual Review for 2008

BIOLOGICAL AND SEDIMENT MONITORING PROGRAM

AT

ROSE AND ANVIL CREEKS, FARO, Y.T.
2008

Submitted to:

DELOITTE & TOUCHE INC

Prepared by:

B.E. Burns

Laberge ENVIRONMENTAL SERVICES

January 2009

Laberge
ENVIRONMENTAL SERVICES
P.O. Box 21072
Whitehorse, Y.T.
Y1A 6P7

E-mail: laberge@northwestel.net
Office Phone: 867-668-6838
Fax: 867-667-6956

LETTER OF TRANSMITTAL

January 12, 2009

Doug Sedgwick
Deloitte & Touche Ltd
30 Wellington St. West
P.O. Box 400 Stn. Commerce Court
Toronto, ON
M5L 1B1

Dear Doug:

Re: **Biological and Sediment Monitoring Programs at Rose and Anvil Creeks, Faro, YT, 2008**

We are pleased to submit herewith, the above report covering the environmental monitoring programs as stipulated in Water Licence Number QZ03-059. The above monitoring programs were completed in the summer of 2008 at the Faro Mine Site property and the receiving waters.

Water and stream sediment chemistry was generally of good quality for the support of freshwater aquatic life. Healthy communities of benthic invertebrates were present at each site.

Should you have any questions or comments on the report, please do not hesitate to contact the undersigned.

Sincerely,

Bonnie Burns
Laberge Environmental Services

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1.0 BACKGROUND

On August 16, 1994, Anvil Range Mining Corporation (Anvil) was officially assigned Licence Number IN89-001, which was originally issued to Curragh Resources Inc, by the Yukon Territory Water Board. On December 21, 1996, mining temporarily ceased but the mill continued to operate until March 1997. In late August 1997, mining resumed with milling commencing in October, however both operations shut down in late January 1998. Low metal prices (zinc and lead) and financial difficulties experienced by Anvil indicated that this closure had the potential to be long term. An amended water licence, number QZ95-003 was issued to Anvil on January 30, 1998. In April 1998, Deloitte and Touche Inc became the interim receivers for the Faro Mine property, operations and assets. They have also acted as caretakers of the site bearing responsibility for the requirements under the water licence. On March 30, 2004, Deloitte and Touche Inc was issued licence QZ03-059 to continue care and maintenance of the site and to conduct and/or manage additional studies and plans, for another five years.

To comply with Part G, Section 64, of the current licence a biological and sediment monitoring program is to be undertaken every two years on the Rose Creek system. The Licence states that three replicate samples of benthic macro-invertebrate fauna are to be collected from seven sites located on Rose and Anvil Creeks. These benthic organisms are to be identified, enumerated and the data evaluated. Stream sediment and water samples are to be collected concurrently.

Deloitte & Touche Inc contracted Laberge Environmental Services (LES) to conduct the final biological and sediment monitoring surveys under Licence QZ03-059. This report contains all data collected during the 2008 program. Some comparisons with past monitoring programs have been included.

2.0 STUDY AREA

The Faro mine site is located approximately 20 road kilometres north of the Town of Faro at approximately 62° 20' N and 133° 25' W (Figure 1).

The study area lies within the ecoregion Yukon Plateau - North. The mean annual temperature for this region is approximately –5°C with a summer mean of 10.5°C and a winter mean of -20°C. Northern boreal forests exist at elevations up to 1500 m asl. White and black spruce form the most common forest types with aspen and balsam poplar occupying disturbed areas. (Yukon Ecoregions Working Group, 2006).

The biological monitoring sites are established on Rose and Anvil Creeks at the following locations (Figure 1):

R1 Upstream of the confluence of the North Fork of Rose Creek and downstream of the dewatered freshwater reservoir.

R2 In the mixing zone downstream of the intersection of the Rose Creek diversion canal and the outlet of the tailings pond, just downstream of X-14.

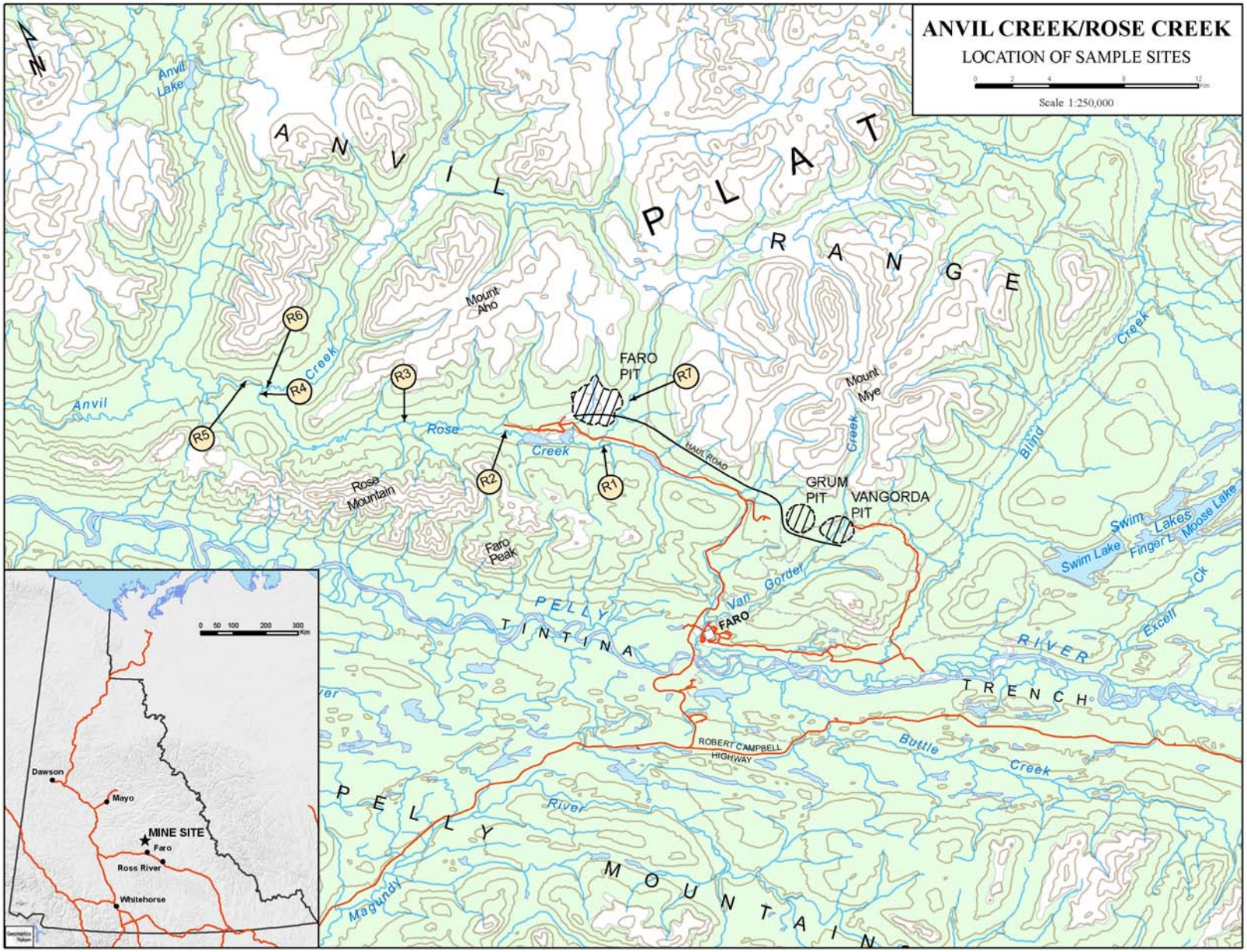
R3 Rose Creek approximately half way between the tailings pond outlet and Anvil Cr.

R4 Rose Creek just upstream of Anvil Creek.

R5 Anvil Creek approximately 200 metres downstream of Rose Creek.

R6 Anvil Creek immediately upstream of Rose Creek.

R7 North Fork of Rose Creek upstream of the confluence with the Faro Creek diversion.


ANVIL CREEK/ROSE CREEK
LOCATION OF SAMPLE SITES
Scale 1:250,000
N
Anvil Lake
ANVIL PLATEAU
RANGE
Mount Aho
Anvil Creek
R6
R4
R5
R3
Rose Creek
Rose Mountain
FARO PIT
R7
R2
R1
HAUL ROAD
Mount Mye
Blind Creek
GRUM PIT
VANGORDA PIT
Faro Peak
Swim Lake
Swim Lakes
Finger L
Moose Lake
Van Gorder Ck
Excell Ck
FARO
PELLY TINTINA TRENCH
RIVER
ROBERT CAMPBELL HIGHWAY
Buttle Creek
Pelly River
PELLY MOUNTAINS
Magundy
0 50 100 200 300 Km
Dawson
Mayo
MINE SITE
Faro
Ross River
Whitehorse

3.0 METHODS

The 2008 biological monitoring program consisted of an initial field survey conducted on July 21st to 23rd , to install the benthic invertebrate samplers and to collect water quality samples. The benthic invertebrate samplers at R1 and R2 were retrieved on August 25th. Water quality and stream sediment samples were collected at this time as well. Helicopter access was required for the sites situated on the lower mainstem of Rose Creek and the sites on Anvil Creek. Due to extreme weather events, a helicopter was not available until the following week. The samplers at the remaining five sites were retrieved on September 4th, and water quality and stream sediment samples were also collected.

3.1 Water Quality

Water quality samples were collected in a fast flowing section of the stream, upstream of the sediment and benthic sampler locations.

3.1.1 Field Measurements

In-situ measurements were taken at each site during both surveys. Conductivity and temperature were determined with a 3301 WTW conductivity meter. Dissolved oxygen readings and pH were obtained using an Orion 4 Star portable DO and pH meter. General site observations were made.

3.1.2 Chemical Analyses

All sample bottles were supplied by Maxxam Analytics Inc of Burnaby, B.C. At each site, the sample bottles were rinsed three times with the sample water prior to filling. Samples were collected in a one-litre plastic bottles for sulphate, alkalinity, total hardness, and nonfilterable residue analyses. Ammonia samples were collected in 120 mL plastic bottles and preserved with sulphuric acid. Samples to be analyzed for total metals and dissolved metals were collected in 120 mL plastic bottles. The total metals samples were preserved with nitric acid. The dissolved metals samples were filtered in the field prior to preservation with nitric acid. Samples were kept cool prior to shipment to Maxxam.

3.2 Water Quantity

Discharge was measured at each of the sites, where possible, on both visits. An area with a uniform cross section was chosen and the velocity and depth were measured using a AA Price velocity meter. Ten or more readings were taken across the profile of the stream. Total discharge was calculated as the sum of these individual discharges (area x velocity).

3.3 Stream Sediment Sampling

Triplicate stream sediment samples were collected from each site in August or September. Sample sites were selected from areas of deposition along the stream bank, generally characterized by the finest grain size evident at the site. Samples were collected with a stainless steel trowel and placed in ziplock type bags.

At the lab, the samples were dried and passed through a 100 mesh (0.15 mm) stainless steel sieve. The portion passing through the sieve was run through an ICP scan for the determination of total metal concentrations.

3.4 Benthic Invertebrate Sampling

3.4.1 Field Collection

Substrate samplers were used for benthic invertebrate sampling. The basket samplers were cylindrical in shape, measured 26 cm long with a diameter of 17 cm, and were constructed of galvanized wire with a one centimetre mesh. Each substrate sampler was filled with washed indigenous gravels collected from the stream bed or the bank at each sample site. The surface area provided by this 'artificial substrate' was approximately 6000 $\pm$ 1000 cm^2 (Baker 1979).

Three rock filled samplers were submerged in riffle areas of the stream at each site in July. These samplers were left to colonize for five weeks (R1 and R2) or six weeks (R3 to R7). The substrate samplers were retrieved by placing a screened bucket with a 300 micron mesh, downstream and under the basket. On shore the basket was opened in the bucket. Individual rocks were then carefully washed in the screened bucket to remove and collect all invertebrates from that sample. The detritus and benthic invertebrates remaining in the bucket were placed in a one litre nalgene bottle and preserved with 10% formalin. These samples were sent to Cordillera Consulting, Summerland, B.C. for sorting, enumeration and identification.

3.4.2 Laboratory Analysis

At the Cordillera Consulting laboratory, each sample was elutriated to remove sand or gravel. The elutriate was examined for molluscs or trichopteran cases which were removed if found. The remaining organic material was washed through two nested sieves (2 mm on top of 300 microns). The contents of the two sieves were sorted and identified separately. If numbers of invertebrates appeared to be high (> 400) the sample was split by surface area within a 300 micron sieve. The fractions were subsampled to achieve a total of more than 325 organisms from the sample.

There were several samples with a large proportion of filamentous algae which could not be subsampled with the above method because even distribution of the sample was not achievable. In these cases the whole sample was rinsed, pressed to a point where no water was dripping and then weighed. A subsample was removed by weight using scissors. This subsample was sorted and subsequent subsamples were removed until 325 organisms had been removed from the whole. The portion of the sample that was eventually analyzed is indicated in each column of Appendix C.

Ten percent of the sorted debris was resorted to test sorting efficiency. The sorting efficiency was found to be >95%.

4.0 RESULTS AND DISCUSSION

The Faro region experienced a very wet summer season in 2008. Consequently, water levels at all sites were very high in July when the benthic samplers were installed, and flows were even greater when they were retrieved in August and September (see photos in Appendix A). This created difficulty and challenges in acquiring sediment samples and in retrieving some of the benthic samplers. These issues will be discussed in detail in the relevant sections below.

4.1 Water Quality

Water quality samples were collected at each of the sites on both visits during the summer of 2008. The analytical results are presented in Appendix B.

Part 3 of Schedule B of the water licence specifically requests the analysis of total hardness, alkalinity, sulphate, suspended solids, ammonia, and total and dissolved copper, iron, lead and zinc. The results for these parameters and the in-situ data are presented in Table 1, with discussion per parameter presented below.

4.1.1 Temperature

The temperature values reflected the cool summer season, ranging from 3.7^{o}C at R6 on September 4th, to 7.1^{o}C at R2 on July 21st.

4.1.2 Conductivity and Total Hardness

Calcium and magnesium are considered to be the primary contributors to hardness but other cations such as strontium, barium, manganese, iron and aluminum also contribute to total hardness. All sites were soft to medium soft during the July sampling. Waters were hard at R3, R4, R5 and R6 during September. Conductivity, which is a measure of the ionic constituents in water, had a similar trend to total hardness with lower values in the upstream sites and considerably higher values in the downstream sites.

4.1.3 pH and Alkalinity

All pH values were near neutral to slightly alkaline ranging from 7.04 to 8.6. Alkalinity is a measure of the buffering capacity of natural waters against changes in pH relating to the carbonate system. Alkalinity values were fairly consistent throughout each watershed. Sites on Anvil Creek had slightly higher alkalinity concentrations than the sites on Rose Creek.

4.1.4 Dissolved Oxygen

All sites were well aerated.

TABLE 1

WATER QUALITY DATA, 2008

Sample Site	R1		R2		R3		R4		R5		R6		R7	
Date, 2008	Jul-22	Aug-25	Jul-21	Aug-25	Jul-22	Sep-04	Jul-22	Sep-04	Jul-22	Sep-04	Jul-22	Sep-04	Jul-22	Sep-04
*Flow, m^3/sec			7.583										3.018	
Temp °C	6.1	6.0	7.1	6.3	6.2	5.5	5.6	4.4	5.0	3.9	4.9	3.7	5.2	4.8
Total Dissolved Solids (in-situ)	75	---	138	---	139	158	132	154	136	141	135	134	79	78
Conductivity														
uS/cm (in-situ)	130.7	---	228	---	228	277	216	270	223	247	221	235	129.6	136.7
uS/cm (lab)	---	100	---	170	---	290	---	280	---	260	---	260	---	150
pH (in-situ)	7.91	7.96	8.26	8.08	8.00	8.40	7.95	8.40	8.24	8.70	8.25	8.50	7.99	8.60
pH (lab)	7.8	7.8	7.90	7.9	7.9	8.1	7.9	8.2	8.1	8.3	8.1	8.3	7.8	8.1
D.O. (mg/L)	---	10.7	10.5	10.4	---	10.6	---	10.7	---	10.9	---	11.2	---	9.9
D.O. (%)	---	100	98.7	97.2	---	97	---	94.4	---	94.5	---	96.7	---	89.9
Alkalinity mg/L as CaCO3	56	44	71	59	70	80	72	81	97	110	99	110	58	62.0
Sulphate	9.4	8.1	48	23	43.0	50	41.0	44	20.0	22.0	17.0	19.0	6.9	7.2
Ammonia	<0.01	<0.005	0.01	<0.005	0.03	0.03	<0.01	0.03	<0.01	0.04	<0.01	<0.01	<0.01	0.04
NFR	1	18	2	45	1	1	5	4	5	4	5	3	3	2
Copper - total	0.00110	**0.00212**	0.00095	**0.00313**	0.00093	0.00086	0.00125	0.00127	0.00108	0.00090	0.00097	0.00083	0.00073	0.00073
- dissolved	0.00106	0.00150	0.00114	0.00153	0.00110	0.00076	0.00110	0.00102	0.00096	0.00075	0.00085	0.00070	0.00072	0.00062
Iron - total	0.091	**0.578**	0.149	**0.954**	0.126	0.14	0.14	0.154	0.133	0.136	0.125	0.124	0.114	0.105
- dissolved	0.059	0.127	0.102	0.121	0.086	0.094	0.063	0.071	0.053	0.067	0.048	0.066	0.059	0.072
Lead - total	0.00085	**0.00469**	0.00043	**0.00433**	0.00043	0.00037	0.00061	0.00049	0.00016	0.00012	0.00009	0.00005	0.00009	0.00009
- dissolved	0.00031	0.00065	0.00032	0.00033	0.00022	0.00014	0.00016	0.00013	0.00007	0.00002	0.00009	0.00001	0.00003	0.00007
Zinc - total	0.0195	**0.0369**	0.0162	**0.0318**	0.0135	0.0171	0.0111	0.0140	0.0017	0.0022	0.0008	0.0006	0.0008	0.0012
- dissolved	0.0190	0.0254	0.0172	0.0136	0.0139	0.0166	0.0098	0.0141	0.0016	0.0018	0.0007	0.0006	0.0006	0.0012
Total Hardness mg/L as CaC03	63.8	51.2	110	82.2	107	142	110	135	116	131	115	129	63.6	70.3

NOTES: All units in mg/L unless otherwise indicated. Values in **bold** indicate the CCME guideline has been exceeded.

* Due to extremely high water levels, discharge could only be safely measured at R2 and R7 during July.

4.1.5 Sulphate

Sulphate concentrations were low in the upper Rose Creek sites and in Anvil Creek. Concentrations were higher at the Rose Creek sites downstream of the tailings facility. Sulphate concentrations normally vary from 10 to 80 mg/L in surface waters (CCREM, 1987) and all reported concentrations fell within this range.

4.1.6 Ammonia

Ammonia was detected at all sites on at least one occasion, except at R1 and R6. The detected levels were significantly below the CCME recommended guideline of 0.7 mg/L NH_3.

4.1.7 Non Filterable Residue (NFR)

All waters were clear except on August 25th, 2008. Due to persistent rainfall over previous days, flows were very high and turbid (Photo #3). Only the land accessed sites R1 and R2 were sampled on August 25th. The remaining sites are accessed by helicopter and due to weather conditions, the sites could not be completed until the following week. The creeks had stabilized by this time and the waters were clear once again, although water levels continued to be high.

4.1.8 Total and Dissolved Metals

The values in bold in Table 1 indicate that the CCME (1999) guideline for the protection of freshwater aquatic life was exceeded for that parameter in that sample. The toxicity of some metals varies with the hardness of the sample waters (Table 2). Generally, toxicity of several metals to freshwater aquatic organisms increases as the hardness of the water decreases.

TABLE 2
CCME RECOMMENDED GUIDELINES FOR THE PROTECTION OF FRESHWATER AQUATIC LIFE

HARDNESS as $CaCO_3$ mg/L	COPPER mg/L	LEAD mg/L	IRON mg/L	ZINC mg/L
0 - 60 soft	0.002	0.001	0.3	0.03
60 - 120 medium soft	0.002	0.002	0.3	0.03
120 - 180 hard	0.003	0.004	0.3	0.03
>180 very hard	0.004	0.007	0.3	0.03

All of the examined metals in Table 1 met the applicable CCME guidelines in all samples with the exception of the total metals samples collected on August 25th at R1 and R2. As discussed previously, total suspended solids were high on this day. All of the dissolved metals samples however, did meet the guidelines.

The above metal concentrations have been discussed in relation to the CCME guidelines. It is important to note that the limits as set out under the current Water Licence issued by the Yukon Territory Water Board, apply to the discharge point and there is no obligation to meet the CCME criteria in the receiving waters at this time.

4.1.9 Quality Assurance / Quality Control

Blind duplicate samples were collected at R7 during the September sampling period and were sent to the lab as an analytical check. A review of the data in Appendix B shows good correlation for all parameters tested.

4.2 Water Quantity

Due to abnormally high waters at all the sites during the study period, discharge measurements could only be safely conducted at R2 and R7 in July. Continuous water level recorders are situated at X-14, just upstream of R2, and at R7. The hydrographs (Figures 2 and 3) show that discharge peaked at both sites in mid summer, rather than during freshet. Rose Creek as measured at X-14 peaked on July 15th at 22:30 with an estimated discharge of 36.9 m^3/sec. The north fork of Rose Creek as measured at R7 peaked on July 15th at 16:30 with an estimated discharge of 10.8 m^3/sec. Very high flows were also documented at both sites in June and in August due to severe rainfall events.

4.3 Stream Sediments

Triplicate stream sediment samples were collected from all sites during August or September. The analytical report is presented in Appendix C. Due to the high water experienced at all of the sites it was difficult obtaining deposited fines. This was especially true at R1, where fines are not readily available in this high velocity reach. Sediment samples were collected from a small depression adjacent and connected to Rose Creek just upstream of R1. The results of the metals analyses were extremely high here and are not representative of concentrations ordinarily documented at R1. It is suspected that the area sampled is usually separated from Rose Creek and represents sediment that may have been deposited long ago. The source of this contaminated sediment is unknown. For the purposes of this report, the values for the sediment at R1 have not been included in any of the following summary tables or discussion.

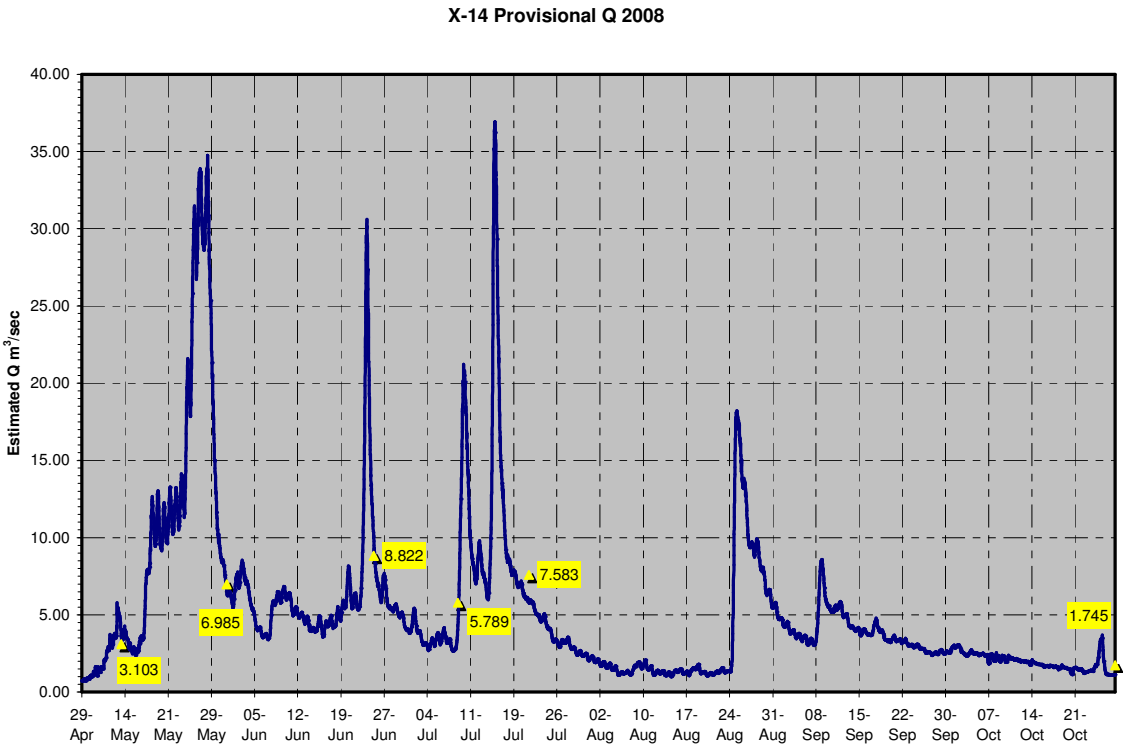


Figure 2 Hydrograph for X-14 from late April '08 to mid October '08.

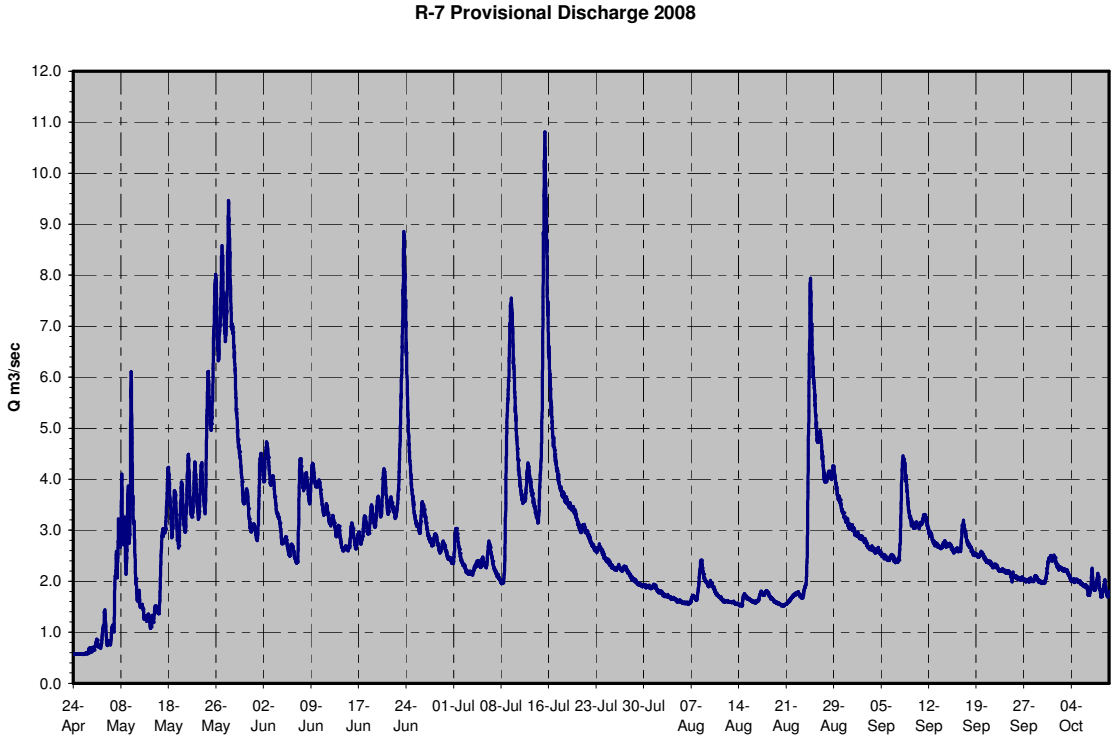


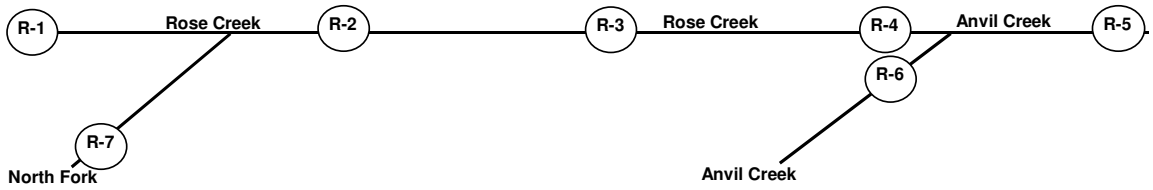
Figure 3 Hydrograph for R-7 from late April '08 to early October '08.

The metal analyses for the other sites were averaged and the standard deviation was calculated to determine the spread of metal concentrations at each site. A few metals, especially those with high concentrations, showed some variability. Of the 30 metals analyzed, the concentration of selenium was below the method detection limit in the examined samples.

Six metals (arsenic, cadmium copper, mercury, lead and zinc) known to be toxic to the aquatic environment were examined in detail. The mean concentrations of these metals were compared to the CCME (1999) interim freshwater sediment quality guidelines (ISQG) and to the probable effects levels (PEL) (Table 3). Generally, concentrations greater than the PEL have a 50% incidence of creating adverse biological effects. A schematic accompanies Table 3 indicating where the tributaries enter the main stems of Rose and Anvil Creeks.

The highest concentrations of most of the examined metals in the stream sediments occurred at R2 or at R3. The PEL for arsenic, lead and zinc was exceeded at R2. The PEL for lead and zinc was also exceeded at R3. The ISQG was exceeded for arsenic and cadmium at several of the other sites but concentrations were generally well below the PEL. The lowest concentration of each metal was documented at the background site, R7.

TABLE 3 STREAM SEDIMENT METAL CONCENTRATIONS (ug/g), AUGUST OR SEPTEMBER 2008



Site #	Station Description	Arsenic ug/g	Cadmium ug/g	Copper ug/g	Lead ug/g	Mercury ug/g	Zinc ug/g
R-7	North Fork of Rose Creek	5.23	0.23	12.8	10	<0.05	56
R-2	Rose Creek d/s tailings ponds	**18.37**	**0.76**	**47.3**	**160**	0.15	**369**
R-3	Rose Creek midway between R-2 and R-4	**16.77**	**0.68**	**49.2**	**202**	0.17	**424**
R-4	Rose Creek just u/s of Anvil Creek	**10.63**	0.37	26.4	**64**	0.06	**184**
R-6	Anvil Creek just u/s Rose Creek	**6.70**	0.57	23.7	10	<0.05	80
R-5	Anvil Creek d/s of Rose Creek	**10.93**	**0.83**	34.1	19	<0.05	**154**
ISQG		5.9	0.6	35.7	35.0	0.2	123
PEL		17.0	3.5	197.0	91.3	0.486	315

Note: ISQG = Interim freshwater Sediment Quality Guidelines, in **bold** where exceeded.
PEL = Probable Effects Level (>50% of adverse effects occur above this level), shaded and in **bold** where exceeded.

4.3.1 Comparisons with Past Data

Limited data exists on the geochemistry of the stream sediments in the Rose Creek system. Metals in sediments have not been a licensed requirement for this system until the issuance of Licence # QZ03-059 in March 2004. In 1996, stream sediment samples were voluntarily collected and analyzed for metals during the Rose Creek biological monitoring program (Burns, 1997).

Environment Canada conducted environmental impact surveys downstream of the tailings impoundment in 1983 (Godin and Osler, 1985) and in 1973 (Hoos and Holman, 1973). Table 4 shows comparisons of selected metal concentrations for all the study periods. All data represents the mean of triplicate samples (N=3) except in 1983 which is the average of two sets of triplicate samples collected in July and August (N=6). Arsenic was not one of the six metals analyzed in 1973. The detection limit for cadmium was very high in 1973 and this set of data has been excluded. Each parameter has also been graphed (Figures 4 to 7) and includes either the PEL or the ISQG, which ever is more meaningful for that data set.

In March of 1975, a tailings spill released 245,000 cubic metres of tailings slurry into Rose Creek (Godin and Osler, 1985). The 1983 data for arsenic and lead was consistently high at the downstream sites (R2, R3 and R4), and are the highest documented to date. Concentrations of zinc were also elevated in 1983 at R2 and R3. These elevated levels could represent lingering effects from the tailings spill of 1975 (Godin and Osler, 1985).

Concentrations of arsenic and lead have decreased significantly at the downstream sites (R2, R3 and R4) since 1983. It appears that arsenic concentrations have leveled off and are now similar to the concentrations at the background sites. Lead levels continue to display a downward trend. Lead concentrations at the background sites R6 and R7 are extremely low. The level of cadmium tends to be relatively stable at each site although concentrations at R4 do show some fluctuation. Zinc concentrations generally peaked in 1983 at the sites where sampled. Levels have generally been much lower at the upstream sites (R1, R6 and R7) than at the potentially impacted sites.

Metals in sediments are difficult to interpret because levels can vary widely as a function of natural mineralization of local soils within a given watershed. Based on the current data set, it appears that concentrations of various metals have been decreasing since 1983. Concentrations of the selected metals at R5 are very similar to those at the upstream site R1. Lead levels however have frequently been greater at R1 than at R5.

4.4 Benthic Invertebrates

Four phyla were found in Rose and Anvil Creeks; Arthropoda, Annelida, Mollusca and Nematoda. A total of 48,077 organisms representing 89 different taxonomic groups were identified within these three phyla. These data are presented in Appendix D.

4.4.1 Abundance and Taxonomic Richness

The number of organisms for the triplicates at each site was summed to give a total abundance value for that site. Populations ranged from 2,033 individuals at R5 (Anvil Creek downstream Rose Creek) to 16,340 individuals at R7 (North Fork Rose Creek).

TABLE 4

COMPARISONS OF METAL CONCENTRATIONS IN SEDIMENTS, 1973, 1983, 1996, 2004, 2006 AND 2008

	Arsenic (ppm)						Cadmium (ppm)						Lead (ppm)						Zinc (ppm)					
	1973	1983	1996	2004	2006	2008	1973	1983	1996	2004	2006	2008	1973	1983	1996	2004	2006	2008	1973	1983	1996	2004	2006	2008
R1		15	6	12	<10			0.8	0.6	0.7	<0.05		280	124	74	125	23		270	260	221	203	131	
R2		86	32	20	24	18		1.2	1.6	1.3	1.2	0.8	83	775	310	207	179	160	180	918	617	482	694	369
R3		104	31	16	15	17		1.1	1.0	0.8	0.8	0.7	280	681	244	165	143	202	440	996	581	376	464	424
R4		51	32	14	16	11		1.1	2.1	0.7	1.0	0.4		585	267	153	120	64		885	908	293	470	184
R5			14	11	13	11			0.8	0.9	1.0	0.8			20	69	25	19			161	212	149	154
R6				12	11	7				0.6	1.0	0.6				11	15	10				66	109	80
R7				12	14	5				0.5	0.6	0.2				15	15	10				78	81.3	56

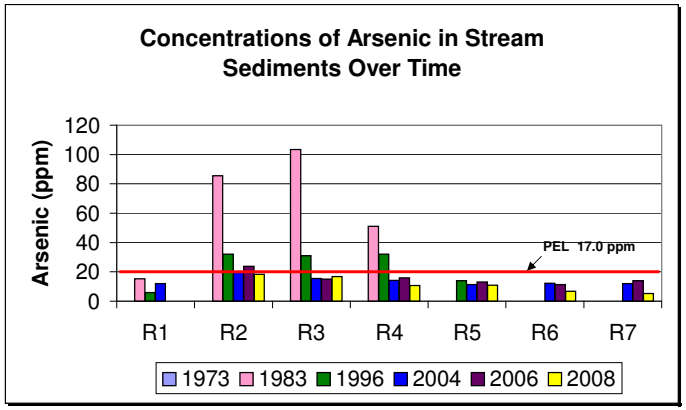


Figure 4 Concentrations of Arsenic in the Stream Sediments Over Time

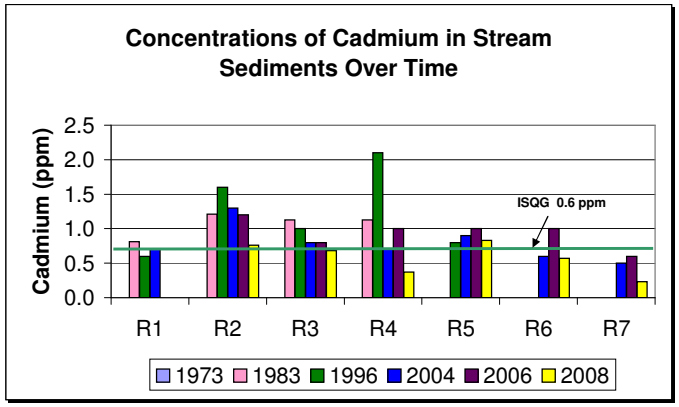


Figure 5 Concentrations of Cadmium in the Stream Sediments Over Time

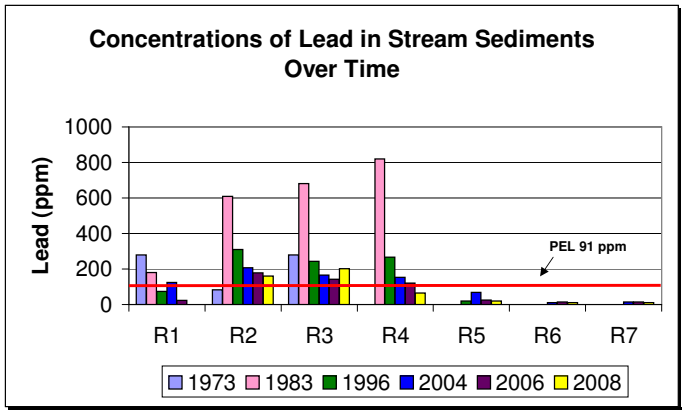


Figure 6 Concentrations of Lead in the Stream Sediments Over Time

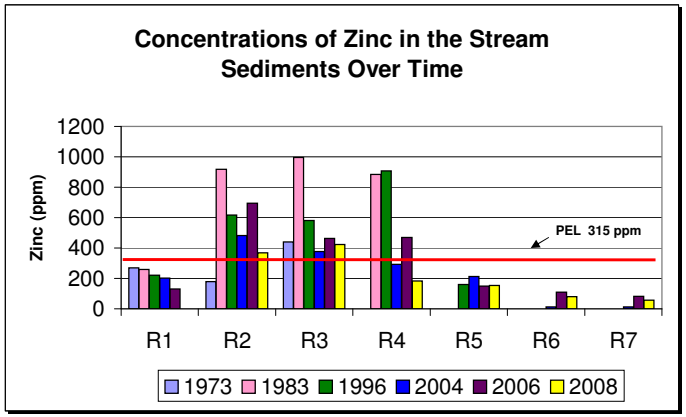


Figure 7 Concentrations of Zinc in the Stream Sediments Over Time

Taxonomic richness was determined for each site by enumerating all taxonomic groups identified from species to phylum, as a measure of community diversity. All communities were diverse with 38 different taxonomic groups identified at R1 to 54 identified at R2. To further characterize the taxonomic wealth of each community, the diversity was related to the population size using the formula: (Diversity – 1) divided by the natural log of the population. The community at R2 also had the highest richness index, and the trend to the diversity was similar for the other, with the notable exception of the community at R5. Here the diversity was the second lowest however when the population size is taken into consideration it actually has the third highest index.

Abundance and diversity were plotted and are displayed in Figure 8. To aid in interpretation, the stations were arranged on the X-axis to demonstrate where the tributaries, R7 and R6 enter the mainstem of Rose or Anvil Creek.

SITE	SITE DESCRIPTION	ABUNDANCE	DIVERSITY	TAXONOMIC RICHNESS INDEX
R1	Rose Creek upstream	5,077	38	4.3
R7	North Fork of Rose Creek	16,340	45	4.5
R2	Rose Creek d/s tailings ponds and diversion canal	5,136	54	6.2
R3	Rose Creek midway between R2 and R4	7,680	45	4.9
R4	Rose Creek just u/s of Anvil Creek	4,391	51	6.0
R6	Anvil Creek just u/s of Rose Creek	7,520	47	5.2
R5	Anvil Creek d/s of Rose Creek	2,033	43	5.5

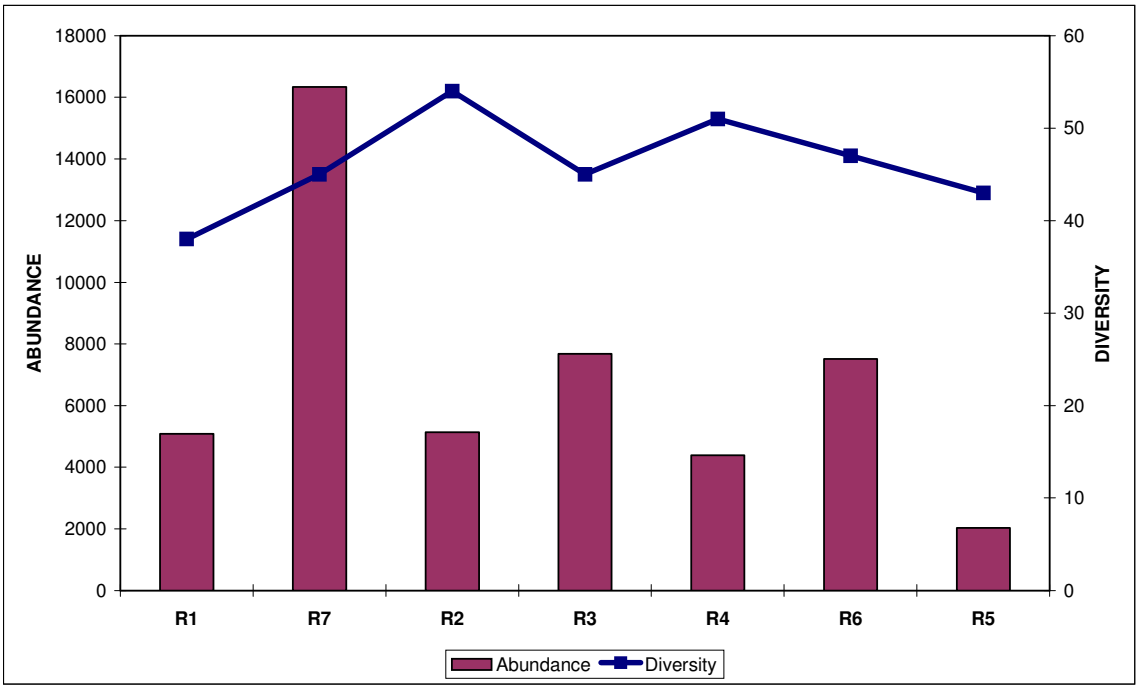


FIGURE 8 Abundance and Taxonomic Richness at Rose and Anvil Creeks, 2008

The community at the background site, R7, had the greatest population. Due to very high water levels in July the basket samplers were installed, for the first time, in the side channel which usually is dry or has shallow water (see Photo #2). The lowest population was recorded at R5. The high water level on Sept 4th created difficulties in retrieving the basket samplers from the deep water (approximately 70 cm) at this site. It is suspected that organisms may have been dislodged and lost from the baskets during the retrieval process.

The most diverse community occurred at R2. As this site is located in the area that potentially receives the greatest impacts from the tailings facility and combined seepages, the high number of different types of organisms residing here is encouraging. The community at the background site at R1 was the least diverse. The community consisted primarily of Diptera that formed 81.4% of the population, with low representation of the other taxa.

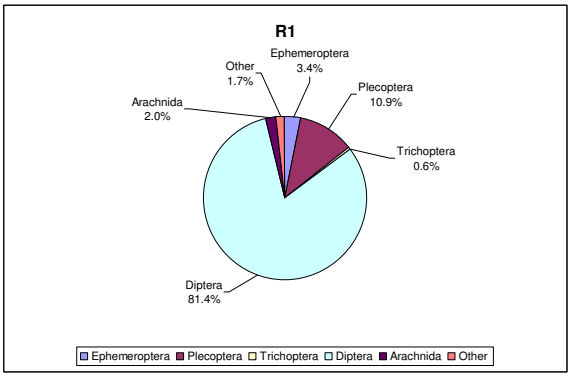
4.4.2 Distribution

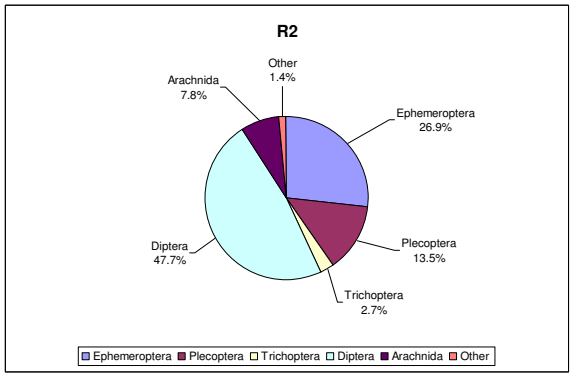
The composition of the benthos communities was calculated as a percentage of the major taxonomic orders present, with pie charts generated for each site (Figure 9). The grouping "Other" is made up of invertebrates from Nematoda, Copepoda, Gastropoda, Collembola, Lepidoptera, Hirudinea, Oligochaeta and/or Ostracoda. Based on the percentages, taxa were then classified with respect to their dominance within the community (Table 5).

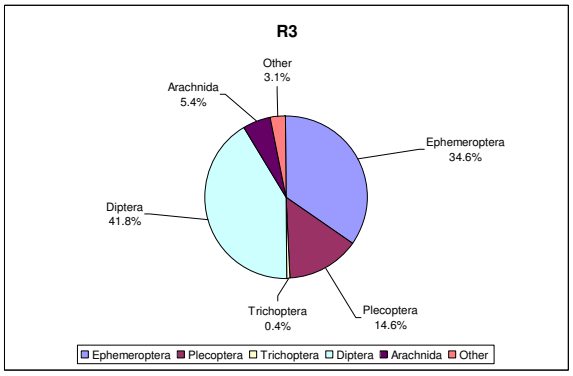
Diptera was the dominant or co-dominant order at all of the sites except at R4 where the community was dominated by Plecoptera and Ephemeroptera. Plecoptera also shared dominance at R6 and R7, and was subdominant at the other sites. Ephemeroptera shared dominance at R2, R3 and R6, and was subdominant or common at the remaining sites.

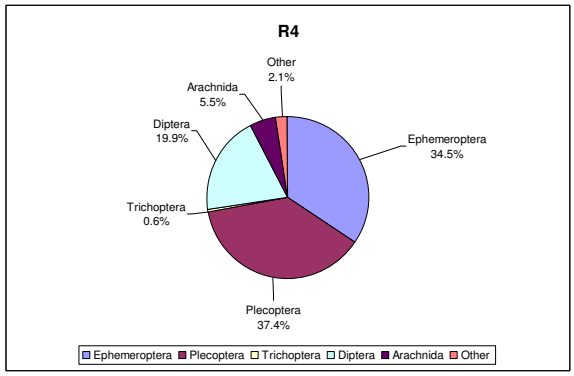
Arachnida, Trichoptera and 'Other' were rare or incidental.

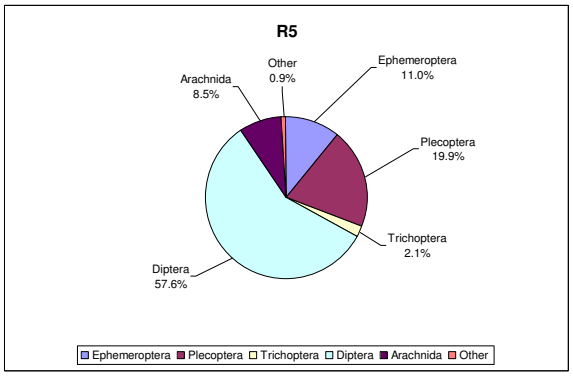
Figure 9 The Composition of the Benthic Invertebrate Community at Each Site, 2008

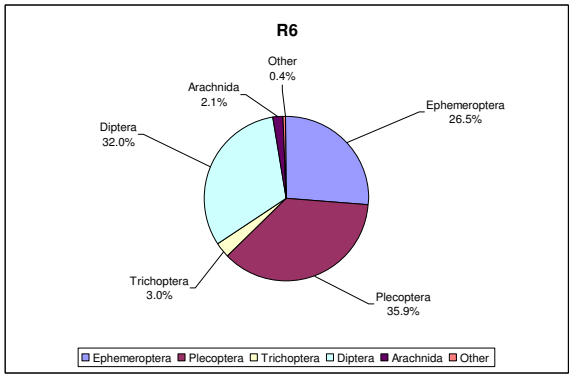


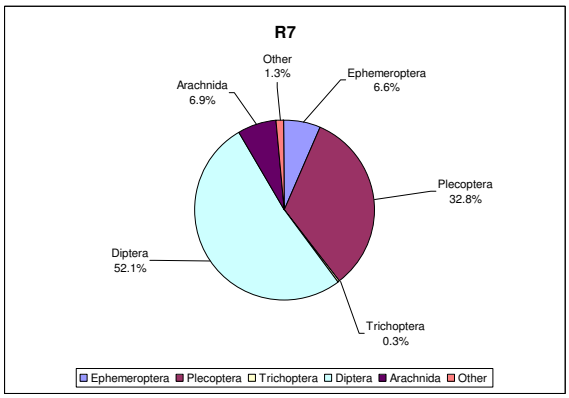












NOTE: Other includes one or more of the following taxonomic groups:
Nematoda
Ostracoda
Copepoda
Hirudinea
Gastropoda
Oligochaeta
Collembola
Lepidoptera

TABLE 5
TAXONOMIC DISTRIBUTION OF BENTHIC INVERTABRATES

SITE	DOMINANT (≥25%)	SUBDOMINANT (10% το 24.9%)	COMMON (1.0% το 9.9%)	RARE (0.1% το 0.9%)
R1	Diptera	Plecoptera	Ephemeroptera Arachnida Other	Trichoptera
R2	Diptera Ephemeroptera	Plecoptera	Arachnida Trichoptera Other	
R3	Diptera	Plecoptera	Arachnida Other	Trichoptera
R4	Plecoptera Ephemeroptera	Diptera	Arachnida Other	Trichoptera
R5	Diptera	Plecoptera Ephemeroptera	Arachnida Trichoptera	Other
R6	Plecoptera Diptera Ephemeroptera		Trichoptera Arachnida	Other
R7	Diptera Plecoptera		Arachnida Ephemeroptera Other	Trichoptera

The insect orders Ephemeroptera, Plecoptera and Trichoptera (EPT) are sensitive to most types of pollution (Rosenberg and Resh, 1993). To further characterize the communities, the proportion of EPT was calculated per site (Table 6).

TABLE 6	**THE PERCENTAGE OF EPT AT EACH COMMUNITY**						
Site	R1	R2	R3	R4	R5	R6	R7
% EPT	15	43	50	72	33	65	40

The community at R4 had the greatest proportion of EPT forming 72% of the population. Only 15% of the community at R1 were EPT members, and as mentioned previously, 81% of the population belonged to the order Diptera. The percentage of EPT at the other communities ranged from 33 to 65.

Lehmkuhl (1979) has identified several groups within these insect orders that have very low tolerance to chemical pollution. Eleven of these taxa (six taxa within Plecoptera, three taxa within Ephemeroptera and two taxa within Trichoptera) have been identified in the Rose and Anvil Creek study area. Table 7 summarizes the presence or absence of each of these taxa per site. Nine out of eleven taxa were present at R2 and R6, eight at R5, seven at R1 and R7, and 6 at R4. Although the community at R4 had the highest percentage of EPT, only six sensitive taxa were represented. This was likely related to habitat conditions rather than chemical pollution as the

water was of very good quality (Table 1). Due to high flows and increased velocities over the colonization period, the baskets at R4 were heavily impacted with sand and small gravels.

TABLE 7
Presence (+) and Absence (-) of Sensitive Taxa at Rose and Anvil Creeks

Sensitive Taxa	R1	R2	R3	R4	R5	R6	R7
Plecoptera							
Nemouridae	+	+	+	+	+	+	+
Perlodidae	+	+	+	+	+	+	+
Capniidae	+	+	+	+	+	+	+
Taeniopterigidae	+	+	-	-	+	+	+
Chloroperlidae	-	-	-	+	+	-	+
Perlidae	-	+	+	-	-	-	-
Ephemeroptera							
Epeorus	-	+	-	-	-	+	-
Ephemerellidae	+	+	+	+	+	+	+
Rithrogena	-	-	-	+	+	+	-
Trichoptera							
Brachycentriidae	+	+	+	-	+	+	-
Rhyacophilidae	+	+	+	-	-	+	+
Total # of sensitive taxa:	7	9	7	6	8	9	7

After Lehmkuhl (1979)

4.4.3 Comparisons with Past Data

Several studies to assess the health of ecosystems have been conducted using benthic macroinvertebrates (Rosenberg and Resh, 1993). Their abundance and taxonomic diversity respond to a wide range of impacts including sedimentation, organic loading and changes in chemical water quality. Using benthic invertebrates as biomonitoring tools offers many advantages for the following reasons; they are ubiquitous, they are abundant and easy to collect, there are a large number of species offering a spectrum of responses to environmental stress, they are generally sedentary and therefore are representative of local conditions, and they have long life cycles compared to other groups (i.e. periphyton). As such, benthic macroinvertebrates act as continuous monitors of the water they inhabit. Assessments are often based on taxa richness and the abundance of pollution sensitive insect orders.

Over the years various agencies and companies have collected benthic data from the Rose Creek system using various sampling methods at varying times of the open water season. Summaries of the past twenty years of Company (Anvil Range and Curragh Resources) monitoring data have been tabulated (Table 7). In each of these eleven surveys, artificial substrate samplers were used,

Table 8

Comparison of Benthic Data over a 20 Year Period

Site	Year	Total Abundance	Taxonomic Richness	Number of Sensitive Taxa	Dominant Taxa
R1	1988	128	24	6	Plecoptera & Ephemeroptera
	1990	1,373	21	6	Diptera & Ephemeroptera
	1992	1,141	27	7	Diptera
	1994	5,489	60	9	Ephemeroptera
	1996	1,629	57	8	Diptera
	1998	50,808	57	10	Diptera & Ephemeroptera
	2000	5,368	57	10	Diptera
	2002	9,988	60	8	Diptera
	2004	55,191	49	8	Diptera
	2006	16,685	57	10	Diptera
	2008	5,077	38	7	Diptera
R2	1988	115	24	6	Diptera
	1990	4,564	20	4	Annelida & Diptera
	1992	400	14	3	Diptera
	1994	920	47	8	Ephemeroptera & Diptera
	1996	991	37	9	Diptera & Ephemeroptera
	1998	1,945	47	8	Diptera & Ephemeroptera
	2000	6,611	48	7	Diptera & Ephemeroptera
	2002	11,639	54	8	Diptera & Oligochaeta
	2004	38,042	43	9	Diptera
	2006	1,596	53	10	Diptera & Plecoptera
	2008	5,136	54	9	Diptera & Ephemeroptera
R3	1988	32	8	1	Diptera
	1990	2,455	20	6	Annelida & Diptera
	1992	321	12	2	Diptera
	1994	54,875	49	9	Ephemeroptera & Plecoptera
	1996	144	25	7	Diptera
	1998	13,491	39	10	Diptera
	2000	18,929	42	7	Ephemeroptera
	2002	1,808	40	6	Oligochaeta & Diptera
	2004	30,826	41	11	Diptera & Ephemeroptera
	2006	3,282	48	9	Diptera
	2008	7,680	45	7	Diptera
R4	1988	116	15	2	Diptera
	1990	2,175	20	4	Diptera
	1992	312	14	1	Diptera
	1994	2,366	53	8	Ephemeroptera & Diptera
	1996	666	35	9	Ephemeroptera
	1998	8,148	48	10	Ephemeroptera & Diptera
	2000	N.D.	N.D.	N.D.	N.D.
	2002	4,430	52	9	Diptera
	2004	4,964	44	10	Diptera
	2006	4,252	51	10	Diptera & Ephemeroptera
	2008	4,391	51	6	Plecoptera & Ephemeroptera
R5	1988	425	22	7	Diptera & Plecoptera
	1990	3,470	25	7	Diptera
	1992	1,263	25	6	Diptera & Acarina
	1994	4,115	55	7	Diptera
	1996	2,726	43	9	Diptera
	1998	7,974	44	10	Diptera & Ephemeroptera
	2000	66,975	54	10	Diptera
	2002	15,088	45	8	Diptera
	2004	2,206	44	9	Diptera
	2006	1,768	38	7	Diptera
	2008	2,033	43	8	Diptera
R6	1988	N.D.	N.D.	N.D.	N.D.
	1990	3,477	25	8	Diptera
	1992	3,911	31	7	Diptera
	1994	15,431	46	7	Diptera & Ephemeroptera
	1996	2,741	45	8	Diptera
	1998	26,944	43	9	Diptera & Ephemeroptera
	2000	39,344	56	10	Diptera
	2002	1,232	36	6	Diptera
	2004	8,759	46	8	Diptera & Ephemeroptera
	2006	8,934	45	9	Diptera
	2008	7,520	47	9	Plecoptera, Diptera & Ephemeroptera
R7	1988	N.D.	N.D.	N.D.	N.D.
	1990	2,467	26	6	Diptera
	1992	1,053	22	4	Diptera
	1994	14,756	44	6	Diptera
	1996	7,029	45	8	Diptera
	1998	39,292	44	9	Diptera
	2000	4,574	40	8	Diptera
	2002	10,965	37	7	Diptera
	2004	32,380	44	9	Diptera
	2006	838	38	8	Diptera
	2008	16,340	45	7	Diptera & Plecoptera

N.D. = not done

the same sample site locations were employed and the sampling personnel were consistent. Benthic invertebrates were sorted and identified by the same taxonomist for all studies with the exception of 1992 (Limnotek Research) and 2008 (Cordillera Consulting). The methodology for splitting samples differed, with the 2008 method being more subjective and possibly less accurate than the method used in the previous studies. This could result in either an over or under estimation of the total number of organisms collected at each site in 2008. In 1992 the complete sample was examined and no splitting was done (Harder, 1992).

In addition, the physical quality of the habitat (riparian vegetation and stream substrate) at each of these sites has changed relatively little over the past twenty years. All sites have mineral substrates of varying particle sizes with very little organic (moss, algal) growth. Consequently, some temporal and spatial comparisons can appropriately be made.

Figure 10 shows the abundance at each site for the eleven surveys examined. Table 8 displays the specific data with some statistics. The populations of the benthic communities at each of the sites generally fluctuated significantly over the twenty years examined, with R4 showing the most stable population in terms of abundance. The highest population documented throughout the study period occurred at R5 where almost 67,000 individuals were collected in 2000. The lowest populations occurred in 1988 at R1 to R5. Note that R6 and R7 were not sampled until 1990. The overall lowest population consisted of a total of 32 individuals collected from R3 in 1988. The population at R3 has fluctuated considerably and had a maximum of almost 55,000 organisms collected in 1994.

Generally the communities have been diverse over time, with the greatest diversity occurring at R1. Taxonomic richness values were considerably lower from 1988 to 1992 including the background sites. All sites have been consistently more diverse since 1994.

The overall trend appears to be an increase in the number of sensitive taxa colonizing all of the sites over the twenty year period.

Diptera, alone or with one of the pollution sensitive orders, dominated the communities at most of the sites over time. Plecoptera shared dominance at R4, R6 and R7 for the first time in 2008.

Figure 10 Abundance of Benthic Invertebrates in Rose and Anvil Creeks over a Twenty Year Period

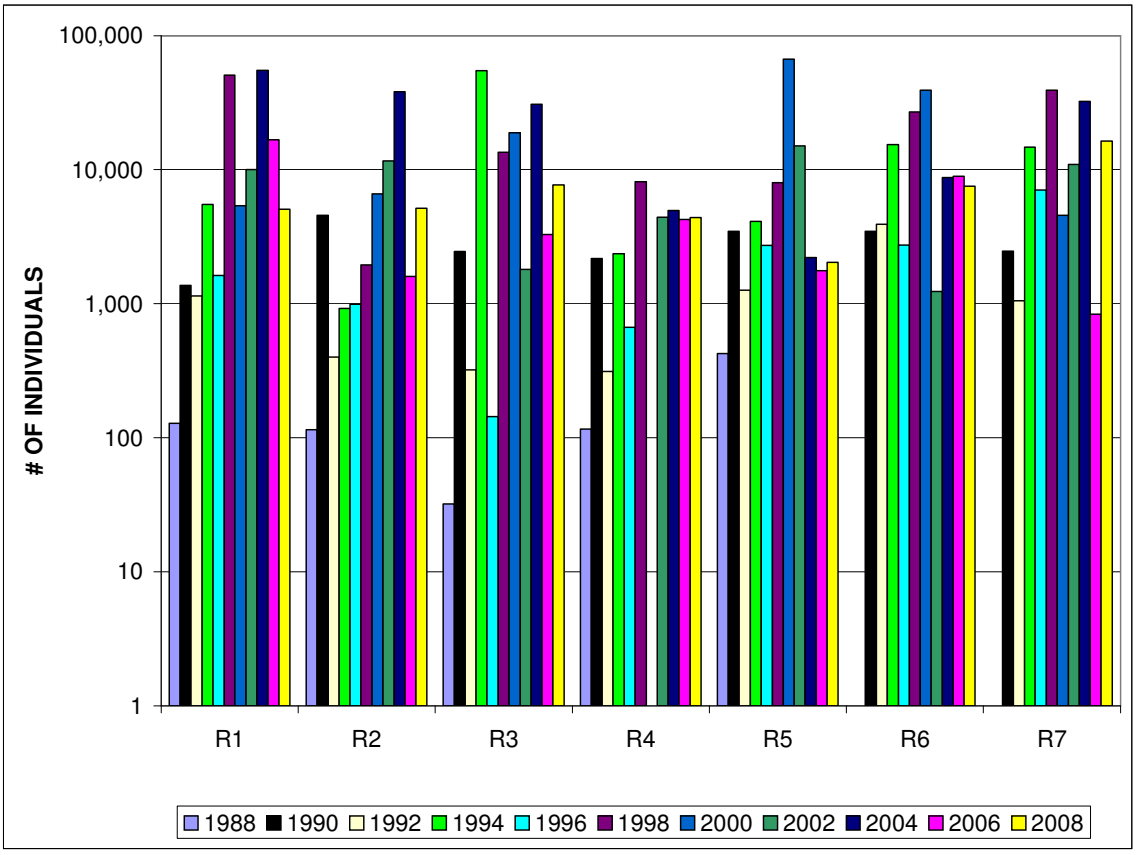


TABLE 9

ABUNDANCE WITH SOME STATISTICS COVERING A TWENTY YEAR PERIOD

	R1	R2	R3	R4	R5	R6	R7
1988	128	115	32	116	425	N.D.	N.D.
1990	1,373	4,564	2,455	2,175	3,470	3,477	2,467
1992	1,141	400	321	312	1,263	3,911	1,053
1994	5,489	920	54,875	2,366	4,115	15,431	14,756
1996	1,629	991	144	666	2,726	2,741	7,029
1998	50,808	1,945	13,491	8,148	7,974	26,944	39,292
2000	5,368	6,611	18,929		66,975	39,344	4,574
2002	9,988	11,639	1,808	4,430	15,088	1,232	10,965
2004	55,191	38,042	30,826	4,964	2,206	8,759	32,380
2006	16,685	1,596	3,282	4,252	1,768	8,934	838
2008	5,077	5,136	7,680	4,391	2,033	7,520	16,340
Mean	13,898	6,542	12,168	3,182	9,822	11,829	12,969
Standard Deviation	19,929	11,005	17,183	2,531	19,406	12,303	13,306
Maximum	55,191	38,042	54,875	8,148	66,975	39,344	39,292
Year of Maximum	2004	2004	1994	1998	2000	2000	1998
Minimum	128	115	32	116	425	1,232	838
Year of Minimum	1988	1988	1988	1988	1988	2002	2006

Note that due to high water in 2000 the baskets could not be retrieved at R4.

5.0 SUMMARY

Overall, the water samples collected at the sites in this study and analyzed for the selected parameters, indicated good water quality for the support of freshwater aquatic life. Due to rainfall events the water was turbid when samples were collected on August 25th, 2008. The CCME guidelines for copper, iron, lead and zinc were slightly exceeded at R1 and R2 in the total metals sample. The dissolved metals samples met the guidelines.

The highest concentration of metals in stream sediments occurred at R2 where several parameters exceeded the CCME probable effects levels. This has made no apparent effect on the benthic community dwelling here however, as the community was very diverse and a high number of pollution sensitive taxa were present. Concentrations downstream of R2 at R3 and R4 were high as well but supported robust healthy benthic communities.

The composition of the benthic communities was fairly similar at all sites with Diptera dominating or co-dominating most populations. There was also a large presence of Ephemeroptera and Plecoptera that shared dominance or were subdominant at most of the sites. The presence of numerous kinds of sensitive taxa indicates healthy habitats. Although R2 is located downstream of the tailings impoundments and is potentially the most impacted site in the study area (highest concentrations of metals in the stream sediments), nine out of the eleven chemically sensitive species identified in the study area were collected here. The presence of these types of insects found in areas where the substratum contains high levels of metals indicate that the metals examined at R2 are likely stable and are not bioavailable to the resident biota.

Based on data collected in 2008, and comparisons with historic data, it appears that effluent from the tailings system currently has minimal, if any, impact on the receiving environment.

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APPENDIX A

PHOTOGRAPHS, 2008

Photo #1: Very high water levels at R2 on July 21st, 2008.

Photo #2: Water levels were so high at R7 that the substrate samplers had to be installed in this side channel rather than in the main channel, July 22nd, 2008.

Photo #3: Flows were turbid and very high at the discharge monitoring site at X-14, just upstream of R2, on August 25th, 2008.

Photo #4: High water levels at R6, looking to the confluence with Rose Cr, September 4th, 2008.

APPENDIX B

WATER QUALITY DATA

JULY, AUGUST & SEPTEMBER 2008

Your Project #: FARO CLOSURE OFFICE
Your C.O.C. #: F112780

Attention: Bonnie Burns
LABERGE ENVIRONMENTAL SERVICES
WHITEHORSE
405 Ogilvie Street
PO Box 21072
Whitehorse, YT
CANADA Y1A 6P7

Report Date: 2008/08/01

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A837468
Received: 2008/07/25, 12:50

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	8	2008/07/28	2008/07/29	BRN SOP-00264 R2.0	Based on SM2320B
Hardness Total (calculated as CaCO3)	8	N/A	2008/08/01		
Hardness (calculated as CaCO3)	8	N/A	2008/08/01		
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	8	N/A	2008/08/01	BRN SOP-00206	Based on EPA 200.8
Elements by ICPMS Low Level (dissolved) (1)	8	N/A	2008/08/01	BRN SOP-00206	Based on EPA 200.8
Elements by ICPMS Low Level (total) (1)	8	2008/07/29	2008/08/01	BRN SOP-00206	Based on EPA 200.8
Na, K, Ca, Mg, S by CRC ICPMS (total)	8	2008/07/29	2008/08/01	BRN SOP-00206	Based on EPA 200.8
Ammonia-N	8	N/A	2008/07/30	BRN SOP-00232 R3.0	SM-4500 NH3 G
Filter and HNO3 Preserve for Metals	8	N/A	2008/07/29	BRN WI-00006 R1.0	Based on EPA 200.2
pH Water	8	N/A	2008/07/29	BRN SOP-00264 R2.0	Based on SM-4500H+B
Sulphate by Automated Colourimetry	8	N/A	2008/07/30	BRN-SOP 00243 R1.0	Based on EPA 375.4
Total Suspended Solids	8	N/A	2008/07/29	BRN SOP-00277 R2.0	Based on SM-2540 D

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

(1) SCC/CAEAL

Encryption Key

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

SUE REYNOLDS, BBY Customer Service
Email: sue.reynolds@maxxamanalytics.com
Phone# (604) 444-4808 Ext:235

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CAEAL have approved this reporting process and electronic report format.

Total cover pages: 1

Maxxam Job #: A837468
Report Date: 2008/08/01

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: BB

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		K87867	K87868	K87869		
Sampling Date		2008/07/22 17:30	2008/07/21 16:00	2008/07/22 13:00		
COC Number		F112780	F112780	F112780		
	Units	**R-1-ROSE CR U/S**	**R-2-ROSE CR NEAR X-14**	**R-3-ROSE CR MIDWAY**	**RDL**	**QC Batch**
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	56	71	70	0.5	2468070
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	<0.5	0.5	2468070
Bicarbonate (HCO3)	mg/L	69	86	86	0.5	2468070
Carbonate (CO3)	mg/L	<0.5	<0.5	<0.5	0.5	2468070
Hydroxide (OH)	mg/L	<0.5	<0.5	<0.5	0.5	2468070
Anions						
Dissolved Sulphate (SO4)	mg/L	9.4	48	43	0.5	2472977
Nutrients						
Ammonia (N)	mg/L	<0.01	0.01	0.03	0.01	2472862
Physical Properties						
pH	pH Units	7.8	7.9	7.9		2468031
Physical Properties						
Total Suspended Solids	mg/L	1	2	1	1	2468990

RDL = Reportable Detection Limit

Maxxam Job #: A837468
Report Date: 2008/08/01

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: BB

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		K87870	K87871	K87872		
Sampling Date		2008/07/22 10:30	2008/07/22 12:00	2008/07/22 11:30		
COC Number		F112780	F112780	F112780		
	Units	**R-4-ROSE CR**	**R-5-ANVIL CR D/S**	**R-6-ANVIL CR U/S**	**RDL**	**QC Batch**
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	72	97	99	0.5	2468070
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	<0.5	0.5	2468070
Bicarbonate (HCO3)	mg/L	88	120	120	0.5	2468070
Carbonate (CO3)	mg/L	<0.5	<0.5	<0.5	0.5	2468070
Hydroxide (OH)	mg/L	<0.5	<0.5	<0.5	0.5	2468070
Anions						
Dissolved Sulphate (SO4)	mg/L	41	20	17	0.5	2472977
Nutrients						
Ammonia (N)	mg/L	<0.01	<0.01	<0.01	0.01	2472862
Physical Properties						
pH	pH Units	7.9	8.1	8.1		2468031
Physical Properties						
Total Suspended Solids	mg/L	5	5	5	1	2468990

RDL = Reportable Detection Limit

Maxxam Job #: A837468
Report Date: 2008/08/01

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: BB

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		K87873	K87874		
Sampling Date		2008/07/22 13:45	2008/07/22 16:45		
COC Number		F112780	F112780		
	Units	**R-7-NORTH FORK**	**X-2-NORTH FORK**	**RDL**	**QC Batch**
Preparation					
Filter and HNO3 Preservation	N/A	FIELD	FIELD	N/A	ONSITE
Misc. Inorganics					
Alkalinity (Total as CaCO3)	mg/L	58	55	0.5	2468070
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	0.5	2468070
Bicarbonate (HCO3)	mg/L	71	67	0.5	2468070
Carbonate (CO3)	mg/L	<0.5	<0.5	0.5	2468070
Hydroxide (OH)	mg/L	<0.5	<0.5	0.5	2468070
Anions					
Dissolved Sulphate (SO4)	mg/L	6.9	9.7	0.5	2472977
Nutrients					
Ammonia (N)	mg/L	<0.01	<0.01	0.01	2472862
Physical Properties					
pH	pH Units	7.8	7.8		2468031
Physical Properties					
Total Suspended Solids	mg/L	3	2	1	2468990

RDL = Reportable Detection Limit

Maxxam Job #: A837468
Report Date: 2008/08/01

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: BB

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		K87867	K87868	K87869		
Sampling Date		2008/07/22 17:30	2008/07/21 16:00	2008/07/22 13:00		
COC Number		F112780	F112780	F112780		
	Units	**R-1-ROSE CR U/S**	**R-2-ROSE CR NEAR X-14**	**R-3-ROSE CR MIDWAY**	**RDL**	**QC Batch**
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	68.3	120	117	0.5	2468909
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	23.8	20.6	19.9	0.2	2468861
Dissolved Antimony (Sb)	ug/L	0.08	0.10	0.11	0.02	2468861
Dissolved Arsenic (As)	ug/L	0.53	0.50	0.45	0.02	2468861
Dissolved Barium (Ba)	ug/L	34.6	37.5	36.6	0.02	2468861
Dissolved Beryllium (Be)	ug/L	<0.01	0.01	0.01	0.01	2468861
Dissolved Bismuth (Bi)	ug/L	<0.005	<0.005	<0.005	0.005	2468861
Dissolved Boron (B)	ug/L	<50	<50	<50	50	2468861
Dissolved Cadmium (Cd)	ug/L	0.021	0.024	0.019	0.005	2468861
Dissolved Chromium (Cr)	ug/L	0.2	0.2	0.2	0.1	2468861
Dissolved Cobalt (Co)	ug/L	0.047	0.505	0.344	0.005	2468861
Dissolved Copper (Cu)	ug/L	1.06	1.14	1.10	0.05	2468861
Dissolved Iron (Fe)	ug/L	59	102	86	1	2468861
Dissolved Lead (Pb)	ug/L	0.306	0.315	0.223	0.005	2468861
Dissolved Lithium (Li)	ug/L	2.0	3.1	3.0	0.5	2468861
Dissolved Manganese (Mn)	ug/L	13.2	424	298	0.05	2468861
Dissolved Molybdenum (Mo)	ug/L	0.36	0.40	0.38	0.05	2468861
Dissolved Nickel (Ni)	ug/L	0.66	1.72	1.44	0.02	2468861
Dissolved Selenium (Se)	ug/L	0.26	0.24	0.25	0.04	2468861
Dissolved Silicon (Si)	ug/L	4790	4120	4540	100	2468861
Dissolved Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	2468861
Dissolved Strontium (Sr)	ug/L	76.5	125	122	0.05	2468861
Dissolved Thallium (Tl)	ug/L	0.003	0.016	0.012	0.002	2468861
Dissolved Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	2468861
Dissolved Titanium (Ti)	ug/L	1.2	2.0	1.8	0.5	2468861
Dissolved Uranium (U)	ug/L	0.684	0.993	0.934	0.002	2468861
Dissolved Vanadium (V)	ug/L	0.7	0.8	0.7	0.2	2468861
Dissolved Zinc (Zn)	ug/L	19.0	17.2	13.9	0.1	2468861
Dissolved Zirconium (Zr)	ug/L	0.1	0.1	<0.1	0.1	2468861
Dissolved Calcium (Ca)	mg/L	20.1	35.7	35.1	0.05	2478613
Dissolved Magnesium (Mg)	mg/L	4.40	7.61	7.15	0.05	2478613

RDL = Reportable Detection Limit

Maxxam Job #: A837468
Report Date: 2008/08/01

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: BB

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		K87867	K87868	K87869		
Sampling Date		2008/07/22 17:30	2008/07/21 16:00	2008/07/22 13:00		
COC Number		F112780	F112780	F112780		
	Units	**R-1-ROSE CR U/S**	**R-2-ROSE CR NEAR X-14**	**R-3-ROSE CR MIDWAY**	**RDL**	**QC Batch**
Dissolved Potassium (K)	mg/L	0.44	0.83	0.84	0.05	2478613
Dissolved Sodium (Na)	mg/L	1.57	2.62	2.53	0.05	2478613
Dissolved Sulphur (S)	mg/L	4	18	16	3	2478613

RDL = Reportable Detection Limit

Maxxam Job #: A837468
Report Date: 2008/08/01

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: BB

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		K87870	K87871	K87872		
Sampling Date		2008/07/22 10:30	2008/07/22 12:00	2008/07/22 11:30		
COC Number		F112780	F112780	F112780		
	Units	**R-4-ROSE CR**	**R-5-ANVIL CR D/S**	**R-6-ANVIL CR U/S**	**RDL**	**QC Batch**
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	109	124	116	0.5	2468909
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	16.9	21.6	21.4	0.2	2468861
Dissolved Antimony (Sb)	ug/L	0.10	0.11	0.13	0.02	2468861
Dissolved Arsenic (As)	ug/L	0.43	0.43	0.43	0.02	2468861
Dissolved Barium (Ba)	ug/L	47.9	51.6	52.7	0.02	2468861
Dissolved Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	2468861
Dissolved Bismuth (Bi)	ug/L	<0.005	<0.005	<0.005	0.005	2468861
Dissolved Boron (B)	ug/L	<50	<50	<50	50	2468861
Dissolved Cadmium (Cd)	ug/L	0.021	0.014	0.014	0.005	2468861
Dissolved Chromium (Cr)	ug/L	0.2	0.2	0.2	0.1	2468861
Dissolved Cobalt (Co)	ug/L	0.168	0.045	0.031	0.005	2468861
Dissolved Copper (Cu)	ug/L	1.10	0.96	0.85	0.05	2468861
Dissolved Iron (Fe)	ug/L	63	53	48	1	2468861
Dissolved Lead (Pb)	ug/L	0.163	0.066	0.086	0.005	2468861
Dissolved Lithium (Li)	ug/L	2.6	1.4	1.3	0.5	2468861
Dissolved Manganese (Mn)	ug/L	176	20.8	7.06	0.05	2468861
Dissolved Molybdenum (Mo)	ug/L	0.45	0.81	0.87	0.05	2468861
Dissolved Nickel (Ni)	ug/L	1.21	0.66	0.56	0.02	2468861
Dissolved Selenium (Se)	ug/L	0.36	0.66	0.64	0.04	2468861
Dissolved Silicon (Si)	ug/L	4310	4180	3910	100	2468861
Dissolved Silver (Ag)	ug/L	0.005	<0.005	<0.005	0.005	2468861
Dissolved Strontium (Sr)	ug/L	113	91.9	88.9	0.05	2468861
Dissolved Thallium (Tl)	ug/L	0.009	0.003	<0.002	0.002	2468861
Dissolved Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	2468861
Dissolved Titanium (Ti)	ug/L	1.8	1.5	1.6	0.5	2468861
Dissolved Uranium (U)	ug/L	0.884	1.20	1.28	0.002	2468861
Dissolved Vanadium (V)	ug/L	0.6	0.5	0.4	0.2	2468861
Dissolved Zinc (Zn)	ug/L	9.8	1.6	0.7	0.1	2468861
Dissolved Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	2468861
Dissolved Calcium (Ca)	mg/L	32.6	34.6	32.5	0.05	2478613
Dissolved Magnesium (Mg)	mg/L	6.69	9.02	8.52	0.05	2478613

RDL = Reportable Detection Limit

Maxxam Job #: A837468
Report Date: 2008/08/01

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: BB

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		K87870	K87871	K87872		
Sampling Date		2008/07/22 10:30	2008/07/22 12:00	2008/07/22 11:30		
COC Number		F112780	F112780	F112780		
	Units	**R-4-ROSE CR**	**R-5-ANVIL CR D/S**	**R-6-ANVIL CR U/S**	**RDL**	**QC Batch**
Dissolved Potassium (K)	mg/L	0.81	0.83	0.78	0.05	2478613
Dissolved Sodium (Na)	mg/L	2.18	1.51	1.35	0.05	2478613
Dissolved Sulphur (S)	mg/L	14	7	6	3	2478613

RDL = Reportable Detection Limit

Maxxam Job #: A837468
Report Date: 2008/08/01

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: BB

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		K87873	K87874		
Sampling Date		2008/07/22 13:45	2008/07/22 16:45		
COC Number		F112780	F112780		
	Units	**R-7-NORTH FORK**	**X-2-NORTH FORK**	**RDL**	**QC Batch**
Misc. Inorganics					
Dissolved Hardness (CaCO3)	mg/L	67.9	67.1	0.5	2468909
Dissolved Metals by ICPMS					
Dissolved Aluminum (Al)	ug/L	21.2	23.9	0.2	2468861
Dissolved Antimony (Sb)	ug/L	0.08	0.08	0.02	2468861
Dissolved Arsenic (As)	ug/L	0.55	0.49	0.02	2468861
Dissolved Barium (Ba)	ug/L	36.6	35.7	0.02	2468861
Dissolved Beryllium (Be)	ug/L	<0.01	0.01	0.01	2468861
Dissolved Bismuth (Bi)	ug/L	<0.005	<0.005	0.005	2468861
Dissolved Boron (B)	ug/L	<50	<50	50	2468861
Dissolved Cadmium (Cd)	ug/L	0.007	0.022	0.005	2468861
Dissolved Chromium (Cr)	ug/L	0.2	0.2	0.1	2468861
Dissolved Cobalt (Co)	ug/L	0.031	0.049	0.005	2468861
Dissolved Copper (Cu)	ug/L	0.72	1.17	0.05	2468861
Dissolved Iron (Fe)	ug/L	59	61	1	2468861
Dissolved Lead (Pb)	ug/L	0.028	0.350	0.005	2468861
Dissolved Lithium (Li)	ug/L	1.8	2.1	0.5	2468861
Dissolved Manganese (Mn)	ug/L	11.1	15.6	0.05	2468861
Dissolved Molybdenum (Mo)	ug/L	0.38	0.35	0.05	2468861
Dissolved Nickel (Ni)	ug/L	0.39	0.66	0.02	2468861
Dissolved Selenium (Se)	ug/L	0.28	0.23	0.04	2468861
Dissolved Silicon (Si)	ug/L	4400	4710	100	2468861
Dissolved Silver (Ag)	ug/L	<0.005	<0.005	0.005	2468861
Dissolved Strontium (Sr)	ug/L	71.0	75.8	0.05	2468861
Dissolved Thallium (Tl)	ug/L	<0.002	0.003	0.002	2468861
Dissolved Tin (Sn)	ug/L	<0.01	<0.01	0.01	2468861
Dissolved Titanium (Ti)	ug/L	1.4	1.6	0.5	2468861
Dissolved Uranium (U)	ug/L	0.661	0.674	0.002	2468861
Dissolved Vanadium (V)	ug/L	0.6	0.8	0.2	2468861
Dissolved Zinc (Zn)	ug/L	0.6	22.1	0.1	2468861
Dissolved Zirconium (Zr)	ug/L	<0.1	0.1	0.1	2468861
Dissolved Calcium (Ca)	mg/L	20.2	19.8	0.05	2478613
Dissolved Magnesium (Mg)	mg/L	4.26	4.30	0.05	2478613

RDL = Reportable Detection Limit

Maxxam Job #: A837468
Report Date: 2008/08/01

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: BB

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		K87873	K87874		
Sampling Date		2008/07/22 13:45	2008/07/22 16:45		
COC Number		F112780	F112780		
	Units	**R-7-NORTH FORK**	**X-2-NORTH FORK**	**RDL**	**QC Batch**
Dissolved Potassium (K)	mg/L	0.37	0.46	0.05	2478613
Dissolved Sodium (Na)	mg/L	1.44	1.56	0.05	2478613
Dissolved Sulphur (S)	mg/L	<3	4	3	2478613

RDL = Reportable Detection Limit

Maxxam Job #: A837468
Report Date: 2008/08/01

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: BB

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		K87867	K87868	K87869		
Sampling Date		2008/07/22 17:30	2008/07/21 16:00	2008/07/22 13:00		
COC Number		F112780	F112780	F112780		
	Units	**R-1-ROSE CR U/S**	**R-2-ROSE CR NEAR X-14**	**R-3-ROSE CR MIDWAY**	**RDL**	**QC Batch**
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	63.8	110	107	0.5	2469403
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	41.9	33.6	32.3	0.2	2468949
Total Antimony (Sb)	ug/L	0.07	0.08	0.08	0.02	2468949
Total Arsenic (As)	ug/L	0.52	0.44	0.42	0.02	2468949
Total Barium (Ba)	ug/L	36.1	36.2	34.6	0.02	2468949
Total Beryllium (Be)	ug/L	0.01	<0.01	0.01	0.01	2468949
Total Bismuth (Bi)	ug/L	<0.005	<0.005	<0.005	0.005	2468949
Total Boron (B)	ug/L	<50	<50	<50	50	2468949
Total Cadmium (Cd)	ug/L	0.021	0.022	0.022	0.005	2468949
Total Chromium (Cr)	ug/L	0.2	0.2	0.2	0.1	2468949
Total Cobalt (Co)	ug/L	0.063	0.481	0.332	0.005	2468949
Total Copper (Cu)	ug/L	1.10	0.95	0.93	0.05	2468949
Total Iron (Fe)	ug/L	91	149	126	1	2468949
Total Lead (Pb)	ug/L	0.849	0.425	0.429	0.005	2468949
Total Lithium (Li)	ug/L	2.1	2.9	2.8	0.5	2468949
Total Manganese (Mn)	ug/L	15.9	416	286	0.05	2468949
Total Molybdenum (Mo)	ug/L	0.35	0.41	0.37	0.05	2468949
Total Nickel (Ni)	ug/L	0.76	1.50	1.20	0.02	2468949
Total Selenium (Se)	ug/L	0.26	0.24	0.23	0.04	2468949
Total Silicon (Si)	ug/L	4720	4160	4320	100	2468949
Total Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	2468949
Total Strontium (Sr)	ug/L	74.7	116	113	0.05	2468949
Total Thallium (Tl)	ug/L	0.003	0.013	0.010	0.002	2468949
Total Tin (Sn)	ug/L	<0.01	0.10	0.05	0.01	2468949
Total Titanium (Ti)	ug/L	1.5	1.4	1.4	0.5	2468949
Total Uranium (U)	ug/L	0.684	0.960	0.892	0.002	2468949
Total Vanadium (V)	ug/L	0.6	0.3	0.3	0.2	2468949
Total Zinc (Zn)	ug/L	19.5	16.2	13.5	0.1	2468949
Total Zirconium (Zr)	ug/L	0.2	0.1	<0.1	0.1	2468949
Total Calcium (Ca)	mg/L	18.8	32.6	32.1	0.05	2478614
Total Magnesium (Mg)	mg/L	4.07	6.96	6.60	0.05	2478614

RDL = Reportable Detection Limit

Maxxam Job #: A837468
Report Date: 2008/08/01

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: BB

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		K87867	K87868	K87869		
Sampling Date		2008/07/22 17:30	2008/07/21 16:00	2008/07/22 13:00		
COC Number		F112780	F112780	F112780		
	Units	**R-1-ROSE CR U/S**	**R-2-ROSE CR NEAR X-14**	**R-3-ROSE CR MIDWAY**	**RDL**	**QC Batch**
Total Potassium (K)	mg/L	0.40	0.74	0.75	0.05	2478614
Total Sodium (Na)	mg/L	1.44	2.38	2.31	0.05	2478614
Total Sulphur (S)	mg/L	4	18	16	3	2478614

RDL = Reportable Detection Limit

Maxxam Job #: A837468
Report Date: 2008/08/01

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: BB

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		K87870	K87871	K87872		
Sampling Date		2008/07/22 10:30	2008/07/22 12:00	2008/07/22 11:30		
COC Number		F112780	F112780	F112780		
	Units	**R-4-ROSE CR**	**R-5-ANVIL CR D/S**	**R-6-ANVIL CR U/S**	**RDL**	**QC Batch**
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	110	116	115	0.5	2469403
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	53.7	68.9	60.6	0.2	2468949
Total Antimony (Sb)	ug/L	0.10	0.11	0.12	0.02	2468949
Total Arsenic (As)	ug/L	0.45	0.49	0.46	0.02	2468949
Total Barium (Ba)	ug/L	47.9	49.4	48.8	0.02	2468949
Total Beryllium (Be)	ug/L	0.01	0.01	0.01	0.01	2468949
Total Bismuth (Bi)	ug/L	<0.005	<0.005	<0.005	0.005	2468949
Total Boron (B)	ug/L	<50	<50	<50	50	2468949
Total Cadmium (Cd)	ug/L	0.026	0.019	0.023	0.005	2468949
Total Chromium (Cr)	ug/L	0.3	0.3	0.3	0.1	2468949
Total Cobalt (Co)	ug/L	0.242	0.092	0.064	0.005	2468949
Total Copper (Cu)	ug/L	1.25	1.08	0.97	0.05	2468949
Total Iron (Fe)	ug/L	140	133	125	1	2468949
Total Lead (Pb)	ug/L	0.605	0.164	0.090	0.005	2468949
Total Lithium (Li)	ug/L	2.5	1.4	1.3	0.5	2468949
Total Manganese (Mn)	ug/L	208	28.6	12.8	0.05	2468949
Total Molybdenum (Mo)	ug/L	0.45	0.76	0.80	0.05	2468949
Total Nickel (Ni)	ug/L	1.40	0.66	0.56	0.02	2468949
Total Selenium (Se)	ug/L	0.41	0.68	0.74	0.04	2468949
Total Silicon (Si)	ug/L	4530	4120	4260	100	2468949
Total Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	2468949
Total Strontium (Sr)	ug/L	114	87.5	85.4	0.05	2468949
Total Thallium (Tl)	ug/L	0.012	0.004	0.003	0.002	2468949
Total Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	2468949
Total Titanium (Ti)	ug/L	2.1	2.9	2.3	0.5	2468949
Total Uranium (U)	ug/L	0.874	1.19	1.17	0.002	2468949
Total Vanadium (V)	ug/L	0.4	0.4	0.2	0.2	2468949
Total Zinc (Zn)	ug/L	11.1	1.7	0.8	0.1	2468949
Total Zirconium (Zr)	ug/L	0.1	0.1	0.1	0.1	2468949
Total Calcium (Ca)	mg/L	32.8	32.6	32.1	0.05	2478614
Total Magnesium (Mg)	mg/L	6.76	8.48	8.47	0.05	2478614

RDL = Reportable Detection Limit

Maxxam Job #: A837468
Report Date: 2008/08/01

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: BB

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		K87870	K87871	K87872		
Sampling Date		2008/07/22 10:30	2008/07/22 12:00	2008/07/22 11:30		
COC Number		F112780	F112780	F112780		
	Units	**R-4-ROSE CR**	**R-5-ANVIL CR D/S**	**R-6-ANVIL CR U/S**	**RDL**	**QC Batch**
Total Potassium (K)	mg/L	0.80	0.78	0.76	0.05	2478614
Total Sodium (Na)	mg/L	2.22	1.42	1.35	0.05	2478614
Total Sulphur (S)	mg/L	15	7	7	3	2478614

RDL = Reportable Detection Limit

Maxxam Job #: A837468
Report Date: 2008/08/01

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: BB

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		K87873	K87874		
Sampling Date		2008/07/22 13:45	2008/07/22 16:45		
COC Number		F112780	F112780		
	Units	**R-7-NORTH FORK**	**X-2-NORTH FORK**	**RDL**	**QC Batch**
Calculated Parameters					
Total Hardness (CaCO3)	mg/L	63.6	63.9	0.5	2469403
Total Metals by ICPMS					
Total Aluminum (Al)	ug/L	43.9	43.5	0.2	2468949
Total Antimony (Sb)	ug/L	0.08	0.08	0.02	2468949
Total Arsenic (As)	ug/L	0.55	0.52	0.02	2468949
Total Barium (Ba)	ug/L	36.0	34.0	0.02	2468949
Total Beryllium (Be)	ug/L	<0.01	0.01	0.01	2468949
Total Bismuth (Bi)	ug/L	<0.005	<0.005	0.005	2468949
Total Boron (B)	ug/L	<50	<50	50	2468949
Total Cadmium (Cd)	ug/L	0.009	0.026	0.005	2468949
Total Chromium (Cr)	ug/L	0.3	0.2	0.1	2468949
Total Cobalt (Co)	ug/L	0.047	0.070	0.005	2468949
Total Copper (Cu)	ug/L	0.73	1.36	0.05	2468949
Total Iron (Fe)	ug/L	114	101	1	2468949
Total Lead (Pb)	ug/L	0.085	0.883	0.005	2468949
Total Lithium (Li)	ug/L	1.7	2.0	0.5	2468949
Total Manganese (Mn)	ug/L	14.7	19.1	0.05	2468949
Total Molybdenum (Mo)	ug/L	0.36	0.35	0.05	2468949
Total Nickel (Ni)	ug/L	0.38	0.69	0.02	2468949
Total Selenium (Se)	ug/L	0.26	0.24	0.04	2468949
Total Silicon (Si)	ug/L	4360	4530	100	2468949
Total Silver (Ag)	ug/L	<0.005	<0.005	0.005	2468949
Total Strontium (Sr)	ug/L	68.7	70.5	0.05	2468949
Total Thallium (Tl)	ug/L	0.002	0.003	0.002	2468949
Total Tin (Sn)	ug/L	<0.01	<0.01	0.01	2468949
Total Titanium (Ti)	ug/L	1.7	1.4	0.5	2468949
Total Uranium (U)	ug/L	0.638	0.650	0.002	2468949
Total Vanadium (V)	ug/L	0.3	0.3	0.2	2468949
Total Zinc (Zn)	ug/L	0.8	22.5	0.1	2468949
Total Zirconium (Zr)	ug/L	0.1	0.1	0.1	2468949
Total Calcium (Ca)	mg/L	18.9	18.8	0.05	2478614
Total Magnesium (Mg)	mg/L	3.98	4.14	0.05	2478614

RDL = Reportable Detection Limit

Maxxam Job #: A837468
Report Date: 2008/08/01

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: BB

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		K87873	K87874		
Sampling Date		2008/07/22 13:45	2008/07/22 16:45		
COC Number		F112780	F112780		
	Units	**R-7-NORTH FORK**	**X-2-NORTH FORK**	**RDL**	**QC Batch**
Total Potassium (K)	mg/L	0.34	0.43	0.05	2478614
Total Sodium (Na)	mg/L	1.37	1.50	0.05	2478614
Total Sulphur (S)	mg/L	<3	4	3	2478614

RDL = Reportable Detection Limit

Maxxam Job #: A837468
Report Date: 2008/08/01

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: BB

General Comments

Results relate only to the items tested.

LABERGE ENVIRONMENTAL SERVICES
Attention: Bonnie Burns
Client Project #: FARO CLOSURE OFFICE
P.O. #:
Site Reference:

Quality Assurance Report

Maxxam Job Number: VA837468

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2468070	AL8	MATRIX SPIKE	Alkalinity (Total as CaCO3)	2008/07/29		100	%	80 - 120
		SPIKE	Alkalinity (Total as CaCO3)	2008/07/29		85	%	80 - 120
		BLANK	Alkalinity (Total as CaCO3)	2008/07/29	<0.5		mg/L	
			Alkalinity (PP as CaCO3)	2008/07/29	<0.5		mg/L	
			Bicarbonate (HCO3)	2008/07/29	<0.5		mg/L	
			Carbonate (CO3)	2008/07/29	<0.5		mg/L	
			Hydroxide (OH)	2008/07/29	<0.5		mg/L	
		RPD	Alkalinity (Total as CaCO3)	2008/07/29	1.6		%	25
			Alkalinity (PP as CaCO3)	2008/07/29	NC		%	25
			Bicarbonate (HCO3)	2008/07/29	1.6		%	25
			Carbonate (CO3)	2008/07/29	NC		%	25
			Hydroxide (OH)	2008/07/29	NC		%	25
2468861	AA1	MATRIX SPIKE	Dissolved Arsenic (As)	2008/08/01		NC	%	75 - 125
			Dissolved Beryllium (Be)	2008/08/01		92	%	75 - 125
			Dissolved Cadmium (Cd)	2008/08/01		94	%	75 - 125
			Dissolved Chromium (Cr)	2008/08/01		98	%	75 - 125
			Dissolved Cobalt (Co)	2008/08/01		96	%	75 - 125
			Dissolved Copper (Cu)	2008/08/01		92	%	75 - 125
			Dissolved Lead (Pb)	2008/08/01		91	%	75 - 125
			Dissolved Lithium (Li)	2008/08/01		NC	%	75 - 125
			Dissolved Nickel (Ni)	2008/08/01		93	%	75 - 125
			Dissolved Selenium (Se)	2008/08/01		82	%	75 - 125
			Dissolved Uranium (U)	2008/08/01		88	%	75 - 125
			Dissolved Vanadium (V)	2008/08/01		98	%	75 - 125
			Dissolved Zinc (Zn)	2008/08/01		92	%	75 - 125
		SPIKE	Dissolved Arsenic (As)	2008/08/01		99	%	75 - 125
			Dissolved Beryllium (Be)	2008/08/01		97	%	75 - 125
			Dissolved Cadmium (Cd)	2008/08/01		96	%	75 - 125
			Dissolved Chromium (Cr)	2008/08/01		100	%	75 - 125
			Dissolved Cobalt (Co)	2008/08/01		98	%	75 - 125
			Dissolved Copper (Cu)	2008/08/01		102	%	75 - 125
			Dissolved Lead (Pb)	2008/08/01		99	%	75 - 125
			Dissolved Lithium (Li)	2008/08/01		101	%	75 - 125
			Dissolved Nickel (Ni)	2008/08/01		101	%	75 - 125
			Dissolved Selenium (Se)	2008/08/01		110	%	75 - 125
			Dissolved Uranium (U)	2008/08/01		98	%	75 - 125
			Dissolved Vanadium (V)	2008/08/01		108	%	75 - 125
			Dissolved Zinc (Zn)	2008/08/01		104	%	75 - 125
		BLANK	Dissolved Aluminum (Al)	2008/08/01	0.3, RDL=0.2		ug/L	
			Dissolved Antimony (Sb)	2008/08/01	<0.02		ug/L	
			Dissolved Arsenic (As)	2008/08/01	<0.02		ug/L	
			Dissolved Barium (Ba)	2008/08/01	<0.02		ug/L	
			Dissolved Beryllium (Be)	2008/08/01	<0.01		ug/L	
			Dissolved Bismuth (Bi)	2008/08/01	<0.005		ug/L	
			Dissolved Boron (B)	2008/08/01	<50		ug/L	
			Dissolved Cadmium (Cd)	2008/08/01	<0.005		ug/L	
			Dissolved Chromium (Cr)	2008/08/01	0.2, RDL=0.1		ug/L	
			Dissolved Cobalt (Co)	2008/08/01	<0.005		ug/L	
			Dissolved Copper (Cu)	2008/08/01	<0.05		ug/L	
			Dissolved Iron (Fe)	2008/08/01	<1		ug/L	
			Dissolved Lead (Pb)	2008/08/01	<0.005		ug/L	
			Dissolved Lithium (Li)	2008/08/01	<0.5		ug/L	
			Dissolved Manganese (Mn)	2008/08/01	<0.05		ug/L	
			Dissolved Molybdenum (Mo)	2008/08/01	<0.05		ug/L	
			Dissolved Nickel (Ni)	2008/08/01	<0.02		ug/L	

LABERGE ENVIRONMENTAL SERVICES
Attention: Bonnie Burns
Client Project #: FARO CLOSURE OFFICE
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA837468

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2468861	AA1	BLANK	Dissolved Selenium (Se)	2008/08/01	0.04, RDL=0.04		ug/L	
			Dissolved Silicon (Si)	2008/08/01	<100		ug/L	
			Dissolved Silver (Ag)	2008/08/01	<0.005		ug/L	
			Dissolved Strontium (Sr)	2008/08/01	<0.05		ug/L	
			Dissolved Thallium (Tl)	2008/08/01	<0.002		ug/L	
			Dissolved Tin (Sn)	2008/08/01	<0.01		ug/L	
			Dissolved Titanium (Ti)	2008/08/01	<0.5		ug/L	
			Dissolved Uranium (U)	2008/08/01	<0.002		ug/L	
			Dissolved Vanadium (V)	2008/08/01	<0.2		ug/L	
			Dissolved Zinc (Zn)	2008/08/01	<0.1		ug/L	
			Dissolved Zirconium (Zr)	2008/08/01	<0.1		ug/L	
		RPD	Dissolved Aluminum (Al)	2008/08/01	0.2		%	25
			Dissolved Antimony (Sb)	2008/08/01	1.5		%	25
			Dissolved Arsenic (As)	2008/08/01	1		%	25
			Dissolved Barium (Ba)	2008/08/01	1.3		%	25
			Dissolved Beryllium (Be)	2008/08/01	NC		%	25
			Dissolved Bismuth (Bi)	2008/08/01	NC		%	25
			Dissolved Boron (B)	2008/08/01	NC		%	25
			Dissolved Cadmium (Cd)	2008/08/01	NC		%	25
			Dissolved Chromium (Cr)	2008/08/01	NC		%	25
			Dissolved Cobalt (Co)	2008/08/01	0.07		%	25
			Dissolved Copper (Cu)	2008/08/01	0.3		%	25
			Dissolved Iron (Fe)	2008/08/01	0.6		%	25
			Dissolved Lead (Pb)	2008/08/01	2.4		%	25
			Dissolved Lithium (Li)	2008/08/01	2.2		%	25
			Dissolved Manganese (Mn)	2008/08/01	0.8		%	25
			Dissolved Molybdenum (Mo)	2008/08/01	0.3		%	25
			Dissolved Nickel (Ni)	2008/08/01	1.5		%	25
			Dissolved Selenium (Se)	2008/08/01	3.0		%	25
			Dissolved Silicon (Si)	2008/08/01	0.7		%	25
			Dissolved Silver (Ag)	2008/08/01	NC		%	25
			Dissolved Strontium (Sr)	2008/08/01	0.6		%	25
			Dissolved Thallium (Tl)	2008/08/01	NC		%	25
			Dissolved Tin (Sn)	2008/08/01	NC		%	25
			Dissolved Titanium (Ti)	2008/08/01	9.4		%	25
			Dissolved Uranium (U)	2008/08/01	2.8		%	25
			Dissolved Vanadium (V)	2008/08/01	4.4		%	25
			Dissolved Zinc (Zn)	2008/08/01	1.8		%	25
			Dissolved Zirconium (Zr)	2008/08/01	NC		%	25
2468949	AA1	MATRIX SPIKE						
		[K87867-01]	Total Arsenic (As)	2008/08/01		96	%	75 - 125
			Total Beryllium (Be)	2008/08/01		102	%	75 - 125
			Total Cadmium (Cd)	2008/08/01		98	%	75 - 125
			Total Chromium (Cr)	2008/08/01		97	%	75 - 125
			Total Cobalt (Co)	2008/08/01		95	%	75 - 125
			Total Copper (Cu)	2008/08/01		96	%	75 - 125
			Total Lead (Pb)	2008/08/01		96	%	75 - 125
			Total Lithium (Li)	2008/08/01		99	%	75 - 125
			Total Nickel (Ni)	2008/08/01		95	%	75 - 125
			Total Selenium (Se)	2008/08/01		99	%	75 - 125
			Total Uranium (U)	2008/08/01		97	%	75 - 125
			Total Vanadium (V)	2008/08/01		96	%	75 - 125
			Total Zinc (Zn)	2008/08/01		NC	%	75 - 125
		SPIKE	Total Arsenic (As)	2008/08/01		100	%	75 - 125
			Total Beryllium (Be)	2008/08/01		98	%	75 - 125

LABERGE ENVIRONMENTAL SERVICES
Attention: Bonnie Burns
Client Project #: FARO CLOSURE OFFICE
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA837468

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2468949	AA1	SPIKE	Total Cadmium (Cd)	2008/08/01		99	%	75 - 125
			Total Chromium (Cr)	2008/08/01		101	%	75 - 125
			Total Cobalt (Co)	2008/08/01		99	%	75 - 125
			Total Copper (Cu)	2008/08/01		101	%	75 - 125
			Total Lead (Pb)	2008/08/01		101	%	75 - 125
			Total Lithium (Li)	2008/08/01		103	%	75 - 125
			Total Nickel (Ni)	2008/08/01		99	%	75 - 125
			Total Selenium (Se)	2008/08/01		96	%	75 - 125
			Total Uranium (U)	2008/08/01		101	%	75 - 125
			Total Vanadium (V)	2008/08/01		112	%	75 - 125
			Total Zinc (Zn)	2008/08/01		104	%	75 - 125
		BLANK	Total Aluminum (Al)	2008/08/01	<0.2		ug/L	
			Total Antimony (Sb)	2008/08/01	<0.02		ug/L	
			Total Arsenic (As)	2008/08/01	<0.02		ug/L	
			Total Barium (Ba)	2008/08/01	<0.02		ug/L	
			Total Beryllium (Be)	2008/08/01	<0.01		ug/L	
			Total Bismuth (Bi)	2008/08/01	<0.005		ug/L	
			Total Boron (B)	2008/08/01	<50		ug/L	
			Total Cadmium (Cd)	2008/08/01	<0.005		ug/L	
			Total Chromium (Cr)	2008/08/01	<0.1		ug/L	
			Total Cobalt (Co)	2008/08/01	<0.005		ug/L	
			Total Copper (Cu)	2008/08/01	<0.05		ug/L	
			Total Iron (Fe)	2008/08/01	<1		ug/L	
			Total Lead (Pb)	2008/08/01	<0.005		ug/L	
			Total Lithium (Li)	2008/08/01	<0.5		ug/L	
			Total Manganese (Mn)	2008/08/01	<0.05		ug/L	
			Total Molybdenum (Mo)	2008/08/01	<0.05		ug/L	
			Total Nickel (Ni)	2008/08/01	<0.02		ug/L	
			Total Selenium (Se)	2008/08/01	<0.04		ug/L	
			Total Silicon (Si)	2008/08/01	<100		ug/L	
			Total Silver (Ag)	2008/08/01	<0.005		ug/L	
			Total Strontium (Sr)	2008/08/01	<0.05		ug/L	
			Total Thallium (Tl)	2008/08/01	<0.002		ug/L	
			Total Tin (Sn)	2008/08/01	<0.01		ug/L	
			Total Titanium (Ti)	2008/08/01	<0.5		ug/L	
			Total Uranium (U)	2008/08/01	<0.002		ug/L	
			Total Vanadium (V)	2008/08/01	<0.2		ug/L	
			Total Zinc (Zn)	2008/08/01	<0.1		ug/L	
			Total Zirconium (Zr)	2008/08/01	<0.1		ug/L	
		RPD [K87867-01]	Total Aluminum (Al)	2008/08/01	2.9		%	25
			Total Antimony (Sb)	2008/08/01	NC		%	25
			Total Arsenic (As)	2008/08/01	1.5		%	25
			Total Barium (Ba)	2008/08/01	6.7		%	25
			Total Beryllium (Be)	2008/08/01	NC		%	25
			Total Bismuth (Bi)	2008/08/01	NC		%	25
			Total Boron (B)	2008/08/01	NC		%	25
			Total Cadmium (Cd)	2008/08/01	NC		%	25
			Total Chromium (Cr)	2008/08/01	NC		%	25
			Total Cobalt (Co)	2008/08/01	2.2		%	25
			Total Copper (Cu)	2008/08/01	0.4		%	25
			Total Iron (Fe)	2008/08/01	1.3		%	25
			Total Lead (Pb)	2008/08/01	4.2		%	25
			Total Lithium (Li)	2008/08/01	NC		%	25
			Total Manganese (Mn)	2008/08/01	1.0		%	25
			Total Molybdenum (Mo)	2008/08/01	5.1		%	25

LABERGE ENVIRONMENTAL SERVICES
Attention: Bonnie Burns
Client Project #: FARO CLOSURE OFFICE
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA837468

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2468949	AA1	RPD [K87867-01]	Total Nickel (Ni)	2008/08/01	10.7		%	25
			Total Selenium (Se)	2008/08/01	5.4		%	25
			Total Silicon (Si)	2008/08/01	1.6		%	25
			Total Silver (Ag)	2008/08/01	NC		%	25
			Total Strontium (Sr)	2008/08/01	2.6		%	25
			Total Thallium (Tl)	2008/08/01	NC		%	25
			Total Tin (Sn)	2008/08/01	NC		%	25
			Total Titanium (Ti)	2008/08/01	NC		%	25
			Total Uranium (U)	2008/08/01	5.4		%	25
			Total Vanadium (V)	2008/08/01	NC		%	25
			Total Zinc (Zn)	2008/08/01	0.9		%	25
			Total Zirconium (Zr)	2008/08/01	NC		%	25
2468990	WR1	SPIKE	Total Suspended Solids	2008/07/29		102	%	N/A
		BLANK	Total Suspended Solids	2008/07/29	<1		mg/L	
2472862	IC4	MATRIX SPIKE	Ammonia (N)	2008/07/30		107	%	80 - 120
		SPIKE	Ammonia (N)	2008/07/30		103	%	80 - 120
		BLANK	Ammonia (N)	2008/07/30	<0.01		mg/L	
		RPD	Ammonia (N)	2008/07/30	1.0		%	25
2472977	IC4	MATRIX SPIKE	Dissolved Sulphate (SO4)	2008/07/30		NC	%	75 - 125
		SPIKE	Dissolved Sulphate (SO4)	2008/07/30		93	%	80 - 120
		BLANK	Dissolved Sulphate (SO4)	2008/07/30	<0.5		mg/L	
		RPD [K87868-01]	Dissolved Sulphate (SO4)	2008/07/30	0.6		%	20
2478613	AA1	BLANK	Dissolved Calcium (Ca)	2008/08/01	<0.05		mg/L	
			Dissolved Magnesium (Mg)	2008/08/01	<0.05		mg/L	
			Dissolved Potassium (K)	2008/08/01	<0.05		mg/L	
			Dissolved Sodium (Na)	2008/08/01	<0.05		mg/L	
			Dissolved Sulphur (S)	2008/08/01	<3		mg/L	
		RPD	Dissolved Calcium (Ca)	2008/08/01	0		%	25
			Dissolved Magnesium (Mg)	2008/08/01	1		%	25
			Dissolved Potassium (K)	2008/08/01	0.6		%	25
			Dissolved Sodium (Na)	2008/08/01	1.2		%	25
			Dissolved Sulphur (S)	2008/08/01	2.5		%	25
2478614	AA1	BLANK	Total Calcium (Ca)	2008/08/01	<0.05		mg/L	
			Total Magnesium (Mg)	2008/08/01	<0.05		mg/L	
			Total Potassium (K)	2008/08/01	<0.05		mg/L	
			Total Sodium (Na)	2008/08/01	<0.05		mg/L	
			Total Sulphur (S)	2008/08/01	<3		mg/L	
		RPD [K87867-01]	Total Calcium (Ca)	2008/08/01	1.7		%	25
			Total Magnesium (Mg)	2008/08/01	3.7		%	25
			Total Potassium (K)	2008/08/01	2.1		%	25
			Total Sodium (Na)	2008/08/01	1.6		%	25
			Total Sulphur (S)	2008/08/01	NC		%	25

N/A = Not Applicable
NC = Non-calculable
RPD = Relative Percent Difference

Maxxam Analytics Inc

8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com

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Toll Free: 1-800-440-4808

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

PAGE 1 OF 1

A837468 ANALYSIS REQUEST F 112780

COMPANY NAME: LABERGE ENVIRONMENTAL SERVICES

PH. #: 867-668-6838
E-mail: bonnie.burns@northwestel.net
FAX #:

COMPANY ADDRESS: PO Box 21072 Whitehorse, Yukon Y1A 6P7

CLIENT PROJECT ID: (#) FARO CLOSURE OFFICE

SAMPLER NAME (PRINT): BONNIE BURNS

PROJECT MANAGER: BONNIE BURNS

FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE DD/MM/YY	SAMPLING: TIME	HEADSPACE VAPOUR	Alkalinity	Sulphate	TSS	Ammonia	Total Hardness	Total metals - CCME	Dissolved metals - CCME	pH
1 R-1 - Rose Cr u/s		✓				22/07/08	17:30	5	✓	✓	✓	✓	✓	✓	✓	✓
2 R-2 - Rose Cr mid X-ing		✓				21/07/08	16:00	5	✓	✓	✓	✓	✓	✓	✓	✓
3 R-3 - Rose Cr midway		✓				22/07/08	13:00	5	✓	✓	✓	✓	✓	✓	✓	✓
4 R-4 - Rose Cr		✓				22/07/08	10:30	5	✓	✓	✓	✓	✓	✓	✓	✓
5 R-5 - Anvil Cr d/s		✓				22/07/08	12:00	5	✓	✓	✓	✓	✓	✓	✓	✓
6 R-6 - Anvil Cr u/s		✓				22/07/08	11:30	5	✓	✓	✓	✓	✓	✓	✓	✓
7 R-7 - North Fork		✓				22/07/08	13:45	5	✓	✓	✓	✓	✓	✓	✓	✓
8 X-2 - North Fork		✓				22/07/08	16:45	5	✓	✓	✓	✓	✓	✓	✓	✓
9																
10																
11																
12																

TAT (Turnaround Time)

<5 DAY TAT MUST HAVE PRIOR APPROVAL

*some exceptions apply please contact lab

STANDARD	5 BUSINESS DAYS	☑
RUSH	3 BUSINESS DAYS	☐
RUSH	2 BUSINESS DAYS	☐
URGENT	1 BUSINESS DAY	☐

OTHER BUSINESS DAYS _____

CUSTODY RECORD

P.O. NUMBER / QUOTE NUMBER:

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE: ultra low level

☑ CCME
☐ CSR
☐ ALBERTA TIER 1
☐ OTHER

ACCOUNTING CONTACT: Laberge Environmental Services

SPECIAL REPORTING OR BILLING INSTRUCTIONS:

JARS USED:

LABORATORY USE ONLY

ARRIVAL TEMPERATURE °C: 7,8,7

DUE DATE:

LOG IN CHECK:

	DATE: DD/MM/YY	TIME:	
RELINQUISHED BY SAMPLER:			RECEIVED BY:
RELINQUISHED BY:			RECEIVED BY:
RELINQUISHED BY:	DATE: 23/07/08	TIME: 12:50	RECEIVED BY LABORATORY: A.M

COCFORM - BC - 06/08

ORIGINAL - MAXXAM YELLOW - MAXXAM PINK - CLIENT

Your Project #: FARO CLOSURE OFFICE (ROSE CR.)
Your C.O.C. #: F109289

Attention: Bonnie Burns
LABERGE ENVIRONMENTAL SERVICES
WHITEHORSE
405 Ogilvie Street
PO Box 21072
Whitehorse, YT
CANADA Y1A 6P7

Report Date: 2008/09/12

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A844444
Received: 2008/08/28, 13:30

Sample Matrix: Soil
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
GS Special Analysis	6	N/A	2008/09/11		
Elements by ICPMS (total)	2	2008/09/05	2008/09/05	BRN SOP-00203	Based on EPA 200.8
Elements by ICPMS (total)	4	2008/09/05	2008/09/06	BRN SOP-00203	Based on EPA 200.8
pH (2:1 DI Water Extract) (1)	6	2008/09/05	2008/09/06	BRN SOP-00266 R1.0	Carter, SSMA 16.2

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	3	2008/09/02	2008/09/02	BRN SOP-00264 R2.0	Based on SM2320B
Conductance - water	3	N/A	2008/09/02	BRN SOP-00264 R2.0	Based on SM-2510B
Hardness Total (calculated as CaCO3)	3	N/A	2008/09/04		
Hardness (calculated as CaCO3)	3	N/A	2008/09/04		
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	3	N/A	2008/09/04	BRN SOP-00206	Based on EPA 200.8
Elements by ICPMS Low Level (dissolved) (1)	3	N/A	2008/09/04	BRN SOP-00206	Based on EPA 200.8
Elements by ICPMS Low Level (total) (1)	3	2008/09/02	2008/09/04	BRN SOP-00206	Based on EPA 200.8
Na, K, Ca, Mg, S by CRC ICPMS (total)	3	2008/09/02	2008/09/04	BRN SOP-00206	Based on EPA 200.8
Ammonia (N)	3	N/A	2008/09/02	BRN SOP-00221 R3.0	Based on SM-4500MH3G
Filter and HNO3 Preserve for Metals	3	N/A	2008/09/03	BRN WI-00006 R1.0	Based on EPA 200.2
pH Water	3	N/A	2008/09/02	BRN SOP-00264 R2.0	Based on SM-4500H+B
Sulphate by Automated Colourimetry	3	N/A	2008/09/04	BRN-SOP 00243 R1.0	Based on EPA 375.4
Total Suspended Solids	3	N/A	2008/09/02	BRN SOP-00277 R2.0	Based on SM-2540 D

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

(1) SCC/CAEAL

../2

Your Project #: FARO CLOSURE OFFICE (ROSE CR.)
Your C.O.C. #: F109289

Attention: Bonnie Burns
LABERGE ENVIRONMENTAL SERVICES
WHITEHORSE
405 Ogilvie Street
PO Box 21072
Whitehorse, YT
CANADA Y1A 6P7

Report Date: 2008/09/12

CERTIFICATE OF ANALYSIS

Encryption Key

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

SUE REYNOLDS, BBY Customer Service
Email: sue.reynolds@maxxamanalytics.com
Phone# (604) 444-4808 Ext:235

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CAEAL have approved this reporting process and electronic report format.

Total cover pages: 2

Maxxam Job #: A844444
Report Date: 2008/09/12

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE (ROSE CR.)

Sampler Initials: BB

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		L37044	L37045	L37046		
Sampling Date		2008/08/25 10:30	2008/08/25 12:30	2008/08/25 14:30		
COC Number		F109289	F109289	F109289		
	Units	**R-1 ROSE CR U/S**	**R-2 ROSE CR NEAR X-14**	**X-2 NORTH FORK @ RD**	**RDL**	**QC Batch**
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	51.3	80.6	51.1	0.5	2543068
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	37.8	35.3	37.1	0.2	2543934
Dissolved Antimony (Sb)	ug/L	0.10	0.10	0.08	0.02	2543934
Dissolved Arsenic (As)	ug/L	0.58	0.48	0.57	0.02	2543934
Dissolved Barium (Ba)	ug/L	27.8	34.3	28.6	0.02	2543934
Dissolved Beryllium (Be)	ug/L	0.01	0.01	0.02	0.01	2543934
Dissolved Bismuth (Bi)	ug/L	<0.005	<0.005	<0.005	0.005	2543934
Dissolved Boron (B)	ug/L	<50	<50	<50	50	2543934
Dissolved Cadmium (Cd)	ug/L	0.024	0.021	0.023	0.005	2543934
Dissolved Chromium (Cr)	ug/L	0.1	0.1	0.1	0.1	2543934
Dissolved Cobalt (Co)	ug/L	0.055	0.248	0.059	0.005	2543934
Dissolved Copper (Cu)	ug/L	1.50	1.53	1.43	0.05	2543934
Dissolved Iron (Fe)	ug/L	127	121	129	1	2543934
Dissolved Lead (Pb)	ug/L	0.647	0.333	0.634	0.005	2543934
Dissolved Lithium (Li)	ug/L	1.8	2.0	1.8	0.5	2543934
Dissolved Manganese (Mn)	ug/L	11.1	166	12.3	0.05	2543934
Dissolved Molybdenum (Mo)	ug/L	0.28	0.38	0.29	0.05	2543934
Dissolved Nickel (Ni)	ug/L	0.96	1.32	0.95	0.02	2543934
Dissolved Selenium (Se)	ug/L	0.18	0.21	0.18	0.04	2543934
Dissolved Silicon (Si)	ug/L	4500	4170	4510	100	2543934
Dissolved Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	2543934
Dissolved Strontium (Sr)	ug/L	64.2	91.2	64.7	0.05	2543934
Dissolved Thallium (Tl)	ug/L	0.002	0.007	0.003	0.002	2543934
Dissolved Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	2543934
Dissolved Titanium (Ti)	ug/L	<0.5	<0.5	0.6	0.5	2543934
Dissolved Uranium (U)	ug/L	0.452	0.629	0.467	0.002	2543934
Dissolved Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	2543934
Dissolved Zinc (Zn)	ug/L	25.4	13.6	25.4	0.1	2543934
Dissolved Zirconium (Zr)	ug/L	0.2	0.2	0.2	0.1	2543934
Dissolved Calcium (Ca)	mg/L	15.1	23.1	15.0	0.05	2549533
Dissolved Magnesium (Mg)	mg/L	3.31	5.55	3.29	0.05	2549533

RDL = Reportable Detection Limit

Maxxam Job #: A844444
Report Date: 2008/09/12

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE (ROSE CR.)

Sampler Initials: BB

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		L37044	L37045	L37046		
Sampling Date		2008/08/25 10:30	2008/08/25 12:30	2008/08/25 14:30		
COC Number		F109289	F109289	F109289		
	Units	**R-1 ROSE CR U/S**	**R-2 ROSE CR NEAR X-14**	**X-2 NORTH FORK @ RD**	**RDL**	**QC Batch**
Dissolved Potassium (K)	mg/L	0.63	0.75	0.61	0.05	2549533
Dissolved Sodium (Na)	mg/L	1.90	2.01	1.90	0.05	2549533
Dissolved Sulphur (S)	mg/L	4	8	4	3	2549533

RDL = Reportable Detection Limit

Maxxam Job #: A844444
Report Date: 2008/09/12

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE (ROSE CR.)

Sampler Initials: BB

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		L37044	L37045	L37046		
Sampling Date		2008/08/25 10:30	2008/08/25 12:30	2008/08/25 14:30		
COC Number		F109289	F109289	F109289		
	Units	**R-1 ROSE CR U/S**	**R-2 ROSE CR NEAR X-14**	**X-2 NORTH FORK @ RD**	**RDL**	**QC Batch**
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	51.2	82.2	53.2	0.5	2542968
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	214	339	309	0.2	2546396
Total Antimony (Sb)	ug/L	0.11	0.12	0.10	0.02	2546396
Total Arsenic (As)	ug/L	1.03	1.17	1.27	0.02	2546396
Total Barium (Ba)	ug/L	36.8	51.0	44.3	0.02	2546396
Total Beryllium (Be)	ug/L	0.04	0.04	0.05	0.01	2546396
Total Bismuth (Bi)	ug/L	0.013	0.012	0.018	0.005	2546396
Total Boron (B)	ug/L	<50	<50	<50	50	2546396
Total Cadmium (Cd)	ug/L	0.050	0.078	0.074	0.005	2546396
Total Chromium (Cr)	ug/L	0.4	0.7	0.7	0.1	2546396
Total Cobalt (Co)	ug/L	0.305	0.764	0.490	0.005	2546396
Total Copper (Cu)	ug/L	2.12	3.13	2.31	0.05	2546396
Total Iron (Fe)	ug/L	578	954	834	1	2546396
Total Lead (Pb)	ug/L	4.69	4.33	7.43	0.005	2546396
Total Lithium (Li)	ug/L	2.2	2.6	2.5	0.5	2546396
Total Manganese (Mn)	ug/L	60.2	252	103	0.05	2546396
Total Molybdenum (Mo)	ug/L	0.27	0.31	0.26	0.05	2546396
Total Nickel (Ni)	ug/L	1.49	2.40	1.81	0.02	2546396
Total Selenium (Se)	ug/L	0.16	0.19	0.19	0.04	2546396
Total Silicon (Si)	ug/L	4740	4850	5350	100	2546396
Total Silver (Ag)	ug/L	0.009	0.008	0.010	0.005	2546396
Total Strontium (Sr)	ug/L	64.9	93.6	67.4	0.05	2546396
Total Thallium (Tl)	ug/L	0.011	0.013	0.011	0.002	2546396
Total Tin (Sn)	ug/L	0.01	0.01	0.01	0.01	2546396
Total Titanium (Ti)	ug/L	8.1	12.5	11.4	0.5	2546396
Total Uranium (U)	ug/L	0.504	0.746	0.556	0.002	2546396
Total Vanadium (V)	ug/L	0.6	0.9	0.7	0.2	2546396
Total Zinc (Zn)	ug/L	36.9	31.8	43.1	0.1	2546396
Total Zirconium (Zr)	ug/L	0.3	0.4	0.3	0.1	2546396
Total Calcium (Ca)	mg/L	15.2	23.7	15.7	0.05	2549535
Total Magnesium (Mg)	mg/L	3.25	5.56	3.41	0.05	2549535

RDL = Reportable Detection Limit

Maxxam Job #: A844444
Report Date: 2008/09/12

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE (ROSE CR.)

Sampler Initials: BB

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		L37044	L37045	L37046		
Sampling Date		2008/08/25 10:30	2008/08/25 12:30	2008/08/25 14:30		
COC Number		F109289	F109289	F109289		
	Units	**R-1 ROSE CR U/S**	**R-2 ROSE CR NEAR X-14**	**X-2 NORTH FORK @ RD**	**RDL**	**QC Batch**
Total Potassium (K)	mg/L	0.69	0.79	0.68	0.05	2549535
Total Sodium (Na)	mg/L	2.00	2.07	1.90	0.05	2549535
Total Sulphur (S)	mg/L	3	8	4	3	2549535

RDL = Reportable Detection Limit

LABERGE ENVIRONMENTAL SERVICES
Attention: Bonnie Burns
Client Project #: FARO CLOSURE OFFICE (ROSE CR.)
P.O. #:
Site Reference:

Quality Assurance Report

Maxxam Job Number: VA844444

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2543934	AA1	MATRIX SPIKE	Dissolved Arsenic (As)	2008/09/04		102	%	75 - 125
			Dissolved Beryllium (Be)	2008/09/04		101	%	75 - 125
			Dissolved Cadmium (Cd)	2008/09/04		108	%	75 - 125
			Dissolved Chromium (Cr)	2008/09/04		96	%	75 - 125
			Dissolved Cobalt (Co)	2008/09/04		94	%	75 - 125
			Dissolved Copper (Cu)	2008/09/04		93	%	75 - 125
			Dissolved Lead (Pb)	2008/09/04		92	%	75 - 125
			Dissolved Lithium (Li)	2008/09/04		97	%	75 - 125
			Dissolved Nickel (Ni)	2008/09/04		94	%	75 - 125
			Dissolved Selenium (Se)	2008/09/04		106	%	75 - 125
			Dissolved Uranium (U)	2008/09/04		96	%	75 - 125
			Dissolved Vanadium (V)	2008/09/04		96	%	75 - 125
			Dissolved Zinc (Zn)	2008/09/04		NC	%	75 - 125
		SPIKE	Dissolved Arsenic (As)	2008/09/04		97	%	75 - 125
			Dissolved Beryllium (Be)	2008/09/04		95	%	75 - 125
			Dissolved Cadmium (Cd)	2008/09/04		99	%	75 - 125
			Dissolved Chromium (Cr)	2008/09/04		98	%	75 - 125
			Dissolved Cobalt (Co)	2008/09/04		97	%	75 - 125
			Dissolved Copper (Cu)	2008/09/04		101	%	75 - 125
			Dissolved Lead (Pb)	2008/09/04		99	%	75 - 125
			Dissolved Lithium (Li)	2008/09/04		98	%	75 - 125
			Dissolved Nickel (Ni)	2008/09/04		99	%	75 - 125
			Dissolved Selenium (Se)	2008/09/04		101	%	75 - 125
			Dissolved Uranium (U)	2008/09/04		97	%	75 - 125
			Dissolved Vanadium (V)	2008/09/04		96	%	75 - 125
			Dissolved Zinc (Zn)	2008/09/04		112	%	75 - 125
		BLANK	Dissolved Aluminum (Al)	2008/09/04	<0.2		ug/L	
			Dissolved Antimony (Sb)	2008/09/04	<0.02		ug/L	
			Dissolved Arsenic (As)	2008/09/04	<0.02		ug/L	
			Dissolved Barium (Ba)	2008/09/04	<0.02		ug/L	
			Dissolved Beryllium (Be)	2008/09/04	<0.01		ug/L	
			Dissolved Bismuth (Bi)	2008/09/04	<0.005		ug/L	
			Dissolved Boron (B)	2008/09/04	<50		ug/L	
			Dissolved Cadmium (Cd)	2008/09/04	<0.005		ug/L	
			Dissolved Chromium (Cr)	2008/09/04	<0.1		ug/L	
			Dissolved Cobalt (Co)	2008/09/04	<0.005		ug/L	
			Dissolved Copper (Cu)	2008/09/04	0.08, RDL=0.05		ug/L	
			Dissolved Iron (Fe)	2008/09/04	<1		ug/L	
			Dissolved Lead (Pb)	2008/09/04	<0.005		ug/L	
			Dissolved Lithium (Li)	2008/09/04	<0.5		ug/L	
			Dissolved Manganese (Mn)	2008/09/04	<0.05		ug/L	
			Dissolved Molybdenum (Mo)	2008/09/04	<0.05		ug/L	
			Dissolved Nickel (Ni)	2008/09/04	0.02, RDL=0.02		ug/L	
			Dissolved Selenium (Se)	2008/09/04	<0.04		ug/L	
			Dissolved Silicon (Si)	2008/09/04	<100		ug/L	
			Dissolved Silver (Ag)	2008/09/04	<0.005		ug/L	
			Dissolved Strontium (Sr)	2008/09/04	<0.05		ug/L	
			Dissolved Thallium (Tl)	2008/09/04	<0.002		ug/L	
			Dissolved Tin (Sn)	2008/09/04	<0.01		ug/L	
			Dissolved Titanium (Ti)	2008/09/04	<0.5		ug/L	
			Dissolved Uranium (U)	2008/09/04	<0.002		ug/L	
			Dissolved Vanadium (V)	2008/09/04	0.2, RDL=0.2		ug/L	
			Dissolved Zinc (Zn)	2008/09/04	<0.1		ug/L	
			Dissolved Zirconium (Zr)	2008/09/04	<0.1		ug/L	
		RPD	Dissolved Aluminum (Al)	2008/09/04	NC		%	25

LABERGE ENVIRONMENTAL SERVICES
Attention: Bonnie Burns
Client Project #: FARO CLOSURE OFFICE (ROSE CR.)
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA844444

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2543934	AA1	RPD	Dissolved Antimony (Sb)	2008/09/04	NC		%	25
			Dissolved Arsenic (As)	2008/09/04	6.7		%	25
			Dissolved Barium (Ba)	2008/09/04	1.3		%	25
			Dissolved Beryllium (Be)	2008/09/04	NC		%	25
			Dissolved Bismuth (Bi)	2008/09/04	NC		%	25
			Dissolved Boron (B)	2008/09/04	NC		%	25
			Dissolved Cadmium (Cd)	2008/09/04	NC		%	25
			Dissolved Chromium (Cr)	2008/09/04	NC		%	25
			Dissolved Cobalt (Co)	2008/09/04	NC		%	25
			Dissolved Copper (Cu)	2008/09/04	0.07		%	25
			Dissolved Iron (Fe)	2008/09/04	NC		%	25
			Dissolved Lead (Pb)	2008/09/04	0.05		%	25
			Dissolved Lithium (Li)	2008/09/04	NC		%	25
			Dissolved Manganese (Mn)	2008/09/04	4.4		%	25
			Dissolved Molybdenum (Mo)	2008/09/04	NC		%	25
			Dissolved Nickel (Ni)	2008/09/04	3.6		%	25
			Dissolved Selenium (Se)	2008/09/04	1.7		%	25
			Dissolved Silicon (Si)	2008/09/04	0.9		%	25
			Dissolved Silver (Ag)	2008/09/04	NC		%	25
			Dissolved Strontium (Sr)	2008/09/04	1.3		%	25
			Dissolved Thallium (Tl)	2008/09/04	NC		%	25
			Dissolved Tin (Sn)	2008/09/04	1.7		%	25
			Dissolved Titanium (Ti)	2008/09/04	NC		%	25
			Dissolved Uranium (U)	2008/09/04	2.3		%	25
			Dissolved Vanadium (V)	2008/09/04	NC		%	25
			Dissolved Zinc (Zn)	2008/09/04	2.3		%	25
2544471	WR1	SPIKE	Total Suspended Solids	2008/09/02		99	%	N/A
		BLANK	Total Suspended Solids	2008/09/02	<1		mg/L	
2545506	BB3	MATRIX SPIKE	Ammonia (N)	2008/09/02		94	%	80 - 120
		SPIKE	Ammonia (N)	2008/09/02		85	%	80 - 120
		BLANK	Ammonia (N)	2008/09/02	<0.005		mg/L	
		RPD [L37046-01]	Ammonia (N)	2008/09/02	NC		%	25
2546249	AL8	MATRIX SPIKE	Alkalinity (Total as CaCO3)	2008/09/02		NC	%	80 - 120
		SPIKE	Alkalinity (Total as CaCO3)	2008/09/02		94	%	80 - 120
		BLANK	Alkalinity (Total as CaCO3)	2008/09/02	<0.5		mg/L	
			Alkalinity (PP as CaCO3)	2008/09/02	<0.5		mg/L	
			Bicarbonate (HCO3)	2008/09/02	<0.5		mg/L	
			Carbonate (CO3)	2008/09/02	<0.5		mg/L	
			Hydroxide (OH)	2008/09/02	<0.5		mg/L	
		RPD	Alkalinity (Total as CaCO3)	2008/09/02	NC		%	25
			Alkalinity (PP as CaCO3)	2008/09/02	NC		%	25
			Bicarbonate (HCO3)	2008/09/02	NC		%	25
			Carbonate (CO3)	2008/09/02	NC		%	25
			Hydroxide (OH)	2008/09/02	NC		%	25
2546300	AL8	SPIKE	Conductivity	2008/09/02		99	%	80 - 120
		BLANK	Conductivity	2008/09/02	<1		uS/cm	
		RPD	Conductivity	2008/09/03	0.3		%	25
2546396	AA1	MATRIX SPIKE	Total Arsenic (As)	2008/09/04		NC	%	75 - 125
			Total Beryllium (Be)	2008/09/04		99	%	75 - 125
			Total Cadmium (Cd)	2008/09/04		97	%	75 - 125
			Total Chromium (Cr)	2008/09/04		96	%	75 - 125
			Total Cobalt (Co)	2008/09/04		93	%	75 - 125
			Total Copper (Cu)	2008/09/04		NC	%	75 - 125
			Total Lead (Pb)	2008/09/04		92	%	75 - 125
			Total Lithium (Li)	2008/09/04		99	%	75 - 125

LABERGE ENVIRONMENTAL SERVICES
Attention: Bonnie Burns
Client Project #: FARO CLOSURE OFFICE (ROSE CR.)
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA844444

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2546396	AA1	MATRIX SPIKE	Total Nickel (Ni)	2008/09/04		NC	%	75 - 125
			Total Selenium (Se)	2008/09/04		100	%	75 - 125
			Total Uranium (U)	2008/09/04		100	%	75 - 125
			Total Vanadium (V)	2008/09/04		95	%	75 - 125
			Total Zinc (Zn)	2008/09/04		NC	%	75 - 125
		SPIKE	Total Arsenic (As)	2008/09/04		97	%	75 - 125
			Total Beryllium (Be)	2008/09/04		98	%	75 - 125
			Total Cadmium (Cd)	2008/09/04		99	%	75 - 125
			Total Chromium (Cr)	2008/09/04		98	%	75 - 125
			Total Cobalt (Co)	2008/09/04		97	%	75 - 125
			Total Copper (Cu)	2008/09/04		102	%	75 - 125
			Total Lead (Pb)	2008/09/04		101	%	75 - 125
			Total Lithium (Li)	2008/09/04		100	%	75 - 125
			Total Nickel (Ni)	2008/09/04		98	%	75 - 125
			Total Selenium (Se)	2008/09/04		99	%	75 - 125
			Total Uranium (U)	2008/09/04		99	%	75 - 125
			Total Vanadium (V)	2008/09/04		95	%	75 - 125
			Total Zinc (Zn)	2008/09/04		108	%	75 - 125
		BLANK	Total Aluminum (Al)	2008/09/04	<0.2		ug/L	
			Total Antimony (Sb)	2008/09/04	<0.02		ug/L	
			Total Arsenic (As)	2008/09/04	<0.02		ug/L	
			Total Barium (Ba)	2008/09/04	<0.02		ug/L	
			Total Beryllium (Be)	2008/09/04	<0.01		ug/L	
			Total Bismuth (Bi)	2008/09/04	<0.005		ug/L	
			Total Boron (B)	2008/09/04	<50		ug/L	
			Total Cadmium (Cd)	2008/09/04	<0.005		ug/L	
			Total Chromium (Cr)	2008/09/04	<0.1		ug/L	
			Total Cobalt (Co)	2008/09/04	<0.005		ug/L	
			Total Copper (Cu)	2008/09/04	0.08, RDL=0.05		ug/L	
			Total Iron (Fe)	2008/09/04	<1		ug/L	
			Total Lead (Pb)	2008/09/04	<0.005		ug/L	
			Total Lithium (Li)	2008/09/04	<0.5		ug/L	
			Total Manganese (Mn)	2008/09/04	<0.05		ug/L	
			Total Molybdenum (Mo)	2008/09/04	<0.05		ug/L	
			Total Nickel (Ni)	2008/09/04	<0.02		ug/L	
			Total Selenium (Se)	2008/09/04	<0.04		ug/L	
			Total Silicon (Si)	2008/09/04	<100		ug/L	
			Total Silver (Ag)	2008/09/04	<0.005		ug/L	
			Total Strontium (Sr)	2008/09/04	<0.05		ug/L	
			Total Thallium (Tl)	2008/09/04	<0.002		ug/L	
			Total Tin (Sn)	2008/09/04	<0.01		ug/L	
			Total Titanium (Ti)	2008/09/04	<0.5		ug/L	
			Total Uranium (U)	2008/09/04	<0.002		ug/L	
			Total Vanadium (V)	2008/09/04	0.2, RDL=0.2		ug/L	
			Total Zinc (Zn)	2008/09/04	<0.1		ug/L	
			Total Zirconium (Zr)	2008/09/04	<0.1		ug/L	
		RPD	Total Aluminum (Al)	2008/09/04	2.0		%	25
			Total Antimony (Sb)	2008/09/04	2.5		%	25
			Total Arsenic (As)	2008/09/04	1.8		%	25
			Total Barium (Ba)	2008/09/04	1.7		%	25
			Total Beryllium (Be)	2008/09/04	9.8		%	25
			Total Bismuth (Bi)	2008/09/04	3.2		%	25
			Total Boron (B)	2008/09/04	NC		%	25
			Total Cadmium (Cd)	2008/09/04	NC		%	25
			Total Chromium (Cr)	2008/09/04	2.6		%	25

LABERGE ENVIRONMENTAL SERVICES
Attention: Bonnie Burns
Client Project #: FARO CLOSURE OFFICE (ROSE CR.)
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA844444

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2546396	AA1	RPD	Total Cobalt (Co)	2008/09/04	0.07		%	25
			Total Copper (Cu)	2008/09/04	0.5		%	25
			Total Iron (Fe)	2008/09/04	4.9		%	25
			Total Lead (Pb)	2008/09/04	1.6		%	25
			Total Lithium (Li)	2008/09/04	NC		%	25
			Total Manganese (Mn)	2008/09/04	0.3		%	25
			Total Molybdenum (Mo)	2008/09/04	1.3		%	25
			Total Nickel (Ni)	2008/09/04	4.2		%	25
			Total Selenium (Se)	2008/09/04	NC		%	25
			Total Silicon (Si)	2008/09/04	5.9		%	25
			Total Silver (Ag)	2008/09/04	NC		%	25
			Total Strontium (Sr)	2008/09/04	2.3		%	25
			Total Thallium (Tl)	2008/09/04	NC		%	25
			Total Tin (Sn)	2008/09/04	9.6		%	25
			Total Titanium (Ti)	2008/09/04	1.1		%	25
			Total Uranium (U)	2008/09/04	0.3		%	25
			Total Vanadium (V)	2008/09/04	2.1		%	25
			Total Zinc (Zn)	2008/09/04	0.5		%	25
			Total Zirconium (Zr)	2008/09/04	NC		%	25
2549533	AA1	BLANK	Dissolved Calcium (Ca)	2008/09/04	<0.05		mg/L	
			Dissolved Magnesium (Mg)	2008/09/04	<0.05		mg/L	
			Dissolved Potassium (K)	2008/09/04	<0.05		mg/L	
			Dissolved Sodium (Na)	2008/09/04	<0.05		mg/L	
			Dissolved Sulphur (S)	2008/09/04	<3		mg/L	
		RPD	Dissolved Calcium (Ca)	2008/09/04	1.3		%	25
			Dissolved Magnesium (Mg)	2008/09/04	1.5		%	25
			Dissolved Potassium (K)	2008/09/04	0.7		%	25
			Dissolved Sodium (Na)	2008/09/04	0.1		%	25
			Dissolved Sulphur (S)	2008/09/04	NC		%	25
2549535	AA1	BLANK	Total Calcium (Ca)	2008/09/04	<0.05		mg/L	
			Total Magnesium (Mg)	2008/09/04	<0.05		mg/L	
			Total Potassium (K)	2008/09/04	<0.05		mg/L	
			Total Sodium (Na)	2008/09/04	0.05, RDL=0.05		mg/L	
			Total Sulphur (S)	2008/09/04	<3		mg/L	
		RPD	Total Calcium (Ca)	2008/09/04	1.1		%	25
			Total Magnesium (Mg)	2008/09/04	1.1		%	25
			Total Potassium (K)	2008/09/04	NC		%	25
			Total Sodium (Na)	2008/09/04	0.6		%	25
			Total Sulphur (S)	2008/09/04	NC		%	25
2550978	BB3	MATRIX SPIKE	Dissolved Sulphate (SO4)	2008/09/04		NC	%	75 - 125
		SPIKE	Dissolved Sulphate (SO4)	2008/09/04		96	%	80 - 120
		BLANK	Dissolved Sulphate (SO4)	2008/09/04	<0.5		mg/L	
		RPD [L37046-01]	Dissolved Sulphate (SO4)	2008/09/04	2.5		%	20
2553466	DJ	MATRIX SPIKE	Total Arsenic (As)	2008/09/05		109	%	75 - 125
			Total Beryllium (Be)	2008/09/05		108	%	75 - 125
			Total Cadmium (Cd)	2008/09/05		114	%	75 - 125
			Total Chromium (Cr)	2008/09/05		100	%	75 - 125
			Total Cobalt (Co)	2008/09/05		107	%	75 - 125
			Total Copper (Cu)	2008/09/05		102	%	75 - 125
			Total Lead (Pb)	2008/09/05		104	%	75 - 125
			Total Mercury (Hg)	2008/09/05		99	%	75 - 125
			Total Nickel (Ni)	2008/09/05		100	%	75 - 125
			Total Selenium (Se)	2008/09/05		111	%	75 - 125
			Total Vanadium (V)	2008/09/05		NC	%	75 - 125
			Total Zinc (Zn)	2008/09/05		NC	%	75 - 125

Your Project #: FARO CLOSURE OFFICE
Your C.O.C. #: F109290, F109291

Attention: Bonnie Burns
LABERGE ENVIRONMENTAL SERVICES
WHITEHORSE
405 Ogilvie Street
PO Box 21072
Whitehorse, YT
CANADA Y1A 6P7

Report Date: 2008/09/19

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A846358
Received: 2008/09/08, 11:25

Sample Matrix: Soil
Samples Received: 18

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
GS Special Analysis	18	N/A	2008/09/12		
Elements by ICPMS (total)	18	2008/09/12	2008/09/12	BRN SOP-00203	Based on EPA 200.8
pH (2:1 DI Water Extract) ◊	18	2008/09/10	2008/09/11	BRN SOP-00266 R1.0	Carter, SSMA 16.2

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	5	2008/09/10	2008/09/12	BRN SOP-00264 R2.0	Based on SM2320B
Alkalinity - Water	1	2008/09/13	2008/09/13	BRN SOP-00264 R2.0	Based on SM2320B
Conductance - water	5	N/A	2008/09/12	BRN SOP-00264 R2.0	Based on SM-2510B
Conductance - water	1	N/A	2008/09/13	BRN SOP-00264 R2.0	Based on SM-2510B
Hardness Total (calculated as CaCO3)	5	N/A	2008/09/12		
Hardness Total (calculated as CaCO3)	1	N/A	2008/09/16		
Hardness (calculated as CaCO3)	5	N/A	2008/09/12		
Hardness (calculated as CaCO3)	1	N/A	2008/09/16		
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	5	N/A	2008/09/11	BRN SOP-00206	Based on EPA 200.8
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	1	N/A	2008/09/16	BRN SOP-00206	Based on EPA 200.8
Elements by ICPMS Low Level (dissolved) ◊	5	N/A	2008/09/11	BRN SOP-00206	Based on EPA 200.8
Elements by ICPMS Low Level (dissolved) ◊	1	N/A	2008/09/16	BRN SOP-00206	Based on EPA 200.8
Elements by ICPMS Low Level (total) ◊	5	2008/09/10	2008/09/12	BRN SOP-00206	Based on EPA 200.8
Elements by ICPMS Low Level (total) ◊	1	2008/09/15	2008/09/16	BRN SOP-00206	Based on EPA 200.8
Na, K, Ca, Mg, S by CRC ICPMS (total)	1	2008/09/10	2008/09/11	BRN SOP-00206	Based on EPA 200.8
Na, K, Ca, Mg, S by CRC ICPMS (total)	4	2008/09/10	2008/09/12	BRN SOP-00206	Based on EPA 200.8
Na, K, Ca, Mg, S by CRC ICPMS (total)	1	2008/09/15	2008/09/16	BRN SOP-00206	Based on EPA 200.8
Ammonia-N	5	N/A	2008/09/18	BRN SOP-00232 R3.0	SM-4500 NH3 G
Ammonia (N)	1	N/A	2008/09/15	BRN SOP-00221 R3.0	Based on SM-4500MH3G
Filter and HNO3 Preserve for Metals	5	N/A	2008/09/09	BRN WI-00006 R1.0	Based on EPA 200.2
Filter and HNO3 Preserve for Metals	1	N/A	2008/09/17	BRN WI-00006 R1.0	Based on EPA 200.2
pH Water	5	N/A	2008/09/12	BRN SOP-00264 R2.0	Based on SM-4500H+B
pH Water	1	N/A	2008/09/13	BRN SOP-00264 R2.0	Based on SM-4500H+B
Sulphate by Automated Colourimetry	5	N/A	2008/09/12	BRN-SOP 00243 R1.0	Based on EPA 375.4
Sulphate by Automated Colourimetry	1	N/A	2008/09/13	BRN-SOP 00243 R1.0	Based on EPA 375.4
Total Suspended Solids	5	N/A	2008/09/11	BRN SOP-00277 R2.0	Based on SM-2540 D
Total Suspended Solids	1	N/A	2008/09/17	BRN SOP-00277 R2.0	Based on SM-2540 D

../2

Your Project #: FARO CLOSURE OFFICE
Your C.O.C. #: F109290, F109291

Attention: Bonnie Burns
LABERGE ENVIRONMENTAL SERVICES
WHITEHORSE
405 Ogilvie Street
PO Box 21072
Whitehorse, YT
CANADA Y1A 6P7

Report Date: 2008/09/19

CERTIFICATE OF ANALYSIS

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

(1) SCC/CAEAL

Encryption Key

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

SUE REYNOLDS, BBY Customer Service
Email: sue.reynolds@maxxamanalytics.com
Phone# (604) 444-4808 Ext:235

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CAEAL have approved this reporting process and electronic report format.

Maxxam Job #: A846358
Report Date: 2008/09/19

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: KN

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		L48556	L48557	L48558	L48559		
Sampling Date		2008/09/04	2008/09/04	2008/09/04	2008/09/04		
COC Number		F109290	F109290	F109290	F109290		
	Units	**R3-MIDWAY**	**R4-ROSE CR U/S**	**R5-ANUIL CR D/S**	**R6-ANUIL CR U/S**	**RDL**	**QC Batch**
Preparation							
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD	N/A	ONSITE
Misc. Inorganics							
Alkalinity (Total as CaCO3)	mg/L	80	81	110	110	0.5	2562732
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	<0.5	<0.5	0.5	2562732
Bicarbonate (HCO3)	mg/L	98	99	130	130	0.5	2562732
Carbonate (CO3)	mg/L	<0.5	<0.5	<0.5	<0.5	0.5	2562732
Hydroxide (OH)	mg/L	<0.5	<0.5	<0.5	<0.5	0.5	2562732
Anions							
Dissolved Sulphate (SO4)	mg/L	50	44	22	19	0.5	2579030
Nutrients							
Ammonia (N)	mg/L	0.03	0.03	0.04	<0.01	0.01	2586837
Physical Properties							
Conductivity	uS/cm	290	280	260	260	1	2566331
pH	pH Units	8.1	8.2	8.3	8.3		2566328
Physical Properties							
Total Suspended Solids	mg/L	1	4	4	3	1	2566638

RDL = Reportable Detection Limit

Maxxam Job #: A846358
Report Date: 2008/09/19

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: KN

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		L48560			L48625		
Sampling Date		2008/09/04			2008/09/04		
COC Number		F109290			F109291		
	Units	**R7-NORTH FORK**	**RDL**	**QC Batch**	**BD**	**RDL**	**QC Batch**
Preparation							
Filter and HNO3 Preservation	N/A	FIELD	N/A	ONSITE	FIELD	N/A	ONSITE
Misc. Inorganics							
Alkalinity (Total as CaCO3)	mg/L	62	0.5	2562732	68	0.5	2573240
Alkalinity (PP as CaCO3)	mg/L	<0.5	0.5	2562732	<0.5	0.5	2573240
Bicarbonate (HCO3)	mg/L	76	0.5	2562732	83	0.5	2573240
Carbonate (CO3)	mg/L	<0.5	0.5	2562732	<0.5	0.5	2573240
Hydroxide (OH)	mg/L	<0.5	0.5	2562732	<0.5	0.5	2573240
Anions							
Dissolved Sulphate (SO4)	mg/L	7.2	0.5	2579030	7.1	0.5	2573342
Nutrients							
Ammonia (N)	mg/L	0.04	0.01	2586837	<0.05 (1)	0.05	2574833
Physical Properties							
Conductivity	uS/cm	150	1	2566331	150	1	2573239
pH	pH Units	8.1		2566328	8.2		2573235
Physical Properties							
Total Suspended Solids	mg/L	2	1	2566638	4	1	2582405

RDL = Reportable Detection Limit
(1) RDL raised due to sample matrix interference.

Maxxam Job #: A846358
Report Date: 2008/09/19

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		L48556	L48557	L48558	L48559		
Sampling Date		2008/09/04	2008/09/04	2008/09/04	2008/09/04		
COC Number		F109290	F109290	F109290	F109290		
	Units	**R3-MIDWAY**	**R4-ROSE CR U/S**	**R5-ANUIL CR D/S**	**R6-ANUIL CR U/S**	**RDL**	**QC Batch**
Misc. Inorganics							
Dissolved Hardness (CaCO3)	mg/L	146	144	140	136	0.5	2559817
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	ug/L	15.0	16.3	13.3	13.4	0.2	2562778
Dissolved Antimony (Sb)	ug/L	0.09	0.11	0.11	0.11	0.02	2562778
Dissolved Arsenic (As)	ug/L	0.32	0.32	0.37	0.36	0.02	2562778
Dissolved Barium (Ba)	ug/L	40.7	53.3	54.0	55.2	0.02	2562778
Dissolved Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	<0.01	0.01	2562778
Dissolved Bismuth (Bi)	ug/L	<0.005	<0.005	<0.005	<0.005	0.005	2562778
Dissolved Boron (B)	ug/L	<50	<50	<50	<50	50	2562778
Dissolved Cadmium (Cd)	ug/L	0.021	0.025	0.014	0.012	0.005	2562778
Dissolved Chromium (Cr)	ug/L	<0.1	<0.1	<0.1	<0.1	0.1	2562778
Dissolved Cobalt (Co)	ug/L	0.490	0.277	0.056	0.032	0.005	2562778
Dissolved Copper (Cu)	ug/L	0.76	1.02	0.75	0.70	0.05	2562778
Dissolved Iron (Fe)	ug/L	94	71	67	66	1	2562778
Dissolved Lead (Pb)	ug/L	0.138	0.127	0.019	0.009	0.005	2562778
Dissolved Lithium (Li)	ug/L	3.8	3.4	1.7	1.6	0.5	2562778
Dissolved Manganese (Mn)	ug/L	440	277	34.2	9.53	0.05	2562778
Dissolved Molybdenum (Mo)	ug/L	0.46	0.51	0.88	0.96	0.05	2562778
Dissolved Nickel (Ni)	ug/L	1.48	1.41	0.50	0.39	0.02	2562778
Dissolved Selenium (Se)	ug/L	0.26	0.38	0.60	0.62	0.04	2562778
Dissolved Silicon (Si)	ug/L	4890	4700	4580	4550	100	2562778
Dissolved Silver (Ag)	ug/L	<0.005	<0.005	<0.005	<0.005	0.005	2562778
Dissolved Strontium (Sr)	ug/L	160	150	106	104	0.05	2562778
Dissolved Thallium (Tl)	ug/L	0.019	0.012	0.003	<0.002	0.002	2562778
Dissolved Tin (Sn)	ug/L	<0.01	0.07	<0.01	<0.01	0.01	2562778
Dissolved Titanium (Ti)	ug/L	0.6	0.6	0.6	0.7	0.5	2562778
Dissolved Uranium (U)	ug/L	1.16	1.09	1.40	1.46	0.002	2562778
Dissolved Vanadium (V)	ug/L	<0.2	<0.2	<0.2	<0.2	0.2	2562778
Dissolved Zinc (Zn)	ug/L	16.6	14.1	1.8	0.6	0.1	2562778
Dissolved Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	<0.1	0.1	2562778
Dissolved Calcium (Ca)	mg/L	43.9	43.0	39.3	38.3	0.05	2568232
Dissolved Magnesium (Mg)	mg/L	8.77	8.82	10.1	9.88	0.05	2568232

RDL = Reportable Detection Limit

Maxxam Job #: A846358
Report Date: 2008/09/19

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		L48556	L48557	L48558	L48559		
Sampling Date		2008/09/04	2008/09/04	2008/09/04	2008/09/04		
COC Number		F109290	F109290	F109290	F109290		
	Units	**R3-MIDWAY**	**R4-ROSE CR U/S**	**R5-ANUIL CR D/S**	**R6-ANUIL CR U/S**	**RDL**	**QC Batch**
Dissolved Potassium (K)	mg/L	1.03	1.06	0.98	0.96	0.05	2568232
Dissolved Sodium (Na)	mg/L	2.97	2.77	1.72	1.59	0.05	2568232
Dissolved Sulphur (S)	mg/L	23	21	9	7	3	2568232

RDL = Reportable Detection Limit

Maxxam Job #: A846358
Report Date: 2008/09/19

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		L48560		L48625		
Sampling Date		2008/09/04		2008/09/04		
COC Number		F109290		F109291		
	Units	**R7-NORTH FORK**	**QC Batch**	**BD**	**RDL**	**QC Batch**
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	72.4	2559817	68.7	0.5	2570025
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	15.1	2562778	15.8	0.2	2574302
Dissolved Antimony (Sb)	ug/L	0.08	2562778	0.08	0.02	2574302
Dissolved Arsenic (As)	ug/L	0.48	2562778	0.50	0.02	2574302
Dissolved Barium (Ba)	ug/L	36.2	2562778	39.2	0.02	2574302
Dissolved Beryllium (Be)	ug/L	<0.01	2562778	<0.01	0.01	2574302
Dissolved Bismuth (Bi)	ug/L	<0.005	2562778	<0.005	0.005	2574302
Dissolved Boron (B)	ug/L	<50	2562778	<50	50	2574302
Dissolved Cadmium (Cd)	ug/L	0.016	2562778	0.007	0.005	2574302
Dissolved Chromium (Cr)	ug/L	<0.1	2562778	<0.1	0.1	2574302
Dissolved Cobalt (Co)	ug/L	0.030	2562778	0.033	0.005	2574302
Dissolved Copper (Cu)	ug/L	0.62	2562778	0.61	0.05	2574302
Dissolved Iron (Fe)	ug/L	72	2562778	85	1	2574302
Dissolved Lead (Pb)	ug/L	0.067	2562778	0.024	0.005	2574302
Dissolved Lithium (Li)	ug/L	2.1	2562778	2.0	0.5	2574302
Dissolved Manganese (Mn)	ug/L	13.4	2562778	13.5	0.05	2574302
Dissolved Molybdenum (Mo)	ug/L	0.39	2562778	0.40	0.05	2574302
Dissolved Nickel (Ni)	ug/L	0.31	2562778	0.50	0.02	2574302
Dissolved Selenium (Se)	ug/L	0.27	2562778	0.29	0.04	2574302
Dissolved Silicon (Si)	ug/L	4960	2562778	4890	100	2574302
Dissolved Silver (Ag)	ug/L	<0.005	2562778	<0.005	0.005	2574302
Dissolved Strontium (Sr)	ug/L	77.3	2562778	81.3	0.05	2574302
Dissolved Thallium (Tl)	ug/L	<0.002	2562778	<0.002	0.002	2574302
Dissolved Tin (Sn)	ug/L	<0.01	2562778	<0.01	0.01	2574302
Dissolved Titanium (Ti)	ug/L	0.6	2562778	<0.5	0.5	2574302
Dissolved Uranium (U)	ug/L	0.754	2562778	0.808	0.002	2574302
Dissolved Vanadium (V)	ug/L	<0.2	2562778	<0.2	0.2	2574302
Dissolved Zinc (Zn)	ug/L	1.2	2562778	0.9	0.1	2574302
Dissolved Zirconium (Zr)	ug/L	<0.1	2562778	<0.1	0.1	2574302
Dissolved Calcium (Ca)	mg/L	22.0	2568232	20.7	0.05	2577304
Dissolved Magnesium (Mg)	mg/L	4.26	2568232	4.12	0.05	2577304

RDL = Reportable Detection Limit

Maxxam Job #: A846358
Report Date: 2008/09/19

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		L48560		L48625		
Sampling Date		2008/09/04		2008/09/04		
COC Number		F109290		F109291		
	Units	**R7-NORTH FORK**	**QC Batch**	**BD**	**RDL**	**QC Batch**
Dissolved Potassium (K)	mg/L	0.47	2568232	0.45	0.05	2577304
Dissolved Sodium (Na)	mg/L	1.59	2568232	1.60	0.05	2577304
Dissolved Sulphur (S)	mg/L	3	2568232	<3	3	2577304

RDL = Reportable Detection Limit

Maxxam Job #: A846358
Report Date: 2008/09/19

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		L48556	L48557	L48558	L48559		
Sampling Date		2008/09/04	2008/09/04	2008/09/04	2008/09/04		
COC Number		F109290	F109290	F109290	F109290		
	Units	**R3-MIDWAY**	**R4-ROSE CR U/S**	**R5-ANUIL CR D/S**	**R6-ANUIL CR U/S**	**RDL**	**QC Batch**
Calculated Parameters							
Total Hardness (CaCO3)	mg/L	142	135	131	129	0.5	2560664
Total Metals by ICPMS							
Total Aluminum (Al)	ug/L	26.4	44.5	44.5	41.9	0.2	2562783
Total Antimony (Sb)	ug/L	0.09	0.11	0.12	0.12	0.02	2562783
Total Arsenic (As)	ug/L	0.36	0.38	0.40	0.40	0.02	2562783
Total Barium (Ba)	ug/L	40.1	55.9	57.7	58.0	0.02	2562783
Total Beryllium (Be)	ug/L	0.01	<0.01	<0.01	<0.01	0.01	2562783
Total Bismuth (Bi)	ug/L	<0.005	<0.005	<0.005	<0.005	0.005	2562783
Total Boron (B)	ug/L	<50	<50	<50	<50	50	2562783
Total Cadmium (Cd)	ug/L	0.024	0.030	0.019	0.019	0.005	2562783
Total Chromium (Cr)	ug/L	<0.1	0.1	0.1	0.2	0.1	2562783
Total Cobalt (Co)	ug/L	0.507	0.341	0.088	0.055	0.005	2562783
Total Copper (Cu)	ug/L	0.86	1.27	0.90	0.83	0.05	2562783
Total Iron (Fe)	ug/L	140	154	136	124	1	2562783
Total Lead (Pb)	ug/L	0.374	0.490	0.123	0.049	0.005	2562783
Total Lithium (Li)	ug/L	3.8	3.3	1.7	1.7	0.5	2562783
Total Manganese (Mn)	ug/L	443	311	39.6	13.0	0.05	2562783
Total Molybdenum (Mo)	ug/L	0.43	0.49	0.91	0.93	0.05	2562783
Total Nickel (Ni)	ug/L	1.51	1.63	0.60	0.52	0.02	2562783
Total Selenium (Se)	ug/L	0.27	0.43	0.65	0.67	0.04	2562783
Total Silicon (Si)	ug/L	4900	4990	4730	4660	100	2562783
Total Silver (Ag)	ug/L	<0.005	<0.005	<0.005	<0.005	0.005	2562783
Total Strontium (Sr)	ug/L	157	146	108	104	0.05	2562783
Total Thallium (Tl)	ug/L	0.019	0.012	0.002	<0.002	0.002	2562783
Total Tin (Sn)	ug/L	<0.01	<0.01	<0.01	<0.01	0.01	2562783
Total Titanium (Ti)	ug/L	0.8	1.5	1.4	1.4	0.5	2562783
Total Uranium (U)	ug/L	1.11	1.05	1.43	1.45	0.002	2562783
Total Vanadium (V)	ug/L	<0.2	<0.2	<0.2	<0.2	0.2	2562783
Total Zinc (Zn)	ug/L	17.1	14.0	2.2	0.6	0.1	2562783
Total Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	<0.1	0.1	2562783
Total Calcium (Ca)	mg/L	42.9	40.4	36.6	35.6	0.05	2565067
Total Magnesium (Mg)	mg/L	8.49	8.40	9.75	9.70	0.05	2565067

RDL = Reportable Detection Limit

Maxxam Job #: A846358
Report Date: 2008/09/19

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		L48556	L48557	L48558	L48559		
Sampling Date		2008/09/04	2008/09/04	2008/09/04	2008/09/04		
COC Number		F109290	F109290	F109290	F109290		
	Units	**R3-MIDWAY**	**R4-ROSE CR U/S**	**R5-ANUIL CR D/S**	**R6-ANUIL CR U/S**	**RDL**	**QC Batch**
Total Potassium (K)	mg/L	1.00	1.01	0.93	0.91	0.05	2565067
Total Sodium (Na)	mg/L	2.97	2.75	1.71	1.63	0.05	2565067
Total Sulphur (S)	mg/L	21	19	8	7	3	2565067

RDL = Reportable Detection Limit

Maxxam Job #: A846358
Report Date: 2008/09/19

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		L48560		L48625		
Sampling Date		2008/09/04		2008/09/04		
COC Number		F109290		F109291		
	Units	**R7-NORTH FORK**	**QC Batch**	**BD**	**RDL**	**QC Batch**
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	70.3	2560664	69.7	0.5	2570057
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	28.9	2562783	52.9	0.2	2574387
Total Antimony (Sb)	ug/L	0.09	2562783	0.08	0.02	2574387
Total Arsenic (As)	ug/L	0.53	2562783	0.56	0.02	2574387
Total Barium (Ba)	ug/L	40.1	2562783	40.6	0.02	2574387
Total Beryllium (Be)	ug/L	<0.01	2562783	<0.01	0.01	2574387
Total Bismuth (Bi)	ug/L	<0.005	2562783	<0.005	0.005	2574387
Total Boron (B)	ug/L	<50	2562783	<50	50	2574387
Total Cadmium (Cd)	ug/L	0.017	2562783	0.011	0.005	2574387
Total Chromium (Cr)	ug/L	<0.1	2562783	0.1	0.1	2574387
Total Cobalt (Co)	ug/L	0.041	2562783	0.061	0.005	2574387
Total Copper (Cu)	ug/L	0.73	2562783	0.69	0.05	2574387
Total Iron (Fe)	ug/L	105	2562783	166	1	2574387
Total Lead (Pb)	ug/L	0.090	2562783	0.086	0.005	2574387
Total Lithium (Li)	ug/L	2.2	2562783	2.2	0.5	2574387
Total Manganese (Mn)	ug/L	15.5	2562783	16.9	0.05	2574387
Total Molybdenum (Mo)	ug/L	0.41	2562783	0.41	0.05	2574387
Total Nickel (Ni)	ug/L	0.36	2562783	0.38	0.02	2574387
Total Selenium (Se)	ug/L	0.29	2562783	0.31	0.04	2574387
Total Silicon (Si)	ug/L	5170	2562783	5050	100	2574387
Total Silver (Ag)	ug/L	<0.005	2562783	<0.005	0.005	2574387
Total Strontium (Sr)	ug/L	81.3	2562783	80.9	0.05	2574387
Total Thallium (Tl)	ug/L	<0.002	2562783	0.003	0.002	2574387
Total Tin (Sn)	ug/L	<0.01	2562783	<0.01	0.01	2574387
Total Titanium (Ti)	ug/L	0.7	2562783	2.4	0.5	2574387
Total Uranium (U)	ug/L	0.794	2562783	0.789	0.002	2574387
Total Vanadium (V)	ug/L	<0.2	2562783	<0.2	0.2	2574387
Total Zinc (Zn)	ug/L	1.2	2562783	0.8	0.1	2574387
Total Zirconium (Zr)	ug/L	<0.1	2562783	<0.1	0.1	2574387
Total Calcium (Ca)	mg/L	21.1	2565067	21.0	0.05	2577305
Total Magnesium (Mg)	mg/L	4.26	2565067	4.20	0.05	2577305

RDL = Reportable Detection Limit

Maxxam Job #: A846358
Report Date: 2008/09/19

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		L48560		L48625		
Sampling Date		2008/09/04		2008/09/04		
COC Number		F109290		F109291		
	Units	**R7-NORTH FORK**	**QC Batch**	**BD**	**RDL**	**QC Batch**
Total Potassium (K)	mg/L	0.45	2565067	0.46	0.05	2577305
Total Sodium (Na)	mg/L	1.64	2565067	1.64	0.05	2577305
Total Sulphur (S)	mg/L	<3	2565067	<3	3	2577305

RDL = Reportable Detection Limit

LABERGE ENVIRONMENTAL SERVICES
Attention: Bonnie Burns
Client Project #: FARO CLOSURE OFFICE
P.O. #:
Site Reference:

Quality Assurance Report

Maxxam Job Number: VA846358

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2562732	MM3	MATRIX SPIKE						
		[L48560-01]	Alkalinity (Total as CaCO3)	2008/09/12		NC	%	80 - 120
		SPIKE	Alkalinity (Total as CaCO3)	2008/09/12		91	%	80 - 120
		BLANK	Alkalinity (Total as CaCO3)	2008/09/12	<0.5		mg/L	
			Alkalinity (PP as CaCO3)	2008/09/12	<0.5		mg/L	
			Bicarbonate (HCO3)	2008/09/12	<0.5		mg/L	
			Carbonate (CO3)	2008/09/12	<0.5		mg/L	
			Hydroxide (OH)	2008/09/12	<0.5		mg/L	
		RPD [L48560-01]	Alkalinity (Total as CaCO3)	2008/09/12	1.2		%	25
			Alkalinity (PP as CaCO3)	2008/09/12	NC		%	25
			Bicarbonate (HCO3)	2008/09/12	1.2		%	25
			Carbonate (CO3)	2008/09/12	NC		%	25
			Hydroxide (OH)	2008/09/12	NC		%	25
2562778	AA1	MATRIX SPIKE	Dissolved Arsenic (As)	2008/09/11		97	%	75 - 125
			Dissolved Beryllium (Be)	2008/09/11		99	%	75 - 125
			Dissolved Cadmium (Cd)	2008/09/11		104	%	75 - 125
			Dissolved Chromium (Cr)	2008/09/11		100	%	75 - 125
			Dissolved Cobalt (Co)	2008/09/11		93	%	75 - 125
			Dissolved Copper (Cu)	2008/09/11		93	%	75 - 125
			Dissolved Lead (Pb)	2008/09/11		99	%	75 - 125
			Dissolved Lithium (Li)	2008/09/11		104	%	75 - 125
			Dissolved Nickel (Ni)	2008/09/11		95	%	75 - 125
			Dissolved Selenium (Se)	2008/09/11		105	%	75 - 125
			Dissolved Uranium (U)	2008/09/11		101	%	75 - 125
			Dissolved Vanadium (V)	2008/09/11		99	%	75 - 125
			Dissolved Zinc (Zn)	2008/09/11		NC	%	75 - 125
		SPIKE	Dissolved Arsenic (As)	2008/09/11		97	%	75 - 125
			Dissolved Beryllium (Be)	2008/09/11		101	%	75 - 125
			Dissolved Cadmium (Cd)	2008/09/11		102	%	75 - 125
			Dissolved Chromium (Cr)	2008/09/11		100	%	75 - 125
			Dissolved Cobalt (Co)	2008/09/11		96	%	75 - 125
			Dissolved Copper (Cu)	2008/09/11		100	%	75 - 125
			Dissolved Lead (Pb)	2008/09/11		105	%	75 - 125
			Dissolved Lithium (Li)	2008/09/11		109	%	75 - 125
			Dissolved Nickel (Ni)	2008/09/11		100	%	75 - 125
			Dissolved Selenium (Se)	2008/09/11		99	%	75 - 125
			Dissolved Uranium (U)	2008/09/11		105	%	75 - 125
			Dissolved Vanadium (V)	2008/09/11		97	%	75 - 125
			Dissolved Zinc (Zn)	2008/09/11		102	%	75 - 125
		BLANK	Dissolved Aluminum (Al)	2008/09/11	<0.2		ug/L	
			Dissolved Antimony (Sb)	2008/09/11	<0.02		ug/L	
			Dissolved Arsenic (As)	2008/09/11	<0.02		ug/L	
			Dissolved Barium (Ba)	2008/09/11	<0.02		ug/L	
			Dissolved Beryllium (Be)	2008/09/11	<0.01		ug/L	
			Dissolved Bismuth (Bi)	2008/09/11	<0.005		ug/L	
			Dissolved Boron (B)	2008/09/11	<50		ug/L	
			Dissolved Cadmium (Cd)	2008/09/11	<0.005		ug/L	
			Dissolved Chromium (Cr)	2008/09/11	<0.1		ug/L	
			Dissolved Cobalt (Co)	2008/09/11	<0.005		ug/L	
			Dissolved Copper (Cu)	2008/09/11	<0.05		ug/L	
			Dissolved Iron (Fe)	2008/09/11	<1		ug/L	
			Dissolved Lead (Pb)	2008/09/11	<0.005		ug/L	
			Dissolved Lithium (Li)	2008/09/11	<0.5		ug/L	
			Dissolved Manganese (Mn)	2008/09/11	<0.05		ug/L	
			Dissolved Molybdenum (Mo)	2008/09/11	<0.05		ug/L	

LABERGE ENVIRONMENTAL SERVICES
Attention: Bonnie Burns
Client Project #: FARO CLOSURE OFFICE
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA846358

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2574833	BB3	BLANK	Ammonia (N)	2008/09/15	<0.005		mg/L	
		RPD	Ammonia (N)	2008/09/15	NC		%	25
2577304	AA1	BLANK	Dissolved Calcium (Ca)	2008/09/16	<0.05		mg/L	
			Dissolved Magnesium (Mg)	2008/09/16	<0.05		mg/L	
			Dissolved Potassium (K)	2008/09/16	<0.05		mg/L	
			Dissolved Sodium (Na)	2008/09/16	<0.05		mg/L	
			Dissolved Sulphur (S)	2008/09/16	<3		mg/L	
		RPD [L48625-01]	Dissolved Calcium (Ca)	2008/09/16	2.8		%	25
			Dissolved Magnesium (Mg)	2008/09/16	2.8		%	25
			Dissolved Potassium (K)	2008/09/16	3.1		%	25
			Dissolved Sodium (Na)	2008/09/16	2.2		%	25
			Dissolved Sulphur (S)	2008/09/16	NC		%	25
2577305	AA1	BLANK	Total Calcium (Ca)	2008/09/16	<0.05		mg/L	
			Total Magnesium (Mg)	2008/09/16	<0.05		mg/L	
			Total Potassium (K)	2008/09/16	<0.05		mg/L	
			Total Sodium (Na)	2008/09/16	<0.05		mg/L	
			Total Sulphur (S)	2008/09/16	<3		mg/L	
		RPD	Total Calcium (Ca)	2008/09/16	0.8		%	25
			Total Magnesium (Mg)	2008/09/16	2.2		%	25
			Total Potassium (K)	2008/09/16	1.2		%	25
			Total Sodium (Na)	2008/09/16	0.3		%	25
			Total Sulphur (S)	2008/09/16	2.9		%	25
2579030	BB3	MATRIX SPIKE	Dissolved Sulphate (SO4)	2008/09/16		NC	%	75 - 125
		SPIKE	Dissolved Sulphate (SO4)	2008/09/16		92	%	80 - 120
		BLANK	Dissolved Sulphate (SO4)	2008/09/16	0.6, RDL=0.5		mg/L	
		RPD	Dissolved Sulphate (SO4)	2008/09/16	NC		%	20
2582405	WR1	SPIKE	Total Suspended Solids	2008/09/17		104	%	N/A
		BLANK	Total Suspended Solids	2008/09/17	<1		mg/L	
2586837	BB3	MATRIX SPIKE	Ammonia (N)	2008/09/18		106	%	80 - 120
		SPIKE	Ammonia (N)	2008/09/18		115	%	80 - 120
		BLANK	Ammonia (N)	2008/09/18	<0.01		mg/L	
		RPD	Ammonia (N)		TBA		%	25

N/A = Not Applicable
TBA = Result to follow
NC = Non-calculable
RPD = Relative Percent Difference

APPENDIX C

SEDIMENT GEOCHEMISTRY DATA

AUGUST AND SEPTEMBER, 2008

Maxxam Job #: A844444
Report Date: 2008/09/12

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE (ROSE CR.)

Sampler Initials: BB

RESULTS OF CHEMICAL ANALYSES OF SOIL

Maxxam ID		L37047	L37048	L37049	L37050		
Sampling Date		2008/08/25 11:00	2008/08/25 11:00	2008/08/25 11:00	2008/08/25 11:00		
COC Number		F109289	F109289	F109289	F109289		
	Units	**R1-A**	**R1-B**	**R1-C**	**X2-A**	**RDL**	**QC Batch**
Parameter							
Special Analysis	N/A	SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES	N/A	2572334

RDL = Reportable Detection Limit

Maxxam ID		L37051	L37052		
Sampling Date		2008/08/25 11:00	2008/08/25 11:00		
COC Number		F109289	F109289		
	Units	**X2-B**	**X2-C**	**RDL**	**QC Batch**
Parameter					
Special Analysis	N/A	SEE NOTES	SEE NOTES	N/A	2572334

RDL = Reportable Detection Limit

Maxxam Job #: A844444
Report Date: 2008/09/12

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE (ROSE CR.)

Sampler Initials: BB

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		L37044	L37045	L37046		
Sampling Date		2008/08/25 10:30	2008/08/25 12:30	2008/08/25 14:30		
COC Number		F109289	F109289	F109289		
	Units	**R-1 ROSE CR U/S**	**R-2 ROSE CR NEAR X-14**	**X-2 NORTH FORK @ RD**	**RDL**	**QC Batch**
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	44	59	44	0.5	2546249
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	<0.5	0.5	2546249
Bicarbonate (HCO3)	mg/L	54	72	54	0.5	2546249
Carbonate (CO3)	mg/L	<0.5	<0.5	<0.5	0.5	2546249
Hydroxide (OH)	mg/L	<0.5	<0.5	<0.5	0.5	2546249
Anions						
Dissolved Sulphate (SO4)	mg/L	8.1	23	8.1	0.5	2550978
Nutrients						
Ammonia (N)	mg/L	<0.005	<0.005	<0.005	0.005	2545506
Physical Properties						
Conductivity	uS/cm	100	170	110	1	2546300
pH	pH Units	7.8	7.9	7.7		2546325
Physical Properties						
Total Suspended Solids	mg/L	18	45	30	1	2544471

RDL = Reportable Detection Limit

Maxxam Job #: A844444
Report Date: 2008/09/12

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE (ROSE CR.)

Sampler Initials: BB

CSR/CCME METALS - SOIL (SOIL)

Maxxam ID		L37047	L37048	L37049		
Sampling Date		2008/08/25 11:00	2008/08/25 11:00	2008/08/25 11:00		
COC Number		F109289	F109289	F109289		
	Units	**R1-A**	**R1-B**	**R1-C**	**RDL**	**QC Batch**
Misc. Inorganics						
Soluble (2:1) pH	pH Units	6.84	6.77	7.03	0.01	2555034
Total Metals by ICPMS						
Total Aluminum (Al)	mg/kg	17800	19400	20100	100	2553466
Total Antimony (Sb)	mg/kg	1.6	1.6	1.7	0.1	2553466
Total Arsenic (As)	mg/kg	31.6	35.5	33.5	0.2	2553466
Total Barium (Ba)	mg/kg	343	388	377	0.1	2553466
Total Beryllium (Be)	mg/kg	1.2	1.1	1.2	0.1	2553466
Total Bismuth (Bi)	mg/kg	1.2	1.2	1.1	0.1	2553466
Total Cadmium (Cd)	mg/kg	2.78	2.79	2.93	0.05	2553466
Total Calcium (Ca)	mg/kg	6960	7040	7480	100	2553466
Total Chromium (Cr)	mg/kg	44	49	52	1	2553466
Total Cobalt (Co)	mg/kg	21.2	26.1	25.2	0.3	2553466
Total Copper (Cu)	mg/kg	50.2	51.4	53.0	0.5	2553466
Total Iron (Fe)	mg/kg	43100	47700	47400	100	2553466
Total Lead (Pb)	mg/kg	347	365	360	0.1	2553466
Total Magnesium (Mg)	mg/kg	7850	8490	8890	100	2553466
Total Manganese (Mn)	mg/kg	2400	3190	3500	0.2	2553466
Total Mercury (Hg)	mg/kg	0.27	0.27	0.27	0.05	2553466
Total Molybdenum (Mo)	mg/kg	2.3	2.3	2.6	0.1	2553466
Total Nickel (Ni)	mg/kg	54.0	62.3	60.8	0.8	2553466
Total Phosphorus (P)	mg/kg	983	957	965	10	2553466
Total Potassium (K)	mg/kg	2200	2300	2320	100	2553466
Total Selenium (Se)	mg/kg	1.2	1.1	1.4	0.5	2553466
Total Silver (Ag)	mg/kg	0.77	0.84	0.82	0.05	2553466
Total Sodium (Na)	mg/kg	279	285	294	100	2553466
Total Strontium (Sr)	mg/kg	49.8	52.6	53.8	0.1	2553466
Total Thallium (Tl)	mg/kg	0.42	0.43	0.42	0.05	2553466
Total Tin (Sn)	mg/kg	1.3	1.5	1.7	0.1	2553466
Total Titanium (Ti)	mg/kg	496	522	530	1	2553466
Total Vanadium (V)	mg/kg	44	48	48	2	2553466
Total Zinc (Zn)	mg/kg	858	991	911	1	2553466
Total Zirconium (Zr)	mg/kg	0.8	0.9	0.9	0.5	2553466

RDL = Reportable Detection Limit

Maxxam Job #: A844444
Report Date: 2008/09/12

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE (ROSE CR.)

Sampler Initials: BB

CSR/CCME METALS - SOIL (SOIL)

Maxxam ID		L37050	L37051	L37052		
Sampling Date		2008/08/25 11:00	2008/08/25 11:00	2008/08/25 11:00		
COC Number		F109289	F109289	F109289		
	Units	**X2-A**	**X2-B**	**X2-C**	**RDL**	**QC Batch**
Misc. Inorganics						
Soluble (2:1) pH	pH Units	7.06	7.09	6.91	0.01	2555034
Total Metals by ICPMS						
Total Aluminum (Al)	mg/kg	11100	15900	15400	100	2553466
Total Antimony (Sb)	mg/kg	2.0	3.7	2.4	0.1	2553466
Total Arsenic (As)	mg/kg	52.2	54.6	52.2	0.2	2553466
Total Barium (Ba)	mg/kg	202	404	305	0.1	2553466
Total Beryllium (Be)	mg/kg	0.7	1.0	0.9	0.1	2553466
Total Bismuth (Bi)	mg/kg	1.1	1.3	3.3	0.1	2553466
Total Cadmium (Cd)	mg/kg	0.76	2.52	1.31	0.05	2553466
Total Calcium (Ca)	mg/kg	4800	5810	5410	100	2553466
Total Chromium (Cr)	mg/kg	31	47	40	1	2553466
Total Cobalt (Co)	mg/kg	16.6	20.3	20.8	0.3	2553466
Total Copper (Cu)	mg/kg	52.2	78.7	60.0	0.5	2553466
Total Iron (Fe)	mg/kg	35400	45900	43300	100	2553466
Total Lead (Pb)	mg/kg	1000	1090	717	0.1	2553466
Total Magnesium (Mg)	mg/kg	5030	7660	6970	100	2553466
Total Manganese (Mn)	mg/kg	618	1180	1410	0.2	2553466
Total Mercury (Hg)	mg/kg	0.39	0.56	0.54	0.05	2553466
Total Molybdenum (Mo)	mg/kg	2.4	2.5	1.9	0.1	2553466
Total Nickel (Ni)	mg/kg	37.2	48.6	41.8	0.8	2553466
Total Phosphorus (P)	mg/kg	1180	964	979	10	2553466
Total Potassium (K)	mg/kg	1540	2200	2090	100	2553466
Total Selenium (Se)	mg/kg	<0.5	0.6	<0.5	0.5	2553466
Total Silver (Ag)	mg/kg	1.33	2.31	1.58	0.05	2553466
Total Sodium (Na)	mg/kg	196	237	245	100	2553466
Total Strontium (Sr)	mg/kg	32.7	37.3	39.0	0.1	2553466
Total Thallium (Tl)	mg/kg	0.33	0.69	0.50	0.05	2553466
Total Tin (Sn)	mg/kg	1.1	2.3	1.7	0.1	2553466
Total Titanium (Ti)	mg/kg	375	430	485	1	2553466
Total Vanadium (V)	mg/kg	35	39	40	2	2553466
Total Zinc (Zn)	mg/kg	413	1080	572	1	2553466
Total Zirconium (Zr)	mg/kg	1.5	0.9	1.3	0.5	2553466

RDL = Reportable Detection Limit

Maxxam Job #: A844444
Report Date: 2008/09/12

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE (ROSE CR.)

Sampler Initials: BB

RESULTS OF CHEMICAL ANALYSES OF SOIL Comments

Sample L37047-01 GS Special Analysis: 100 mesh sieve is performed on the sample

Sample L37048-01 GS Special Analysis: 100 mesh sieve is performed on the sample

Sample L37049-01 GS Special Analysis: 100 mesh sieve is performed on the sample

Sample L37050-01 GS Special Analysis: 100 mesh sieve is performed on the sample

Sample L37051-01 GS Special Analysis: 100 mesh sieve is performed on the sample

Sample L37052-01 GS Special Analysis: 100 mesh sieve is performed on the sample

CSR/CCME METALS - SOIL (SOIL) Comments

Sample L37047-01 Elements by ICPMS (total): < 100 mesh

Sample L37048-01 Elements by ICPMS (total): < 100 mesh

Sample L37049-01 Elements by ICPMS (total): < 100 mesh

Sample L37050-01 Elements by ICPMS (total): < 100 mesh

Sample L37051-01 Elements by ICPMS (total): < 100 mesh

Sample L37052-01 Elements by ICPMS (total): < 100 mesh

Results relate only to the items tested.

LABERGE ENVIRONMENTAL SERVICES
Attention: Bonnie Burns
Client Project #: FARO CLOSURE OFFICE (ROSE CR.)
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA844444

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2553466	DJ	QC STANDARD	Total Aluminum (Al)	2008/09/05		93	%	75 - 125
			Total Antimony (Sb)	2008/09/05		108	%	75 - 125
			Total Arsenic (As)	2008/09/05		97	%	75 - 125
			Total Barium (Ba)	2008/09/05		106	%	75 - 125
			Total Bismuth (Bi)	2008/09/05		91	%	75 - 125
			Total Cadmium (Cd)	2008/09/05		93	%	75 - 125
			Total Calcium (Ca)	2008/09/05		100	%	75 - 125
			Total Chromium (Cr)	2008/09/05		91	%	75 - 125
			Total Cobalt (Co)	2008/09/05		101	%	75 - 125
			Total Copper (Cu)	2008/09/05		95	%	75 - 125
			Total Iron (Fe)	2008/09/05		96	%	75 - 125
			Total Lead (Pb)	2008/09/05		102	%	75 - 125
			Total Magnesium (Mg)	2008/09/05		96	%	75 - 125
			Total Manganese (Mn)	2008/09/05		99	%	75 - 125
			Total Molybdenum (Mo)	2008/09/05		103	%	75 - 125
			Total Nickel (Ni)	2008/09/05		99	%	75 - 125
			Total Phosphorus (P)	2008/09/05		98	%	75 - 125
			Total Silver (Ag)	2008/09/05		96	%	75 - 125
			Total Strontium (Sr)	2008/09/05		96	%	75 - 125
			Total Thallium (Tl)	2008/09/05		88	%	75 - 125
			Total Titanium (Ti)	2008/09/05		97	%	75 - 125
			Total Vanadium (V)	2008/09/05		94	%	75 - 125
			Total Zinc (Zn)	2008/09/05		93	%	75 - 125
		SPIKE	Total Arsenic (As)	2008/09/05		113	%	75 - 125
			Total Beryllium (Be)	2008/09/05		107	%	75 - 125
			Total Cadmium (Cd)	2008/09/05		109	%	75 - 125
			Total Chromium (Cr)	2008/09/05		99	%	75 - 125
			Total Cobalt (Co)	2008/09/05		105	%	75 - 125
			Total Copper (Cu)	2008/09/05		109	%	75 - 125
			Total Lead (Pb)	2008/09/05		103	%	75 - 125
			Total Mercury (Hg)	2008/09/05		100	%	75 - 125
			Total Nickel (Ni)	2008/09/05		105	%	75 - 125
			Total Selenium (Se)	2008/09/05		114	%	75 - 125
			Total Vanadium (V)	2008/09/05		100	%	75 - 125
			Total Zinc (Zn)	2008/09/05		118	%	75 - 125
		BLANK	Total Aluminum (Al)	2008/09/05	<100		mg/kg	
			Total Antimony (Sb)	2008/09/05	<0.1		mg/kg	
			Total Arsenic (As)	2008/09/05	<0.2		mg/kg	
			Total Barium (Ba)	2008/09/05	0.1, RDL=0.1		mg/kg	
			Total Beryllium (Be)	2008/09/05	<0.1		mg/kg	
			Total Bismuth (Bi)	2008/09/05	<0.1		mg/kg	
			Total Cadmium (Cd)	2008/09/05	<0.05		mg/kg	
			Total Calcium (Ca)	2008/09/05	<100		mg/kg	
			Total Chromium (Cr)	2008/09/05	<1		mg/kg	
			Total Cobalt (Co)	2008/09/05	<0.3		mg/kg	
			Total Copper (Cu)	2008/09/05	<0.5		mg/kg	
			Total Iron (Fe)	2008/09/05	<100		mg/kg	
			Total Lead (Pb)	2008/09/05	<0.1		mg/kg	
			Total Magnesium (Mg)	2008/09/05	<100		mg/kg	
			Total Manganese (Mn)	2008/09/05	<0.2		mg/kg	
			Total Mercury (Hg)	2008/09/05	<0.05		mg/kg	
			Total Molybdenum (Mo)	2008/09/05	<0.1		mg/kg	
			Total Nickel (Ni)	2008/09/05	<0.8		mg/kg	
			Total Phosphorus (P)	2008/09/05	<10		mg/kg	
			Total Potassium (K)	2008/09/05	<100		mg/kg	

LABERGE ENVIRONMENTAL SERVICES
Attention: Bonnie Burns
Client Project #: FARO CLOSURE OFFICE (ROSE CR.)
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA844444

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2553466	DJ	BLANK	Total Selenium (Se)	2008/09/05	<0.5		mg/kg	
			Total Silver (Ag)	2008/09/05	<0.05		mg/kg	
			Total Sodium (Na)	2008/09/05	<100		mg/kg	
			Total Strontium (Sr)	2008/09/05	<0.1		mg/kg	
			Total Thallium (Tl)	2008/09/05	<0.05		mg/kg	
			Total Tin (Sn)	2008/09/05	<0.1		mg/kg	
			Total Titanium (Ti)	2008/09/05	<1		mg/kg	
			Total Vanadium (V)	2008/09/05	<2		mg/kg	
			Total Zinc (Zn)	2008/09/05	<1		mg/kg	
			Total Zirconium (Zr)	2008/09/05	<0.5		mg/kg	
		RPD	Total Aluminum (Al)	2008/09/05	7.1		%	35
			Total Antimony (Sb)	2008/09/05	NC		%	35
			Total Arsenic (As)	2008/09/05	NC		%	35
			Total Barium (Ba)	2008/09/05	3.8		%	35
			Total Beryllium (Be)	2008/09/05	NC		%	35
			Total Bismuth (Bi)	2008/09/05	NC		%	35
			Total Cadmium (Cd)	2008/09/05	NC		%	35
			Total Calcium (Ca)	2008/09/05	2.8		%	35
			Total Chromium (Cr)	2008/09/05	1.2		%	35
			Total Cobalt (Co)	2008/09/05	3.7		%	35
			Total Copper (Cu)	2008/09/05	6.0		%	35
			Total Iron (Fe)	2008/09/05	1.1		%	35
			Total Lead (Pb)	2008/09/05	2.6		%	35
			Total Magnesium (Mg)	2008/09/05	3.7		%	35
			Total Manganese (Mn)	2008/09/05	2.6		%	35
			Total Mercury (Hg)	2008/09/05	NC		%	35
			Total Molybdenum (Mo)	2008/09/05	NC		%	35
			Total Nickel (Ni)	2008/09/05	2.4		%	35
			Total Phosphorus (P)	2008/09/05	6.5		%	35
			Total Potassium (K)	2008/09/05	1.6		%	35
			Total Selenium (Se)	2008/09/05	NC		%	35
			Total Silver (Ag)	2008/09/05	NC		%	35
			Total Sodium (Na)	2008/09/05	2.2		%	35
			Total Strontium (Sr)	2008/09/05	1.4		%	35
			Total Thallium (Tl)	2008/09/05	NC		%	35
			Total Tin (Sn)	2008/09/05	NC		%	35
			Total Titanium (Ti)	2008/09/05	1.5		%	35
			Total Vanadium (V)	2008/09/05	1.8		%	35
			Total Zinc (Zn)	2008/09/05	1.2		%	35
			Total Zirconium (Zr)	2008/09/05	NC		%	35
2555034	MM3	SPIKE	Soluble (2:1) pH	2008/09/06		100	%	N/A
		RPD	Soluble (2:1) pH	2008/09/06	0.1		%	20

N/A = Not Applicable
NC = Non-calculable
RPD = Relative Percent Difference

A844444

Maxxam Analytics Inc
8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com

Phone: (604) 444-4808
Fax: (604) 444-4511
Toll Free: 1-800-440-4808

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

ANALYSIS REQUEST F109289

COMPANY NAME: Laberge Environmental Services	PH. #: 867-668-6838 E-mail: bonnie burns@northwestel.net FAX #: 867-667-6956
COMPANY ADDRESS: PO Box 21072 Whitehorse, Yukon Y1A 6P7	CLIENT PROJECT ID: (#) FARO CLOSURE OFFICE (ROSE CR. BENTHICS)
SAMPLER NAME (PRINT): BONNIE BURNS	PROJECT MANAGER: BONNIE BURNS

	FIELD SAMPLE ID	MAXXAM LAB # (Lab Use Only)	MATRIX: GROUND WATER	SURFACE WATER	SOIL	OTHER	# CONTAINERS	SAMPLING: DATE DD/MM/YY	TIME	HEADSPACE VAPOUR	Alkalinity	Sulphate	TSS	Ammonia	Total Hardness	Dissolved metals - CCME	Total metals - CCME	pH & conductivity	Dry & sieve thru a 100 mesh (0.15 mm)	Stainless sieve & perform total metal analysis on portion that passes the 100 mesh
1	R-1 Rose Cr u/s			✓			5	25/08/08	10:30		✓	✓	✓	✓	✓	✓	✓	✓		
2	R-2 Rose Cr near X-14			✓			5	25/08/08	12:30		✓	✓	✓	✓	✓	✓	✓	✓		
3	X-2 North Fork Rd			✓			5	25/08/08	14:30		✓	✓	✓	✓	✓	✓	✓	✓		
4	R1-A				✓		1	25/08/08	14:00										✓	
5	R1-B				✓		1	25/08/08	14:00										✓	
6	R1-C				✓		1	25/08/08	14:00										✓	
7	X2-A				✓		1	25/08/08	11:00										✓	
8	X2-B				✓		1	25/08/08	11:00										✓	
9	X2-C				✓		1	25/08/08	11:00										✓	
10																				
11	NOTE: Due to severe weather conditions the helicopter access sites could not be																			
12	completed. The rest of the samples will hopefully be done next week. BB																			

TAT (Turnaround Time)

<5 DAY TAT MUST HAVE PRIOR APPROVAL

*some exceptions apply please contact lab

STANDARD	5 BUSINESS DAYS	☐
RUSH	3 BUSINESS DAYS	☐
RUSH	2 BUSINESS DAYS	☐
URGENT	1 BUSINESS DAY	☐

OTHER BUSINESS DAYS _____

CUSTODY RECORD

P.O. NUMBER / QUOTE NUMBER:

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE: Receiving waters - ultra low detection limits

☑ CCME ☐ CSR ☐ ALBERTA TIER 1 ☐ OTHER

ACCOUNTING CONTACT: Laberge Environmental Services

SPECIAL REPORTING OR BILLING INSTRUCTIONS: - Samples were filtered & preserved in the field.

JARS USED:

LAB USE ONLY

ARRIVAL TEMPERATURE °C: 8,8,4

DUE DATE:

LOG IN CHECK:

RELINQUISHED BY SAMPLER:	DATE: DD/MM/YY	TIME:	RECEIVED BY:
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY:
RELINQUISHED BY:	DATE: DD/MM/YY 28/08/08	TIME: 13:30	RECEIVED BY LABORATORY: JA

COCFORM - BC - 06/06

ORIGINAL - MAXXAM YELLOW - MAXXAM PINK - CLIENT

Maxxam Job #: A846358
Report Date: 2008/09/19

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: KN

RESULTS OF CHEMICAL ANALYSES OF SOIL

Maxxam ID		L48581	L48592	L48594	L48596	L48598		
Sampling Date		2008/09/04	2008/09/04	2008/09/04	2008/09/04	2008/09/04		
COC Number		F109290	F109290	F109290	F109290	F109290		
	Units	**R2-A**	**R2-B**	**R2-C**	**R3-A**	**R3-B**	**RDL**	**QC Batch**
Parameter								
Special Analysis	N/A	SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES	N/A	2562293

RDL = Reportable Detection Limit

Maxxam ID		L48601	L48603	L48605	L48608	L48611		
Sampling Date		2008/09/04	2008/09/04	2008/09/04	2008/09/04	2008/09/04		
COC Number		F109290	F109290	F109291	F109291	F109291		
	Units	**R3-C**	**R4-A**	**R4-B**	**R4-C**	**R5-A**	**RDL**	**QC Batch**
Parameter								
Special Analysis	N/A	SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES	N/A	2562293

RDL = Reportable Detection Limit

Maxxam ID		L48613	L48614	L48616	L48618	L48619		
Sampling Date		2008/09/04	2008/09/04	2008/09/04	2008/09/04	2008/09/04		
COC Number		F109291	F109291	F109291	F109291	F109291		
	Units	**R5-B**	**R5-C**	**R6-A**	**R6-B**	**R6-C**	**RDL**	**QC Batch**
Parameter								
Special Analysis	N/A	SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES	N/A	2562293

RDL = Reportable Detection Limit

Maxxam ID		L48620	L48621	L48623		
Sampling Date		2008/09/04	2008/09/04	2008/09/04		
COC Number		F109291	F109291	F109291		
	Units	**R7-A**	**R7-B**	**R7-C**	**RDL**	**QC Batch**
Parameter						
Special Analysis	N/A	SEE NOTES	SEE NOTES	SEE NOTES	N/A	2562293

RDL = Reportable Detection Limit

Maxxam Job #: A846358
Report Date: 2008/09/19

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: KN

CSR/CCME METALS - SOIL (SOIL)

Maxxam ID		L48581	L48592	L48594	L48596		
Sampling Date		2008/09/04	2008/09/04	2008/09/04	2008/09/04		
COC Number		F109290	F109290	F109290	F109290		
	Units	**R2-A**	**R2-B**	**R2-C**	**R3-A**	**RDL**	**QC Batch**
Misc. Inorganics							
Soluble (2:1) pH	pH Units	7.17	7.40	7.19	7.29	0.01	2566053
Total Metals by ICPMS							
Total Aluminum (Al)	mg/kg	13400	11400	12800	11600	100	2569724
Total Antimony (Sb)	mg/kg	1.5	1.3	1.6	1.2	0.1	2569724
Total Arsenic (As)	mg/kg	19.7	17.2	18.2	13.4	0.2	2569724
Total Barium (Ba)	mg/kg	410	292	356	347	0.1	2569724
Total Beryllium (Be)	mg/kg	0.5	0.5	0.6	0.6	0.1	2569724
Total Bismuth (Bi)	mg/kg	0.4	0.3	0.3	0.3	0.1	2569724
Total Cadmium (Cd)	mg/kg	0.88	0.62	0.78	0.76	0.05	2569724
Total Calcium (Ca)	mg/kg	7270	6420	7080	6400	100	2569724
Total Chromium (Cr)	mg/kg	36	31	35	29	1	2569724
Total Cobalt (Co)	mg/kg	16.8	13.9	15.9	16.7	0.3	2569724
Total Copper (Cu)	mg/kg	55.0	38.8	48.0	39.0	0.5	2569724
Total Iron (Fe)	mg/kg	30900	27600	31200	26500	100	2569724
Total Lead (Pb)	mg/kg	163	149	168	136	0.1	2569724
Total Magnesium (Mg)	mg/kg	7140	6230	6810	5770	100	2569724
Total Manganese (Mn)	mg/kg	2660	1460	2290	5150	0.2	2569724
Total Mercury (Hg)	mg/kg	0.17	0.13	0.16	0.13	0.05	2569724
Total Molybdenum (Mo)	mg/kg	1.7	1.2	1.6	1.3	0.1	2569724
Total Nickel (Ni)	mg/kg	42.0	34.0	38.8	35.7	0.8	2569724
Total Phosphorus (P)	mg/kg	987	1160	1040	969	10	2569724
Total Potassium (K)	mg/kg	1060	898	1000	1010	100	2569724
Total Selenium (Se)	mg/kg	<0.5	<0.5	<0.5	<0.5	0.5	2569724
Total Silver (Ag)	mg/kg	0.45	0.47	0.47	0.35	0.05	2569724
Total Sodium (Na)	mg/kg	232	221	239	234	100	2569724
Total Strontium (Sr)	mg/kg	44.3	40.5	44.5	42.2	0.1	2569724
Total Thallium (Tl)	mg/kg	0.25	0.24	0.26	0.29	0.05	2569724
Total Tin (Sn)	mg/kg	0.8	0.6	0.7	0.7	0.1	2569724
Total Titanium (Ti)	mg/kg	293	278	293	305	1	2569724
Total Vanadium (V)	mg/kg	35	30	33	30	2	2569724
Total Zinc (Zn)	mg/kg	413	317	377	405	1	2569724
Total Zirconium (Zr)	mg/kg	1.2	1.1	1.0	0.9	0.5	2569724

RDL = Reportable Detection Limit

Maxxam Job #: A846358
Report Date: 2008/09/19

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: KN

CSR/CCME METALS - SOIL (SOIL)

Maxxam ID		L48598	L48601	L48603	L48605		
Sampling Date		2008/09/04	2008/09/04	2008/09/04	2008/09/04		
COC Number		F109290	F109290	F109290	F109291		
	Units	**R3-B**	**R3-C**	**R4-A**	**R4-B**	**RDL**	**QC Batch**
Misc. Inorganics							
Soluble (2:1) pH	pH Units	7.24	7.39	7.42	7.45	0.01	2566053
Total Metals by ICPMS							
Total Aluminum (Al)	mg/kg	12100	11600	9930	9640	100	2569724
Total Antimony (Sb)	mg/kg	1.8	1.1	0.9	1.0	0.1	2569724
Total Arsenic (As)	mg/kg	22.4	14.5	12.3	10.5	0.2	2569724
Total Barium (Ba)	mg/kg	579	305	293	353	0.1	2569724
Total Beryllium (Be)	mg/kg	0.6	0.5	0.3	0.3	0.1	2569724
Total Bismuth (Bi)	mg/kg	0.5	0.3	0.2	0.2	0.1	2569724
Total Cadmium (Cd)	mg/kg	0.78	0.50	0.41	0.36	0.05	2569724
Total Calcium (Ca)	mg/kg	6080	6240	4890	4990	100	2569724
Total Chromium (Cr)	mg/kg	29	28	32	30	1	2569724
Total Cobalt (Co)	mg/kg	18.4	15.0	11.0	10.7	0.3	2569724
Total Copper (Cu)	mg/kg	73.9	34.6	28.4	28.5	0.5	2569724
Total Iron (Fe)	mg/kg	30700	25600	19900	20100	100	2569724
Total Lead (Pb)	mg/kg	345	126	63.5	78.1	0.1	2569724
Total Magnesium (Mg)	mg/kg	5820	5820	6410	6290	100	2569724
Total Manganese (Mn)	mg/kg	5140	3370	1940	1460	0.2	2569724
Total Mercury (Hg)	mg/kg	0.26	0.12	0.05	0.07	0.05	2569724
Total Molybdenum (Mo)	mg/kg	1.5	1.2	1.2	1.1	0.1	2569724
Total Nickel (Ni)	mg/kg	35.5	30.5	32.6	31.4	0.8	2569724
Total Phosphorus (P)	mg/kg	925	1080	914	1030	10	2569724
Total Potassium (K)	mg/kg	1120	1020	809	766	100	2569724
Total Selenium (Se)	mg/kg	<0.5	<0.5	<0.5	<0.5	0.5	2569724
Total Silver (Ag)	mg/kg	0.77	0.35	0.23	0.24	0.05	2569724
Total Sodium (Na)	mg/kg	233	251	186	194	100	2569724
Total Strontium (Sr)	mg/kg	42.3	42.5	31.7	31.6	0.1	2569724
Total Thallium (Tl)	mg/kg	0.38	0.24	0.16	0.17	0.05	2569724
Total Tin (Sn)	mg/kg	0.9	0.7	0.5	0.5	0.1	2569724
Total Titanium (Ti)	mg/kg	333	315	258	263	1	2569724
Total Vanadium (V)	mg/kg	30	29	33	32	2	2569724
Total Zinc (Zn)	mg/kg	556	312	198	198	1	2569724
Total Zirconium (Zr)	mg/kg	0.9	0.8	0.9	0.7	0.5	2569724

RDL = Reportable Detection Limit

Maxxam Job #: A846358
Report Date: 2008/09/19

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: KN

CSR/CCME METALS - SOIL (SOIL)

Maxxam ID		L48608	L48611	L48613	L48614		
Sampling Date		2008/09/04	2008/09/04	2008/09/04	2008/09/04		
COC Number		F109291	F109291	F109291	F109291		
	Units	**R4-C**	**R5-A**	**R5-B**	**R5-C**	**RDL**	**QC Batch**
Misc. Inorganics							
Soluble (2:1) pH	pH Units	7.52	7.43	7.60	7.57	0.01	2566053
Total Metals by ICPMS							
Total Aluminum (Al)	mg/kg	9020	14700	14400	13200	100	2569724
Total Antimony (Sb)	mg/kg	0.8	1.9	1.8	1.8	0.1	2569724
Total Arsenic (As)	mg/kg	9.1	10.6	11.3	10.9	0.2	2569724
Total Barium (Ba)	mg/kg	238	208	204	196	0.1	2569724
Total Beryllium (Be)	mg/kg	0.3	0.6	0.6	0.6	0.1	2569724
Total Bismuth (Bi)	mg/kg	0.2	0.3	0.2	0.2	0.1	2569724
Total Cadmium (Cd)	mg/kg	0.34	0.88	0.80	0.80	0.05	2569724
Total Calcium (Ca)	mg/kg	4590	5960	5840	5400	100	2569724
Total Chromium (Cr)	mg/kg	30	35	33	31	1	2569724
Total Cobalt (Co)	mg/kg	9.4	13.4	12.8	12.0	0.3	2569724
Total Copper (Cu)	mg/kg	22.3	35.4	34.0	32.8	0.5	2569724
Total Iron (Fe)	mg/kg	17700	28000	26000	25900	100	2569724
Total Lead (Pb)	mg/kg	50.8	19.9	18.5	17.5	0.1	2569724
Total Magnesium (Mg)	mg/kg	6040	7790	7740	6900	100	2569724
Total Manganese (Mn)	mg/kg	1270	509	420	443	0.2	2569724
Total Mercury (Hg)	mg/kg	<0.05	<0.05	<0.05	<0.05	0.05	2569724
Total Molybdenum (Mo)	mg/kg	1.0	2.2	2.2	2.2	0.1	2569724
Total Nickel (Ni)	mg/kg	29.6	40.7	39.1	36.3	0.8	2569724
Total Phosphorus (P)	mg/kg	988	1180	1200	1160	10	2569724
Total Potassium (K)	mg/kg	688	1040	1020	900	100	2569724
Total Selenium (Se)	mg/kg	<0.5	<0.5	<0.5	<0.5	0.5	2569724
Total Silver (Ag)	mg/kg	0.20	0.30	0.28	0.29	0.05	2569724
Total Sodium (Na)	mg/kg	163	184	183	168	100	2569724
Total Strontium (Sr)	mg/kg	28.9	33.5	32.7	29.8	0.1	2569724
Total Thallium (Tl)	mg/kg	0.12	0.22	0.20	0.19	0.05	2569724
Total Tin (Sn)	mg/kg	0.5	0.6	0.7	0.6	0.1	2569724
Total Titanium (Ti)	mg/kg	228	402	382	348	1	2569724
Total Vanadium (V)	mg/kg	30	63	61	57	2	2569724
Total Zinc (Zn)	mg/kg	155	163	153	145	1	2569724
Total Zirconium (Zr)	mg/kg	0.7	1.2	1.1	1.0	0.5	2569724

RDL = Reportable Detection Limit

Maxxam Job #: A846358
Report Date: 2008/09/19

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: KN

CSR/CCME METALS - SOIL (SOIL)

Maxxam ID		L48616	L48618	L48619	L48620		
Sampling Date		2008/09/04	2008/09/04	2008/09/04	2008/09/04		
COC Number		F109291	F109291	F109291	F109291		
	Units	**R6-A**	**R6-B**	**R6-C**	**R7-A**	**RDL**	**QC Batch**
Misc. Inorganics							
Soluble (2:1) pH	pH Units	7.49	7.66	7.50	6.99	0.01	2566053
Total Metals by ICPMS							
Total Aluminum (Al)	mg/kg	14200	13500	12400	9660	100	2569724
Total Antimony (Sb)	mg/kg	0.9	0.8	0.7	0.4	0.1	2569724
Total Arsenic (As)	mg/kg	7.0	6.9	6.2	5.6	0.2	2569724
Total Barium (Ba)	mg/kg	185	183	165	126	0.1	2569724
Total Beryllium (Be)	mg/kg	0.5	0.5	0.4	0.5	0.1	2569724
Total Bismuth (Bi)	mg/kg	0.2	0.2	0.2	0.2	0.1	2569724
Total Cadmium (Cd)	mg/kg	0.66	0.56	0.50	0.25	0.05	2569724
Total Calcium (Ca)	mg/kg	7300	7740	7130	3890	100	2569724
Total Chromium (Cr)	mg/kg	34	34	31	17	1	2569724
Total Cobalt (Co)	mg/kg	11.0	11.3	10.1	6.6	0.3	2569724
Total Copper (Cu)	mg/kg	25.0	24.0	22.0	14.0	0.5	2569724
Total Iron (Fe)	mg/kg	20500	20100	19700	16800	100	2569724
Total Lead (Pb)	mg/kg	10.8	10.7	9.8	10.5	0.1	2569724
Total Magnesium (Mg)	mg/kg	7270	7220	6710	3760	100	2569724
Total Manganese (Mn)	mg/kg	728	701	477	325	0.2	2569724
Total Mercury (Hg)	mg/kg	<0.05	<0.05	<0.05	<0.05	0.05	2569724
Total Molybdenum (Mo)	mg/kg	1.1	1.0	0.9	0.6	0.1	2569724
Total Nickel (Ni)	mg/kg	34.1	34.8	30.9	14.9	0.8	2569724
Total Phosphorus (P)	mg/kg	1040	1120	1160	880	10	2569724
Total Potassium (K)	mg/kg	1220	1160	1030	1150	100	2569724
Total Selenium (Se)	mg/kg	<0.5	<0.5	<0.5	<0.5	0.5	2569724
Total Silver (Ag)	mg/kg	0.14	0.13	0.12	0.10	0.05	2569724
Total Sodium (Na)	mg/kg	281	284	256	147	100	2569724
Total Strontium (Sr)	mg/kg	40.6	42.8	38.4	29.6	0.1	2569724
Total Thallium (Tl)	mg/kg	0.16	0.15	0.13	0.15	0.05	2569724
Total Tin (Sn)	mg/kg	0.6	0.6	0.6	0.6	0.1	2569724
Total Titanium (Ti)	mg/kg	383	364	334	319	1	2569724
Total Vanadium (V)	mg/kg	43	41	39	24	2	2569724
Total Zinc (Zn)	mg/kg	83	80	76	60	1	2569724
Total Zirconium (Zr)	mg/kg	0.9	0.9	1.0	0.7	0.5	2569724

RDL = Reportable Detection Limit

Maxxam Job #: A846358
Report Date: 2008/09/19

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: KN

CSR/CCME METALS - SOIL (SOIL)

Maxxam ID		L48621	L48623		
Sampling Date		2008/09/04	2008/09/04		
COC Number		F109291	F109291		
	Units	**R7-B**	**R7-C**	**RDL**	**QC Batch**
Misc. Inorganics					
Soluble (2:1) pH	pH Units	7.01	7.19	0.01	2566053
Total Metals by ICPMS					
Total Aluminum (Al)	mg/kg	8510	8530	100	2569724
Total Antimony (Sb)	mg/kg	0.4	0.4	0.1	2569724
Total Arsenic (As)	mg/kg	5.0	5.1	0.2	2569724
Total Barium (Ba)	mg/kg	110	112	0.1	2569724
Total Beryllium (Be)	mg/kg	0.4	0.5	0.1	2569724
Total Bismuth (Bi)	mg/kg	0.2	0.2	0.1	2569724
Total Cadmium (Cd)	mg/kg	0.21	0.22	0.05	2569724
Total Calcium (Ca)	mg/kg	3720	3840	100	2569724
Total Chromium (Cr)	mg/kg	15	16	1	2569724
Total Cobalt (Co)	mg/kg	6.2	6.2	0.3	2569724
Total Copper (Cu)	mg/kg	12.0	12.4	0.5	2569724
Total Iron (Fe)	mg/kg	15300	15500	100	2569724
Total Lead (Pb)	mg/kg	9.5	9.2	0.1	2569724
Total Magnesium (Mg)	mg/kg	3450	3310	100	2569724
Total Manganese (Mn)	mg/kg	294	338	0.2	2569724
Total Mercury (Hg)	mg/kg	<0.05	<0.05	0.05	2569724
Total Molybdenum (Mo)	mg/kg	0.5	0.5	0.1	2569724
Total Nickel (Ni)	mg/kg	13.2	13.5	0.8	2569724
Total Phosphorus (P)	mg/kg	893	932	10	2569724
Total Potassium (K)	mg/kg	1020	971	100	2569724
Total Selenium (Se)	mg/kg	<0.5	<0.5	0.5	2569724
Total Silver (Ag)	mg/kg	0.09	0.09	0.05	2569724
Total Sodium (Na)	mg/kg	143	134	100	2569724
Total Strontium (Sr)	mg/kg	27.8	27.7	0.1	2569724
Total Thallium (Tl)	mg/kg	0.13	0.13	0.05	2569724
Total Tin (Sn)	mg/kg	0.6	0.7	0.1	2569724
Total Titanium (Ti)	mg/kg	292	293	1	2569724
Total Vanadium (V)	mg/kg	22	23	2	2569724
Total Zinc (Zn)	mg/kg	53	56	1	2569724
Total Zirconium (Zr)	mg/kg	0.6	0.5	0.5	2569724

RDL = Reportable Detection Limit

Maxxam Job #: A846358
Report Date: 2008/09/19

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: KN

RESULTS OF CHEMICAL ANALYSES OF SOIL Comments

Sample L48581-01 GS Special Analysis: 100 mesh sieve was performed on the sample

Sample L48592-01 GS Special Analysis: 100 mesh sieve was performed on the sample

Sample L48594-01 GS Special Analysis: 100 mesh sieve was performed on the sample

Sample L48596-01 GS Special Analysis: 100 mesh sieve was performed on the sample

Sample L48598-01 GS Special Analysis: 100 mesh sieve was performed on the sample

Sample L48601-01 GS Special Analysis: 100 mesh sieve was performed on the sample

Sample L48603-01 GS Special Analysis: 100 mesh sieve was performed on the sample

Sample L48605-01 GS Special Analysis: 100 mesh sieve was performed on the sample

Sample L48608-01 GS Special Analysis: 100 mesh sieve was performed on the sample

Sample L48611-01 GS Special Analysis: 100 mesh sieve was performed on the sample

Sample L48613-01 GS Special Analysis: 100 mesh sieve was performed on the sample

Sample L48614-01 GS Special Analysis: 100 mesh sieve was performed on the sample

Sample L48616-01 GS Special Analysis: 100 mesh sieve was performed on the sample

Sample L48618-01 GS Special Analysis: 100 mesh sieve was performed on the sample

Sample L48619-01 GS Special Analysis: 100 mesh sieve was performed on the sample

Sample L48620-01 GS Special Analysis: 100 mesh sieve was performed on the sample

Sample L48621-01 GS Special Analysis: 100 mesh sieve was performed on the sample

Sample L48623-01 GS Special Analysis: 100 mesh sieve was performed on the sample

CSR/CCME METALS - SOIL (SOIL) Comments

Sample L48581-01 Elements by ICPMS (total): Total metals analysis on portion that passes 100 mesh sieve

Sample L48592-01 Elements by ICPMS (total): Total metals analysis on portion that passes 100 mesh sieve

Sample L48594-01 Elements by ICPMS (total): Total metals analysis on portion that passes 100 mesh sieve

Sample L48596-01 Elements by ICPMS (total): Total metals analysis on portion that passes 100 mesh sieve

Sample L48598-01 Elements by ICPMS (total): Total metals analysis on portion that passes 100 mesh sieve

Sample L48601-01 Elements by ICPMS (total): Total metals analysis on portion that passes 100 mesh sieve

Sample L48603-01 Elements by ICPMS (total): Total metals analysis on portion that passes 100 mesh sieve

Sample L48605-01 Elements by ICPMS (total): Total metals analysis on portion that passes 100 mesh sieve

Sample L48608-01 Elements by ICPMS (total): Total metals analysis on portion that passes 100 mesh sieve

Sample L48611-01 Elements by ICPMS (total): Total metals analysis on portion that passes 100 mesh sieve

Sample L48613-01 Elements by ICPMS (total): Total metals analysis on portion that passes 100 mesh sieve

Maxxam Job #: A846358
Report Date: 2008/09/19

LABERGE ENVIRONMENTAL SERVICES
Client Project #: FARO CLOSURE OFFICE

Sampler Initials: KN

Sample	L48614-01 Elements by ICPMS (total): Total metals analysis on portion that passes 100 mesh sieve
Sample	L48616-01 Elements by ICPMS (total): Total metals analysis on portion that passes 100 mesh sieve
Sample	L48618-01 Elements by ICPMS (total): Total metals analysis on portion that passes 100 mesh sieve
Sample	L48619-01 Elements by ICPMS (total): Total metals analysis on portion that passes 100 mesh sieve
Sample	L48620-01 Elements by ICPMS (total): Total metals analysis on portion that passes 100 mesh sieve
Sample	L48621-01 Elements by ICPMS (total): Total metals analysis on portion that passes 100 mesh sieve
Sample	L48623-01 Elements by ICPMS (total): Total metals analysis on portion that passes 100 mesh sieve

Results relate only to the items tested.

Maxxam Analytics Inc
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CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

A846358 ANALYSIS REQUEST F 109290

COMPANY NAME: LABERGE ENVIRONMENTAL SERVICES
PH. #: 867-668-6838
E-mail: bonnieburns@northwestel.net
FAX #: 867-667-6956
COMPANY ADDRESS: PO Box 21072 Whitehorse, YT Y1A 6P7
CLIENT PROJECT ID: (#) FARO CLOSURE OFFICE (ROSE CR. BENTHICS)
SAMPLER NAME (PRINT): KEN NORDIN
PROJECT MANAGER:

FIELD SAMPLE ID	MAXXAM LAB # (Lab Use Only)	MATRIX: GROUND WATER	SURFACE WATER	SOIL	OTHER	# CONTAINERS	SAMPLING: DATE DD/MM/YY	TIME	HEADSPACE VAPOUR	Alkalinity	Sulphate	TSS	Ammonia	Total Hardness	Dissolved metals - ultra (CCME)	Total metals - ultra (CCME)	pH + conductivity	Dry & sieve thru #	100 mesh (0.15 mm)	Stainless wire +	Perform total metal	analysis on portion	that passes 100 mesh	Sieve.
1 R3 - Midway			✓			5	04/09/08			✓	✓	✓	✓	✓	✓	✓	✓							
2 R4 - Ros Cr u/s			✓			5	"			✓	✓	✓	✓	✓	✓	✓	✓							
3 R5 - Anvil Cr d/s			✓			5	"			✓	✓	✓	✓	✓	✓	✓	✓							
4 R6 - Anvil Cr u/s			✓			5	"			✓	✓	✓	✓	✓	✓	✓	✓							
5 R7 - North Fork			✓			5	"			✓	✓	✓	✓	✓	✓	✓	✓							
6 R2-A				✓		1	"											✓						
7 R2-B				✓		1	"											✓						
8 R2-C				✓		1	"											✓						
9 R3-A				✓		1	"											✓						
10 R3-B				✓		1	"											✓						
11 R3-C				✓		1	"											✓						
12 R4-A				✓		1	"											✓						

TAT (Turnaround Time)

<5 DAY TAT MUST HAVE PRIOR APPROVAL

*some exceptions apply please contact lab

STANDARD	5 BUSINESS DAYS	☐
RUSH	3 BUSINESS DAYS	☐
RUSH	2 BUSINESS DAYS	☐
URGENT	1 BUSINESS DAY	☐

OTHER BUSINESS DAYS _____

CUSTODY RECORD

P.O. NUMBER / QUOTE NUMBER:

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE: Receiving waters ultra low detection limits

☑ CCME ☐ CSR ☐ ALBERTA TIER 1 ☐ OTHER

ACCOUNTING CONTACT: Laberge Env. Serv.

SPECIAL REPORTING OR BILLING INSTRUCTIONS: Samples were filtered & preserved in field

JARS USED:

ARRIVAL TEMPERATURE °C: 7.7, 4 | DUE DATE: | LOG IN CHECK:

RELINQUISHED BY SAMPLER:	DATE: DD/MM/YY	TIME:	RECEIVED BY:
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY:
RELINQUISHED BY:	DATE: SEPT 8 08 DD/MM/YY	TIME: 11:25	RECEIVED BY LABORATORY: EV

COCFORM - BC - 06/06

ORIGINAL - MAXXAM YELLOW - MAXXAM PINK - CLIENT

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

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

ANALYSIS REQUEST F109291

COMPANY NAME: Labrge Env. Serv,
PH. #:
E-mail: bonnieburns@northwestel.net
FAX #:

COMPANY ADDRESS:

CLIENT PROJECT ID: (#)
FARO CLOSURE OFFICE
(Rose Cr. Benthics)

SAMPLER NAME (PRINT): KEN NORDIN

PROJECT MANAGER:

	FIELD SAMPLE ID	MAXXAM LAB # (Lab Use Only)	MATRIX: GROUND WATER	SURFACE WATER	SOIL	OTHER	# CONTAINERS	SAMPLING: DATE DD/MM/YY	TIME	HEADSPACE VAPOUR	Dry & sieve thru a 100 mesh (0.15mm) Stainless Steel sieve & perform total metals analysis on portion that passed 100 mesh sieve
1	R4-B				✓		1	04/09/08			✓
2	R4-C				✓		1	"			✓
3	R5-A				✓		1	"			✓
4	R5-B				✓		1	"			✓
5	R5-C				✓		1	"			✓
6	R6-A				✓		1	"			✓
7	R6-B				✓		1	"			✓
8	R6-C				✓		1	"			✓
9	R7-A				✓		1	"			✓
10	R7-B				✓		1	"			✓
11	R7-C				✓		1	"			✓
12											

TAT (Turnaround Time)

<5 DAY TAT MUST HAVE PRIOR APPROVAL

*some exceptions apply please contact lab

STANDARD 5 BUSINESS DAYS ☐
RUSH 3 BUSINESS DAYS ☐
RUSH 2 BUSINESS DAYS ☐
URGENT 1 BUSINESS DAY ☐

OTHER BUSINESS DAYS _____

CUSTODY RECORD

P.O. NUMBER / QUOTE NUMBER:

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:

☐ CCME
☐ CSR
☐ ALBERTA TIER 1
☐ OTHER

ACCOUNTING CONTACT:

SPECIAL REPORTING OR BILLING INSTRUCTIONS:

JARS USED:

ARRIVAL TEMPERATURE °C: 7.7.6

DUE DATE:

LOG IN CHECK:

	DATE DD/MM/YY	TIME	
RELINQUISHED BY SAMPLER:			RECEIVED BY:
RELINQUISHED BY:			RECEIVED BY:
RELINQUISHED BY:	SEPT 8 08	11:25	RECEIVED BY LABORATORY: EU

COCFORM - BC - 06/06

ORIGINAL - MAXXAM YELLOW - MAXXAM PINK - CLIENT

APPENDIX D

BENTHIC INVERTEBRATE DATA, 2008

Sample ID:		R1-A	R1-B	R1-C	R2-C	R2-D	R2-E	R3-A	R3-B	R3-C
Portion subsampled: Fine		1/2	3/16	3/16	3/4	3/16	1/8	1/8	3/16	1/8
Portion subsampled: Coarse		1/16	1/8	1/8	1/2	1/4	1/4	1/8	1/4	1/4
PHYLUM ARTHROPODA										
Class Insecta										
Order: Ephemeroptera	larvae (dam.)									
Family: Ameletidae										
Ameletus sp.	nymph				5					
Family: Baetidae	nymph (dam./juv.)	34	40	65	53	437	668	824	532	1008
Baetis sp.	nymph									16
Baetis bicaudatus	nymph									
Baetis tricaudatus	nymph					4	4			
Acentrella sp.	nymph			8			12		4	
Family: Heptageniidae	nymph (dam./juv.)				5	65	40	16	95	72
Rhithrogena sp.	nymph									
Cinygmula sp.	nymph									
Epeorus sp.	nymph				2					
Family: Ephemerellidae	nymph (dam./juv.)	4	5	15	1	20	32	32	25	4
Ephemerella sp.	nymph									
Serratella sp.	nymph					4	16			
Drunella doddsi	nymph						8		15	16
Drunella grandis	nymph						4			
Drunella spinifera	nymph									
Drunella coloradensis	nymph									
Order: Plecoptera	nympn (dam./juv.)	18	123	85	4	75		16	25	4
Family: Chloroperlidae										
Sweltsa sp.	nymph									
Suwallia sp.	nymph									
Family: Perlodidae	nymph (dam./juv.)			10	1	10	8	8	10	28
Kogotus sp.	nymph									
Skwala sp.	nymph								4	
Megarcys sp.	nymph									4
Isoperla sp.	nymph									
Family: Perlidae	nymph (dam./juv.)					14		8		
Family: Taeniopterygidae										
Taenionema sp.	nymph	14		20		20				
Family: Nemouridae	nymph									
Zapada sp.	nymph	28	38	48	1	78	108	176	98	72
Zapada oregonensis/haysi	nymph	20		47	9	79	104	256	32	136
Zapada columbiana	nymph									4
Zapada cinctipes	nymph	16		65		21	60			12
Visoka sp.	nymph									
Family: Capniidae	nymph (dam./juv.)	16		5	11	35	52	40	103	88
Order: Trichoptera	pupae									
Family: Hydropsychidae	larvae (dam./juv.)					25	20	8	10	
Parapsyche sp.	larvae					8	16			
Family:Glossosomatidae										

Sample ID:		R1-A	R1-B	R1-C	R2-C	R2-D	R2-E	R3-A	R3-B	R3-C
Portion subsampled: Fine		1/2	3/16	3/16	3/4	3/16	1/8	1/8	3/16	1/8
Portion subsampled: Coarse		1/16	1/8	1/8	1/2	1/4	1/4	1/8	1/4	1/4
Glossosoma sp.	larvae									
Family: Rhyacophilidae										
Rhyacophila sp.	larvae		8	16	4	42			5	4
Family: Brachycentridae										
Micrasema sp.	larvae	2	5		1					
Brachycentrus sp.	larvae									4
Family: Limnephilidae	larvae (dam./juv.)					5				
Dicosmoecus sp.	larvae				3	16				
Order: Diptera										
Order: Diptera UID	larvae	4						8		
Order: Diptera UID	pupae			5				8		
Family: Tipulidae										
Dicranota sp.	larvae							8		
Limnophila sp.	larvae					5				
Family: Psychodidae UID	larvae					5				
Pericoma sp.	larvae		16			5	8	16	20	8
Family: Ceratopogonidae										
Bezzia/Palpomyia sp.	larvae		10			4		8		16
Family: Empididae										
Chelifera/Metachela sp.	larvae				1					
Clinocera sp.	larvae		13							
Family: Simuliidae	pupae	40	38	55	3	4	8		5	4
Simulium sp.	larvae	10	35	55	7	20	120	112	75	112
Prosimulium sp.	larvae	26		10		5	24			16
Family: Chironomidae	larvae								4	
Family: Chironomidae	pupae	96	64	40	4	8				8
Subfamily : Orthocladiinae	larvae			265			144			
Corynoneura sp.	larvae				1					
Cricotopus/Orthocladius sp.	larvae	76	160	80	104	410	248	664	144	252
Diplocladius sp.	larvae		55							
Eukieferiella sp.	larvae	90	1065	884	37	75	120	200	115	144
Hydrobaenus sp.	larvae									
Rheocricotopus sp.	larvae									
Thienemanniella sp.	larvae									
Tvetenia sp.	larvae				13	35	40	152	125	96
Subfamily : Diamesinae	larvae									
Diamesa sp.	larvae	56				33	24			
Pagastia sp.	larvae	334	325	168	60	189	244	224	60	132
Potthastia (longimana group)	larvae				3			8	5	
Subfamily Tanypodinae	larvae									
Thienemannimyia Group	larvae				15	15	80			24
Subfamily : Chironominae	larvae									
Tribe : Tanytarsini	larvae									
Micropsectra/Tanytarsus sp.	larvae				72	125	136	136	55	248
Rheotanytarsus sp.	larvae		15	40						
Stempellinella sp.	larvae									

Sample ID:		R1-A	R1-B	R1-C	R2-C	R2-D	R2-E	R3-A	R3-B	R3-C
Portion subsampled: Fine		1/2	3/16	3/16	3/4	3/16	1/8	1/8	3/16	1/8
Portion subsampled: Coarse		1/16	1/8	1/8	1/2	1/4	1/4	1/8	1/4	1/4
Order: Lepidoptera	larvae									
Order: Collembola	larvae	2	30	5						
Class: Crustacea										
Order: Ostracoda					3	14				
Order: Copepoda										
Class: Arachnida										
Order: Prostigmata	deutonymph	6	10	5	3	35	84	40	5	8
Order: Prostigmata	juvenile									
Order: Prostigmata UID	adult	2								
Family: Hydrozetidae	adult	4						8		
Family: Limnesiidae										
Limnesia	adult				4	5				
Family: Hygrobatidae										
Hygrobates	adult				1	5				8
Family: Sperchontidae										
Sperchon	adult	2		5		15	36	16	15	4
Family: Lebertiidae										
Lebertia	adult			5		35	16	16		8
Family: Feltriidae										
Feltria	adult	12	25	5	1	40	64	64	35	56
Family: Arturidae										
Arturus	adult	6		15	4	30	24	64	25	44
PHYLUM ANNELIDA										
Class: Oligochaeta										
Family: Naididae		32			2	10	12	40	20	12
Class: Hirudinea										
Family: Piscicolidae						5				
PHYLUM MOLLUSCA										
Class: Gastropoda										
PHYLUM NEMATODA		6	15		5	4	16	8	10	148
Total per sample		956	2095	2026	442	2094	2600	3184	1676	2820
Total per site		5077			5136			7680		
Taxonomic Richness/Sample		27	21	27	33	44	34	30	29	35
Taxonomic Richness/Site		38			54			45		

Sample ID:		R4-A	R4-B	R4-C	R5-A	R5-B	R5-C	R6-A	R6-B	R6-C
Portion subsampled: Fine		3/8	3/16	1/4	1/2	3/4	all	1/8	1/8	3/8
Portion subsampled: Coarse		1/8	1/4	1/4	1/2	1/2	1/2	1/8	1/16	1/4
PHYLUM ARTHROPODA										
Class Insecta										
Order: Ephemeroptera	larvae (dam.)							8		
Family: Ameletidae										
Ameletus sp.	nymph		15							
Family: Baetidae	nymph (dam./juv.)	16	70	228	100	13	5	512	536	57
Baetis sp.	nymph		8							
Baetis bicaudatus	nymph									
Baetis tricaudatus	nymph									
Acentrella sp.	nymph				2			8		4
Family: Heptageniidae	nymph (dam./juv.)	148	495	332	26	7	1	104	168	55
Rhithrogena sp.	nymph	5	15					16	8	22
Cinygmula sp.	nymph					2		8		3
Epeorus sp.	nymph				2			40	8	8
Family: Ephemerellidae	nymph (dam./juv.)	23	122	24	30	14	2	136	80	25
Ephemerella sp.	nymph					2			16	
Serratella sp.	nymph								8	
Drunella doddsi	nymph			4	4	4		40	56	56
Drunella grandis	nymph									
Drunella spinifera	nymph		8		6		4			
Drunella coloradensis	nymph							8		4
Order: Plecoptera	nympn (dam./juv.)	18	10	8		9	1	40	24	16
Family: Chloroperlidae										
Sweltsa sp.	nymph	8	21	12	2					
Suwallia sp.	nymph	3								
Family: Perlodidae	nymph (dam./juv.)	21	45	8	8	4		8	24	8
Kogotus sp.	nymph									
Skwala sp.	nymph									
Megarcys sp.	nymph									
Isoperla sp.	nymph		5							
Family: Perlidae	nymph (dam./juv.)									
Family: Taeniopterygidae										
Taenionema sp.	nymph				8	3		16	8	5
Family: Nemouridae	nymph									
Zapada sp.	nymph	44	140	88	100	38	7	336	160	61
Zapada oregonensis/haysi	nymph	105	127	116	80	64	19	488	424	101
Zapada columbiana	nymph								16	
Zapada cinctipes	nymph	37	61	44	18	15	7	304	280	74
Visoka sp.	nymph			4						
Family: Capniidae	nymph (dam./juv.)	286	255	176	16	5		160	96	49
Order: Trichoptera	pupae			4						
Family: Hydropsychidae	larvae (dam./juv.)	5		8	14	13	1	96	32	8
Parapsyche sp.	larvae				4	6	2	8	32	24
Family:Glossosomatidae										

Sample ID:		R4-A	R4-B	R4-C	R5-A	R5-B	R5-C	R6-A	R6-B	R6-C
Portion subsampled: Fine		3/8	3/16	1/4	1/2	3/4	all	1/8	1/8	3/8
Portion subsampled: Coarse		1/8	1/4	1/4	1/2	1/2	1/2	1/8	1/16	1/4
Glossosoma sp.	larvae			4					8	5
Family: Rhyacophilidae										
Rhyacophila sp.	larvae								8	
Family: Brachycentridae										
Micrasema sp.	larvae						1			
Brachycentrus sp.	larvae				2				8	
Family: Limnephilidae	larvae (dam./juv.)									
Dicosmoecus sp.	larvae			4						
Order: Diptera										
Order: Diptera UID	larvae	3							8	
Order: Diptera UID	pupae			4						
Family: Tipulidae										
Dicranota sp.	larvae		5	4						
Limnophila sp.	larvae									
Family: Psychodidae UID	larvae	3								
Pericoma sp.	larvae	24	5	8	8	2		16	8	5
Family: Ceratopogonidae										
Bezzia/Palpomyia sp.	larvae	5		4						
Family: Empididae										
Chelifera/Metachela sp.	larvae	3					1	8		
Clinocera sp.	larvae									
Family: Simuliidae	pupae				8	5	2	96	88	103
Simulium sp.	larvae	3	25	40	36	10	8	184	200	108
Prosimulium sp.	larvae				26	4	3	64	72	18
Family: Chironomidae	larvae			8						
Family: Chironomidae	pupae				2		6	40	48	8
Subfamily : Orthocladiinae	larvae							64		12
Corynoneura sp.	larvae	5	5			2				
Cricotopus/Orthocladius sp.	larvae	44	153	44	30	52	56		56	
Diplocladius sp.	larvae									
Eukieferiella sp.	larvae	26	4	8	98	12	12	152	88	31
Hydrobaenus sp.	larvae				86	230	117	240		
Rheocricotopus sp.	larvae									
Thienemanniella sp.	larvae									
Tvetenia sp.	larvae	39	45	8	44	13	15	208	104	60
Subfamily : Diamesinae	larvae									
Diamesa sp.	larvae									
Pagastia sp.	larvae	128	82	116	138	30	34	152	80	40
Potthastia (longimana group)	larvae		5							
Subfamily Tanypodinae	larvae									
Thienemannimyia Group	larvae									
Subfamily : Chironominae	larvae									
Tribe : Tanytarsini	larvae									
Micropsectra/Tanytarsus sp.	larvae									
Rheotanytarsus sp.	larvae		19		40	22	21	24	16	5
Stempellinella sp.	larvae									

Sample ID:		R4-A	R4-B	R4-C	R5-A	R5-B	R5-C	R6-A	R6-B	R6-C
Portion subsampled: Fine		3/8	3/16	1/4	1/2	3/4	all	1/8	1/8	3/8
Portion subsampled: Coarse		1/8	1/4	1/4	1/2	1/2	1/2	1/8	1/16	1/4
Order: Lepidoptera	larvae		5	8						
Order: Collembola	larvae	3	5							
Class: Crustacea										
Order: Ostracoda			5							
Order: Copepoda					2					3
Class: Arachnida										
Order: Prostigmata	deutonymph	11	19	4	8	4	1	8		3
Order: Prostigmata	juvenile									
Order: Prostigmata UID	adult									
Family: Hydrozetidae	adult			4						
Family: Limnesiidae										
Limnesia	adult		5							
Family: Hygrobatidae										
Hygrobates	adult		5	4						
Family: Sperchontidae										
Sperchon	adult	18	14	24	28	4	2			3
Family: Lebertiidae										
Lebertia	adult	5	25	8	6	3	1		8	5
Family: Feltriidae										
Feltria	adult	10	10	12	14	5	10	24	8	16
Family: Arturidae										
Arturus	adult	13	35	16	44	21	22	40	32	13
PHYLUM ANNELIDA										
Class: Oligochaeta										
Family: Naididae		13	19	4	2	2		8		3
Class: Hirudinea										
Family: Piscicolidae										
PHYLUM MOLLUSCA										
Class: Gastropoda					6					
PHYLUM NEMATODA		10	10	12	2	3		8	8	4
Total per sample		1085	1902	1404	1050	622	361	3672	2824	1024
Total per site		4391			2033			7520		
Taxonomic Richness/Sample		32	37	36	37	33	27	36	36	37
Taxonomic Richness/Site		51			43			47		

Sample ID:		R7-A	R7-B	R7-E	Total	%
Portion subsampled: Fine		1/16	1/16	1/8		
Portion subsampled: Coarse		1/8	1/8	1/8		
PHYLUM ARTHROPODA						
Class Insecta					**8**	**0.02**
Order: Ephemeroptera	larvae (dam.)					
Family: Ameletidae					**20**	**0.04**
Ameletus sp.	nymph				**5334**	**11.09**
Family: Baetidae	nymph (dam./juv.)	32	64	40	**32**	**0.07**
Baetis sp.	nymph			8	**8**	**0.02**
Baetis bicaudatus	nymph		8		**8**	**0.02**
Baetis tricaudatus	nymph				**38**	**0.08**
Acentrella sp.	nymph				**2109**	**4.39**
Family: Heptageniidae	nymph (dam./juv.)	312	80	88	**66**	**0.14**
Rhithrogena sp.	nymph				**37**	**0.08**
Cinygmula sp.	nymph	24			**60**	**0.12**
Epeorus sp.	nymph				**1002**	**2.08**
Family: Ephemerellidae	nymph (dam./juv.)	120	152	136	**18**	**0.04**
Ephemerella sp.	nymph				**28**	**0.06**
Serratella sp.	nymph				**203**	**0.42**
Drunella doddsi	nymph				**4**	**0.01**
Drunella grandis	nymph				**18**	**0.04**
Drunella spinifera	nymph				**12**	**0.02**
Drunella coloradensis	nymph					
					620	**1.29**
Order: Plecoptera	nympn (dam./juv.)		112	32		
Family: Chloroperlidae					**59**	**0.12**
Sweltsa sp.	nymph	16			**3**	**0.01**
Suwallia sp.	nymph				**257**	**0.53**
Family: Perlodidae	nymph (dam./juv.)	24	16	16		
Kogotus sp.	nymph				**4**	**0.01**
Skwala sp.	nymph				**4**	**0.01**
Megarcys sp.	nymph				**5**	**0.01**
Isoperla sp.	nymph				**22**	**0.05**
Family: Perlidae	nymph (dam./juv.)					
Family: Taeniopterygidae					**126**	**0.26**
Taenionema sp.	nymph		24	8		
Family: Nemouridae	nymph				**3742**	**7.78**
Zapada sp.	nymph	672	848	600	**3288**	**6.84**
Zapada oregonensis/haysi	nymph	328	600	152	**20**	**0.04**
Zapada columbiana	nymph				**2270**	**4.72**
Zapada cinctipes	nymph	440	480	336	**4**	**0.01**
Visoka sp.	nymph				**2010**	**4.18**
Family: Capniidae	nymph (dam./juv.)	224	80	312		
					4	**0.01**
Order: Trichoptera	pupae				**240**	**0.50**
Family: Hydropsychidae	larvae (dam./juv.)				**116**	**0.24**
Parapsyche sp.	larvae	16				
Family:Glossosomatidae					**25**	**0.05**

Sample ID:		R7-A	R7-B	R7-E	Total	%
Portion subsampled: Fine		1/16	1/16	1/8		
Portion subsampled: Coarse		1/8	1/8	1/8		
Glossosoma sp.	larvae			8		
Family: Rhyacophilidae					**103**	**0.21**
Rhyacophila sp.	larvae	8		8		
Family: Brachycentridae					**9**	**0.02**
Micrasema sp.	larvae				**14**	**0.03**
Brachycentrus sp.	larvae				**5**	**0.01**
Family: Limnephilidae	larvae (dam./juv.)				**31**	**0.07**
Dicosmoecus sp.	larvae	8				
Order: Diptera					**23**	**0.05**
Order: Diptera UID	larvae				**17**	**0.04**
Order: Diptera UID	pupae					
Family: Tipulidae					**49**	**0.10**
Dicranota sp.	larvae		32		**5**	**0.01**
Limnophila sp.	larvae				**8**	**0.02**
Family: Psychodidae UID	larvae				**205**	**0.43**
Pericoma sp.	larvae	24	16	16		
Family: Ceratopogonidae					**47**	**0.10**
Bezzia/Palpomyia sp.	larvae					
Family: Empididae					**21**	**0.04**
Chelifera/Metachela sp.	larvae		8		**13**	**0.03**
Clinocera sp.	larvae				**459**	**0.95**
Family: Simuliidae	pupae				**1191**	**2.48**
Simulium sp.	larvae		16	16	**348**	**0.72**
Prosimulium sp.	larvae		80		**3148**	**6.55**
Family: Chironomidae	larvae	1488	1648		**380**	**0.79**
Family: Chironomidae	pupae	24	16	16	**485**	**1.01**
Subfamily : Orthocladiinae	larvae				**30**	**0.06**
Corynoneura sp.	larvae	16			**3981**	**8.28**
Cricotopus/Orthocladius sp.	larvae	560	448	400	**55**	**0.11**
Diplocladius sp.	larvae				**3217**	**6.69**
Eukieferiella sp.	larvae			56	**689**	**1.43**
Hydrobaenus sp.	larvae	16			**16**	**0.03**
Rheocricotopus sp.	larvae	16				
Thienemanniella sp.	larvae				**3733**	**7.76**
Tvetenia sp.	larvae	536	1040	1160		
Subfamily : Diamesinae	larvae				**113**	**0.24**
Diamesa sp.	larvae				**3136**	**6.52**
Pagastia sp.	larvae	232	240	128	**21**	**0.04**
Potthastia (longimana group)	larvae					
Subfamily Tanypodinae	larvae				**134**	**0.28**
Thienemannimyia Group	larvae					
Subfamily : Chironominae	larvae					
Tribe : Tanytarsini	larvae				**772**	**1.60**
Micropsectra/Tanytarsus sp.	larvae				**410**	**0.85**
Rheotanytarsus sp.	larvae	192	16		**8**	**0.02**
Stempellinella sp.	larvae			8		

Sample ID:		R7-A	R7-B	R7-E	Total	%
Portion subsampled: Fine		1/16	1/16	1/8		
Portion subsampled: Coarse		1/8	1/8	1/8		
					13	**0.03**
Order: Lepidoptera	larvae					
					45	**0.09**
Order: Collembola	larvae					
Class: Crustacea					**22**	**0.04**
Order: Ostracoda					**5**	**0.01**
Order: Copepoda						
Class: Arachnida					**517**	**1.07**
Order: Prostigmata	deutonymph	64	48	152		
Order: Prostigmata	juvenile				**10**	**0.02**
Order: Prostigmata UID	adult			8	**56**	**0.12**
Family: Hydrozetidae	adult		16	24		
Family: Limnesiidae					**14**	**0.03**
Limnesia	adult					
Family: Hygrobatidae					**63**	**0.13**
Hygrobates	adult	16		24		
Family: Sperchontidae					**410**	**0.85**
Sperchon	adult	128	32	64		
Family: Lebertiidae					**173**	**0.36**
Lebertia	adult	16		16		
Family: Feltriidae					**636**	**1.32**
Feltria	adult	96	96	32		
Family: Arturidae					**736**	**1.53**
Arturus	adult	104	64	120		
PHYLUM ANNELIDA					**8**	**0.02**
Class: Oligochaeta				8	**259**	**0.54**
Family: Naididae		16	56	8		
Class: Hirudinea					**5**	**0.01**
Family: Piscicolidae						
PHYLUM MOLLUSCA					**6**	**0.01**
Class: Gastropoda						
					405	**0.84**
PHYLUM NEMATODA			64	72		
					48077	**100**
Total per sample		5768	6400	4072		
Total per site		16240				
					89	
Taxonomic Richness/Sample		30	29	32		
Taxonomic Richness/Site		45				

2008

**AQUATIC LIFE SAMPLING AND TESTING PROGRAM
FOR THE ANVIL RANGE MINE SITE,
ROSE AND VANGORDA CREEK WATERSHEDS,
FARO, YUKON**

TO MEET THE REQUIREMENTS OF WATER LICENSE QZ03-059

Conducted: During August, 2008

Prepared for Delloite and Touche Inc.

December, 2008

Prepared by: White Mountain Environmental Consulting, Whitehorse, Yukon
Paul Sparling and Martin Crill

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1.0 Introduction

The following report details the results of the fifth consecutive year of field investigations conducted under the *Aquatic Life Sampling and Testing Program* for the Anvil Range Mine Site at Faro, Yukon, as required under water license QZ03-059. Field investigations for this project were conducted during August, 2008 under the authority of License No. 08-12, Department of Fisheries and Oceans, Canada.

The primary goal of these investigations has been to annually sample watersheds potentially affected by the Faro and Vangorda Plateau mine sites. Specific sites within the Rose and Vangorda Creek watersheds have been investigated since 2004 to track the presence, relative abundance and condition of fish. From each sampling site, flesh samples from slimy sculpin (*Cottus cognatus*) and Arctic grayling (*Thymallus arcticus*) have been taken and analyzed to determine the level of metals in fish tissue.

This investigation also continued the collection of quality data on fish habitats and fish utilization for use in long term monitoring. The sampling methodology used in 2008 was consistent with that used in previous investigations to allow comparison between annual data sets.

2.0 Study Area

Investigations were conducted within the Rose and Vangorda Creek watersheds in potentially affected waters as well as on control (unaffected) sites on Anvil and Blind Creeks. Sample sites for the 2008 investigation were all previously established sites with exception of Site V8 which was expanded to include a reach of Vangorda Creek 300 meters downstream of the original sample location and a secondary site on Blind Creek to allow for the collection of slimy sculpin samples for metal analysis. The following sites were sampled during the investigation:

Sample sites associated with Rose Creek (Figure 1):

R1 South Fork of Rose Creek immediately upstream of the confluence of North and South Fork of Rose Creek;

R2 The mixing zone downstream of the intersection of Rose Creek and the tailings pond discharge channel;

R4 Rose Creek just upstream of the confluence with Anvil Creek; and

R6A Anvil Creek upstream of the confluence with Rose Creek (control site), this site has been referred to as site R8 in previous reports.

Sampling sites associated with Vangorda Creek (Figure 2):

V8 Lower Vangorda Creek below the town of Faro access road; and an additional reach 300 meters downstream of the main site, and

B1 Blind Creek near the lower bridge (control site), and new in 2008, an additional site upstream of the original site, at the second bridge.

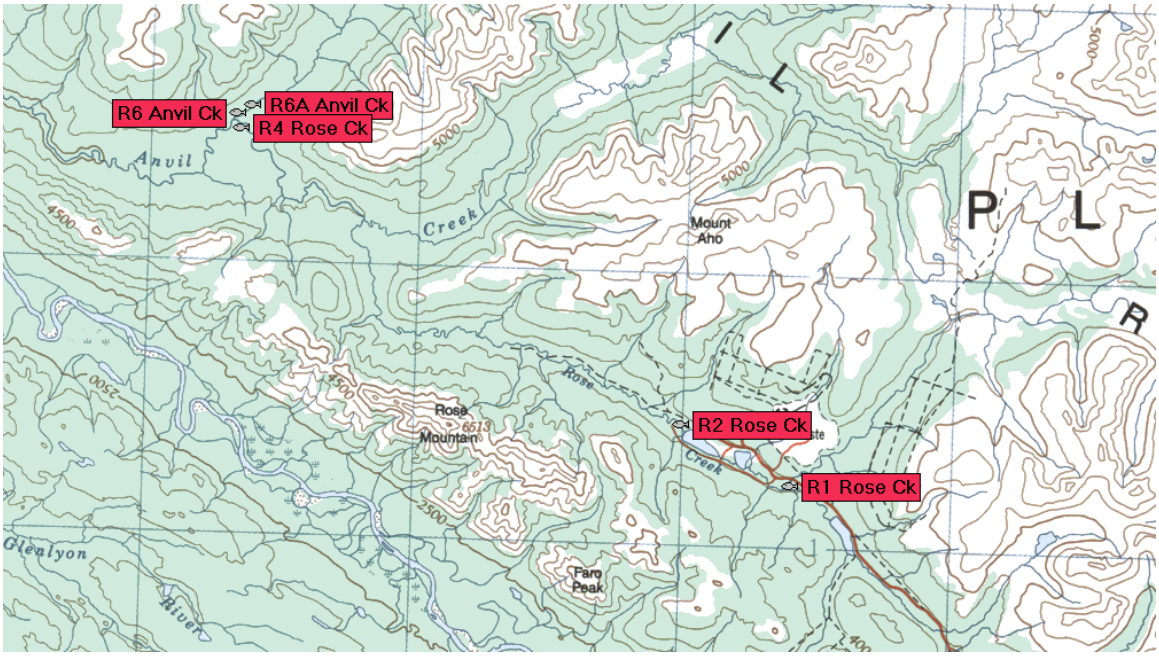

Figure 1: Sample sites associated with Rose Creek from 1:250,000 105K *Tay River* topographic map.

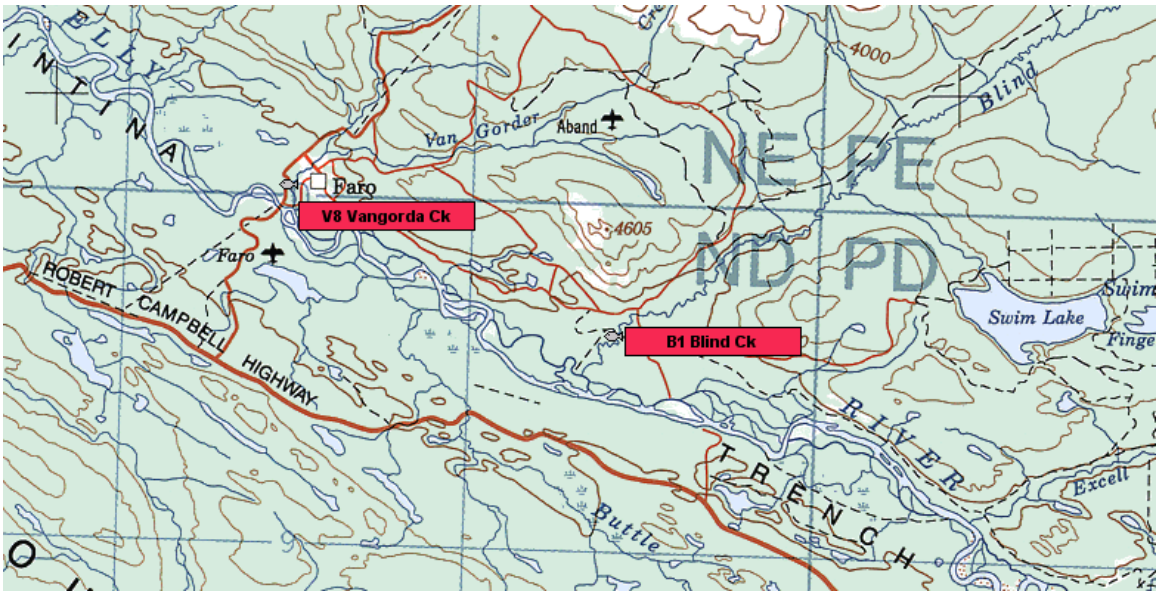

Figure 2: Sampling sites associated with Vangorda and Blind Creeks from 1:250,000 105K, Tay River topographic map.

3.0 Methods

Field investigations were conducted between August 15 and 20, 2008 when water levels were stable and fish distribution was at its seasonal peak. This timing corresponds with previous investigations which were also conducted during mid August.

Each site sampled corresponded to the locations sampled during previous years. The only sites altered from past investigations were Vangorda and Blind Creeks. On Vangorda the secondary sample site 300 meters downstream of the existing sample reach that was further extended from 2007 to include the final run before the Pelly River,

for the collection of slimy sculpin and Arctic grayling for metal analysis of fish flesh. On Blind Creek a second site upstream of the first bridge at a second bridge was sampled extensively with minnow traps to enhance sculpin collections for metal samples. The two sample sites near the confluence of Rose and Anvil Creeks were accessed with a helicopter; all other sample sites were accessed by road.

The general description of fish habitat compiled in past years was re-evaluated at each site, including; flow parameters consisting of velocities (floating object method), depth, wetted and channel width, substrates, channel configuration, bank stability, water temperature, riparian vegetation and an assessment of available fish cover. Photographs representative of each site were taken.

The principle fish collection technique used was electro-fishing. Secondary techniques included minnow trapping, angling, and beach seining. Crew members wore polarized glasses at all times to enhance fish viewing abilities and all visual observations of fish were recorded.

Electro-fishing was conducted with a Smith-Route POW type 12A battery powered, back pack electro-fisher. The electro-fisher operator was accompanied by a crew member with a dip net. Each site was investigated using a single pass technique with sampling effort similar to that of previous years. Each site was sampled by moving in an upstream direction and sweeping from side to side through each reach; all shoreline areas were fished and attempts at covering all mid-stream habitats were made. Electro-fishing results have been calculated as the number of fish recorded per 100 seconds of shock time to allow comparison between sites and different years.

Minnow trapping was conducted with “Gee type” minnow traps (¼” mesh). Traps were baited with salmon roe (Yukon River origin) suspended in the trap in a perforated plastic bag, and were set in a variety of habitat types at each site. Traps were set for an overnight period and the results have been expressed as number of fish captured per site per 24 hour period. Minnow trapping at sites R4 and R6a was not conducted during 2008 due to helicopter access constraints.

Beach seining was only conducted to collect metal analysis specimens from Vangorda and Blind Creeks. Catch per unit effort from seining was not calculated as the effectiveness of seine pulls varied due to such factors as shoreline configuration, bottom substrates, water depth and velocity. Area seined and seine catches were recorded in a field note book.

Angling was conducted with light spin casting gear and a variety of small lures and dry flies. Effort was recorded as minutes fished and all fish captured or observed were recorded. Effort was extended until a sample of five Arctic grayling for metal analysis was collected.

All fish captured, other than those taken for metal samples were handled delicately to allow for live release after sampling. Anaesthetics were not used. All fish captured or observed were identified as to species and general life stage (fry, juvenile, sub-adult, adult), a sub-sample was measured for fork length (±1 mm) and then released unharmed as near as possible to the location from which they were sampled. All fish captured or observed were recorded into a field book and the information was later entered into an excel data base.

3.1 Metal Sample Collection and Analysis

Fish samples for metal content analysis were collected during the course of general field assessments. A maximum of 5 Arctic grayling and 5 slimy sculpins samples were collected from each site for analysis of metals in tissue. Extra seine and minnow trap effort was conducted at Blind Creek to procure slimy sculpin samples and additional electro-fishing effort was conducted on Vangorda Creek to collect slimy sculpins.

Arctic Grayling with a fork length >200 mm and slimy sculpins 80 mm or longer were selected for tissue sampling when possible. At sites where less than 5 sculpins over 80 mm in length were caught, a composite sample of 2 or more individual sculpins was utilized.

Specimens collected for metal sample analysis were placed into labeled zip loc baggies immediately after capture. The collected specimens were sampled later in a controlled environment. For sacrificed Arctic grayling, internal and external observations of fish health, sex and maturity, diet, fork length and round weight was recorded. From each grayling a tissue sample weighing approximately 50 grams was taken from the caudal area and placed in separate labeled bags and then frozen. Stomach contents were analyzed at the time of sampling. Sample data and stomach content analysis from Arctic grayling was entered to an excel data base format at the completion of the field season.

For slimy sculpins sacrificed, the total length and round weight for each specimen was recorded, including the individuals from composite samples. Each sculpin sample was bagged and labeled separately; each composite sample was bagged and labeled as a single sample, the samples were then frozen.

The frozen tissue samples were submitted to Bodycote Labs (formerly Norwest Labs) for metals analysis. Metal analysis included microwave acid digest for ICP metals and metals semi trace in tissue. The metal results were expressed as ug/gram. The lab technique used to analyze the 2008 samples was the same as for the previous three years. The sample technique used in 2004 was updated in 2005 and has remained consistent since.

4.0 2007 Results

The sample sites showed little physical variation from conditions observed in previous years and fish habitats remained stable at most sample locations. The exception was Vangorda Creek; site V8 where an active bedrock slump may have affected the water quality. In general, water levels during 2008 were slightly above the average recorded however still less than in 2005, when the highest flows were observed. An updated general description of fish habitats and a representative photo for each site has been presented in Appendix 1.

Fish distribution and habitat utilization varied slightly between each site; most sites had consistent speciation with previous years. The most notable change was during the 2008 investigations juvenile chinook salmon (jcs) were much less common at Blind Creek and Vangorda Creek than in previous years, a single jcs was captured at R4 and jcs were absent from all other sites. This was expected as the number of adult chinook in the Yukon system was low during 2007. The number and size of slimy sculpin at site R1 continues to decrease, likely a function of the displaced sculpin in the system after the dewatering of the freshwater reservoir basin in 2004.

Arctic grayling adults were present at all sites. At site R2 grayling were again dispersed, though less difficult to catch than in 2006. At site R6A grayling were abundant and easier to catch than in 2006. Slimy sculpin were uncommon and difficult to capture at Blind Creek, were uncommon at site V8, and common and easily captured at the other sites.

A summary of electro-fishing results for all species for 2008 has been presented in Table 1. A summary of minnow trapping results has been presented in Table 2 with a complete listing of all minnow trapping results for 2008 presented in Appendix 4. Angling data have been presented in Table 3.

A complete set of 5 Arctic grayling were taken for metal analysis from each site. Lengths ranged from 213 to 375 mm. A complete listing of sample information for specimens collected has been presented in Appendix 3.

Stomach content analysis from all Arctic grayling sampled in 2008 indicates that Trichoptera (Caddis fly) continues to be the primary food source for Arctic grayling at all sites at this time of year, including Blind Creek for the first time where salmon roe was the most common diet item in years past. Terrestrial insects, including ants, spiders, beetles, unidentified insects and flies, together accounted for significant component of the diet. Salmon eggs were observed in Grayling stomachs from Blind Creek and at R1. This marks the second time salmon eggs have been recorded at R1, the first being in 2005 and indicates that either adult salmon spawn nearby or the grayling travel a significant distance in short periods of time. Other food items included snails, caterpillars, rose hips, bastard toad flax seeds and larvae. As in 2006 and 2007, bees and wasps were noticeably absent from the 2008 diet.

Sample information for Arctic grayling stomach content analysis has been presented in Appendix 3 in conjunction with all other sample information for the fish sacrificed for metal sample analysis.

Slimy sculpin taken for metals analysis ranged in length from 55 to 102 mm. The weights of the sculpin samples ranged from 1.8 to 13.2 grams. A total of 13 whole fish samples and 17 composite samples were taken. Unlike previous years composite samples came from R1, R4 and R6a as well as Vangorda and Blind Creeks. Data for slimy sculpin samples has been presented in Appendix 3.

No unusual spikes or anomalies in metal concentrations in fish flesh were noted in 2007 data other than a slight increase in zinc at site V8. A complete discussion of metal concentrations in fish tissue has been presented in the discussion of multi year results (page 12).

4.1 Site Summary: R1 Rose Creek

4.1.a Fish Habitat and Utilization

Site R1 consists of a narrow, boulder strewn riffle/rapid with limited habitats. The habitats are small for large fish and the current flows fast for small fish. Cover consists of occasional cut banks and eddies behind boulders. Because of the limited Arctic grayling habitat a reach that extends for a distance of 800 meters upstream of the sample site is used for capturing grayling.

Electro-fishing at R1 consisted of 836 seconds of effort and was conducted through the 100 meter sample reach. Fish recorded by electro-fishing consisted of 21 slimy sculpin adults and 2 slimy sculpin fry (Table 1).

Minnow trapping at site R1 consisted of 9 traps set for an average soak time of 19.2 hours each. No fish were caught (Table 2).

Angling effort at site R1 for 310 minutes produced a catch of 8 Arctic grayling (Table 3). Grayling were dispersed in the study area as habitat for larger grayling remains limited.

4.1.b Metal Samples

Samples taken for metal analysis included; 5 Arctic grayling (3 immature females and 2 mature males), 3 single adult slimy sculpin and 2 composites of 2 sculpin.

The Arctic grayling samples ranged in length from 291 to 341 mm, and in weight from 254 to 419 gms. The samples were of a similar size those taken from this site in previous years. Stomachs were 80% full and the contents consisted of 62.5% caddis fly, 30% unidentified terrestrial insects, and 2.5% ants.

The sculpin samples were considerably smaller than in previous years and consisted of 3 whole fish samples and 2 composites of 2 individuals .The sculpins ranged in length from 61 to 93 mm and in weight from 2.6 to 9.9 gms.

4.2 Site Summary: R2 Rose Creek

4.2.a Fish Habitat and Utilization

This site provides a wide variety of stable habitats, including riffles, rapids, glide areas and deep corner and side pools.

Electro-fishing at R2 consisted of 827 seconds of effort and was conducted through the 100 meter sample reach. Fish recorded by electro-fishing consisted of 35 slimy sculpin adults' 1 burbot juvenile, 2 juvenile and one fry Arctic grayling (Table 1). This site has annually shown a consistent decline in the number of sculpin fry recorded since 2004. This year marks the first year that zero sculpin fry were recorded.

Minnow trapping at site R2 consisted of 9 traps set for an average soak time of 29.6 hours each. The total catch from the minnow trapping consisted of 1 adult slimy sculpin, 1 juvenile Arctic grayling and 1 burbot (Table 2). The minnow traps set at R2 were all set downstream of the confluence of the tailings pond channel with Rose Creek.

Angling for 190 minutes downstream of the tailings pond channel captured 7 Arctic grayling (Table 3). There were few grayling observed along the reach and they were well dispersed.

4.2.b Metal Samples

Samples taken for metal analysis consisted of 5 single slimy sculpin adults and 5 adult Arctic grayling.

The Arctic grayling samples ranged in length from 306 to 364 mm, and in weight from 330 to 480 gms. The samples consisted of 2 mature females, 1 immature female and 2 mature male. The stomachs were 95% full and the contents consisted of 73.7 caddis fly, 21.1 terrestrial insects, 4.2 % ants and 1% red worm.

The five individual sculpin samples ranged in length from 91 to 102 mm and in weight from 8.1 to 13.2 gms.

4.3 Site Summary: R4 Rose Creek

4.3.a Fish Habitat and Utilization

Electro-fishing was conducted through all areas of the 110 meter reach and 950 seconds of effort recorded a total of 35 slimy sculpin adults, and 1 juvenile chinook salmon (Tables 1).

Minnow trapping was not conducted at R4 during the 2008 field investigation due to the lack of available helicopters.

Angling for 90 minutes captured 17 adult Arctic grayling (Table 3), 12 juveniles and sub adults were released.

4.3.b Metal Samples

A complete sample of 5 Arctic grayling adults were taken from R4. The grayling ranged in length from 285 to 337 mm, in weight from 233 to 417 gms and consisted of 2 mature females, 1 immature female, 1 mature male and 1 immature male. The Arctic grayling stomachs were 55% full and contents consisted of 74.5% caddis fly, 21.8% terrestrial insects, and 3.6% benthic.

The slimy sculpin samples consisted of 3 whole fish samples and 2 composite. The sculpin samples ranged in length from 65 to 89 mm and in weight from 3.2 to 7.2 gms.

4.4 Site Summary: R6a Anvil Creek

4.4.a Fish Habitat and Utilization

Flows in Anvil Creek during 2008 were slightly lower than in the past 2 years. The site has a good variety of habitats including a fast moving thalwag and a deep corner pool. Fishing effort was limited in the main channel and was focused on the shore areas and the pool.

Electro-fishing was conducted along the shoreline areas of both banks and in the shallow side flow on the right bank and covered similar areas to the 2006 and 2007 investigations. A total of 1,050 seconds of effort recorded 55 adult slimy sculpin (Table 1). This catch was almost identical to that of 2007 with the exception of a burbot caught in 2007 and none in 2008.

Minnow trapping was not conducted at R6a during the 2008 field investigation due to the lack of available helicopters.

A total of 90 minutes of angling effort captured 14 adult Arctic grayling, five were taken for metal samples and 7 sub adults were released (Table 3).

4.4.b Metal Samples

Arctic grayling samples taken for metal analysis at site R6a consisted of 3 mature females and 2 mature males, and ranged in length from 285 to 351 mm, and weight from 245 to 509 gms. Stomachs were 90% full and contents consisted of 87% caddis fly, 7.8% terrestrial insects, and 5.5 % benthic.

Slimy sculpin samples consisted of 2 individual and 3 composite samples ranging in length from 86 to 108 mm and in weight from 7.0 to 11.6 grams.

4.5 Site Summary: V8 Vangorda Creek

4.5.a Fish Habitat and Utilization

The study reach of Vangorda Creek varies from year to year in the amount of turbidity caused by sloughing side banks; During 2008 the water was clearer than during any of the other study years, however a rock face at the upstream end of the reach had collapsed. This rock is highly mineralized and may have affected water quality in the area. A slight increase in pH was detected between the water upstream of the slide and downstream of the slide. A reach 180 meters downstream of the study reach was used for the collection of slimy sculpin and Arctic grayling for metal analysis.

Electro-fishing was conducted for a total of 731 seconds through the entire 120 meter reach (Table 1). Fish recorded included 2 slimy sculpin adults, 5 juvenile chinook, 2 sub-adult Arctic grayling and 1 sub adult burbot and 2 adult round whitefish. Additional electro fishing for 280 seconds covering 140 meters downstream of the bridge was extended to capture slimy sculpin for metal samples.

Minnow trapping at site V8 consisted of 9 traps set for an average soak time of 20.4 hours each. The total catch from the minnow trapping consisted of 5 jcs, representing a continued significant decrease in abundance (Table 2).

Angling on Vangorda Creek was successful in the lower reach of the creek were the velocity decreases and pools become larger and deeper. A total of 80 minutes of angling effort captured 6 grayling (Table 3).

4.5.b Metal Samples

Arctic grayling samples taken at site V8 consisted of 2 mature females and 3 mature males. They ranged in length from 286 to 322 mm and in weight from 219 to 324 gms. Stomachs were 60% full and contents consisted of 63% caddis fly 23% unidentified terrestrial insects, 5% ants and 8% beetles.

Slimy sculpin samples consisted of 5 composite samples. The sculpin samples ranged in length from 57 to 69 mm, and in weight from 2.0 to 4.0 gms. This sculpin sample represents the most complete sample obtained during the 5 years of study and was a result of extending the sampling area.

4.6 Site Summary: B1

4.6.a Fish Habitat and Utilization

The Blind Creek sample reach is a much large Creek than the other sites and has a good variety of slow to fast moving habitats.

Electro-fishing was not and has not been conducted on Blind Creek at the request of the Department of Fisheries and Oceans due to the presence of spawning adult chinook salmon. A chinook salmon enumeration weir located 50 meters downstream of the bridge was removed shortly before the time of sampling. Adult salmon were observed below the bridge and active redds were within the study area. This year only 248 adult salmon were counted at the weir, the lowest number recorded.

Arctic grayling were in groups throughout the study area, with most aggregated in deep pools near the active redds. Slimy sculpin were uncommon even near salmon redds.

Extra minnow traps for the capture of slimy sculpin for metal samples were set as in previous years although an extra set was set 2 kms upstream at the site of a second bridge to determine if a more suitable location was available, the extra traps did not catch any sculpins. A total of 18 minnow traps were set in the sample reach for an average soak time of 16 hours each (Table 2). The catch consisted of 2 slimy sculpin, 160 jcs (0+) and 11 jcs (1+). This catch of jcs is half of last years.

Seining effort was exerted on Blind Creek to procure a suitable sample of slimy sculpin for metal analysis. Seining effort was conducted downstream of the bridge. A total of 5 seine pulls were made, the catch consisted of 21 small adult and 3 fry, slimy sculpins, 184 jcs, 11 jcs 1+, 4 juvenile round whitefish, 15 sub adult and 9 juvenile Arctic grayling.

Angling effort at Blind Creek, both upstream and downstream of the bridge for 160 minutes captured 9 Arctic grayling adults (Table 3). Grayling were not as abundant as in previous years and it was thought they may have been concentrated further upstream were more salmon redds are located.

4.6.b Metal Samples

A complete set of 5 Arctic grayling samples were taken for metals analysis, they ranged in length from 272 to 342mm, and in weight from 204 to 396 gms. The sample consisted of 3 mature females and 2 mature males. Stomachs were 65% full and the contents consisted of 51% caddis fly, 23% salmon eggs, 15% slimy sculpin and 3% terrestrial insects.

Five composite sculpin samples were taken and the individual fish ranged in length from 55 to 71 mm and in weight from 1.8 to 4.2 gms.

Concentrations of metals in fish flesh from Blind Creek remained lower for most metals than in fish from the other sites investigated, although similar to site R8, and were lower than in previous years (Tables 5 and 6).

Table 1: Summary of electro-fishing results for all sites sampled during August of 2008,.

Sample Site	Date Sampled	Sample Effort (seconds)	Sample Effort (area)	Arctic Grayling	Slimy Sculpin	Burbot	Juvenile chinook salmon	Round W.fish
R1	Aug. 17	836	100 m	0	21 ad 2 fry	0	0	0
R2	Aug. 17	827	100 m.	2 juv. 1 fry	35 ad	1	0	0
R4	Aug. 19	950	110 m.	0	35 ad	0	1	0
R8	Aug. 19	1,050	120 m.	0	55 ad	0	0	0
V8	Aug. 18	731	120 m.	2 s ad	0	1 s ad	5 juv	2 s ad

Summary of abbreviations: ad= adult, juv.= juvenile, sub. ad.= sub adult Round W. fish= round whitefish

Table 2: Summary of minnow trapping results for all sites sampled during Faro Aquatics program, August 2008. The number presented equals the total number of fish captured in all traps at each site.

Sample Site	No. of traps	Average soak time (hrs)	Arctic Grayling	Slimy Sculpin	Burbot	Juvenile chinook salmon	Juv. Ch. Salmon +1
R1	9	18.50	0	0	0	0	0
R2	9	15.50	0	0	0	0	0
R4	9	23.43	1	12	0	0	0
R6a	9	21.46	0	2	0	0	0
V8	13	17.42	0	0	0	285	0
B1	14	21.29	0	1	0	222	38

Table 3: Summary of angling results for all sites sampled during Faro Aquatics program, August 2008

Sample Site	Angling Effort (minutes)	Catch (Number of Arctic Grayling)
R1	90	9
R2	110	5
R4	40	12
R6a	40	12
B1	60	12

5.0 Discussion of Multi-Year Results

5.1 Metal Concentration in Fish Tissue

Concentrations of metal in the tissue of Arctic grayling have been plotted for copper, lead, manganese and zinc; and for slimy sculpin for cadmium, copper, manganese and zinc for all years between 2004 and 2008 (See figures 10 through 17). Broken graph lines for grayling indicate missing data from R2 for 2005 and for sculpin missing data from V8 for 2006.

In Arctic grayling, zinc, manganese and cadmium concentrations peaked in 2005 at all sites (including control sites), and declined toward a minimum (again at all sites) in 2007. In 2008 copper cadmium and magnesium remained at a consistent level with 2007, zinc levels at all sites showed a slight increase. At site R4, levels of manganese and cadmium in particular spiked strongly in 2005, before falling back to the low levels recorded at other sites for 2006, 2007 and 2007.

In slimy sculpin, any trends that can be discerned are more specific to a given metal than is the case in grayling. With regard to copper, concentrations in fish taken both from control and mine-affected sites rose slightly during 2004-2005 and fell in 2006, before rising more slightly again in 2007 and continuing to rise in 2008.

The only significant spikes in slimy sculpin are lead in 2005 (all sites, but especially R2) and manganese in 2007 at R2 and R4. Lead levels have remained steady since 2006; however manganese at R2 dropped during 2008 but increased at R2 and R4. Given the

spatial relationship between these two sites and discharge waters from the tailings reservoir, metal levels from these two sites should be the subject of particular attention in future years, especially as this pattern was not mirrored in control sites.

Zinc levels in sculpin remained steady at most sites but did show an increase at V8 during 2008. This may be a function of the active bedrock bank slump at the upstream end of the sample reach.

5.2 Fish Utilization

Comparisons of fish utilization recorded over the past four years has been graphed and presented as table 4 and figures 3 through 9. Dramatic variations such as those noted for jcs likely reflect an accurate shift in numbers of the species in the area for each year. Low returns of adult salmon in 2007 produced small recruitment for the 2008 season; a similar decline is anticipated for 2009. Small variations in occurrence of other species may be a function of sampling conditions and food distribution.

A single juvenile chinook salmon (jcs) was captured a R4 during 2008; jcs were not recorded in the Rose/ Anvil drainage during 2007. Jcs were captured however at B1 and V8, as in previous years though numbers since 2004 have shown a continued and marked decline to 2006. This pattern of chinook utilization corresponds with escapement numbers for adult chinook salmon from the year proceeding each year of capture. Low numbers of jcs in Vangorda Creek are likely due to a combination of factors; the low numbers of salmon in the area and a potential avoidance of the creek as it has had a deposit of mineralized rock slide into the creek a short distance from the Yukon River and at the top of the sample reach.

Both Arctic grayling and burbot were more common in 2004 at site R1 than in any other year, the numbers of both species have steadily declined over the subsequent four years. Large numbers of burbot and grayling were removed from the freshwater reservoir basin at the time of dewatering and it is not unlikely that remnant populations remained in the creek after dewatering and have slowly reduced in number since. A similar reduction in slimy sculpin has also been noted although the decline has not been so much in number as in size of the fish. The size of sculpins in R1 has continually decreased since 2006.

Slimy sculpin numbers from site R4 have dropped to levels noted prior to 2007 where they had increased during the previous 4 years and have remained relatively stable at each of the other sites.

Table 4: Summary of multi-year electro-fishing results for investigations conducted during August of, 2004, 2005, 2006, 2007 and 2008. Catches have been expressed as the number of fish recorded per 100 seconds shocking time.

SITE	YEAR	grayling sub ad. & adult	grayling juvenile	sculpin adult	sculpin fry	Burbot	C.salmon juvenile	R.whitefish
R1	2004	0.36	1.80	3.47	0	0.24	0.36	0.12
	2005	0	1.53	4.83	0	0.24	0	0
	2006	0	0	1.75	0	0	0	0
	2007	0	0.34	3.09	0.11	0	0	0
	2008	0	0	2.51	0.23	0	0	0
R2	2004	0.27	0	15.65	1.10	0.27	0	0
	2005	1.81	0.11	8.60	0.79	0.79	0.23	0
	2006	0	0	4.22	0.55	0.08	0	0
	2007	0	0.18	5.12	0.18	0	0	0
	2008	0.24	0.12	4.23	0	0.12	0	0
R4	2004	0.11	0	2.86	0	0	0	0
	2005	0.57	0	4.31	0.58	0	0	0
	2006	0	0.10	8.37	5.10	0	0	0
	2007	0.11	0.68	11.12	0	0.11	0	0
	2008	0	0	3.68	0	0	0.11	0
R8	2004	0.11	0	2.86	0.11	0	0	0
	2005	0	0	4.21	0.10	0	0	0
	2006	0	0	6.29	1.28	0.26	0	0
	2007	0	0	5.02	0	0.18	0	0
	2008	0	0	5.24	0	0	0	0
V8	2004	1.08	0.59	0.69	0	0	16.60	0
	2005	0.30	0	0.49	0	0	18.62	0
	2006	1.02	0	0.26	0	0.13	4.99	0
	2007	2.58	2.57	0.22	0	0.11	15.45	0.11
	2008	0.27	0	0	0	0.14	0.68	0.27

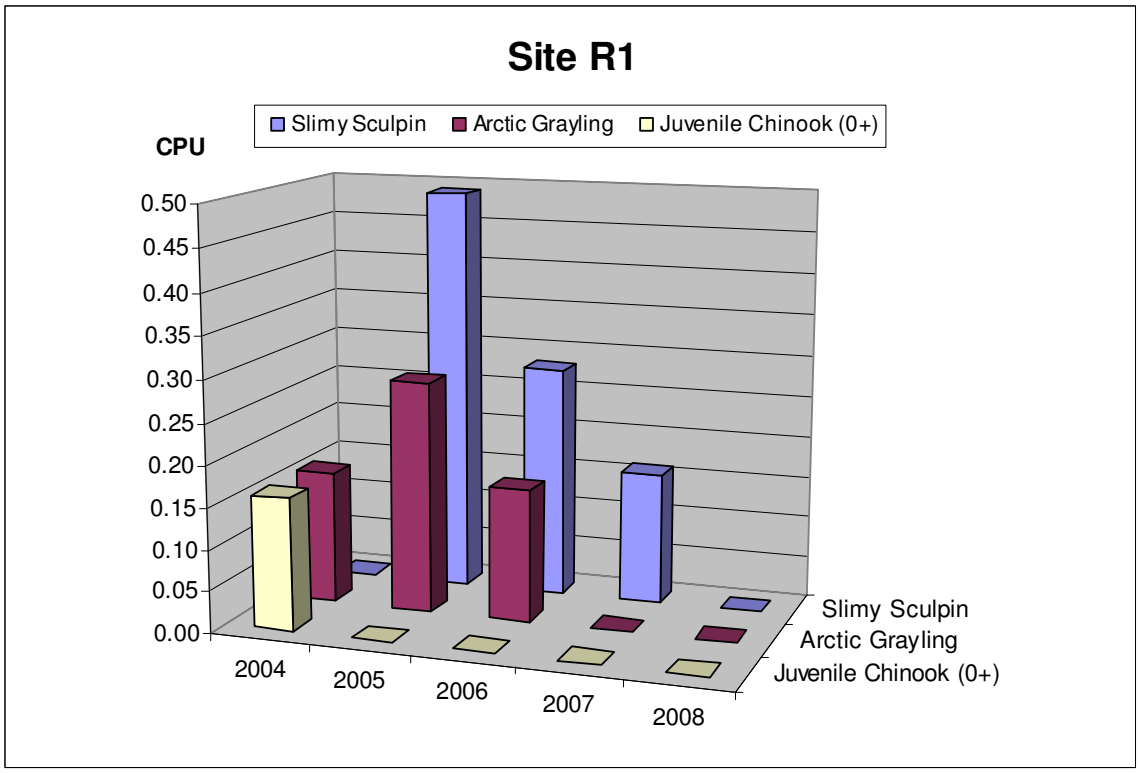

Figure 3: Comparison of minnow trap catches for site R1, Faro Aquatics sampling program for all years of sampling.

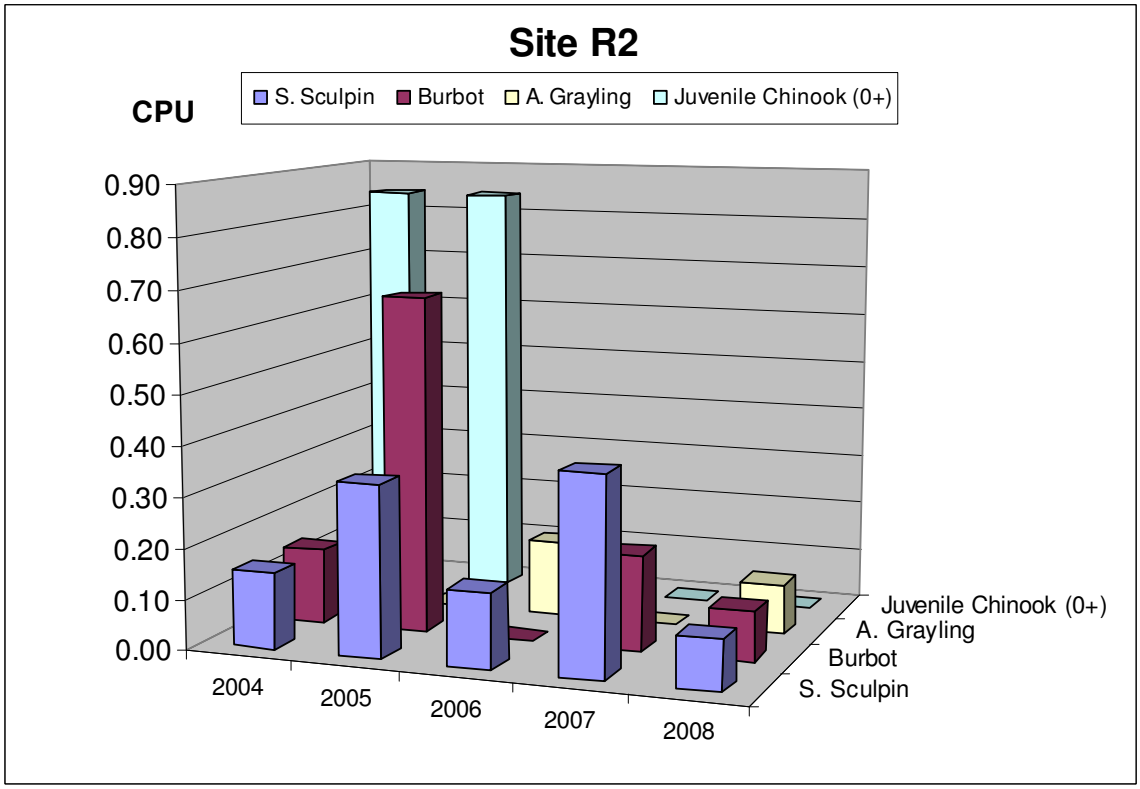

Figure 4: Comparison of minnow trap catches for site R2, Faro Aquatics sampling program for all years of sampling.

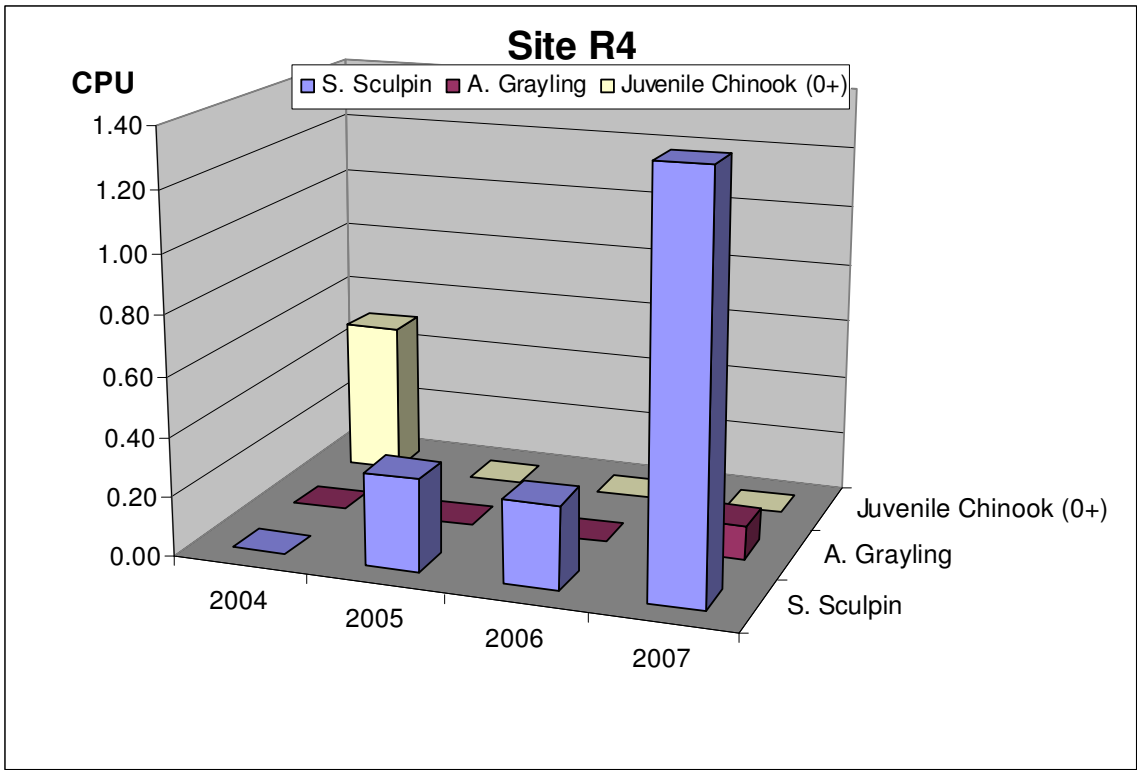

Figure 5: Comparison of minnow trap catches for site R4, Faro Aquatics sampling program for all years of sampling. No minnow trapping was conducted during 2008.

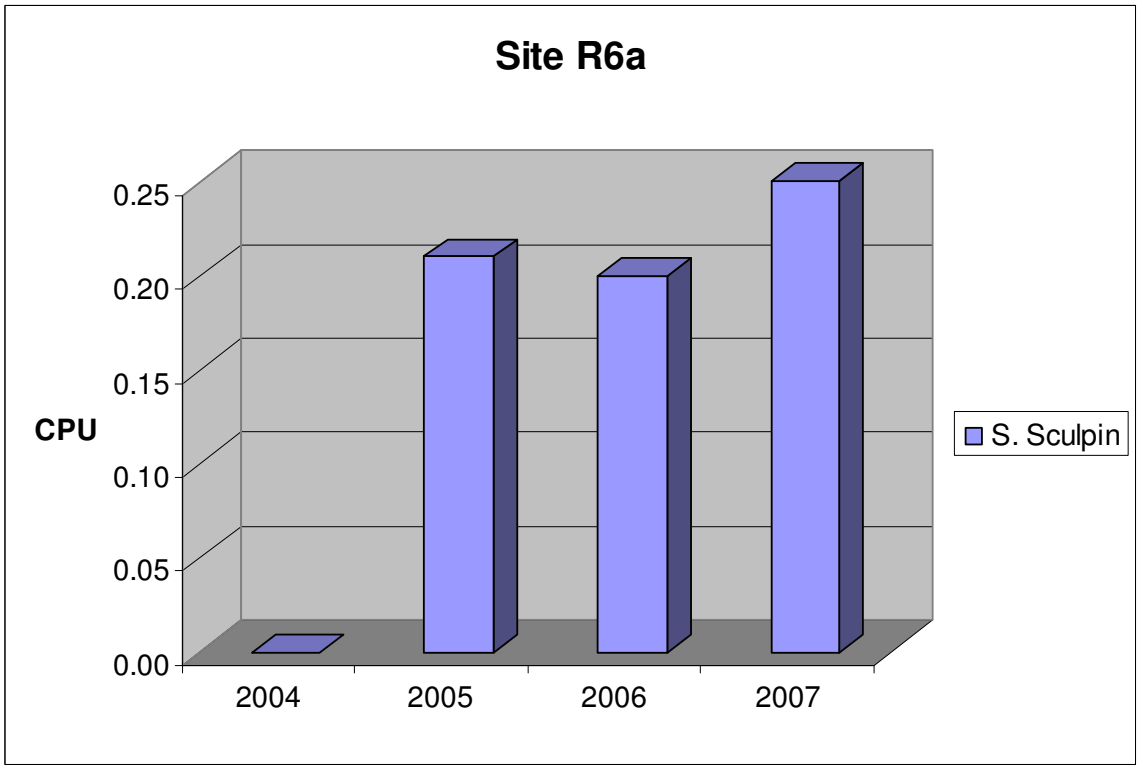

Figure 6: Comparison of minnow trap catches for site R6a, Faro Aquatics sampling program for all years of sampling. No minnow trapping was conducted during 2008.

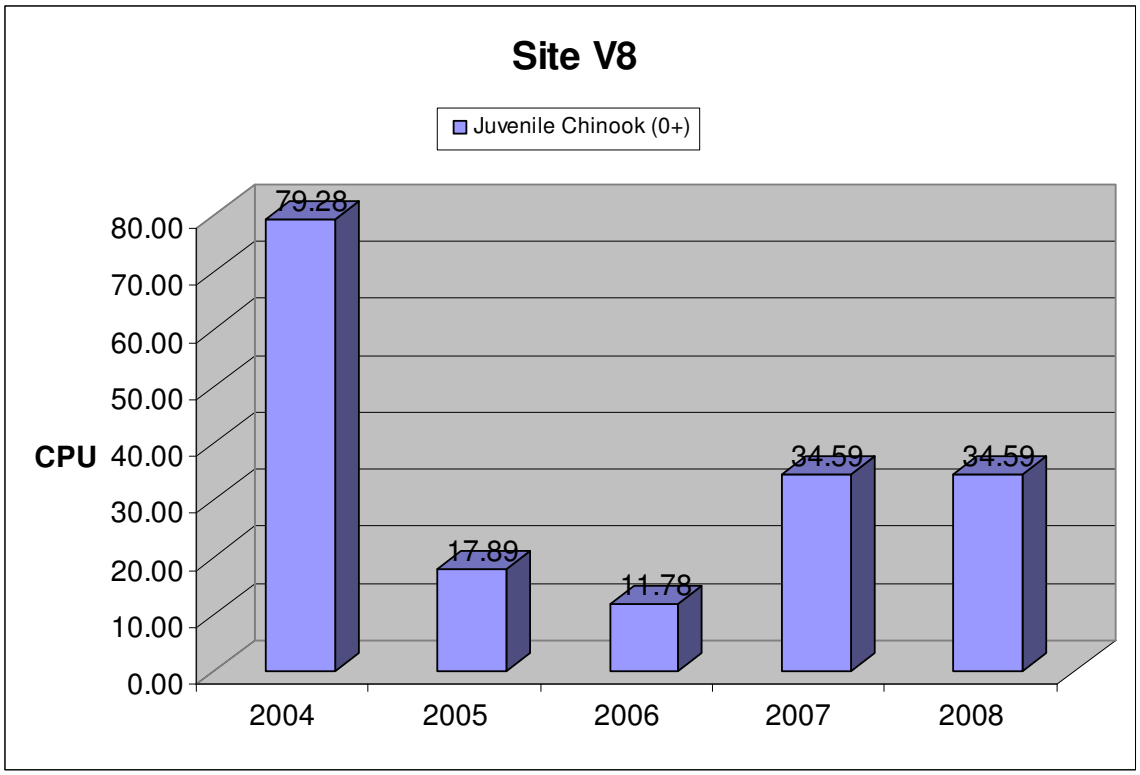

Figure 7: Comparison of minnow trap catches for site V8, Faro Aquatics sampling program for all years of sampling.

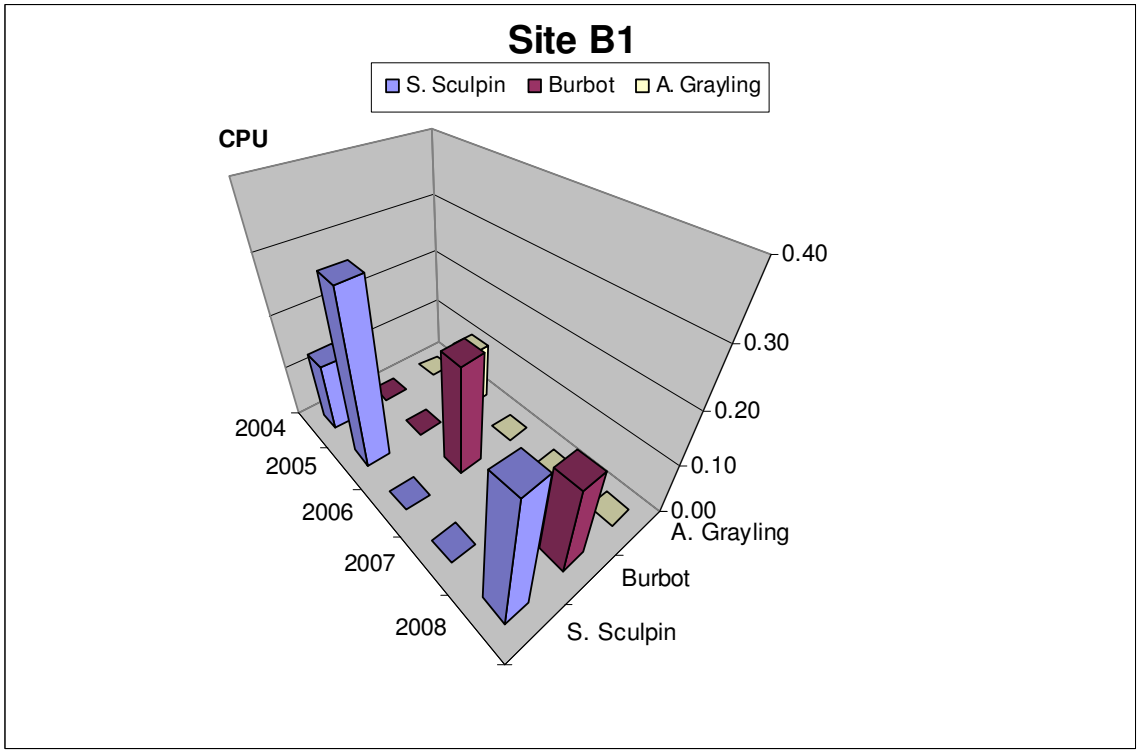

Figure 8: Comparison of minnow trap catches of slimy sculpin, burbot and Arctic grayling for site B1, Faro Aquatics sampling program for all years of sampling.

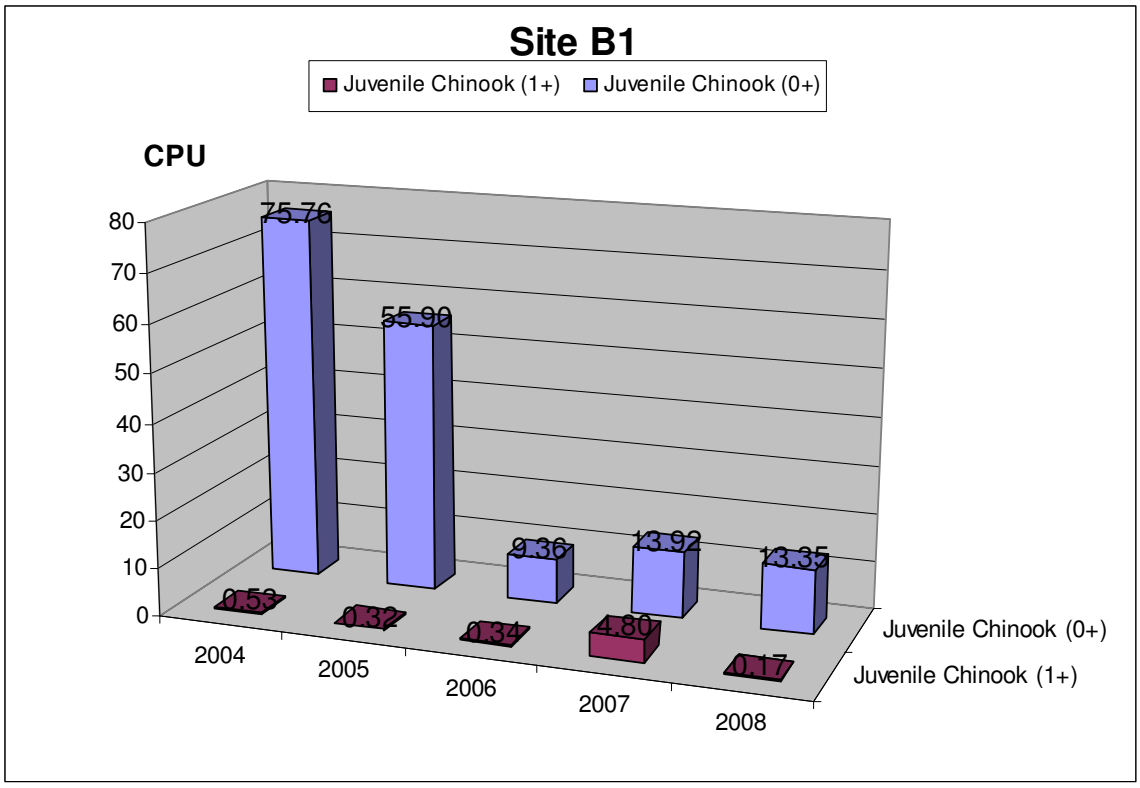

Figure 9: Comparison of chinook salmon minnow trap catches for site B1, Faro Aquatics sampling program for all years of sampling.

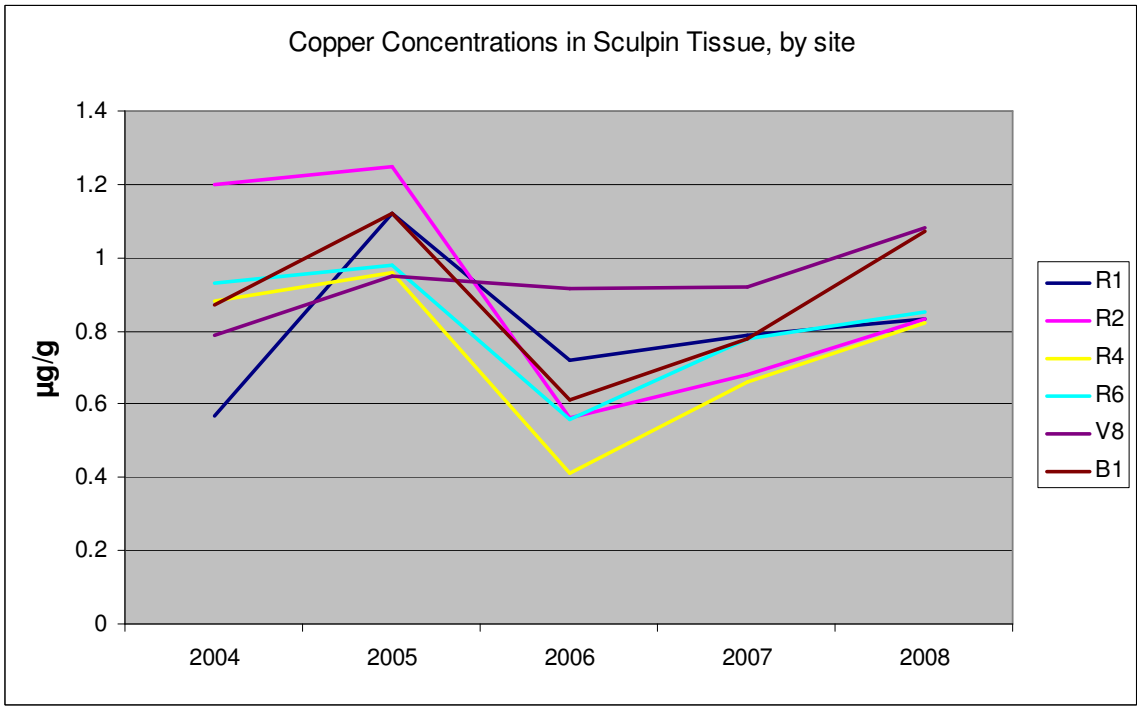

Figure 10: Comparison of copper concentrations in slimy sculpin tissue from all six Faro Aquatics sample stations for 2004 through 2008.

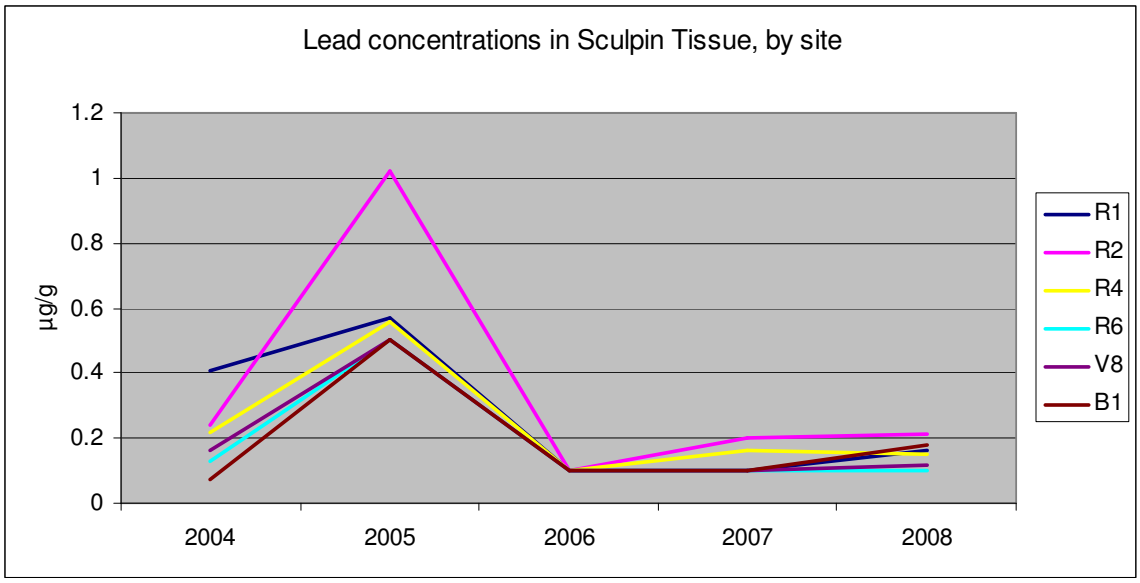

Figure 11: Comparison of lead concentrations in slimy sculpin tissue from all six Faro Aquatics sample stations for 2004 through 2008.

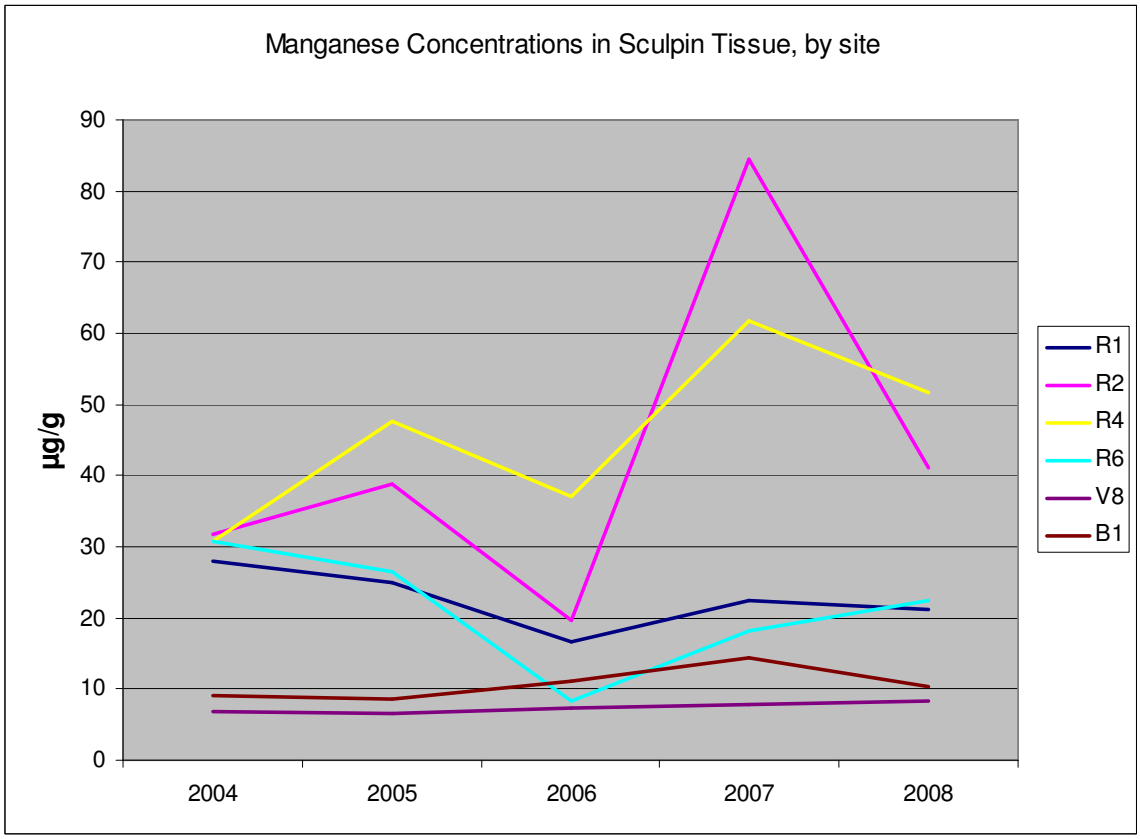

Figure 12: Comparison of manganese concentrations in slimy sculpin tissue from all six Faro Aquatics sample stations for 2004 through 2008.

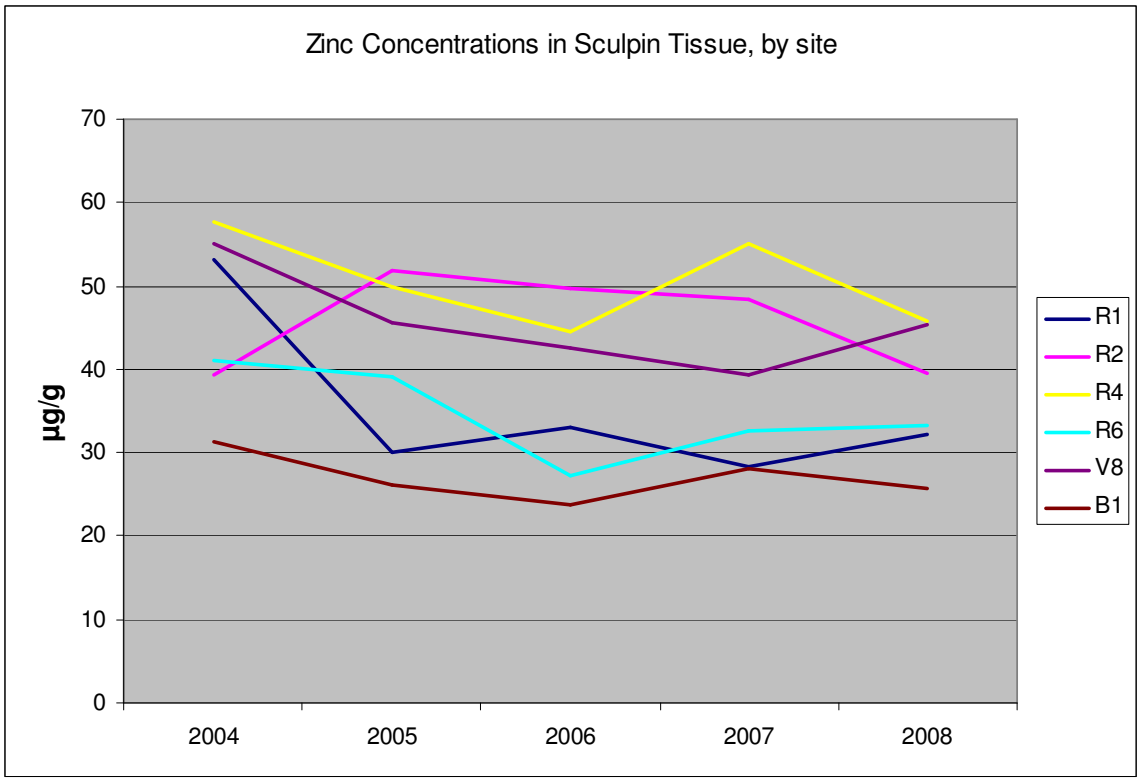

Figure 13: Comparison of zinc in slimy sculpin tissue from all six Faro Aquatics sample stations for 2004 through 2008.

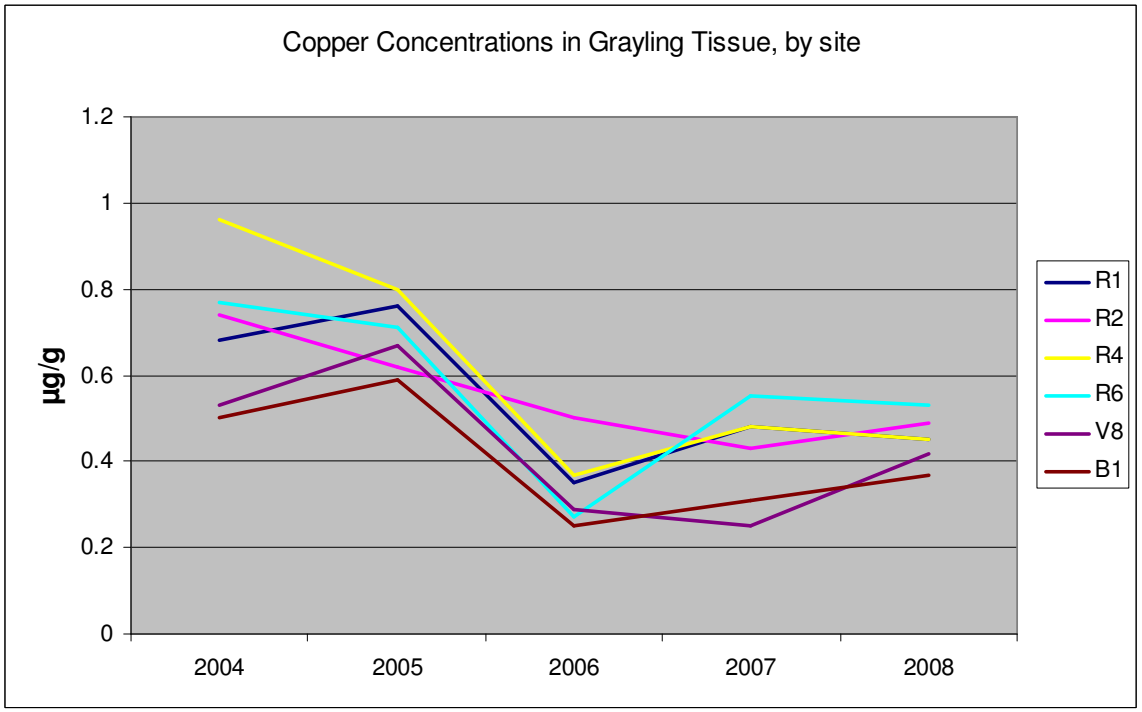

Figure 14: Comparison of copper concentrations in Arctic grayling tissue from all six Faro Aquatics sample stations for 2004 through 2008.

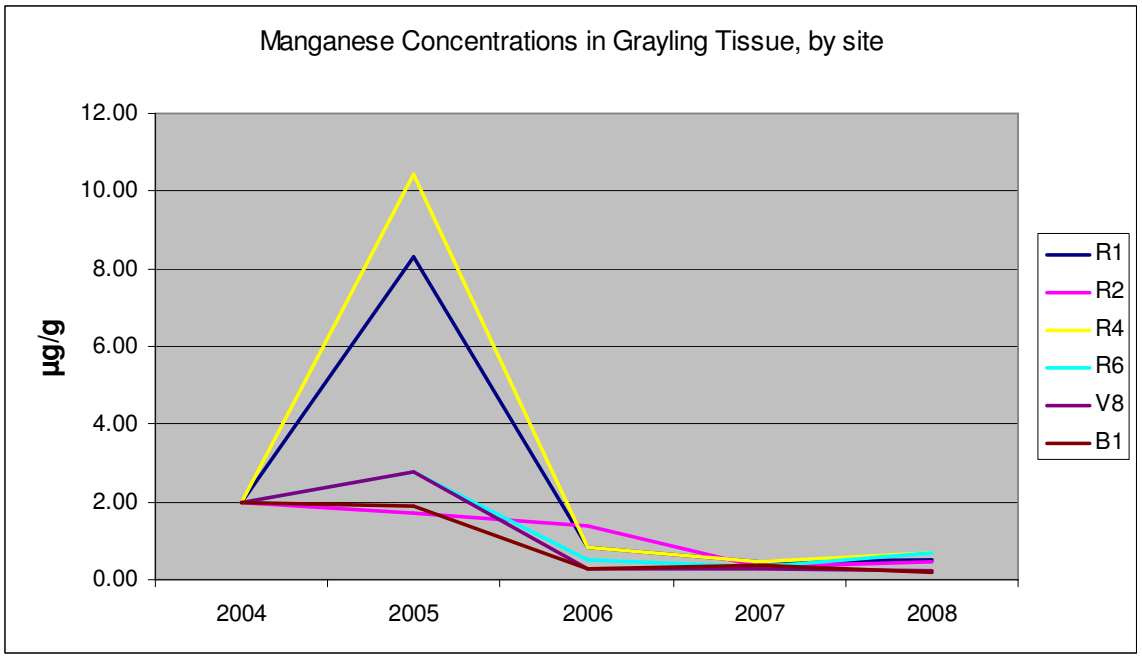

Figure 15: Comparison of manganese concentrations in Arctic grayling tissue from all six Faro Aquatics sample stations for 2004 through 2008.

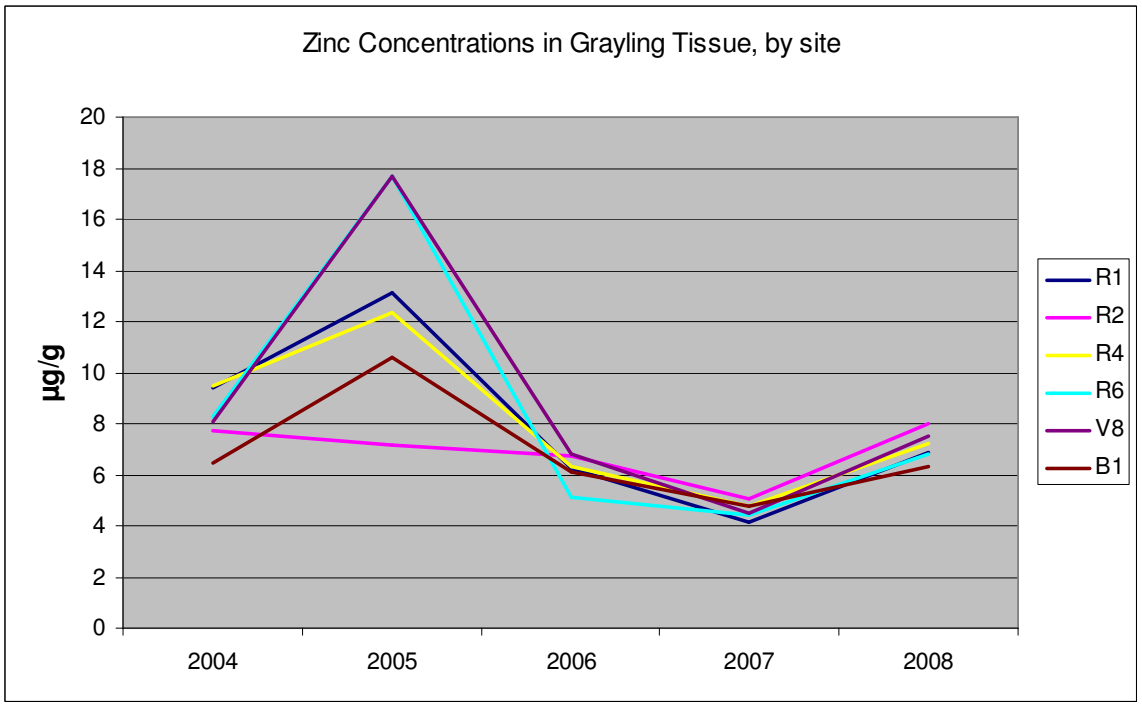

Figure 16: Comparison of zinc concentrations in Arctic grayling tissue from all six Faro Aquatics sample stations for 2004 through 2008.

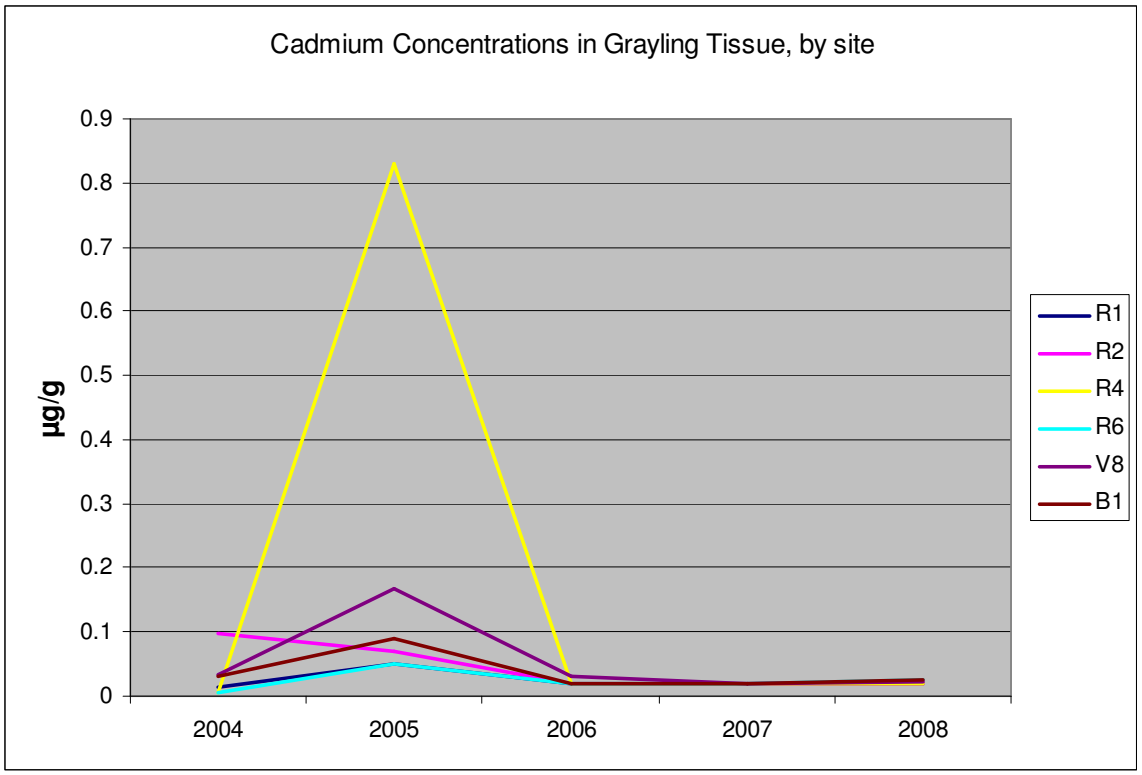

Figure 17: Comparison of cadmium metal concentrations in Arctic grayling tissue from all six Faro Aquatics sample stations for 2004 through 2008.

APPENDIX 1
GENERAL SITE DESCRIPTIONS

SITE: R1 Rose Creek

UTM: Down stream end 05 83 739 E, 69 12 390 N
Site Location: reach starts 10 meters upstream of the confluence of the north and south forks of Rose Creek and extends upstream for 110 meters.
Date Sampled: August 17 and 18, 2004, August 13 and 14, 2005
August 16 and 17, 2006, August 14 and 15, 2007
August 16 and 17, 2008

CHANNEL CHARACTERISTICS:

Surveyed Length:	3000 m
Average Channel Width:	4 meters
Average Wetted Width:	4 meters
Average Depth:	0.4 meters
Average Velocity	1.5 meters per second
% Pool, Riffle, Run / Glide:	65% riffles through boulders, 25% run and 10% small boulder and side pools
Cover	Dominant cover is boulder pools and perched boulders
Overhead vegetation	10% overhanging
Riparian Vegetation	Willow, dwarf birch, cinquefoil, with spruce adjacent

BED MATERIAL:

70% boulder, 20% cobble, 5% gravel, 5% sand with occasional bedrock outcrop in lower part of reach

BANK CHARACTERISTICS: Well defined channel with bedrock confining the channel on the left bank, the right bank has an open flood plain above an abrupt bank rise of 0.4 meters.

CHANNEL MORPHOLOGY CHARACTERISTICS: Uniform channel with a mostly flat bottom, some contour is provided by small pools near submerged bedrock along the left bank and boulders causing small cascades. A small island exists at the top of the reach. Flows within the South Fork of Rose Creek at site R1 in 2008 were similar to those of 2006. A long riffling run that extends approximately 800 meters upstream of the sample station was used as a collection area for angling Arctic grayling; this reach has similar morphology to the sample area although with more small pools and less velocity.

Photo 1: Rose Creek looking upstream at Site R1 from the bottom of the sample reach, 2008. The North Fork of Rose Creek enters on the left of the photo.

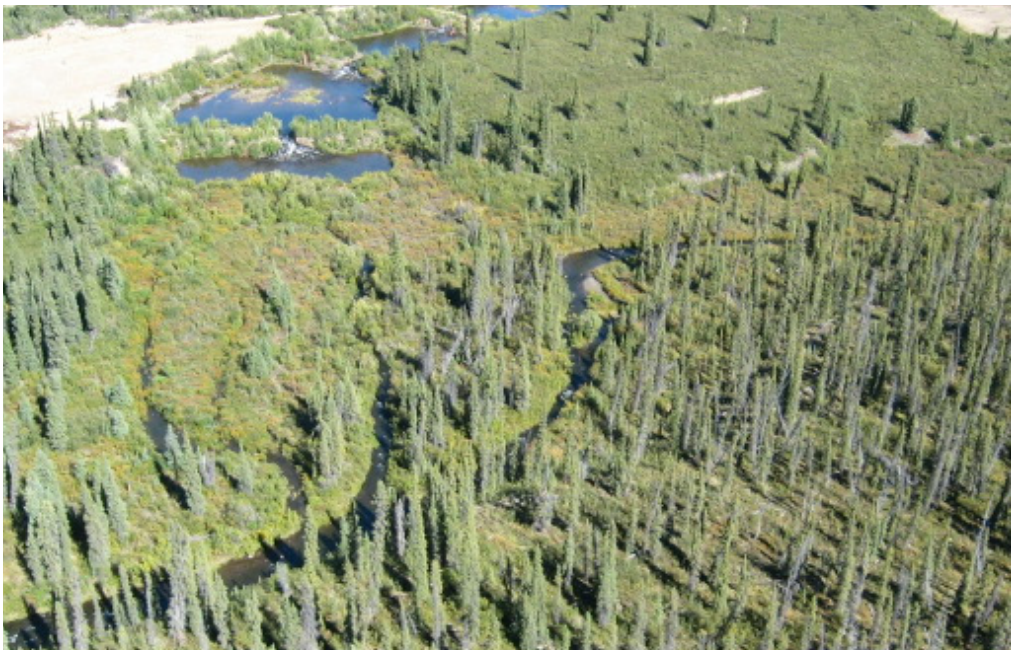

Photo 2: Ariel view of site R1 (on right) and the confluence with North Fork Rose Creek, 2007. The sample reach extends from the confluence to just below the first bend of the creek in the centre of the photo.

SITE: R2 Rose Creek

UTM: down stream end 05 79 401 E, 69 14 972 N
Site Location: reach starts at the confluence of the tailing pond discharge channel with Rose Creek and extends downstream for 110 meters through the mix water zone.
Date Sampled: August 18 and 19, 2004 August 15 and 16, 2005
August 15 and 16, 2006 August 14 and 15, 2007
August 16 and 17, 2008

CHANNEL CHARACTERISTICS:

Surveyed Length:	110 meters
Average Channel Width:	14 meters
Average Wetted Width:	12 meters
Average Depth:	0.7 meters
Average Velocity	0.8 meters per second
% Pool, Riffle, Run / Glide:	30% pool, 30% riffle, 40% glide
Cover	Large woody debri, undercut banks and deep pools
Overhead vegetation	No overhead vegetation
Riparian Vegetation	Willow, dwarf birch and dead spruce

BED MATERIAL:

30% cobble, 50% gravel, 20% sand with sand and gravel increasing in deeper pools and exposed point bars mostly sand and gravel.

BANK CHARACTERISTICS: Sand and gravel point bars opposite of mud cut banks that rise 1.5 to 2.5 meters to an open flood plain.

CHANNEL MORPHOLOGY CHARACTERISTICS: Meandering channel with corner pools, small riffles and point bars adjacent to cut banks. Water levels in 2008 were similar to, 2006 and approximately 0.3 meters lower than the highest flows experienced in 2005.

Photo 3: The tailings pond discharge channel entering Rose Creek at the upstream end of the sample reach site R2 during August, 2008.

Photo 4: Site R2, Rose Creek. The downstream end of the diversion channel flows in to the photo from the right upstream of the out flow of treated water and the sample site. August 2007.

SITE: R4 Rose Creek

UTM: down stream end 05 67 827 E, 69 21 736 N
Site Location: reach starts 80 meters upstream of the confluence of Rose Creek and Anvil Creek and extends upstream for 110 meters.
Date Sampled: August 12, 2004 August 17 and 18, 2005
August 16 and 17, 2006, August 17 and 18, 2007
August 19, 2008

CHANNEL CHARACTERISTICS:

Surveyed Length:	130 meters
Average Channel Width:	20 meters
Average Wetted Width:	14.5 meters
Average Depth:	0.5 meters
Average Velocity	> 1.0 meters per second
% Pool, Riffle, Run / Glide:	60% riffle, 15% boulder pool and 25% run
Cover	Boulder pools and overhead vegetation
Overhead vegetation	20% coverage
Riparian Vegetation	Alder and willow with spruce behind

BED MATERIAL:

5% large boulder, 20% boulder, 30% cobble, 40% gravel, 5% sand.

BANK CHARACTERISTICS: Open flood plain with gentle rise adjacent to well defined stepped banks that rise to a maximum of 2 meters to an open flood plain.

CHANNEL MORPHOLOGY CHARACTERISTICS: Mostly flat channel with one side typically deeper than the opposite side. Some exposed large boulders and a large side pool exists near the bottom of the reach. Water levels in 2008 were slightly higher than those of 2007 and similar to those of 2006.

Photo 5: Rose Creek at site R4 during August of 2008. Water levels are slightly higher than in 2007 and similar to those of 2006.

SITE: R6 Anvil Creek

UTM: down stream end 05 67 917 E, 69 21 804 N
Site Location: reach starts 100 meters upstream of the confluence of Anvil Creek with Rose Creek and extends upstream a further 100 meters.
Date Sampled: August 12, 2004
August 17 and 18, 2005

Anvil Creek just upstream of the confluence with Rose Creek (control site).
This reach is located at and begins 150 meters upstream of the confluence and then extends upstream for 100 meters. This site has not been sampled for fish since 2005 due to impracticalities with flow conditions. Site R6A, 500 meters upstream on Anvil Creek was established in 2006 as an alternate site for fish and benthic collections.

CHANNEL CHARACTERISTICS:

Surveyed Length:	100 meters
Average Channel Width:	15 meters
Average Wetted Width:	14 meters
Average Depth:	0.4 meters
Average Velocity	1.5 meters per second
% Pool, Riffle, Run / Glide:	15% rapid, 45% riffle, 20% run, 20% boulder pool
Cover	Turbulence, perched boulders and cobbles, and limited undercut and cut banks.
Overhead vegetation	< 5% cover
Riparian Vegetation	Willow with a sedge fringe and spruce adjacent

BED MATERIAL:

5% large boulder, 50% small boulder, 30% cobble, 15% sand

BANK CHARACTERISTICS: Well defined and stable banks rise to even 2 meter height on 50% slope.

CHANNEL MORPHOLOGY CHARACTERISTICS: Channel mostly flat but the mid channel areas are elevated with deep flows occurring towards the banks. Water levels in Anvil Creek were 0.5 meters deeper during 2005 investigations than those of 2004 and 0.2 meters higher again in 2006. This site has not been sampled since 2005.

Photo 6: Looking upstream to the top of the sample reach at site R6, from the edge of the confluence with Rose Creek, 2005.

SITE: R6A Anvil Creek

UTM: down stream end 05 68 768 E, 69 21 412 N
Site Location: reach starts 1.35 km by creek channel (800 meters direct) upstream of the confluence of Anvil Creek with Rose Creek and extends upstream a further 100 meters.
Date Sampled: August 16 and 17, 2006 August 17 and 18, 2007
August 19, 2008

Anvil Creek upstream of the confluence with Rose Creek (control site).

CHANNEL CHARACTERISTICS:

Surveyed Length:	130 meters
Average Channel Width:	14 meters
Average Wetted Width:	9 meters
Average Depth:	0.7 meters
Average Velocity	>1 meter per second
% Pool, Riffle, Run / Glide:	10% rapid, 15% riffle, 20% run, 40% race, 15% pool
Cover	Large boulders, pools and LOD and undercut bank.
Crown Closure	< 5% cover
Riparian Vegetation	Alder, spruce, willow mix with grasses, sedge and cinquefoil

BED MATERIAL:

80% small boulder, 15% cobble, 5% gravel, with sand deposits at downstream point bar.

BANK CHARACTERISTICS: Consistent well defined and stable banks rise abruptly 0.7 to 1.0 meter height.

CHANNEL MORPHOLOGY CHARACTERISTICS: The channel is partially entrenched by a small hill on the upper right bank, becomes confined and deep centered before spreading to over 50 meters wide at a small side channel in the lower portion of the reach on the right bank. The reach ends with a shoot rapid entering a deep corner pool with undercut banks.

Photo 7: Reach R6a sample site, flowing right to left. August, 2008. The corner pool in the lower end of the reach is the location used to capture Arctic grayling samples.

SITE: B1 Blind Creek

UTM: down stream end 05 36 680 E, 68 96 005 N
Site Location: reach starts immediately upstream of the bridge and extends upstream for 100 meters; reaches below the bridge have been used for fish sample collections.
Date Sampled: August 14 and 15, 2004 August 19 and 20, 2005
August 18 and 19, 2006 August 17 and 18, 2007
August 19 and 20, 2008

CHANNEL CHARACTERISTICS:

Surveyed Length:	350 meters
Average Channel Width:	15.5 meters
Average Wetted Width:	14 meters
Average Depth:	0.7 meters
Average Velocity	0.4 meters per second
% Pool, Riffle, Run / Glide:	100% glide
Cover	Fine organic debris, cut banks (up to 40%), small woody debris against shore and a beaver lodge
Overhead vegetation	10% cover
Riparian Vegetation	Alder, willow with some spruce, with high bush cranberry, raspberry and cinquefoil adjacent

BED MATERIAL:

Sand silt and organic debris overlaying 60% cobble, 40% gravel.

BANK CHARACTERISTICS: Shallow point bars occur opposite of cut and eroding banks near gentle corners. Cut banks rise between 1 and 2 meters to an open flood plain.

CHANNEL MORPHOLOGY CHARACTERISTICS: Uniform channel with a deep side opposite of a side of deposition. Flows in Blind Creek were slightly higher in 2006 than during 2005 sampling which were very similar to those encountered during 2004.

Photo 8: Collecting minnow traps in Blind Creek near the weir site during August of 2008.

SITE: V8 Vangorda Creek

UTM: down stream end 05 84 790 E, 69 00 606 N
Site Location: reach starts immediately upstream of a small foot bridge that crosses the creek at the site of the town of Faro sewage discharge pipe crossing and extends upstream for 100 meters
Date Sampled: August 14 and 15, 2004 August 17 and 18, 2005
August 17 and 18, 2006 August 15, 16, 17 and 23, 2007
August 17 and 18, 2008

CHANNEL CHARACTERISTICS:

Surveyed Length:	100 meters
Average Channel Width:	6.0 meters
Average Wetted Width:	3.3 meters
Average Depth:	0.5 meters
Average Velocity	1.5 meters per second
% Pool, Riffle, Run / Glide:	80% riffle (almost rapid), 20% eddy and side pools
Cover	Over head vegetation, large and small woody debri, flood washed shrubby vegetation and boulder pools
Overhead vegetation	20% cover
Riparian Vegetation	Alder and willow with occasional spruce and poplar

BED MATERIAL: Exposed substrate consists of 50% boulder, 20% cobble, 15% gravel, 15% sand with occasional bedrock outcrop in upper part of reach. Most substrates loosely consolidated and highly silted. Creek channel was heavily modified by a high water event this season.

BANK CHARACTERISTICS: Well defined channel with newly eroded, but stable, banks that rise gently to a maximum of 2 meters. A small area of bedrock confines the channel on the left bank at the upstream end of the reach.

CHANNEL MORPHOLOGY CHARACTERISTICS: Very little meandering in an entrenched valley, unconsolidated materials from 2004 have been washed out and boulders protrude in most of the channel.

Photo 9: Rock slide at the upstream end of Vangorda Creek site V8 sample site during 2008. The materials that slid are surrounded by mineralized materials visible on the left side of the photo.

Bodycote TESTING GROUP

Report Transmission Cover Page

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID:	**642807**
Approval Status:	Approved
Invoice Frequency:	by Lot
COD Status:	
Control Number:	L009766
Date Received:	Sep 17, 2008
Date Reported:	Sep 29, 2008
Report Number:	1150502

Contact	Company	Address
Paul Sparling	White Mountain Environmental Consulting	PO Box 10140 Whitehorse, YT Y1A 7A1 Phone: (867) 399-7019 Fax: Email: psparling@gmail.com

	Copies	Delivery	Format
M	1	Post	
	1	Email - Single Report	PDF

_____ PAGES IN THIS TRANSMISSION

Notes To Clients:

Reports associated with this Lot

Id/Format/Report Date	Id/Format/Report Date	Id/Format/Report Date

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Sample Custody

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID:	**642807**
Control Number:	L009766
Date Received:	Sep 17, 2008
Date Reported:	Sep 29, 2008
Report Number:	1150502

Sample Disposal Date: October 29, 2008

All samples will be stored until this date unless other instructions are received. Please indicate other requirements below and return this form to the address or fax number on the bottom of this page.

☐ Extend Sample Storage Until _____ (MM/DD/YY)

The following charges apply to extended sample storage:

Storage for 1 to 5 samples per month	$ 10.00
Storage for 6 to 20 samples per month	$ 15.00
Storage for 21 to 50 samples per month	$ 30.00
Storage for 51 to 200 samples per month	$ 60.00
Storage for more than 200 samples per month	$ 110.00

☐ Return Sample, collect, to the address below via:

- ☐ Greyhound
- ☐ Loomis
- ☐ Purolator
- ☐ Other (specify) _____

Name _____

Company _____

Address _____

_____

Phone _____

Fax _____

Signature _____

Bodycote TESTING GROUP

Analytical Report

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID:	**642807**
Control Number:	L009766
Date Received:	Sep 17, 2008
Date Reported:	Sep 29, 2008
Report Number:	1150502

	Reference Number	642807-1	642807-2	642807-3	
	Sample Date	Aug 16, 2008	Aug 16, 2008	Aug 16, 2008	
	Sample Location				
	Sample Description	Site-R1 AG1 / Rose Creek	Site-R1 AG2 / Rose Creek	Site-R1 AG3 / Rose Creek	
	Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	2	1	2	1
Antimony	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.5
Arsenic	Total (wet weight)	ug/g	<0.1	0.1	<0.1	0.2
Barium	Total (wet weight)	ug/g	0.040	0.028	0.042	0.03
Beryllium	Total (wet weight)	ug/g	<0.007	<0.008	<0.008	0.01
Bismuth	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.5
Cadmium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Calcium	Total (wet weight)	ug/g	372	199	429	2
Chromium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.04
Cobalt	Total (wet weight)	ug/g	<0.02	0.05	0.04	0.05
Copper	Total (wet weight)	ug/g	0.47	0.48	0.52	0.05
Iron	Total (wet weight)	ug/g	4.9	5.6	4.2	1
Lead	Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.3
Lithium	Total (wet weight)	ug/g	0.29	0.25	0.27	0.1
Magnesium	Total (wet weight)	ug/g	258	263	253	1
Manganese	Total (wet weight)	ug/g	0.49	0.37	0.37	0.3
Molybdenum	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Nickel	Total (wet weight)	ug/g	0.05	<0.05	<0.05	0.1
Phosphorus	Total (wet weight)	ug/g	2470	2360	2510	0.5
Potassium	Total (wet weight)	ug/g	4510	4480	4590	5
Selenium	Total (wet weight)	ug/g	1.3	0.81	1.1	0.3
Silver	Total (wet weight)	ug/g	<0.07	<0.08	<0.08	0.2
Sodium	Total (wet weight)	ug/g	643	607	669	1
Strontium	Total (wet weight)	ug/g	0.322	0.22	0.372	0.02
Titanium	Total (wet weight)	ug/g	0.02	0.03	<0.02	0.05
Vanadium	Total (wet weight)	ug/g	<0.07	<0.08	0.09	0.1
Zinc	Total (wet weight)	ug/g	5.41	7.20	6.69	0.1
Zirconium	Total (wet weight)	ug/g	<0.02	0.02	<0.02	0.05
Thallium	Total (wet weight)	ug/g	0.70	0.68	0.60	0.3

Bodycote TESTING GROUP

Analytical Report

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID:	**642807**
Control Number:	L009766
Date Received:	Sep 17, 2008
Date Reported:	Sep 29, 2008
Report Number:	1150502

	Reference Number	642807-4	642807-5	642807-6	
	Sample Date	Aug 16, 2008	Aug 16, 2008	Aug 16, 2008	
	Sample Location				
	Sample Description	Site-R1 AG4 / Rose Creek	Site-R1 AG5 / Rose Creek	Site-R2 AG1 / Rose Creek	
	Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	0.8	2	2.9	1
Antimony	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.5
Arsenic	Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.2
Barium	Total (wet weight)	ug/g	0.02	0.090	0.090	0.03
Beryllium	Total (wet weight)	ug/g	<0.008	<0.007	<0.007	0.01
Bismuth	Total (wet weight)	ug/g	<0.2	<0.2	<0.25	0.5
Cadmium	Total (wet weight)	ug/g	<0.02	0.03	<0.02	0.05
Calcium	Total (wet weight)	ug/g	215	400	817	2
Chromium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.04
Cobalt	Total (wet weight)	ug/g	0.04	0.04	0.03	0.05
Copper	Total (wet weight)	ug/g	0.42	0.36	0.43	0.05
Iron	Total (wet weight)	ug/g	3.8	8.5	4.7	1
Lead	Total (wet weight)	ug/g	<0.1	0.1	0.2	0.3
Lithium	Total (wet weight)	ug/g	0.2	0.29	0.33	0.1
Magnesium	Total (wet weight)	ug/g	244	223	272	1
Manganese	Total (wet weight)	ug/g	0.29	1.1	1.0	0.3
Molybdenum	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Nickel	Total (wet weight)	ug/g	0.06	0.2	<0.05	0.1
Phosphorus	Total (wet weight)	ug/g	2280	2200	2600	0.5
Potassium	Total (wet weight)	ug/g	4460	4320	4310	5
Selenium	Total (wet weight)	ug/g	0.91	1.0	1.0	0.3
Silver	Total (wet weight)	ug/g	<0.08	<0.07	<0.07	0.2
Sodium	Total (wet weight)	ug/g	586	726	623	1
Strontium	Total (wet weight)	ug/g	0.18	0.352	0.750	0.02
Titanium	Total (wet weight)	ug/g	0.03	<0.02	<0.02	0.05
Vanadium	Total (wet weight)	ug/g	0.08	<0.07	<0.07	0.1
Zinc	Total (wet weight)	ug/g	7.61	7.58	9.67	0.1
Zirconium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Thallium	Total (wet weight)	ug/g	0.60	0.57	0.62	0.3

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Analytical Report

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID:	**642807**
Control Number:	L009766
Date Received:	Sep 17, 2008
Date Reported:	Sep 29, 2008
Report Number:	1150502

		Reference Number	642807-7	642807-8	642807-9	
		Sample Date	Aug 16, 2008	Aug 16, 2008	Aug 16, 2008	
		Sample Location				
		Sample Description	Site-R2 AG2 / Rose Creek	Site-R2 AG3 / Rose Creek	Site-R2 AG4 / Rose Creek	
		Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	1	1	0.6	1
Antimony	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.5
Arsenic	Total (wet weight)	ug/g	0.2	<0.1	<0.1	0.2
Barium	Total (wet weight)	ug/g	0.01	0.028	0.032	0.03
Beryllium	Total (wet weight)	ug/g	<0.007	<0.008	<0.007	0.01
Bismuth	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.5
Cadmium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Calcium	Total (wet weight)	ug/g	211	166	174	2
Chromium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.04
Cobalt	Total (wet weight)	ug/g	0.06	0.06	0.09	0.05
Copper	Total (wet weight)	ug/g	0.60	0.54	0.47	0.05
Iron	Total (wet weight)	ug/g	5.3	7.6	4.9	1
Lead	Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.3
Lithium	Total (wet weight)	ug/g	0.2	0.2	0.2	0.1
Magnesium	Total (wet weight)	ug/g	252	246	262	1
Manganese	Total (wet weight)	ug/g	0.2	0.29	0.28	0.3
Molybdenum	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Nickel	Total (wet weight)	ug/g	<0.05	<0.05	<0.05	0.1
Phosphorus	Total (wet weight)	ug/g	2280	2280	2340	0.5
Potassium	Total (wet weight)	ug/g	4510	4500	4560	5
Selenium	Total (wet weight)	ug/g	1.0	1.3	1.2	0.3
Silver	Total (wet weight)	ug/g	<0.07	<0.08	<0.07	0.2
Sodium	Total (wet weight)	ug/g	628	658	607	1
Strontium	Total (wet weight)	ug/g	0.16	0.14	0.13	0.02
Titanium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Vanadium	Total (wet weight)	ug/g	0.08	<0.08	<0.07	0.1
Zinc	Total (wet weight)	ug/g	7.84	7.69	7.38	0.1
Zirconium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Thallium	Total (wet weight)	ug/g	0.67	0.62	0.61	0.3

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Analytical Report

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID:	**642807**
Control Number:	L009766
Date Received:	Sep 17, 2008
Date Reported:	Sep 29, 2008
Report Number:	1150502

		Reference Number	642807-10	642807-11	642807-12	
		Sample Date	Aug 16, 2008	Aug 19, 2008	Aug 19, 2008	
		Sample Location				
		Sample Description	Site-R2 AG5 / Rose Creek	Site-R4 AG1 / Rose Creek	Site-R4 AG2 / Rose Creek	
		Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	2	1	1	1
Antimony	Total (wet weight)	ug/g	<0.2	<0.2	0.25	0.5
Arsenic	Total (wet weight)	ug/g	0.2	0.1	<0.1	0.2
Barium	Total (wet weight)	ug/g	0.042	0.052	0.030	0.03
Beryllium	Total (wet weight)	ug/g	<0.008	<0.007	<0.007	0.01
Bismuth	Total (wet weight)	ug/g	0.39	<0.2	<0.2	0.5
Cadmium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Calcium	Total (wet weight)	ug/g	372	224	246	2
Chromium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.04
Cobalt	Total (wet weight)	ug/g	0.04	0.03	0.03	0.05
Copper	Total (wet weight)	ug/g	0.42	0.41	0.43	0.05
Iron	Total (wet weight)	ug/g	3.8	5.8	4.8	1
Lead	Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.3
Lithium	Total (wet weight)	ug/g	0.2	0.2	0.2	0.1
Magnesium	Total (wet weight)	ug/g	264	246	248	1
Manganese	Total (wet weight)	ug/g	0.58	0.73	0.59	0.3
Molybdenum	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Nickel	Total (wet weight)	ug/g	<0.05	0.07	<0.05	0.1
Phosphorus	Total (wet weight)	ug/g	2380	2320	2250	0.5
Potassium	Total (wet weight)	ug/g	4400	4420	4460	5
Selenium	Total (wet weight)	ug/g	1.2	1.2	0.92	0.3
Silver	Total (wet weight)	ug/g	<0.08	<0.07	<0.07	0.2
Sodium	Total (wet weight)	ug/g	590	622	604	1
Strontium	Total (wet weight)	ug/g	0.322	0.18	0.16	0.02
Titanium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Vanadium	Total (wet weight)	ug/g	0.09	<0.07	<0.07	0.1
Zinc	Total (wet weight)	ug/g	7.38	6.50	6.81	0.1
Zirconium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Thallium	Total (wet weight)	ug/g	0.66	0.66	0.64	0.3

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Analytical Report

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID:	**642807**
Control Number:	L009766
Date Received:	Sep 17, 2008
Date Reported:	Sep 29, 2008
Report Number:	1150502

		Reference Number	642807-13	642807-14	642807-15	
		Sample Date	Aug 19, 2008	Aug 19, 2008	Aug 19, 2008	
		Sample Location				
		Sample Description	Site-R4 AG3 / Rose Creek	Site-R4 AG4 / Rose Creek	Site-R4 AG5 / Rose Creek	
		Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	2	2	0.9	1
Antimony	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.5
Arsenic	Total (wet weight)	ug/g	<0.1	<0.1	0.1	0.2
Barium	Total (wet weight)	ug/g	0.058	0.050	0.025	0.03
Beryllium	Total (wet weight)	ug/g	<0.008	<0.007	<0.007	0.01
Bismuth	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.5
Cadmium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Calcium	Total (wet weight)	ug/g	427	533	201	2
Chromium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.04
Cobalt	Total (wet weight)	ug/g	0.04	0.06	0.06	0.05
Copper	Total (wet weight)	ug/g	0.38	0.38	0.65	0.05
Iron	Total (wet weight)	ug/g	5.9	4.2	5.8	1
Lead	Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.3
Lithium	Total (wet weight)	ug/g	0.2	0.2	0.2	0.1
Magnesium	Total (wet weight)	ug/g	241	245	238	1
Manganese	Total (wet weight)	ug/g	0.95	0.73	0.38	0.3
Molybdenum	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Nickel	Total (wet weight)	ug/g	<0.05	<0.05	0.05	0.1
Phosphorus	Total (wet weight)	ug/g	2350	2360	2260	0.5
Potassium	Total (wet weight)	ug/g	4400	4380	4520	5
Selenium	Total (wet weight)	ug/g	0.95	0.98	1.4	0.3
Silver	Total (wet weight)	ug/g	<0.08	<0.07	<0.07	0.2
Sodium	Total (wet weight)	ug/g	646	664	664	1
Strontium	Total (wet weight)	ug/g	0.355	0.389	0.13	0.02
Titanium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Vanadium	Total (wet weight)	ug/g	<0.08	0.08	0.07	0.1
Zinc	Total (wet weight)	ug/g	8.94	6.44	7.59	0.1
Zirconium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Thallium	Total (wet weight)	ug/g	0.64	0.54	0.71	0.3

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Analytical Report

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID:	**642807**
Control Number:	L009766
Date Received:	Sep 17, 2008
Date Reported:	Sep 29, 2008
Report Number:	1150502

		Reference Number	642807-16	642807-17	642807-18	
		Sample Date	Aug 19, 2008	Aug 19, 2008	Aug 19, 2008	
		Sample Location				
		Sample Description	Site-R8 AG1 / Anvil Creek	Site-R8 AG2 / Anvil Creek	Site-R8 AG3 / Anvil Creek	
		Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	1	1	0.6	1
Antimony	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.5
Arsenic	Total (wet weight)	ug/g	0.1	<0.1	<0.1	0.2
Barium	Total (wet weight)	ug/g	0.037	0.027	<0.01	0.03
Beryllium	Total (wet weight)	ug/g	<0.007	<0.007	<0.007	0.01
Bismuth	Total (wet weight)	ug/g	<0.25	<0.2	<0.2	0.5
Cadmium	Total (wet weight)	ug/g	<0.02	<0.02	0.04	0.05
Calcium	Total (wet weight)	ug/g	314	263	166	2
Chromium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.04
Cobalt	Total (wet weight)	ug/g	0.03	0.04	0.04	0.05
Copper	Total (wet weight)	ug/g	0.59	0.56	0.51	0.05
Iron	Total (wet weight)	ug/g	5.3	5.5	4.5	1
Lead	Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.3
Lithium	Total (wet weight)	ug/g	0.2	0.2	0.2	0.1
Magnesium	Total (wet weight)	ug/g	251	247	252	1
Manganese	Total (wet weight)	ug/g	0.46	0.2	0.1	0.3
Molybdenum	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Nickel	Total (wet weight)	ug/g	<0.05	<0.05	0.05	0.1
Phosphorus	Total (wet weight)	ug/g	2410	2250	2290	0.5
Potassium	Total (wet weight)	ug/g	4370	4120	4380	5
Selenium	Total (wet weight)	ug/g	1.0	1.4	1.4	0.3
Silver	Total (wet weight)	ug/g	<0.07	<0.07	<0.07	0.2
Sodium	Total (wet weight)	ug/g	657	621	599	1
Strontium	Total (wet weight)	ug/g	0.22	0.19	0.10	0.02
Titanium	Total (wet weight)	ug/g	<0.02	<0.02	0.02	0.05
Vanadium	Total (wet weight)	ug/g	<0.07	<0.07	<0.07	0.1
Zinc	Total (wet weight)	ug/g	6.64	6.24	6.60	0.1
Zirconium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Thallium	Total (wet weight)	ug/g	0.66	0.67	0.65	0.3

Bodycote TESTING GROUP

Analytical Report

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID:	**642807**
Control Number:	L009766
Date Received:	Sep 17, 2008
Date Reported:	Sep 29, 2008
Report Number:	1150502

		Reference Number	642807-19	642807-20	642807-21	
		Sample Date	Aug 19, 2008	Aug 19, 2008	Aug 19, 2008	
		Sample Location				
		Sample Description	Site-R8 AG4 / Anvil Creek	Site-R8 AG5 / Anvil Creek	Site-V8 AG1 / Vangorda Creek	
		Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	1	2	0.9	1
Antimony	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.5
Arsenic	Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.2
Barium	Total (wet weight)	ug/g	0.047	0.058	0.030	0.03
Beryllium	Total (wet weight)	ug/g	<0.007	<0.008	<0.007	0.01
Bismuth	Total (wet weight)	ug/g	0.27	<0.25	<0.2	0.5
Cadmium	Total (wet weight)	ug/g	<0.02	<0.02	0.04	0.05
Calcium	Total (wet weight)	ug/g	287	487	194	2
Chromium	Total (wet weight)	ug/g	<0.02	<0.02	0.027	0.04
Cobalt	Total (wet weight)	ug/g	<0.02	0.04	0.03	0.05
Copper	Total (wet weight)	ug/g	0.45	0.52	0.46	0.05
Iron	Total (wet weight)	ug/g	5.6	5.3	4.7	1
Lead	Total (wet weight)	ug/g	<0.1	<0.1	0.2	0.3
Lithium	Total (wet weight)	ug/g	0.2	0.2	0.2	0.1
Magnesium	Total (wet weight)	ug/g	231	258	236	1
Manganese	Total (wet weight)	ug/g	0.25	0.2	<0.1	0.3
Molybdenum	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Nickel	Total (wet weight)	ug/g	<0.05	<0.05	<0.05	0.1
Phosphorus	Total (wet weight)	ug/g	2270	2500	2150	0.5
Potassium	Total (wet weight)	ug/g	4440	4350	4400	5
Selenium	Total (wet weight)	ug/g	1.3	1.2	1.7	0.3
Silver	Total (wet weight)	ug/g	<0.07	<0.08	<0.07	0.2
Sodium	Total (wet weight)	ug/g	666	617	708	1
Strontium	Total (wet weight)	ug/g	0.22	0.408	0.14	0.02
Titanium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Vanadium	Total (wet weight)	ug/g	<0.07	<0.08	0.1	0.1
Zinc	Total (wet weight)	ug/g	7.77	6.68	6.79	0.1
Zirconium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Thallium	Total (wet weight)	ug/g	0.59	0.66	0.62	0.3

Bodycote TESTING GROUP

Analytical Report

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID:	**642807**
Control Number:	L009766
Date Received:	Sep 17, 2008
Date Reported:	Sep 29, 2008
Report Number:	1150502

		Reference Number	642807-22	642807-23	642807-24
		Sample Date	Aug 19, 2008	Aug 19, 2008	Aug 19, 2008
		Sample Location			
		Sample Description	Site-V8 AG2 / Vangorda Creek	Site-V8 AG3 / Vangorda Creek	Site-V8 AG4 / Vangorda Creek
		Matrix	Tissue	Tissue	Tissue
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	1	2	0.9	1
Antimony	Total (wet weight)	ug/g	0.30	0.35	0.29	0.5
Arsenic	Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.2
Barium	Total (wet weight)	ug/g	0.02	0.080	0.02	0.03
Beryllium	Total (wet weight)	ug/g	<0.007	<0.008	<0.007	0.01
Bismuth	Total (wet weight)	ug/g	<0.2	<0.25	<0.2	0.5
Cadmium	Total (wet weight)	ug/g	<0.02	0.04	<0.02	0.05
Calcium	Total (wet weight)	ug/g	248	672	202	2
Chromium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.04
Cobalt	Total (wet weight)	ug/g	0.04	<0.02	<0.02	0.05
Copper	Total (wet weight)	ug/g	0.39	0.36	0.46	0.05
Iron	Total (wet weight)	ug/g	4.1	5.4	4.9	1
Lead	Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.3
Lithium	Total (wet weight)	ug/g	0.2	0.2	0.2	0.1
Magnesium	Total (wet weight)	ug/g	259	253	231	1
Manganese	Total (wet weight)	ug/g	0.1	0.30	0.1	0.3
Molybdenum	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Nickel	Total (wet weight)	ug/g	0.07	<0.05	0.06	0.1
Phosphorus	Total (wet weight)	ug/g	2260	2440	2140	0.5
Potassium	Total (wet weight)	ug/g	4540	4420	4300	5
Selenium	Total (wet weight)	ug/g	1.6	1.6	1.0	0.3
Silver	Total (wet weight)	ug/g	<0.07	<0.08	<0.07	0.2
Sodium	Total (wet weight)	ug/g	608	716	669	1
Strontium	Total (wet weight)	ug/g	0.19	0.566	0.17	0.02
Titanium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Vanadium	Total (wet weight)	ug/g	0.08	<0.08	<0.07	0.1
Zinc	Total (wet weight)	ug/g	8.32	7.19	7.22	0.1
Zirconium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Thallium	Total (wet weight)	ug/g	0.63	0.78	0.64	0.3

Bodycote TESTING GROUP

Analytical Report

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID:	**642807**
Control Number:	L009766
Date Received:	Sep 17, 2008
Date Reported:	Sep 29, 2008
Report Number:	1150502

		Reference Number	642807-25	642807-26	642807-27	
		Sample Date	Aug 19, 2008	Aug 20, 2008	Aug 20, 2008	
		Sample Location				
		Sample Description	Site-V8 AG5 / Vangorda Creek	Site-B1 AG1 / Blind Creek	Site-B1 AG2 / Blind Creek	
		Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	1	2	0.7	1
Antimony	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.5
Arsenic	Total (wet weight)	ug/g	<0.1	0.26	<0.1	0.2
Barium	Total (wet weight)	ug/g	0.02	0.095	0.01	0.03
Beryllium	Total (wet weight)	ug/g	<0.007	<0.008	<0.007	0.01
Bismuth	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.5
Cadmium	Total (wet weight)	ug/g	<0.02	<0.02	0.04	0.05
Calcium	Total (wet weight)	ug/g	202	491	156	2
Chromium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.04
Cobalt	Total (wet weight)	ug/g	0.05	<0.02	0.03	0.05
Copper	Total (wet weight)	ug/g	0.44	0.37	0.47	0.05
Iron	Total (wet weight)	ug/g	5.3	8.0	4.3	1
Lead	Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.3
Lithium	Total (wet weight)	ug/g	0.2	0.2	0.2	0.1
Magnesium	Total (wet weight)	ug/g	226	217	246	1
Manganese	Total (wet weight)	ug/g	<0.1	0.28	<0.1	0.3
Molybdenum	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Nickel	Total (wet weight)	ug/g	<0.05	<0.05	<0.05	0.1
Phosphorus	Total (wet weight)	ug/g	2010	2210	2200	0.5
Potassium	Total (wet weight)	ug/g	4340	4110	4540	5
Selenium	Total (wet weight)	ug/g	1.6	0.84	1.5	0.3
Silver	Total (wet weight)	ug/g	<0.07	<0.08	<0.07	0.2
Sodium	Total (wet weight)	ug/g	640	818	650	1
Strontium	Total (wet weight)	ug/g	0.14	0.415	0.12	0.02
Titanium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Vanadium	Total (wet weight)	ug/g	<0.07	<0.08	<0.07	0.1
Zinc	Total (wet weight)	ug/g	8.05	8.11	6.83	0.1
Zirconium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Thallium	Total (wet weight)	ug/g	0.71	0.48	0.51	0.3

Bodycote TESTING GROUP

Analytical Report

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID:	**642807**
Control Number:	L009766
Date Received:	Sep 17, 2008
Date Reported:	Sep 29, 2008
Report Number:	1150502

		Reference Number	642807-28	642807-29	642807-30	
		Sample Date	Aug 20, 2008	Aug 20, 2008	Aug 20, 2008	
		Sample Location				
		Sample Description	Site-B1 AG3 / Blind Creek	Site-B1 AG4 / Blind Creek	Site-B1 AG5 / Blind Creek	
		Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	1	1	0.5	1
Antimony	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.5
Arsenic	Total (wet weight)	ug/g	<0.1	<0.1	0.1	0.2
Barium	Total (wet weight)	ug/g	0.028	0.030	<0.01	0.03
Beryllium	Total (wet weight)	ug/g	<0.008	<0.008	<0.007	0.01
Bismuth	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.5
Cadmium	Total (wet weight)	ug/g	<0.02	<0.02	0.04	0.05
Calcium	Total (wet weight)	ug/g	285	208	138	2
Chromium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.04
Cobalt	Total (wet weight)	ug/g	0.03	0.03	0.02	0.05
Copper	Total (wet weight)	ug/g	0.33	0.36	0.32	0.05
Iron	Total (wet weight)	ug/g	3.8	5.7	4.9	1
Lead	Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.3
Lithium	Total (wet weight)	ug/g	0.2	0.2	0.2	0.1
Magnesium	Total (wet weight)	ug/g	264	252	256	1
Manganese	Total (wet weight)	ug/g	0.2	0.2	0.1	0.3
Molybdenum	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Nickel	Total (wet weight)	ug/g	<0.05	<0.05	<0.05	0.1
Phosphorus	Total (wet weight)	ug/g	2250	2310	2280	0.5
Potassium	Total (wet weight)	ug/g	4390	4620	4440	5
Selenium	Total (wet weight)	ug/g	1.4	1.2	1.0	0.3
Silver	Total (wet weight)	ug/g	<0.08	<0.08	<0.07	0.2
Sodium	Total (wet weight)	ug/g	638	650	671	1
Strontium	Total (wet weight)	ug/g	0.23	0.16	0.097	0.02
Titanium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Vanadium	Total (wet weight)	ug/g	<0.08	<0.08	0.1	0.1
Zinc	Total (wet weight)	ug/g	7.35	4.80	4.66	0.1
Zirconium	Total (wet weight)	ug/g	<0.02	0.02	<0.02	0.05
Thallium	Total (wet weight)	ug/g	0.61	0.56	0.53	0.3

Bodycote TESTING GROUP

Analytical Report

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID:	**642807**
Control Number:	L009766
Date Received:	Sep 17, 2008
Date Reported:	Sep 29, 2008
Report Number:	1150502

		Reference Number	642807-31	642807-32	642807-33	
		Sample Date	Aug 20, 2008	Aug 20, 2008	Aug 20, 2008	
		Sample Location				
		Sample Description	Site-R1 SS1 / Rose Creek	Site-R1 SS2 / Rose Creek	Site-R1 SS3 / Rose Creek	
		Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	18	21	29.2	1
Antimony	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.5
Arsenic	Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.2
Barium	Total (wet weight)	ug/g	2.22	2.79	3.19	0.03
Beryllium	Total (wet weight)	ug/g	<0.008	<0.008	<0.007	0.01
Bismuth	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.5
Cadmium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Calcium	Total (wet weight)	ug/g	9850	9790	9600	2
Chromium	Total (wet weight)	ug/g	0.02	0.035	0.042	0.04
Cobalt	Total (wet weight)	ug/g	0.06	0.05	0.06	0.05
Copper	Total (wet weight)	ug/g	0.86	0.83	0.81	0.05
Iron	Total (wet weight)	ug/g	37.6	38.7	60.8	1
Lead	Total (wet weight)	ug/g	0.2	0.1	0.1	0.3
Lithium	Total (wet weight)	ug/g	1.8	1.8	1.8	0.1
Magnesium	Total (wet weight)	ug/g	316	310	301	1
Manganese	Total (wet weight)	ug/g	18.3	24.3	18.3	0.3
Molybdenum	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Nickel	Total (wet weight)	ug/g	0.32	0.2	0.30	0.1
Phosphorus	Total (wet weight)	ug/g	6520	6560	6000	0.5
Potassium	Total (wet weight)	ug/g	2820	2940	2860	5
Selenium	Total (wet weight)	ug/g	0.94	0.93	0.84	0.3
Silver	Total (wet weight)	ug/g	<0.08	<0.08	<0.07	0.2
Sodium	Total (wet weight)	ug/g	1040	1030	1040	1
Strontium	Total (wet weight)	ug/g	14.4	13.9	13.7	0.02
Titanium	Total (wet weight)	ug/g	0.31	0.41	0.76	0.05
Vanadium	Total (wet weight)	ug/g	0.2	0.1	0.07	0.1
Zinc	Total (wet weight)	ug/g	29.1	25.6	30.8	0.1
Zirconium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Thallium	Total (wet weight)	ug/g	0.63	0.58	0.58	0.3

Bodycote TESTING GROUP

Analytical Report

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID:	**642807**
Control Number:	L009766
Date Received:	Sep 17, 2008
Date Reported:	Sep 29, 2008
Report Number:	1150502

		Reference Number	642807-34	642807-35	642807-36	
		Sample Date	Aug 20, 2008	Aug 20, 2008	Aug 18, 2008	
		Sample Location				
		Sample Description	Site-R1 SS4 / Rose Creek	Site-R1 SS5 / Rose Creek	Site-R2 SS1 / Rose Creek	
		Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	17	16	19	1
Antimony	Total (wet weight)	ug/g	<0.2	0.27	<0.2	0.5
Arsenic	Total (wet weight)	ug/g	0.2	<0.1	<0.1	0.2
Barium	Total (wet weight)	ug/g	3.81	2.64	2.26	0.03
Beryllium	Total (wet weight)	ug/g	<0.007	<0.007	<0.007	0.01
Bismuth	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.5
Cadmium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Calcium	Total (wet weight)	ug/g	12300	9910	11800	2
Chromium	Total (wet weight)	ug/g	<0.02	0.030	0.032	0.04
Cobalt	Total (wet weight)	ug/g	0.03	0.03	0.1	0.05
Copper	Total (wet weight)	ug/g	0.82	0.82	0.68	0.05
Iron	Total (wet weight)	ug/g	37.9	31.8	57.9	1
Lead	Total (wet weight)	ug/g	0.2	0.2	0.2	0.3
Lithium	Total (wet weight)	ug/g	2.2	1.8	2.1	0.1
Magnesium	Total (wet weight)	ug/g	329	336	330	1
Manganese	Total (wet weight)	ug/g	27.5	17.9	62.4	0.3
Molybdenum	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Nickel	Total (wet weight)	ug/g	0.2	0.52	0.39	0.1
Phosphorus	Total (wet weight)	ug/g	7500	6620	7460	0.5
Potassium	Total (wet weight)	ug/g	2730	2970	2930	5
Selenium	Total (wet weight)	ug/g	0.83	0.88	1.4	0.3
Silver	Total (wet weight)	ug/g	<0.07	<0.07	<0.07	0.2
Sodium	Total (wet weight)	ug/g	1030	986	1120	1
Strontium	Total (wet weight)	ug/g	18.2	14.3	11.1	0.02
Titanium	Total (wet weight)	ug/g	0.39	0.40	0.40	0.05
Vanadium	Total (wet weight)	ug/g	<0.07	<0.07	0.2	0.1
Zinc	Total (wet weight)	ug/g	40.0	35.2	40.6	0.1
Zirconium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Thallium	Total (wet weight)	ug/g	0.56	0.63	0.63	0.3

Bodycote TESTING GROUP

Analytical Report

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID: **642807**
Control Number: L009766
Date Received: Sep 17, 2008
Date Reported: Sep 29, 2008
Report Number: 1150502

Reference Number			642807-37	642807-38	642807-39
Sample Date			Aug 18, 2008	Aug 18, 2008	Aug 18, 2008
Sample Location					
Sample Description			Site-R2 SS2 / Rose Creek	Site-R2 SS3 / Rose Creek	Site-R2 SS4 / Rose Creek
Matrix			Tissue	Tissue	Tissue
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	34.4	262	12	1
Antimony	Total (wet weight)	ug/g	0.29	<0.2	<0.2	0.5
Arsenic	Total (wet weight)	ug/g	0.2	0.2	<0.1	0.2
Barium	Total (wet weight)	ug/g	2.10	3.32	1.62	0.03
Beryllium	Total (wet weight)	ug/g	<0.007	0.008	<0.007	0.01
Bismuth	Total (wet weight)	ug/g	<0.2	<0.2	<0.25	0.5
Cadmium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Calcium	Total (wet weight)	ug/g	13400	9280	9890	2
Chromium	Total (wet weight)	ug/g	0.072	0.812	<0.02	0.04
Cobalt	Total (wet weight)	ug/g	0.05	0.30	0.04	0.05
Copper	Total (wet weight)	ug/g	0.78	1.3	0.89	0.05
Iron	Total (wet weight)	ug/g	66.8	444	34.6	1
Lead	Total (wet weight)	ug/g	<0.1	0.59	<0.1	0.3
Lithium	Total (wet weight)	ug/g	2.5	2.1	1.8	0.1
Magnesium	Total (wet weight)	ug/g	366	433	313	1
Manganese	Total (wet weight)	ug/g	41.2	45.2	34.0	0.3
Molybdenum	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Nickel	Total (wet weight)	ug/g	0.43	1.3	0.63	0.1
Phosphorus	Total (wet weight)	ug/g	7960	5890	6370	0.5
Potassium	Total (wet weight)	ug/g	2920	2910	2750	5
Selenium	Total (wet weight)	ug/g	0.73	0.74	0.94	0.3
Silver	Total (wet weight)	ug/g	<0.07	<0.08	<0.07	0.2
Sodium	Total (wet weight)	ug/g	1160	1030	1120	1
Strontium	Total (wet weight)	ug/g	11.7	7.75	9.31	0.02
Titanium	Total (wet weight)	ug/g	0.92	7.98	0.2	0.05
Vanadium	Total (wet weight)	ug/g	0.38	0.85	0.2	0.1
Zinc	Total (wet weight)	ug/g	41.2	31.0	48.2	0.1
Zirconium	Total (wet weight)	ug/g	<0.02	0.1	<0.02	0.05
Thallium	Total (wet weight)	ug/g	0.56	0.62	0.56	0.3

Bodycote TESTING GROUP

Analytical Report

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID:	**642807**
Control Number:	L009766
Date Received:	Sep 17, 2008
Date Reported:	Sep 29, 2008
Report Number:	1150502

		Reference Number	642807-40	642807-41	642807-42	
		Sample Date	Aug 18, 2008	Aug 19, 2008	Aug 19, 2008	
		Sample Location				
		Sample Description	Site-R2 SS5 / Rose Creek	Site-R4 SS1 / Rose Creek	Site-R4 SS2 / Rose Creek	
		Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	8.4	11	11	1
Antimony	Total (wet weight)	ug/g	0.28	0.27	0.27	0.5
Arsenic	Total (wet weight)	ug/g	<0.1	0.2	<0.1	0.2
Barium	Total (wet weight)	ug/g	1.57	3.96	3.91	0.03
Beryllium	Total (wet weight)	ug/g	<0.007	<0.007	<0.007	0.01
Bismuth	Total (wet weight)	ug/g	<0.25	<0.2	<0.2	0.5
Cadmium	Total (wet weight)	ug/g	<0.02	0.04	<0.02	0.05
Calcium	Total (wet weight)	ug/g	12500	16800	17800	2
Chromium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.04
Cobalt	Total (wet weight)	ug/g	0.03	0.06	0.06	0.05
Copper	Total (wet weight)	ug/g	0.51	0.85	0.74	0.05
Iron	Total (wet weight)	ug/g	12	29.2	23	1
Lead	Total (wet weight)	ug/g	0.1	<0.1	0.2	0.3
Lithium	Total (wet weight)	ug/g	2.3	2.70	2.83	0.1
Magnesium	Total (wet weight)	ug/g	333	383	387	1
Manganese	Total (wet weight)	ug/g	22.3	30.1	63.4	0.3
Molybdenum	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Nickel	Total (wet weight)	ug/g	0.2	0.31	0.42	0.1
Phosphorus	Total (wet weight)	ug/g	7700	8830	8890	0.5
Potassium	Total (wet weight)	ug/g	2690	2850	2880	5
Selenium	Total (wet weight)	ug/g	0.96	1.1	0.72	0.3
Silver	Total (wet weight)	ug/g	<0.07	<0.07	<0.07	0.2
Sodium	Total (wet weight)	ug/g	1120	1190	1150	1
Strontium	Total (wet weight)	ug/g	12.6	12.3	17.4	0.02
Titanium	Total (wet weight)	ug/g	0.06	0.2	0.2	0.05
Vanadium	Total (wet weight)	ug/g	0.2	0.2	0.1	0.1
Zinc	Total (wet weight)	ug/g	36.3	47.4	50.5	0.1
Zirconium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Thallium	Total (wet weight)	ug/g	0.54	0.46	0.63	0.3

Bodycote TESTING GROUP

Analytical Report

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID:	**642807**
Control Number:	L009766
Date Received:	Sep 17, 2008
Date Reported:	Sep 29, 2008
Report Number:	1150502

		Reference Number	642807-43	642807-44	642807-45	
		Sample Date	Aug 19, 2008	Aug 19, 2008	Aug 19, 2008	
		Sample Location				
		Sample Description	Site-R4 SS3 / Rose Creek	Site-R4 SS4 / Rose Creek	Site-R4 SS5 / Rose Creek	
		Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	10	15	15	1
Antimony	Total (wet weight)	ug/g	0.30	<0.2	<0.2	0.5
Arsenic	Total (wet weight)	ug/g	0.1	<0.1	<0.1	0.2
Barium	Total (wet weight)	ug/g	2.53	4.54	3.12	0.03
Beryllium	Total (wet weight)	ug/g	<0.008	<0.008	<0.007	0.01
Bismuth	Total (wet weight)	ug/g	<0.2	<0.25	<0.2	0.5
Cadmium	Total (wet weight)	ug/g	<0.02	0.04	<0.02	0.05
Calcium	Total (wet weight)	ug/g	9620	14000	12600	2
Chromium	Total (wet weight)	ug/g	0.02	0.02	<0.02	0.04
Cobalt	Total (wet weight)	ug/g	<0.02	0.07	0.08	0.05
Copper	Total (wet weight)	ug/g	0.98	0.84	0.70	0.05
Iron	Total (wet weight)	ug/g	16	31.3	25.7	1
Lead	Total (wet weight)	ug/g	<0.1	0.2	0.2	0.3
Lithium	Total (wet weight)	ug/g	1.8	2.62	2.3	0.1
Magnesium	Total (wet weight)	ug/g	292	355	353	1
Manganese	Total (wet weight)	ug/g	28.0	66.2	71.0	0.3
Molybdenum	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Nickel	Total (wet weight)	ug/g	0.33	0.42	0.2	0.1
Phosphorus	Total (wet weight)	ug/g	6210	8110	7870	0.5
Potassium	Total (wet weight)	ug/g	2590	2820	2800	5
Selenium	Total (wet weight)	ug/g	1.1	0.82	0.78	0.3
Silver	Total (wet weight)	ug/g	<0.08	<0.08	<0.07	0.2
Sodium	Total (wet weight)	ug/g	1050	1160	1040	1
Strontium	Total (wet weight)	ug/g	8.93	14.6	12.4	0.02
Titanium	Total (wet weight)	ug/g	0.2	0.30	0.34	0.05
Vanadium	Total (wet weight)	ug/g	0.08	0.1	0.1	0.1
Zinc	Total (wet weight)	ug/g	35.7	56.2	39.4	0.1
Zirconium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Thallium	Total (wet weight)	ug/g	0.56	0.61	0.60	0.3

Bodycote TESTING GROUP

Analytical Report

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID: **642807**
Control Number: L009766
Date Received: Sep 17, 2008
Date Reported: Sep 29, 2008
Report Number: 1150502

Reference Number	642807-46	642807-47	642807-48
Sample Date	Aug 19, 2008	Aug 19, 2008	Aug 19, 2008
Sample Location			
Sample Description	Site-R8 SS1 / Anvil Creek	Site-R8 SS2 / Anvil Creek	Site-R8 SS3 / Anvil Creek
Matrix	Tissue	Tissue	Tissue

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	34.5	11	17	1
Antimony	Total (wet weight)	ug/g	0.29	<0.2	<0.2	0.5
Arsenic	Total (wet weight)	ug/g	<0.1	0.1	0.1	0.2
Barium	Total (wet weight)	ug/g	3.36	4.24	3.37	0.03
Beryllium	Total (wet weight)	ug/g	<0.007	<0.007	<0.007	0.01
Bismuth	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.5
Cadmium	Total (wet weight)	ug/g	<0.02	0.04	0.06	0.05
Calcium	Total (wet weight)	ug/g	12700	18200	12500	2
Chromium	Total (wet weight)	ug/g	0.11	<0.02	0.030	0.04
Cobalt	Total (wet weight)	ug/g	0.05	0.05	0.03	0.05
Copper	Total (wet weight)	ug/g	0.84	0.80	1.0	0.05
Iron	Total (wet weight)	ug/g	47.5	22	36.9	1
Lead	Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.3
Lithium	Total (wet weight)	ug/g	2.4	3.09	2.3	0.1
Magnesium	Total (wet weight)	ug/g	367	390	362	1
Manganese	Total (wet weight)	ug/g	23.2	32.0	13.4	0.3
Molybdenum	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Nickel	Total (wet weight)	ug/g	0.33	0.28	0.25	0.1
Phosphorus	Total (wet weight)	ug/g	7820	9620	7950	0.5
Potassium	Total (wet weight)	ug/g	2650	2730	2800	5
Selenium	Total (wet weight)	ug/g	1.0	1.0	1.2	0.3
Silver	Total (wet weight)	ug/g	<0.07	<0.07	<0.07	0.2
Sodium	Total (wet weight)	ug/g	1080	1220	1020	1
Strontium	Total (wet weight)	ug/g	10.8	12.5	10.7	0.02
Titanium	Total (wet weight)	ug/g	1.1	0.2	0.61	0.05
Vanadium	Total (wet weight)	ug/g	0.2	0.2	0.2	0.1
Zinc	Total (wet weight)	ug/g	34.6	38.8	28.6	0.1
Zirconium	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Thallium	Total (wet weight)	ug/g	0.49	0.44	0.60	0.3

Bodycote TESTING GROUP

Analytical Report

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID:	**642807**
Control Number:	L009766
Date Received:	Sep 17, 2008
Date Reported:	Sep 29, 2008
Report Number:	1150502

		Reference Number	642807-49	642807-50	642807-51	
		Sample Date	Aug 19, 2008	Aug 19, 2008	Aug 19, 2008	
		Sample Location				
		Sample Description	Site-R8 SS4 / Anvil Creek	Site-R8 SS5 / Anvil Creek	Site-V8 SS1 / Vangorda Creek	
		Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	28.4	16	64.2	1
Antimony	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.5
Arsenic	Total (wet weight)	ug/g	<0.1	0.1	0.1	0.2
Barium	Total (wet weight)	ug/g	3.29	2.76	3.33	0.03
Beryllium	Total (wet weight)	ug/g	<0.007	<0.007	<0.008	0.01
Bismuth	Total (wet weight)	ug/g	<0.25	<0.2	<0.2	0.5
Cadmium	Total (wet weight)	ug/g	0.03	0.04	0.1	0.05
Calcium	Total (wet weight)	ug/g	12400	11300	13800	2
Chromium	Total (wet weight)	ug/g	0.052	0.027	0.17	0.04
Cobalt	Total (wet weight)	ug/g	0.06	0.03	0.08	0.05
Copper	Total (wet weight)	ug/g	0.77	0.86	1.0	0.05
Iron	Total (wet weight)	ug/g	54.3	26.7	102	1
Lead	Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.3
Lithium	Total (wet weight)	ug/g	2.2	2.0	2.59	0.1
Magnesium	Total (wet weight)	ug/g	353	348	410	1
Manganese	Total (wet weight)	ug/g	27.6	16.2	8.34	0.3
Molybdenum	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Nickel	Total (wet weight)	ug/g	0.43	0.31	0.60	0.1
Phosphorus	Total (wet weight)	ug/g	7450	7280	8220	0.5
Potassium	Total (wet weight)	ug/g	2820	2860	2920	5
Selenium	Total (wet weight)	ug/g	1.2	1.2	1.7	0.3
Silver	Total (wet weight)	ug/g	<0.07	<0.07	<0.08	0.2
Sodium	Total (wet weight)	ug/g	1120	1090	1220	1
Strontium	Total (wet weight)	ug/g	10.2	9.04	15.5	0.02
Titanium	Total (wet weight)	ug/g	0.51	0.33	1.7	0.05
Vanadium	Total (wet weight)	ug/g	0.30	0.1	0.30	0.1
Zinc	Total (wet weight)	ug/g	35.6	28.3	37.9	0.1
Zirconium	Total (wet weight)	ug/g	0.03	<0.02	0.04	0.05
Thallium	Total (wet weight)	ug/g	0.50	0.59	0.59	0.3

Bodycote TESTING GROUP

Analytical Report

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID:	**642807**
Control Number:	L009766
Date Received:	Sep 17, 2008
Date Reported:	Sep 29, 2008
Report Number:	1150502

		Reference Number	642807-52	642807-53	642807-54
		Sample Date	Aug 19, 2008	Aug 19, 2008	Aug 19, 2008
		Sample Location			
		Sample Description	Site-V8 SS2 / Vangorda Creek	Site-V8 SS3 / Vangorda Creek	Site-V8 SS4 / Vangorda Creek
		Matrix	Tissue	Tissue	Tissue
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	54.7	85.6	41.3	1
Antimony	Total (wet weight)	ug/g	<0.2	<0.2	0.36	0.5
Arsenic	Total (wet weight)	ug/g	<0.1	0.1	<0.1	0.2
Barium	Total (wet weight)	ug/g	3.72	3.10	2.83	0.03
Beryllium	Total (wet weight)	ug/g	<0.007	<0.007	<0.007	0.01
Bismuth	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.5
Cadmium	Total (wet weight)	ug/g	0.35	0.1	0.1	0.05
Calcium	Total (wet weight)	ug/g	13600	12300	11600	2
Chromium	Total (wet weight)	ug/g	0.18	0.332	0.096	0.04
Cobalt	Total (wet weight)	ug/g	0.08	0.09	0.06	0.05
Copper	Total (wet weight)	ug/g	1.1	1.2	1.3	0.05
Iron	Total (wet weight)	ug/g	90.2	118	62.5	1
Lead	Total (wet weight)	ug/g	0.2	<0.1	0.1	0.3
Lithium	Total (wet weight)	ug/g	2.57	2.3	2.1	0.1
Magnesium	Total (wet weight)	ug/g	476	404	360	1
Manganese	Total (wet weight)	ug/g	9.62	9.16	6.62	0.3
Molybdenum	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Nickel	Total (wet weight)	ug/g	3.58	5.16	1.4	0.1
Phosphorus	Total (wet weight)	ug/g	7840	7520	7280	0.5
Potassium	Total (wet weight)	ug/g	2770	2840	2950	5
Selenium	Total (wet weight)	ug/g	1.5	1.4	1.5	0.3
Silver	Total (wet weight)	ug/g	<0.07	<0.07	<0.07	0.2
Sodium	Total (wet weight)	ug/g	1220	1110	1110	1
Strontium	Total (wet weight)	ug/g	14.9	14.2	13.0	0.02
Titanium	Total (wet weight)	ug/g	1.3	3.63	1.0	0.05
Vanadium	Total (wet weight)	ug/g	0.29	0.36	0.27	0.1
Zinc	Total (wet weight)	ug/g	56.2	39.8	39.4	0.1
Zirconium	Total (wet weight)	ug/g	0.06	0.05	<0.02	0.05
Thallium	Total (wet weight)	ug/g	0.56	0.50	0.55	0.3

Bodycote TESTING GROUP

Analytical Report

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID:	**642807**
Control Number:	L009766
Date Received:	Sep 17, 2008
Date Reported:	Sep 29, 2008
Report Number:	1150502

		Reference Number	642807-55	642807-56	642807-57	
		Sample Date	Aug 19, 2008	Aug 20, 2008	Aug 20, 2008	
		Sample Location				
		Sample Description	Site-V8 SS5 / Vangorda Creek	Site-B1 SS1 / Blind Creek	Site-B1 SS2 / Blind Creek	
		Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	38.3	27.6	36.9	1
Antimony	Total (wet weight)	ug/g	0.30	<0.2	<0.2	0.5
Arsenic	Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.2
Barium	Total (wet weight)	ug/g	3.35	5.54	3.78	0.03
Beryllium	Total (wet weight)	ug/g	<0.007	<0.007	<0.007	0.01
Bismuth	Total (wet weight)	ug/g	<0.25	<0.2	<0.2	0.5
Cadmium	Total (wet weight)	ug/g	0.2	0.1	0.2	0.05
Calcium	Total (wet weight)	ug/g	14400	12500	10500	2
Chromium	Total (wet weight)	ug/g	0.11	0.22	0.084	0.04
Cobalt	Total (wet weight)	ug/g	0.05	0.05	0.07	0.05
Copper	Total (wet weight)	ug/g	0.80	0.77	0.82	0.05
Iron	Total (wet weight)	ug/g	65.0	40.2	65.7	1
Lead	Total (wet weight)	ug/g	0.2	0.2	0.2	0.3
Lithium	Total (wet weight)	ug/g	2.63	2.3	2.0	0.1
Magnesium	Total (wet weight)	ug/g	389	355	345	1
Manganese	Total (wet weight)	ug/g	7.75	8.73	9.02	0.3
Molybdenum	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Nickel	Total (wet weight)	ug/g	0.57	0.2	0.27	0.1
Phosphorus	Total (wet weight)	ug/g	8330	7360	6690	0.5
Potassium	Total (wet weight)	ug/g	2790	2600	2910	5
Selenium	Total (wet weight)	ug/g	1.6	1.2	1.5	0.3
Silver	Total (wet weight)	ug/g	<0.07	<0.07	<0.07	0.2
Sodium	Total (wet weight)	ug/g	1210	1130	1190	1
Strontium	Total (wet weight)	ug/g	15.8	16.7	13.1	0.02
Titanium	Total (wet weight)	ug/g	1.1	0.73	1.1	0.05
Vanadium	Total (wet weight)	ug/g	0.2	0.2	0.2	0.1
Zinc	Total (wet weight)	ug/g	53.5	24.2	26.6	0.1
Zirconium	Total (wet weight)	ug/g	<0.02	<0.02	0.03	0.05
Thallium	Total (wet weight)	ug/g	0.50	0.49	0.56	0.3

Bodycote TESTING GROUP

Analytical Report

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID:	**642807**
Control Number:	L009766
Date Received:	Sep 17, 2008
Date Reported:	Sep 29, 2008
Report Number:	1150502

		Reference Number	642807-58	642807-59	642807-60	
		Sample Date	Aug 20, 2008	Aug 20, 2008	Aug 20, 2008	
		Sample Location				
		Sample Description	Site-B1 SS3 / Blind Creek	Site-B1 SS4 / Blind Creek	Site-B1 SS5 / Blind Creek	
		Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	21	33.2	41.8	1
Antimony	Total (wet weight)	ug/g	<0.2	<0.2	0.26	0.5
Arsenic	Total (wet weight)	ug/g	0.2	0.2	<0.1	0.2
Barium	Total (wet weight)	ug/g	5.70	7.14	4.82	0.03
Beryllium	Total (wet weight)	ug/g	<0.007	<0.007	<0.007	0.01
Bismuth	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.5
Cadmium	Total (wet weight)	ug/g	0.05	0.07	0.06	0.05
Calcium	Total (wet weight)	ug/g	13500	12600	10300	2
Chromium	Total (wet weight)	ug/g	0.035	0.047	0.087	0.04
Cobalt	Total (wet weight)	ug/g	0.05	0.04	0.05	0.05
Copper	Total (wet weight)	ug/g	1.9	1.0	0.86	0.05
Iron	Total (wet weight)	ug/g	36.6	57.5	65.4	1
Lead	Total (wet weight)	ug/g	<0.1	0.2	0.2	0.3
Lithium	Total (wet weight)	ug/g	2.50	2.3	1.9	0.1
Magnesium	Total (wet weight)	ug/g	354	383	374	1
Manganese	Total (wet weight)	ug/g	10.5	14.2	9.30	0.3
Molybdenum	Total (wet weight)	ug/g	<0.02	<0.02	<0.02	0.05
Nickel	Total (wet weight)	ug/g	3.47	1.1	0.59	0.1
Phosphorus	Total (wet weight)	ug/g	7980	7570	6390	0.5
Potassium	Total (wet weight)	ug/g	2840	2890	3470	5
Selenium	Total (wet weight)	ug/g	1.2	1.4	1.3	0.3
Silver	Total (wet weight)	ug/g	<0.07	<0.07	<0.07	0.2
Sodium	Total (wet weight)	ug/g	1190	1120	987	1
Strontium	Total (wet weight)	ug/g	18.2	17.5	13.9	0.02
Titanium	Total (wet weight)	ug/g	0.46	1.0	1.5	0.05
Vanadium	Total (wet weight)	ug/g	0.1	0.2	0.2	0.1
Zinc	Total (wet weight)	ug/g	29.5	26.4	21.7	0.1
Zirconium	Total (wet weight)	ug/g	<0.02	0.03	0.04	0.05
Thallium	Total (wet weight)	ug/g	0.48	0.43	0.41	0.3

Approved by:

Andrew Garrard, BSc
Operations Manager

Bodycote TESTING GROUP

Methodology and Notes

Bill To:	White Mountain Environmental	Project:	
Report To:	White Mountain Environmental	ID:	Faro Aquatics
	PO Box 10140	Name:	
	Whitehorse, YT, Canada	Location:	
	Y1A 7A1	LSD:	
Attn:	Paul Sparling	P.O.:	
Sampled By:		Acct code:	
Company:			

Lot ID:	**642807**
Control Number:	L009766
Date Received:	Sep 17, 2008
Date Reported:	Sep 29, 2008
Report Number:	1150502

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Metals (Total) wet weight	US EPA	*	Metals & Trace Elements by ICP-AES, 6010B	25-Sep-08	BTG Surrey

** Bodycote method(s) based on reference method*

References

US EPA US Environmental Protection Agency Test Methods

Comments:

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.
The test report shall not be reproduced except in full, without the written approval of the laboratory.

Faro Aquatics 2008 Metal Sample Data sheet

	Fork Lgth	Rnd Wt	Sex/Mat	Stomach	contents
Site R-1 Rose Creek		Slimy Sculpin			
range 61 to 93 mm, 2.6 to 9.9 gms					
ss#1	93	9.9			
ss#2	82	5.6			
ss#3	81	5.6			
ss#4	75,61	5.0, 2.6			
ss#5	69, 66	3.6, 3.0			
Site R-1 Rose Creek		Arctic Grayling			
range=291 to341 mm, 254 to 419 gms					
ag#1	341	419	M7	F=20	12 terr ins, 8 cad
ag#2	312	332	M7	F=20	15 cad, 4 ter ins, 1 stone fly
ag#3	291	254	F1	F=20	15 cad, 3 salmon eggs, 1 ant, tr ter ins
ag#4	294	267	F1	F=10	8 cad, 2 ter ins
ag#5	316	273	F1	F=10	4 cad, 5 ter ins, 1 ant
				total 80	
cad = 62.5%, ter ins= 30%. Salm eggs=3.8%, ants=2.5%					
Site R-2 Rose Creek		Slimy Sculpin			
range 91 to102 mm, 8.1 to 13.2 gms					
ss#1	101	13.2			
ss#2	102	10.3			
ss#3	93	8.6			
ss#4	91	8.1			
ss#5	96	9.8			
Site R-2 Rose Creek Arctic grayling					
range 306 to 364 mm, 330 to 480 gms					
ag#1	335	480	F2	F=20	16 cad, 2 ter ins, 1 ant, 1 red worm
ag#2	306	330	M7	F=15	15 cad
ag#3	364	438	M7	F=20	19 cad, 1 ant
ag#4	325	333	F2	F=20	10 cad, 2 ant, 8 ter ins, tr red worm
ag#5	328	359	F1	F=20	10 cad, 10 ter ins, tr ant
				total 95	
cad=73.7%, terestrial insects=21.1%, ants= 4.2%, red worm= 1.1%					
Site R-4 Rose Creek Slimy Sculpin					
range 65 to 89 mm, 3.2 to 7.2 gms					
ss#1	89	7.1			
ss#2	88	7.2			
ss#3	75,65	5.3, 3.2			
ss#4	85	6.5			
ss#5	76,75	5.5, 4.5			
Site R-4 Rose Creek Arctic grayling					
range 285 to 337 mm, 233 to 417 gms					
ag#1	337	417	M7	F=10	6 cad, 3 ter ins, 1 benthic
ag#2	297	292	F2	F=10	8 cad, 2 ter ins, tr benthic
ag#3	312	297	F2	F=10	9 cad, 1 ter ins

ag#4	308	280	M6	F=15	10 cad, 5 ter ins
ag#5	285	233	F1	F=10	8 cad, 1 ter in, 1 benthic
				total 55	

caddis fly=74.5%, ter ins= 21.8%, benthic= 3.6%

Site R6a Anvil Creek Slimy Sculpin

range 86 to 108 mm, 7.0 to 11.6 gms

ss#1	95	9.3
ss#2	91	8.3
ss#3	76,65	5.1,2.6
ss#4	83, 65	5.7, 2.8
ss#5	72,71	4.4, 4.0

Site R-6a Anvil Creek Arctic grayling

range 285 to 351 mm, 245 to 509 gms

ag#1	347	484	F2	F=20	15 cad, 4 ter ins, 1 benthic
ag#2	318	367	F2	F=15	15 cad
ag#3	285	245	F2	F=20	18 cad, 2 benthic
ag#4	318	337	M7	F=20	15 cad, 3 ter ins, 2 benthic
ag#5	351	509	M7	F=15	15 cad
				total 90	

caddis fly=86.7%, ter ins= 7.8%, Benthic=5.5%

Site V-8 Vangorda Creek Slimy Sculpin

range 57 to 69 mm, 2.0 to 4.0 gms

ss#1	69,62	3.2,2.7
ss#2	61,62	4.0, 2.5
ss#3	63,59	2.8, 2.5
ss#4	66,60	3.4,2.1
ss#5	57,68,60	2.0,2.1,2.0

Site V-8 Vangorda Creek Arctic grayling

range 286 to 322 mm, 219 to 324 gms

ag#1	318	324	M7	F=10	10 cad
ag#2	295	258	F2	F=5	2 cad, 2 ants, 1 terr ins
ag#3	321	296	F2	F=15	9 cad, 5 stone fly, 1 btl
ag#4	322	312	M7	F=15	7 cad, 4 spr btl, 3 gr catpil, 1 ant
ag#5	286	219	M7	F=15	10 cad, 5 ter ins
				Total 60	

caddis fly =63.3%, terr. Insects= 23.3%, ants=5%, btls 8.3%

Site B-1 Blind Creek Slimy Sculpin

range 55 to 71mm, 1.8 to 4.2 gms

ss#1	71,61	4.2,2.4
ss#2	68,59	3.6, 2.0
ss#3	72,57	4.0,1.8
ss#4	68,63	3.4,2.6
ss#5	66,57,55	3.2,1.8,1.8

Site B-1 Blind Creek Arctic grayling

range 272 to 342 mm, 204 to 396 gms

ag#1	320	299	F2	F=10	9 cad, 1 ter ins

ag#2	318	323	M7	F=15	10 ss, 4 cad, 1 ter ins
ag#3	323	358	F2	F=5	5 cad
ag#4	314	330	M7	F=15	15 cad
ag#5	328	398	F2	F=20	15 salm egg, 5 gravel
				total 65	

salmon eggs=23.1%, caddis fly=50.8%, slimy sculpin=15.4%, ter ins= 3.1%, gravel 7.7%

2008: Faro Aquatic Effects Minnow Trapping Catch Records

						Catch					CPU	CPU	CPU	CPU	CPU
	date set	date lift	time set	time lift	soak time	s. sculpin	A.grayling	burbot	jcs	JCS +1	s. sculpin	A.grayling	burbot	jcs	JCS +1
Location: R4 Rose Creek confluence with Anvil Creek															
Trap # 1	no traps set at R4 in 2008														
Trap # 2															
Trap # 3															
Trap # 4															
Trap # 5															
Trap # 6															
Trap # 7															
Trap # 8															
Trap # 9															
										Average	#DIV/0!	#DIV/0!			

						Catch					CPU	CPU	CPU	CPU	CPU
	date set	date lift	time set	time lift	soak time	s. sculpin	A.grayling	burbot	jcs	JCS +1	s. sculpin	A.grayling	burbot	jcs	JCS +1
Location: R6a Anvil Creek															
Trap # 1	no traps set at R8 during 2008														
Trap # 2															
Trap # 3															
Trap # 4															
Trap # 5															
Trap # 6															
Trap # 7															
Trap # 8															
Trap # 9															
										Average	#DIV/0!				

											CPU	CPU	CPU	CPU	CPU
	date set	date lift	time set	time lift	soak time	s. sculpin	A.grayling	burbot	jcs	JCS +1	s. sculpin	A.grayling	burbot	jcs	JCS +1
Location: V8 Vangorda Creek															
Trap #1	17/08	18/08	19:45	16:10	20.35	0			3					3.54	
Trap #2	17/08	18/08	19:45	16:10	20.35	0			0					0.00	
Trap #3	17/08	18/08	19:45	16:15	20.5	0			0					0.00	
Trap #4	17/08	18/08	19:50	16:15	20.35	0			0					0.00	
Trap #5	17/08	18/08	19:55	16:25	20.5	0			0					0.00	
Trap #6	17/08	18/08	19:55	16:25	20.5	0			2					1.17	
Trap #7	17/08	18/08	20:00	16:25	20.35	0			0					0.00	
Trap #8	17/08	18/08	20:00	16:30	20.5	0			0					0.00	
Trap #9	17/08	18/08	20:10	16:40	20.5	0			0					0.00	
									0.555556	Average				0.52	

											CPU	CPU	CPU	CPU	CPU
	date set	date lift	time set	time lift	soak time	s. sculpin	A.grayling	burbot	jcs	JCS +1	s. sculpin	A.grayling	burbot	jcs	JCS +1
Location: V8 Vangorda Creek: Additional traps set for slimy sculpin d/stream of bridge															
Trap #1	17/08	18/08	20:30	17:25	21:36				1					1.15	
Trap #2	17/08	18/08	20:30	17:20	21:36				12					13.78	
Trap #3	17/08	18/08	20:35	17:25	21:36				4					4.59	
Trap #4	17/08	18/08	20:40	17:20	21:36				4					4.59	
Trap #5	17/08	18/08	20:45	17:15	21:36				7					8.05	
Trap #6	17/08	18/08	20:50	17:05	21:36				17					19.55	
Trap #7	17/08	18/08	21:00	17:00	21:36				5					5.75	
									7.142857	Average				8.21	
									50						

											CPU	CPU	CPU	CPU	CPU
	date set	date lift	time set	time lift	soak time	s. sculpin	A.grayling	burbot	jcs	JCS +1	s. sculpin	A.grayling	burbot	jcs	JCS +1
Location: R1															
Trap # 1	16/08	17/08	14:55	10:00	19.10	0	0				0.00	0.00			
Trap # 2	16/08	17/08	14:55	10:05	19.20	0	0				0.00	0.00			
Trap # 3	16/08	17/08	15:00	10:05	19.10	0	0				0.00	0.00			
Trap # 4	16/08	17/08	15:05	10:15	19.20	0	0				0.00	0.00			
Trap # 5	16/08	17/08	15:10	10:20	19.20	0	0				0.00	0.00			
Trap # 6	16/08	17/08	15:15	10:30	19.25	0	0				0.00	0.00			
Trap # 7	16/08	17/08	15:20	10:40	19.50	0	0				0.00	0.00			
Trap # 8	16/08	17/08	15:20	10:40	19.35	0	0				0.00	0.00			
Trap # 9	16/08	17/08	15:25	10:45	19.35	0	0				0.00	0.00			
										Average	0.00	0.00	0.00	0.00	0.00

											CPU	CPU	CPU	CPU	CPU
	date set	date lift	time set	time lift	soak time	s. sculpin	A.grayling	burbot	jcs	JCS +1	s. sculpin	A.grayling	burbot	jcs	JCS +1
Location: R2															
Trap #1	16/08	17/08	11:00	17:00	30.00	0	0	0			0.00	0.00	0.00		
Trap #2	16/08	17/08	11:05	17:00	29.90	0	0	0			0.00	0.00	0.00		
Trap #3	16/08	17/08	11:15	17:05	29.80	0	0	1			0.00	0.00	0.81		
Trap #4	16/08	17/08	11:20	17:05	29.75	1	0	0			0.81	0.00	0.00		
Trap #5	16/08	17/08	11:25	16:45	29.65	0	1	0			0.00	0.81	0.00		
Trap #6	16/08	17/08	11:30	16:45	29.25	0	0	0			0.00	0.00	0.00		
Trap #7	16/08	17/08	11:35	16:50	29.45	0	0	0			0.00	0.00	0.00		
Trap #8	16/08	17/08	11:40	16:55	29.45	0	0	0			0.00	0.00	0.00		
Trap #9	16/08	17/08	11:50	16:55	29.10	0	0	0		Average	0.10	0.10	0.10		

											CPU	CPU	CPU	CPU	CPU
	date set	date lift	time set	time lift	soak time	s. sculpin	A.grayling	burbot	jcs	JCS +1	s. sculpin	A.grayling	burbot	jcs	JCS +1
Location: Blind Creek															
Trap #1	19/08	20/08	19:30	11:20	15.8	0		0	3	0	0.00		0.00	4.56	0.00
Trap #2	19/08	20/08	19:30	11:20	15.8	1		0	3	0	1.52		0.00	4.56	0.00
Trap #3	19/08	20/08	19:30	lost		0		0	0	0	0.00		0.00	0.00	0.00
Trap #4	19/08	20/08	19:30	11:20	15.8	0		0	4	0	0.00		0.00	6.08	0.00
Trap #5	19/08	20/08	19:30	11:20	15.8	0		0	0	0	0.00		0.00	0.00	0.00
Trap #6	19/08	20/08	19:30	11:20	15.8	0		0	7	0	0.00		0.00	10.63	0.00
Trap #7	19/08	20/08	19:35	11:35	16	0		0	6	0	0.00		0.00	9.00	0.00
Trap #8	19/08	20/08	19:40	11:40	16	0		0	25	0	0.00		0.00	37.50	0.00
Trap #9	19/08	20/08	19:45	11:45	16	0		0	7	0	0.00		0.00	10.50	0.00
Trap #10	19/08	20/08	19:50	11:50	16	0		0	9	0	0.00		0.00	13.50	0.00
Trap #11	19/08	20/08	19:55	11:55	16	0		1	11	1	0.00		1.50	16.50	1.50
Trap #12	19/08	20/08	19:55	12:10	16.25	1		0	19	0	1.50		0.00	28.50	0.00
Trap #13	19/08	20/08	19:55	12:10	16.25	1		0	21	0	1.50		0.00	31.50	0.00
Trap #14	19/08	20/08	20:00	12:15	16.25	0		0	17	0	0.00		0.00	25.50	0.00
Trap #15	19/08	20/08	20:05	12:20	16.25	0		1	0	0	0.00		1.50	0.00	0.00
Trap #16	19/08	20/08	20:05	12:20	16.25	0		0	13	0	0.00		0.00	19.50	0.00
Trap #17	19/08	20/08	20:05	11:50	15.75	0		0	7	0	0.00		0.00	10.50	0.00
Trap #18	19/08	20/08	20:05	11:50	15.75	0		0	8	1	0.00		0.00	12.00	1.50
						0.166667		0.111111	8.888889	Average	0.25		0.17	13.35	0.17
									160						

											CPU	CPU	CPU	CPU	CPU
	date set	date lift	time set	time lift	soak time	s. sculpin	A.grayling	burbot	jcs	JCS +1	s. sculpin	A.grayling	burbot	jcs	JCS +1
Location: Blind Creek 2															
Trap #1	19/08	20/08	20:15	12:45	16.50				14					20.30	
Trap #2	19/08	20/08	20:15	12:45	16.50				13					18.90	
Trap #3	19/08	20/08	20:20	12:45	16.40			1	10	2			1.45	14.50	2.90
Trap #4	19/08	20/08	20:20	12:40	16.35				2					2.90	
Trap #5	19/08	20/08	20:15	12:30	16.25			1	25				1.45	36.25	
Trap #6	19/08	20/08	20:15	12:30	16.25				4					5.80	
Trap #7	19/08	20/08	20:20	12:20	16				1					1.45	
Trap #8	19/08	20/08	20:25	12:25	16				26	9				37.70	12.96
Trap #9	19/08	20/08	20:30	12:30	16				8					11.60	
										Average					
									103						

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Report

Deloitte & Touche Inc. (acting as the Court Appointed Interim Receiver for Anvil Range Mining Corporation)

Anvil Range Mine Adaptive Management Plan

AECOM

Deloitte & Touche Inc. (acting as Court Appointed Interim Receiver for Anvil Range Mining Corporation)

Anvil Range Mine Adaptive Management Plan

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Project Number:

107417-80632

Date:

February, 2009

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This Statement of Qualifications and Limitations is attached to and forms part of the Report.

Signature Page

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GOMM ENVIRONMENTAL ENGINEERING CONSULTING

Executive Summary

The Water Licence for the Anvil Range Mine (QZ03-059) provides primarily for the continuation of environmental care and maintenance activities to the end of 2008, when a Final Closure and Reclamation Plan is scheduled to be in place. In addition to water and facilities that will receive active management, there are other waters and facilities on the mine site that are recognized as representing potential environmental risks but which do not require immediate intervention. Long term management of these waters and facilities will be addressed in the Final Closure and Reclamation Plan. However, a short term management strategy is required to monitor for potential degradation of conditions to the point where active intervention might be necessary prior to the end of February 2009 and to provide a framework for ensuring that appropriate management actions are implemented.

Such a strategy is provided for in the Water Licence through the Adaptive Management Plan ("AMP"). A conceptual AMP was developed and reviewed by parties to the Environmental Assessment and Water Licencing processes through 2002 and 2003. The Water Licence then required that a detailed AMP Implementation Protocol be developed that follows from the conceptual plan. The AMP Implementation Protocol was filed with the Water Board in June 2004. The Implementation Protocol also requires that an annual review of the AMP program be undertaken. The annual review provides a mechanism whereby any necessary or beneficial modifications to the AMP program can be identified and proposed to the Water Board on a regular basis.

Eight AMP "events" were developed through the Environmental Assessment and Water Licence Renewal processes. These events represent possible future environmental conditions that would require a management response, if they were to occur.

The eight events are as follows with a summary for 2008 activities:

1. Degraded Groundwater Quality in Rose Creek Valley Aquifer;
   One new trigger activated in 2008 for increasing concentrations of sulphate at X25A/B.
   New triggers at P03-09-2, P03-09-5 and P03-09-9 and p08-03-03 for increasing concentrations of sulphate.
2. Degraded Water Quality in Vangorda Creek Downstream of the Mine Facilities;
   One trigger activated in 2008 for sulphate. Data analysis demonstrated that this was due to the elevated sulphate concentrations during a period of discharge of compliant effluent.
3. Degraded Water Quality in Rose Creek Downstream of the Mine Facilities;
   One trigger activated in 2008 for sulphate. Data analysis demonstrated that this was due to the elevated sulphate concentrations during winter low flow period, consistent with historical trends, particularly during periods of discharge of compliant effluent during low flow conditions.
4. Degraded Seepage Quality from the Grum Rock Dump;
   No new triggers at V2 in 2008. The 2008 monitoring results suggest that zinc concentrations have stabilized around 1 mg/L. The transfer of water from station V15 to station V2A was implemented in 2007, via Grum Creek diversion as a proactive intervention and has been seen to be successful.

5. Degraded Water Quality in the North Fork of Rose Creek;
   No new triggers in 2008. Ongoing concern over increasing concentrations in this area, particularly zinc during the winter low flow period, prompted a detail site investigation, design and implementation of a remedial intervention system to collect and route contaminated shallow groundwater to Faro Pit.
6. Water level in Grum Pit Reaches Maximum Desired Elevation;
   No triggers activated in 2008.
7. Disruption of Fannin Sheep Migration Through the Mine Site; and
   No triggers activated in 2008.
8. Wind Dispersed Tailings Result in Adverse Effects in the Terrestrial Environment.
   No triggers activated in 2008. Ongoing concerns with respest to dusting from the tailings resulted in the development of a Tailings Dust Control Program using Soil Sement. Wet conditions on site resulted in this program being delayed until 2009.

Other than the specific recommendations listed above, the AMP program functioned in 2008 as intended and no other changes should be made.

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C. Tailings Dust Control Project

1. Introduction

1.1 Background

The Anvil Range Mine, inclusive of both the Faro and Vangorda Plateau mine sites, is located near the Town of Faro, Yukon. The mine produced lead and zinc mineral concentrates from 1969 to 1998 and was, at one time, the largest open pit, lead-zinc mines in the world. All mining and processing operations ceased permanently in early 1998 when the mine owner, Anvil Range Mining Corporation, entered into receivership. The mine has been under the management of a court appointed interim receiver, Deloitte & Touche Inc., since April 1998 and will be officially transferred to the Yukon Government February 28, 2009.

The Water Licence for the Anvil Range Mine (QZ03-059) provides primarily for the continuation of environmental care and maintenance activities to the end of February 2009, when a Final Closure and Reclamation Plan is scheduled to be submitted. The licenced care and maintenance activities address specifically water and facilities that require active management to ensure that adequate environmental protection is provided in the short term.

In addition to water and facilities that will receive active management, there are other waters and facilities on the mine site that are recognized as representing potential environmental risks but which do not require immediate intervention. Long term management of these waters and facilities will be addressed in the Final Closure and Reclamation Plan. However, a short term management strategy is required to monitor for potential degradation of conditions to the point where active intervention might be necessary prior to the end of 2008 and to provide a framework for ensuring that appropriate management actions are implemented.

Such a strategy is provided for in the Water Licence through the Adaptive Management Plan ("AMP"). A conceptual AMP was developed and reviewed by parties to the Environmental Assessment and Water Licencing processes through 2002 and 2003. The Water Licence then required that a detailed AMP Implementation Protocol be developed that follows from the conceptual plan. Part F, Item 54 of the Water Licence reads:

> *An Adaptive Management Plan for the facilities authorized by this licence shall be prepared and submitted to the Board by June 30, 2004. The plan shall identify the indicators and triggers for action, the measures of statistically significant changes to be tracked, the monitoring locations and parameters, the sampling frequencies, the methods to be used to analyze and evaluate the data, and the actions to be taken.*

The AMP Implementation Protocol was filed with the Water Board in June 2004. The Implementation Protocol provided all of the information that was required by the Water Licence for the eight AMP "events" that had been developed in the conceptual plan.

The Implementation Protocol also requires that an annual review of the AMP program be undertaken. The annual review provides a mechanism whereby any necessary or beneficial modifications to the AMP

program can be identified and proposed to the Water Board on a regular basis. The annual review also ensures that all of the year's activities under the AMP program are compiled and documented.

1.2 AMP Events

Eight AMP "events" were developed through the Environmental Assessment and Water Licence Renewal processes. These events represent possible future environmental conditions that would require a management response, if they were to occur.

The eight events are as follows:

1. Degraded Groundwater Quality in Rose Creek Valley Aquifer;
2. Degraded Water Quality in Vangorda Creek Downstream of the Mine Facilities;
3. Degraded Water Quality in Rose Creek Downstream of the Mine Facilities;
4. Degraded Seepage Quality from the Grum Rock Dump;
5. Degraded Water Quality in the North Fork of Rose Creek;
6. Water level in Grum Pit Reaches Maximum Desired Elevation;
7. Disruption of Fannin Sheep Migration Through the Mine Site; and
8. Wind Dispersed Tailings Result in Adverse Effects in the Terrestrial Environment.

Each of the AMP events is described according to nine common elements. This ensures that a consistent approach is followed for each event that achieves the general objectives of the AMP Implementation Protocol. The common elements are as follows:

1. Description of the event and possible environmental consequences;
   As developed through the Environmental Assessment and Licence Renewal Processes.
   The possible environmental consequences will lead to the narrative trigger and specific thresholds.
2. Discussion of event-specific information or issues;
   Any unique issues or information that have a direct influence for applying the AMP.
3. Narrative response trigger;
   As developed through the Environmental Assessment and Licence Renewal Processes.
   The narrative trigger will lead to the specific indicators.
4. Specific indicators;
   The environmental parameters to be monitored and assessed.
5. Specific Thresholds;
   Defines the conditions, in terms of the specific indicators, when management actions should be taken.
   There may be a series of staged thresholds for an individual event.
6. Monitoring requirements;
   The frequency and means for monitoring of the specific indicators.
7. Evaluation of monitoring results;
   The means of evaluating whether any specific thresholds have been crossed.

8. General approach to responses; and
   As developed through the Environmental Assessment and Licence Renewal Processes.
   Describes the general approach to management responses, if necessary.
9. Specific thresholds and responses.
   Describes the specific responses to be implemented if any specific thresholds have been crossed.

The details of these AMP elements are not provided in this report. Readers are referred to the AMP Implementation Protocol for this level of detail (Gartner Lee Limited, now AECOM, on behalf of the Interim Receiver, June 2004).

1.3 Approach to the Annual Review

This report provides the annual review of the AMP for the year 2008, as described in the AMP Implementation Protocol. The prime purpose of the annual review is to assess the adequacy and appropriateness of the elements of each event, such as trigger locations, specific indicators and thresholds, and monitoring requirements. Updates, amendments or other changes to the AMP may be recommended based on the annual review.

Each AMP Event includes a routine management review of the monitoring data against the triggers and thresholds. The results of these reviews are reported to the Water Board as part of the Monthly Reports submitted under Part A, Item 15 of the Water Licence. The results of these reviews are summarized as part of the Annual Review. Where required for some of the AMP Events, the results of the annual review are also summarized.

Each AMP event is reviewed individually in the following sections of the report.

2. AMP Event 1, Degraded Groundwater Quality in Rose Creek Valley Aquifer

2.1 Description

Groundwater in the Rose Creek Valley aquifer collects seepage and contaminants released from the surface tailings impoundments and has the potential to become contaminated to the degree where discharge from the aquifer to Rose Creek may result in a sustained adverse effect in Rose Creek. The groundwater quality in the Rose Creek Valley aquifer is presently measured twice per year, in spring and fall, at various locations within the tailings facility and downstream of the tailings facility. Samples are analyzed for dissolved metals, pH, temperature, conductivity, total dissolved solids, sulphate, and alkalinity as per the Water Licence (YWB, 2004). Additional groundwater quality data is also provided for through a series of monitoring wells which were installed in 2003 as part of the ongoing hydrogeological and geochemical investigations of the Rose Creek Tailings Facility and the Rose Creek Valley Aquifer.

Since degradation of groundwater quality is anticipated to occur progressively from the source area (tailings deposit) in a downgradient direction (Cross Valley Dam and downstream), the trigger locations for the implementation of the AMP are designed to provide for the early detection of emerging trends or "plumes". The trigger locations include locations downgradient of the tailings deposit as well as locations directly underlying the tailings deposit as follows:

- groundwater quality downgradient of the Cross Valley Dam (location P03-09);
- groundwater quality at the Intermediate Dam, below the downstream extent of the tailings deposit (locations X24 and X25);
- groundwater quality (i.e., the aquifer underlying the tailings deposit) approximately mid-length of the Intermediate Impoundment (location P03-08); and
- groundwater quality at the Second Impoundment Dam, approximately mid-length of the tailings facility (location P03-04).

The environmental consequences of degraded water quality in the Rose Creek Valley aquifer are the potential exposure of aquatic resources, terrestrial resources and human resource users to increased levels of contaminants in Rose Creek, Anvil Creek and the Pelly River. Zinc is currently the primary contaminant of concern and zinc and sulphate are currently the primary indicators of acid rock drainage.

A substantial amount of work has been carried out to characterize the environmental conditions in the Rose Creek Valley aquifer. This work serves to provide information that is important to the Adaptive Management Plan as well as the long term needs of the Final Closure and Reclamation Plan that is currently being developed. The results of the ongoing studies of the Rose Creek Valley aquifer need to be continually incorporated into the AMP.

2.2 Summary of Implementation Protocol Information

The following is a summary of the AMP Implementation Protocol information for this event to serve as a quick reference for the review that follows.

Indicators	Locations	Thresholds	Monitoring
$Zn_{(D)}$, SO_4	X24, X25	• 3 consecutive results > 75th percentile of reference period; or • statistically significant trend projects >75th percentile of reference period within three years.	Quarterly
	P03-04, -08 and -09	• statistically significant trend.	Quarterly

Dissolved iron was initially identified as an indictor in the Rose Creek Valley Aquifer AMP but was removed after 2005 due to issues related to the sensitivity of dissolve iron concentrations on sampling methodology in samples collected during the reference period.

Note that there was insufficient data for monitoring wells P03-04, -08 and -09 to form a “reference period” because these wells were installed in 2003.

2.3 Background

2.3.1 X24 and X25

As documented in the 2004 Adaptive Management Plan Annual Report the following triggers were activated at the toe of the Intermediate Dam for zinc, sulphate and iron:

1. *Sulphate in monitoring wells X24-A, X24-C and X24-D;*
2. *Dissolved zinc in X24-D; and*
3. *Dissolved iron in monitoring wells X25-A and X25-B.*

In response to the activation of these triggers the procedures described in the Adaptive Management Plan Implementation Protocol (AMPIP) were initiated. The following four action steps are described in the AMPIP and, as stated in the AMPIP, were initiated in 2004:

1. *Verification of the monitoring information followed by notification to the YG Water Inspector (completed 2004);*
2. *Additional monitoring, if necessary (completed 2004);*
3. *Data analysis and predictive impact modeling, if necessary; and*

4. Mitigation (Response) plan, if necessary.

The first two steps outlined above were completed in 2004 and summarized in the 2004 Annual Adaptive Management Annual Report. In early 2005, a data analysis of the related monitoring results was carried out, incorporating new information that has been developed for development of the Final Closure and Reclamation Plan. The results of this analysis indicated that the increased concentrations being seen at the AMP trigger locations, specifically X24, may in part be due to contaminant loading to the aquifer from drainage in the Old Faro Creek Channel, including loading from the Faro rock dumps (location X23) and the Emergency Tailings Area.

Data analysis was then carried out in February 2005 using predictive modeling to assess the potential for contaminant loading to the receiving environment and any associated impacts. This was done using the aquifer loading balance model that has been developed by Robertson Geoconsultants as part of the closure planning studies. The fundamental outcome of this modeling exercise was to determine if the current groundwater conditions are having an effect on Rose Creek and, further, provide an indication of the rate and development of contaminant loading, if any, to the receiving environment. The following provides a summary of the results of predictive modeling. Details of the modeling were summarized in a letter to Government of Yukon, Water Resources Branch in May 2006 (Appendix A).

The predictive model was run based on the fall 2004 groundwater quality data for X24 (A, B and C) and X25 for sulphate and dissolved zinc. The following four scenarios were run using the calibrated Rose Creek Water and Load Balance Model to estimate the loading to Rose Creek from groundwater and subsequent sulphate and dissolved zinc concentrations in Rose Creek.

- "Base Case" using fall 2004 concentrations;
- Sensitivity Run 1 – 20% increase in sulphate and dissolved zinc concentrations at X24 and X25;
- Sensitivity Run 2 – 50% increase in sulphate and dissolved zinc concentrations at X24 and X25; and
- Sensitivity Run 3 – 100% increase in sulphate and dissolved zinc concentrations at X24 and X25.

The results of this predictive modeling exercise indicate that the present groundwater conditions (base case) are not predicted to have a detrimental effect on the water quality in Rose Creek in the near future. Predicted concentrations of dissolved zinc for the four scenarios (0.03 – 0.041 mg/L) are within the range of concentrations presently seen in Rose Creek downstream of the Cross Valley Dam (X14). Based on these results there is no need for the development of a short-term response plan, other than ongoing monitoring and assessment of all related water quality data. Furthermore the degradation of water quality in the Rose Creek Valley aquifer and subsequent impacts Rose Creek, Anvil Creek and the Pelly River continues to be a major area of investigation as part of the ongoing development of the Faro Closure and Reclamation Plan.

In September 2005, an additional trigger was activated at X24-A for dissolved iron. An assessment of the water quality data and sampling techniques was carried out which indicated that the elevated levels of iron may be due to slight variation in sampling methodology during the reference period. The sensitivity of dissolved iron concentrations to minor variations in sampling methodology introduces some uncertainty in the

interpretation of the results prior to 2002. Furthermore, through the ongoing aquatic risk assessment work being carried out as part of closure planning, iron was not identified as a contaminant of concern in the receiving environment. Therefore, it was recommended that dissolved iron no longer be an indicator in the AMP Protocol for the Rose Creek Aquifer. This recommendation was subsequently adopted in 2006.

Therefore, at the end of 2005, the triggers for dissolved zinc and sulphate at X24 and X25 remained "activated" because concentrations were above the threshold values; however, the determination had been made that no immediate response was required pending the analysis of future monitoring results. The ongoing management review in 2006 of the relevant groundwater quality data from X24 and X25 indicated there were no new triggers above those already identified in 2005.

Due to ongoing sampling issues at location X24 (A/B/C) an investigation was conducted in August 2006 to assess the present conditions of the wells and determine the cause of the previous sampling difficulties. Problems at these wells were first encountered at X24-B where sand heaved within the well to above the water table. This problem continued to progress in the area, with issues now encountered at X24-A and X24-C. In 2007, X24 B and C could not be sampled due to the ongoing issues of the build up of sediment in the wells. The following is a summary of the recommendations after the 2007 monitoring program:

- X24A-96 – Well was suspected to have been compromised upon installation (RGC, 1996) and decommissioning should be considered based on the present condition. This conclusion is also supported by others (RGC, 2007).

- X24-96 B/C – Wells were not sampled in 2007 due to operational issues and recommendations outlined by Gartner Lee (2007). Based on field observations made by Gartner Lee in 2007, it is recommended that these wells be decommissioned (RGC, 2007).

- X24-D – Although there have not been any issues regarding sampling at X24-D, it is recommended that it be investigated in 2007. X24D-96 is the only well from the nested X24-96 series that is recommended to remain operational for continued groundwater monitoring (RGC, 2007).

In 2007, X24-B and C could not be sampled due to the ongoing issues of the build up of sediment in the wells. In addition, X24-A, although it could be sampled, is also suspect due to the accumulation of sediment due to it possibly being compromised during installation, and caution should be used when using data from this well. Based on the ongoing issues associated with these three wells it has been recommended by Gartner Lee Limited, and supported by others (Robertson GeoConsultants) that these wells be decommissioned. AMP trigger location X24-D has been determined to be adequate for routine monitoring and ongoing assessment of AMP Event 1. Therefore the following modifications were made for AMP Event 1, Degraded Groundwater Quality in Rose Creek Aquifer as part of the 2007 Annual AMP Review, specifically that X24-A, X24-B and X24-C be removed as AMP trigger monitoring stations at X24.

In 2007 there were no new triggers at location X24 and X25 above those already identified other than dissolved zinc at X24-A: specifically: three consecutive monitoring results greater than the upper 75th

percentile of the reference period (1998 – 2002). Given the issues outlined below associated with this well, ongoing assessment and follow-up on this trigger was discontinued.

2.3.2 P03 Multi-Level Wells

Review of the water quality data from three AMP multi-level wells installed in 2003 (P03-04, P03-08 and P03-09) included an assessment of the following specific threshold for dissolved zinc and sulphate:

- A statistically significant trend in the groundwater monitoring results with a requirement of a minimum of four results.

Previously, ongoing trends were limited by the number of data points (degrees of freedom). At the end of 2006, sufficient data points were provide for a statistically significant determination. Annual review of the 2006 multi-level data against the threshold indicated that the following thresholds for sulphate and dissolved zinc were reached:

- Increasing trend in zinc concentrations at P03-04-2 and P03-04-3; and
- Increasing trend in sulphate concentrations at P03-09-3 and P03-09-4.

Annual review of the 2007 multi-level data against the threshold indicated that the following new thresholds for sulphate and dissolved zinc were reached:

- Increasing trend in sulphate concentrations at P03-04-2 and P03-04-3; and
- Increasing trend in sulphate concentrations at P03-09-6 and P03-09-7.

Furthermore, review of the updated 2006 and 2007 relevant groundwater quality data from the three AMP multi-levels (P03-04, P03-08 and P03-09) indicates that the triggers identified in 2006 still remained in effect.

As outlined in the 2006 AMP Annual Review, the next step in response to activation of this trigger was verification and notification of the AMP Trigger to Government of Yukon, Water Resources Branch. This would be followed up by a detailed assessment of the trigger location including any associated water quality data. Given restrictions in the collection of groundwater samples in winter conditions, the earliest a verification sample could be collected in spring 2007. In the interim, it was planned to expedite the response to these trigger by initiating a detailed assessment of the multi-levels triggers prior to the spring sampling event. At the same time, during the 2007/2008 study planning meetings, it was identified that there was a need to provide an updated review of the groundwater quality monitoring data. This work was subsequently undertaken by Robertson GeoConsultants Inc. and a final report was issued in May 2008. Based on the findings of the RGC 2007 groundwater review, an additional study was recommended and initiated in January 2007: geochemical assessment of groundwater quality in Rose Creek aquifer including the determination of the hydraulic gradients and geochemical fingerprinting was recommended to determine the cause for the recent deterioration in groundwater quality in this portion of the Rose Creek.

Therefore, it was decided to hold off on the completion of the trigger assessment until such time that the results of the geochemical assessment could be incorporated. Results of the 2008 geochemical assessment are summarized below in Section 2.4.

2.4 Summary of 2008 Geochemical Assessment

To further the understanding of the recent deterioration of the groundwater quality in the Rose Creek aquifer, RGC carried out a geochemical assessment of the groundwater quality in the aquifer which included conservative and reactive mixing calculations (RGC 2009b). The main objective of this assessment was to determine if seepage from the Old Faro Creek Channel is the cause of the recent deterioration of the aquifer water quality and subsequently assess if the intervention implemented in the ETA area will have a positive effect on groundwater quality trends in the aquifer. The various sources of acid rock drainage (ARD) products were distinguished based on their distinct geochemical characteristics or "fingerprint". The relative contribution of each source to impacted groundwater was then evaluated at various locations in the aquifer.

The following provides a summary of the key findings of this assessment. Full details can be found in Geochemical Assessment of Groundwater Quality in the Rose Creek Aquifer (RGC, 2009b) that will be submitted to the Water Inspectors and other interested government agencies under separate cover.

- As discussed in Section 2.3.1, previous studies on the groundwater quality in the aquifer have concluded that the recent increase in ARD products such as zinc and sulphate in wells screened in the northern portion of the aquifer could be due to seepage from the Old Faro Creek channel. The results of the geochemical "fingerprinting" and mixing calculations support this conclusion. Furthermore the assessment indicates that the seepage from the Old Faro Creek channel may have contributed a significant contaminant load to this portion of the aquifer.

- The seepage interception system that was implemented in the ETA area in the fall of 2006 has been operating seasonally during the ice free period, typically from May to October. This system captures and conveys via pipeline approximately 78% of the flow into the Old Faro Creek Channel. The mixing calculations suggest that the continued operation of this system will result in significant improvement in the groundwater quality in the northern portion of the Rose Creek aquifer. At P03-06, the results of the mixing calculations indicate that full interception of the Old Faro Creek channel and elimination of seepage from this source could reduce sulphate and zinc concentrations by approximately 50%.

- The time required for the benefits of the interception system to be evident in the Rose Creek aquifer is dependent on groundwater transport parameters including velocity and distance. Conservative transport calculations indicate that improvement in groundwater quality at P03-06 can be expected to occur after 1 to 5 years. Improvements to groundwater quality farther downstream at the Intermediate Dam (X24), would occur later, in approximately 4 to 20 years.

- While the interception of seepage from the Old Faro Creek channel will reduce the contaminant load to the aquifer, the load from the tailings is predicted to gradually increase over time. This increase in loading may offset any improvement due to the seepage interception.

Based on the results of the geochemical assessment, it is recommended that the ongoing AMP assessment of key monitoring wells in the northern portion of the aquifer (P06-03, X21 and X24) should continue to assess whether the ongoing interception of the Old Faro Creek is resulting in improvements to groundwater quality. Although these locations are included in the routine tailings groundwater monitoring program, presently only X24 is identified as a trigger location in the AMPIP. Therefore, based on the recommendations stemming from the geochemical assessment it is recommended to add P06-03 and X21 as aquifer AMP trigger locations. This recommendation will be forward to Dennison Environmental for consideration for inclusion into 2009/10 Adaptive Management Program.

RGC (2009b) also recommends that a more comprehensive geochemical assessment be carried out to include mixing calculations for other wells that have shown recent increases in contaminant concentrations (X21 and X24). In addition the used of collected stable isotope data to further delineate contaminant sources to the aquifer should also be considered. This recommendation will be forwarded to the Faro Project Management Team for consideration in the 2009/10 study program.

2.5 2008 Review

2.5.1 Wells X24 and X25

The ongoing management review in 2008 of the relevant groundwater quality data from X24D and X25A/B at the toe of the Intermediate Dam was carried using data collected during four sampling events: May, August, September and November. This data review included assessment of the two following specific thresholds for dissolved zinc and sulphate:

- Three consecutive monitoring results greater than the upper 75th percentile of the reference period (1998 – 2002); or
- A statistically significant trend in the monitoring results (from 2003 and on) which, when extrapolated forward three years, would result in values greater than the upper 75th percentile of the reference period.

The results of the review are summarized in Table 2-1 and Table 2-2.. Based on the 2008 data there were no new triggers at location X24D and two new triggers at X25: specifically three consecutive monitoring results greater than the upper 75th percentile of the reference period (1998 – 2002) at both X25A and X25B.

Table 2-1. Sulphate and Zinc Data for Rose Creek Valley Aquifer - X24D (2008)

	X24D	
Date	**Sulphate (mg/L)**	**Zinc (mg/L)**
May 2008	Frozen	
August 2008	*2100*	*0.0829*
September 2008	*1900*	*0.0822*
November 2008	*2200*	*0.0846*
Threshold	**1057**	**0.03**

Table 2-2. Sulphate and Zinc Data for Rose Creek Valley Aquifer - X25 (2008)

	X25A		X25B	
Date	**Sulphate (mg/L)**	**Zinc (mg/L)**	**Sulphate (mg/L)**	**Zinc (mg/L)**
May 2008	*327*	<0.005	383	<0.005
August 2008	*369*	0.0019	*410*	0.0004
September 2008	*379*	0.0014	*430*	0.0004
November 2008	*410*	0.002	*420*	0.0002
Threshold	**294**	**0.055**	**395**	**0.02**

Based on the recent review of groundwater quality data carried out by Robertson Geoconsultants (RGC 2009) the water quality in the aquifer in the area of X25, beneath the southern portion of the Intermediate Dam, is characterized by significantly lower SO_4 concentrations than observed in the northern portion, in the area of X24. At X25 and other wells in the southern portion of the intermediate Dam, water quality has remained relatively unchanged. One exception was the concentration of SO_4, which increased in each of the wells in this area, including X25, except P01-04B. Although the levels of sulphate at X25 are increasing to levels above the threshold values, they remain significantly lower than those in the wells in northern portion (i.e. X24) and zinc concentrations at X25 have remained at or below the detection limit for the current monitoring period.

2.5.2 P03 Multi-Level Wells

A management review consisting of the relevant groundwater quality data from the three AMP multi-level wells installed in 2003 (P03-04, P03-08 and P03-09) was conducted in 2008. This data review included an assessment of the following specific threshold for dissolved zinc and sulphate:

- A statistically significant trend in the groundwater monitoring results with a requirement of a minimum of 4 results.

Annual review of the 2008 multi-level data against the threshold indicated that the following new thresholds for sulphate and dissolved zinc have been reached:

- Increasing trend in sulphate concentrations at P03-09-2, P03-09-5 and P03-09-9; and
- Increasing trend in sulphate concentrations at P03-08--03.

Although an increasing trend in sulphate has been found for P03-08-03, the sulphate concentrations at the trigger locations of P03-08-03 remain relatively low, peaking at 210 mg/L in November 2008.

Ongoing review of the groundwater quality data from the toe of the Cross Valley Dam, including P03-09, show a pattern of deteriorating water quality with time that is most evident from increases in the concentrations of oxidation products (i.e. SO_4) and key metals of interest (i.e. Zn) (RGC 2009). It is likely that the elevated levels of oxidation products and metals are related to the leading edge of the seepage "breakthrough" observed up-gradient at the Intermediate Dam (RGC, 2008). Although increases in sulphate concentrations are evident at the toe of the Cross Valley Dam at P03-09, water quality time trends in wells farther downstream of the toe of the Cross Valley Dam indicated that the groundwater quality remained unchanged during the current monitoring period.

Review of the 2008 relevant groundwater quality data from the three AMP multi-levels (P03-04, P03-08 and P03-09) indicates that the following triggers identified in 2006 and 2007 are no longer in effect:

- Increasing trend in zinc and sulphate concentrations at P03-04-2; and
- Increasing trend in zinc concentrations at P03-04-3.

Review of the time trends of selected water quality parameters for P03-04, located about 140m downgradient of the decommissioned wells P01-07A/B/C/D/E, was carried out as part of RGC's 2008 annual review of groundwater data. The results of this review indicate that contaminant concentrations in the deeper piezometers at this location (P03-04-01 to -05) all peaked around 2007 and started to decline in 2008. These observations would suggest that sealing of the leaky wells indeed reduced the contaminant loading and improved groundwater quality in the Rose Creek aquifer at P03-04.

3. AMP Event 2, Degraded Water Quality in Vangorda Creek Downstream of Mine Facilities

3.1 Description

The water quality in Vangorda Creek downstream of the Vangorda Plateau mine facilities could be negatively affected by surface water runoff from the mine facilities and groundwater seepage. The water quality in Vangorda Creek downstream of the mine facilities is measured monthly at Station V8 at the foot bridge in the Town of Faro for total metals, dissolved metals, pH, temperature, conductivity, total suspended solids, sulphate, ammonia and hardness (YWB 2004). Water quality in Vangorda Creek is also monitored monthly farther upstream in the main stem of Vangorda Creek at Station VGMAIN.

The environmental consequences of degraded water quality in Vangorda Creek is the potential exposure of aquatic resources, terrestrial resources and human resource users to increased levels of contaminants in Vangorda Creek and, possibly, the Pelly River. Zinc is currently the primary contaminant of concern and zinc and sulphate are currently the primary indicators of acid rock drainage. However, the consideration of degraded water quality should include other metals and contaminants which could source from the rock dumps, open pits and other mine facilities. Assessment of total copper and total suspended solids (TSS) also forms part of the AMPIP in this area.

3.2 Summary of Implementation Protocol Information

As part of the 2005 Annual AMP Review, an assessment was carried out to determine if there are any statistically significant seasonal differences in the sulphate concentrations at V8, and if necessary determine seasonally based threshold values for sulphate at V8 based on the reference period (1998 – 2002). Concentrations of sulphate during the reference period were found to exhibit seasonal variability. Using the Analysis of Variance and Multiple Comparisons (Least Significant Difference) at a 5 % significance level, statistically higher concentrations are observed in the winter months (November – April) compared to the open water months (May – October). Given this seasonal variability in the concentrations of sulphate in Vangorda Creek at V8, it was recommended that the AMP Protocol for V8 be modified for sulphate to include two seasonal components: open water season (May – October) and winter (November – April). The following is a summary of the modified AMP Implementation Protocol information for this event to serve as a quick reference for the review that follows.

Indicators	Locations	Thresholds	Monitoring
Zn(T), Cu(T), and TSS	V8	• 3 consecutive results > 75th percentile of reference period; or • statistically significant trend projects >75th percentile of reference period within three years.	Monthly
SO_4	V8	• 3 consecutive results > 75th percentile of reference period (75 mg/L); or • statistically significant trend projects >75th percentile of reference period within three years.	Monthly (May – October)
SO_4	V8	• 3 consecutive results > 75th percentile of reference period (171 mg/L); or • statistically significant trend projects >75th percentile of reference period within three years.	Monthly (November – April)

3.3 Review

A management review of the relevant water quality data from V8 was carried out on a monthly basis in 2008. This data review included assessment of the two following specific thresholds for total copper, total zinc, total suspended solid (TSS) and sulphate:

- Three consecutive monitoring results greater than the upper 75th percentile of the reference period (1998 – 2002); or
- A statistically significant trend in the monitoring results (from 2003 and on) which, when extrapolated forward three years, would result in values greater than the upper 75th percentile of the reference period.

For sulphate, the data review included the assessment based on two seasonal components: open water season (May – October) and winter (November – April).

The results of the review are summarized in Table 3-1 and in Figure 3-1, Figure 3-2, and Figure 3-3.

In 2008, there was one trigger activated for sulphate at V8. Review of the August 2008 water quality data from V8 against the pre-defined thresholds indicated that the concentrations of sulphate were greater than the open water season Adaptive Management Plan (AMP) trigger level of 75 mg/L for three consecutive monthly samples: 86.7 mg/L on June 16, 78.7 mg/L on July 14 and 149 mg/L on August 11.

This was documented in the monthly data report to the Yukon Water Board dated September 30, 2008. The following short term management plan was outlined for this trigger event:

> ***Upon receipt and analysis of the upcoming monthly samples for September, an assessment will be provided to the Water Inspector if the trigger continues (as per the AMP Protocol).***

Review of the September water quality data from V8 for sulphate confirms that the sulphate concentrations at V8 in September dropped to 56.8 mg/L, below the threshold value of 75 mg/L and no further assessment was required. These elevated concentrations of sulphate were primarily due to the discharge of compliant effluent into Vangorda Creek from location V25BSP. Water quality atsite V8 continued to be monitored and assessed as part of regular AMP evaluations for the remainder of 2008.

Table 3-1. Summary of 2008 AMP Data for Vangorda Creek (V8)

Date	Total Zinc (mg/L)	Total Copper (mg/L)	Total Suspended Solids (mg/L)	Sulphate (mg/L)
01/7/08	0.015	<0.0010	1	137
02/18/08	0.015	0.0010	2	150
03/17/08	0.011	<0.0010	2	168
04/14/08	0.011	<0.0010	<1	165
05/14/08	0.022	0.0050	*54*	69.6
06/16/08	0.035	0.0010	4	*86.7*
07/14/08	0.025	0.0030	*30*	*78.7*
08/11/08	0.019	0.0010	8	*149*
09/15/08	0.020	0.0040	*49*	56.8
10/15/08	0.013	0.0010	4	*83.8*
11/03/08	0.019	0.0020	6	104
12/01/08	0.035	0.0010	2	134
Trigger	**0.042**	**0.023**	**8**	**75[a]/171[b]**

Note:
Italics = Exceeds Trigger Value.
a. Open Water Trigger Value.
b. Winter Trigger Value.

Figure 3-1. Vangorda Creek (V8) Sulphate (2003 – 2008)

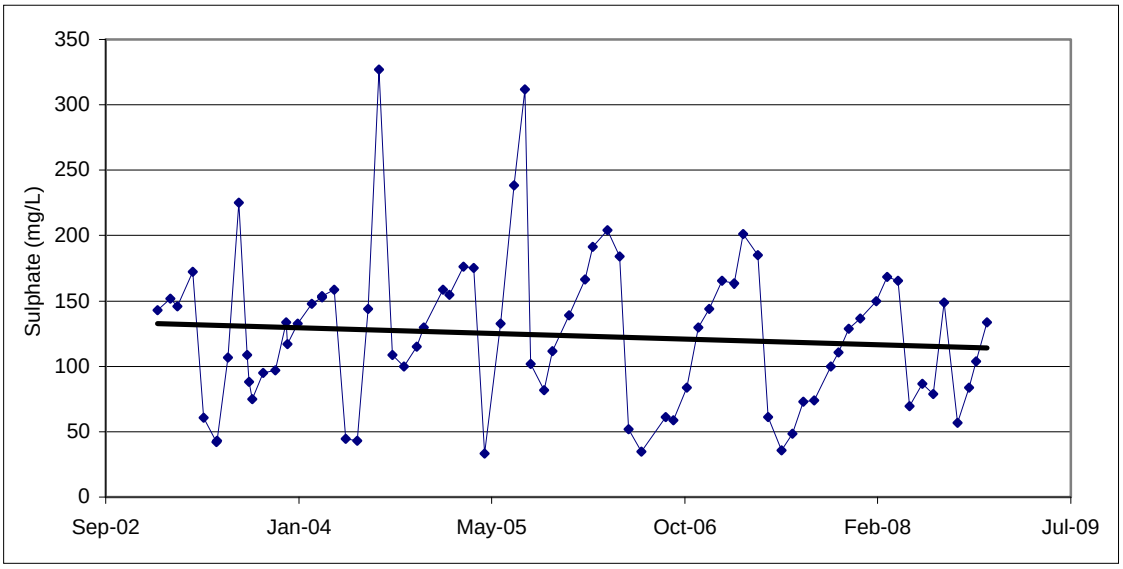


Figure 3-2. Vangorda Creek (V8) Total Suspended Solids (TSS) (2003 – 2008)

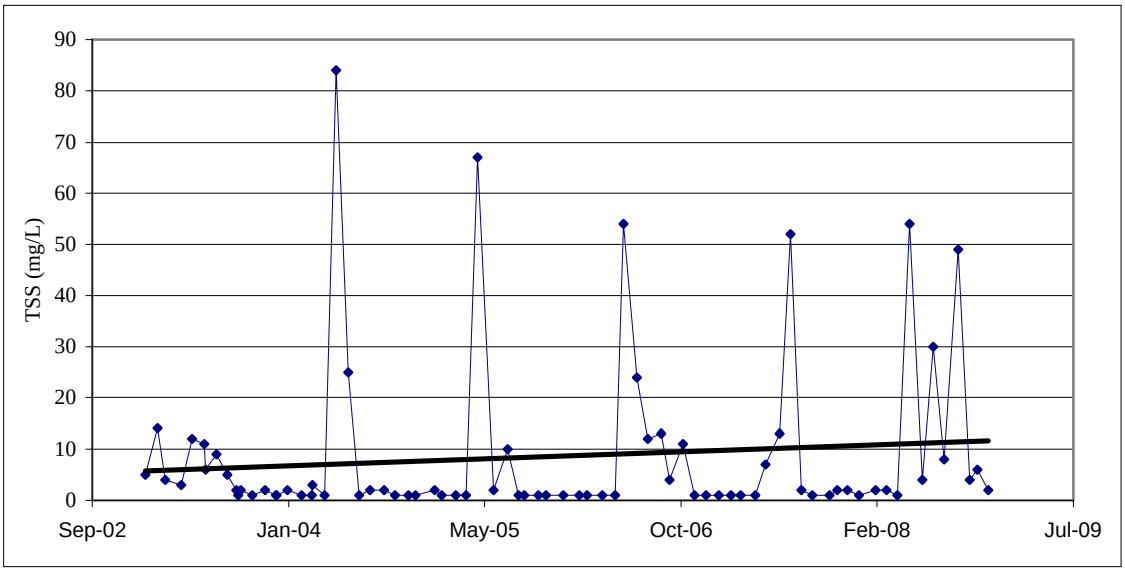
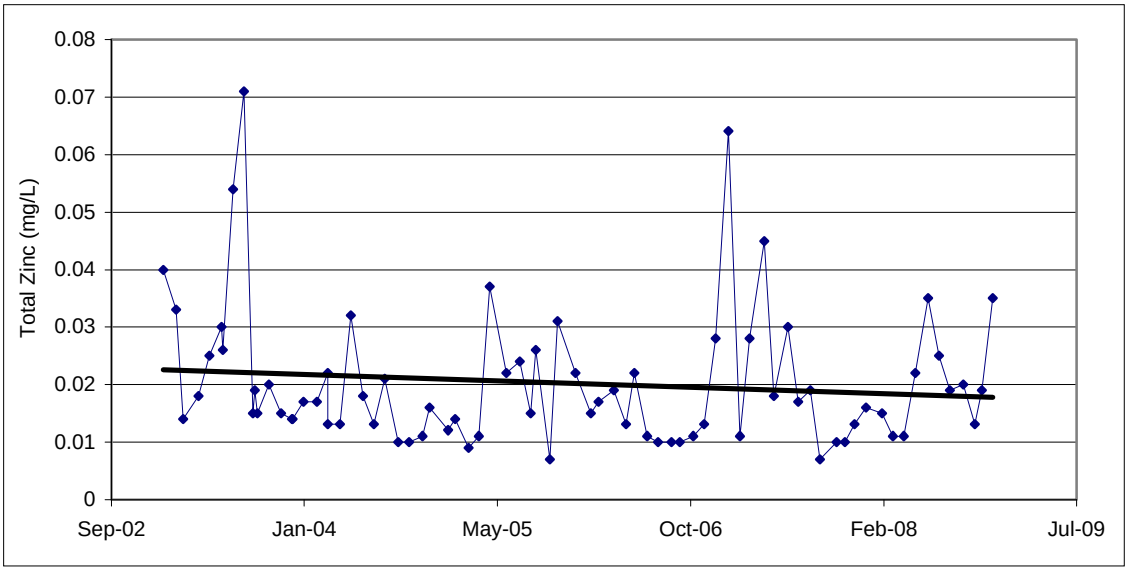


Figure 3-3. Vangorda Creek (V8) Total Zinc (2003 – 2008)



4. AMP Event 3, Degraded Water Quality in Rose Creek Downstream of Mine Facilities

4.1 Description

Water quality in Rose Creek downstream of the mine facilities could be negatively affected by surface runoff from the mine facilities and groundwater seepage from the Rose Creek Tailings Facility. The water quality in Rose Creek immediately downstream of the Mine Facilities is presently measured monthly at Station X14, and weekly during periods of effluent release (effluent is released upstream at location X5), for total metals, dissolved metals, pH, temperature, conductivity, total suspended solids, sulphate, ammonia and hardness (YWB 2004). Water quality in Rose Creek is also monitored twice per year, winter and summer, in the receiving environment farther downstream at R3, mid length of Rose Creek, and at R4, upstream of the confluence with Anvil Creek.

The environmental consequences of degraded water quality in Rose Creek is the potential exposure of aquatic resources, terrestrial resources and human resource users to increased levels of contaminants in Rose Creek, Anvil Creek and the Pelly River. Zinc is currently the primary contaminant of concern and zinc and sulphate are currently the primary indicators of acid rock drainage. However, the consideration of degraded water quality should include other metals and contaminants which could source from the rock dumps, open pits, tailings and other mine facilities.

4.2 Summary of Implementation Protocol Information

The following is a summary of the AMP Implementation Protocol information for this event to serve as a quick reference for the review that follows.

Indicators	Locations	Thresholds	Monitoring
$Zn_{(T)}$, $Cu_{(T)}$, and SO_4	X14	• three consecutive results > 75^{th} percentile of reference period; or • statistically significant trend projects >75^{th} percentile of reference period within three years.	Monthly and Weekly during periods of discharge

Given the variations in sample frequency at X14 from monthly to weekly during periods of discharge, the AMP Protocol for X14 was modified to ensure consistency with the reference period sample frequency and the basis for the determination of the thresholds. When carrying out the assessment of consecutive weekly samples during periods of discharge, the weekly concentrations are averaged for the month. This subsequent monthly average value is then assessed as per the AMP Protocol.

4.3 Review

A management review of the relevant water quality data from X14 was carried out on a monthly basis in 2008. This data review included assessment of the two following specific thresholds for total copper, total zinc and sulphate:

- Three consecutive monitoring results greater than the upper 75th percentile of the reference period (1998 – 2002); or
- A statistically significant trend in the monitoring results (from 2003 and on) which, when extrapolated forward three years, would result in values greater than the upper 75th percentile of the reference period.

The results of the review are summarized in Table 4-1 and in Figure 4-1 and Figure 4-2.

In 2008, there was one trigger activated for sulphate. Similar to previous years, review of the March water quality data from X14 against the pre-defined threshold of 166 mg/L indicated that the concentrations of sulphate were greater than the trigger level for three consecutive monthly samples (225 mg/L in January, 255 mg/L in February and 275 mg/L in March).

This was documented in the monthly data report to the Yukon Water Board dated April 28, 2008. The following short term management plan was outlined for this trigger event:

> ***Upon receipt and analysis of the upcoming monthly samples for April and May at X14, an assessment will be provided to the Water Inspector (per the AMP Protocol). If appropriate, the assessment may propose a modification of the threshold values that provides recognition of the natural seasonal variation in sulphate.***

This trend in elevated sulphate concentrations during the winter low flow period is consistent with historical trends at this location where concentrations as high as 326 mg/L have been seen during winter low flow conditions. This seasonal variation in sulphate is known to occur during winter low flow conditions with higher concentrations in winter than in summer due to the predominance of groundwater "baseflow" (which naturally contains higher sulphate and hardness than surface runoff) and the influence of the discharge of compliant water from the toe of the Cross Valley Dam (X13) during the winter season. In this case, one would expect that the threshold might be exceeded again in April followed by a decrease in sulphate concentrations as surface runoff increases.

Review of the April data for X14 indicated that the concentrations of sulphate continued to exceed the threshold value (466 mg/L on April 14th, 467 mg/L on April 15th, 504 mg/L on April 22nd and 472 mg/L on April 29th) due to the presence of ongoing low flow conditions and further confounded by the discharge of compliant water to Rose Creek from the Cross Valley Pond at X5. This was documented in the monthly data report to the Yukon Water Board dated May 30, 2008.

Assessment of the May 2008 data showed that with the onset of spring freshet and higher flow volumes in Rose Creek, the sulphate concentrations dropped ranging from 19.5 mg/L to 108 mg/L, all well below the trigger value of 166 mg/L except the first weekly sample collected on May 6th due to ongoing low flow conditions.

Table 4-1. Summary of 2008 AMP Data for Rose Creek (X14)

Date	Total Zinc (mg/L)	Total Copper (mg/L)	Sulphate (mg/L)
1/8/08	0.049	<0.001	*172*
2/19/08	0.052	<0.001	*255*
3/18/08	0.058	0.001	*275*
4/14/08	*0.1*	0.002	*466*
4/15/08	*0.096*	0.002	*467*
4/22/08	*0.089*	0.001	*594*
4/29/08	0.13	0.002	*472*
5/6/08	0.12	0.003	*269*
5/13/08	0.071	0.003	97.2
5/15/08	0.059	0.003	108
5/20/08	0.034	0.003	39.5
5/27/08	0.025	0.003	19.5
6/3/08	0.015	0.001	45.9
6/10/08	0.025	0.002	47.6
6/16/08	0.021	0.001	56.1
6/17/08	0.018	<0.001	56.8
6/24/08	0.027	0.002	30.4
7/1/08	0.041	0.001	78.3
7/8/08	0.026	<0.001	59
7/14/08	0.022	0.001	40.7
7/16/08	0.031	0.003	33.6
7/22/08	0.022	0.001	48.2
7/31/08	0.027	0.001	76.6
8/5/08	0.033	0.001	93.8
8/11/08	0.028	0.001	86.3
8/12/08	0.032	0.001	82.8
8/19/08	0.031	0.001	75.9
8/28/08	0.018	0.002	34
9/2/08	0.023	0.001	60.1
9/9/08	0.016	0.002	49.8
9/15/08	0.025	<0.001	68
9/16/08	0.023	0.001	66.8
9/23/08	0.031	<0.001	84.3
9/30/08	0.036	<0.001	79.8
10/7/08	0.044	<0.001	79.7
10/14/08	0.059	<0.001	122
10/15/08	0.06	<0.001	111
10/21/08	0.076	0.001	130
11/4/08	0.062	<0.001	51.2
12/1/08	0.075	<0.001	79
Trigger	**0.08**	**0.022**	**166**

Note: Italics = Exceeds Trigger Value.

The contemplated assessment of natural seasonal variability was not completed. Such an assessment might result in recommending a two-part seasonal threshold value in the manner that was previously recommended for location V8. However, such an assessment for location X14 would be confounded by a number of complicating factors such as releases of (sulphate-rich) effluent. Therefore, this assessment has been deferred at this time.

Figure 4-1. Rose Creek (X14) Sulphate (2003 – 2008)

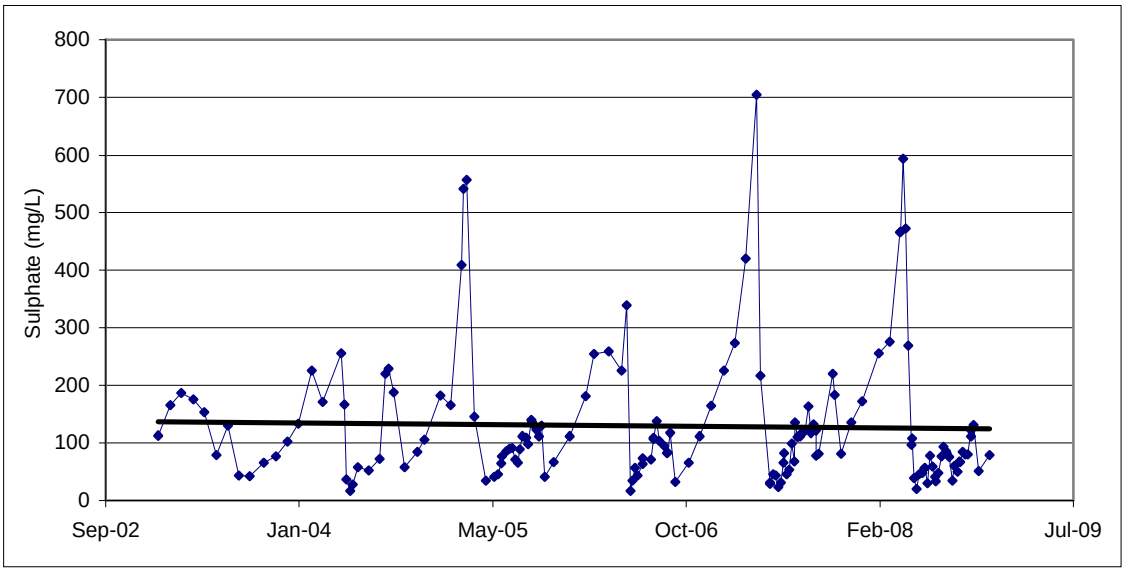
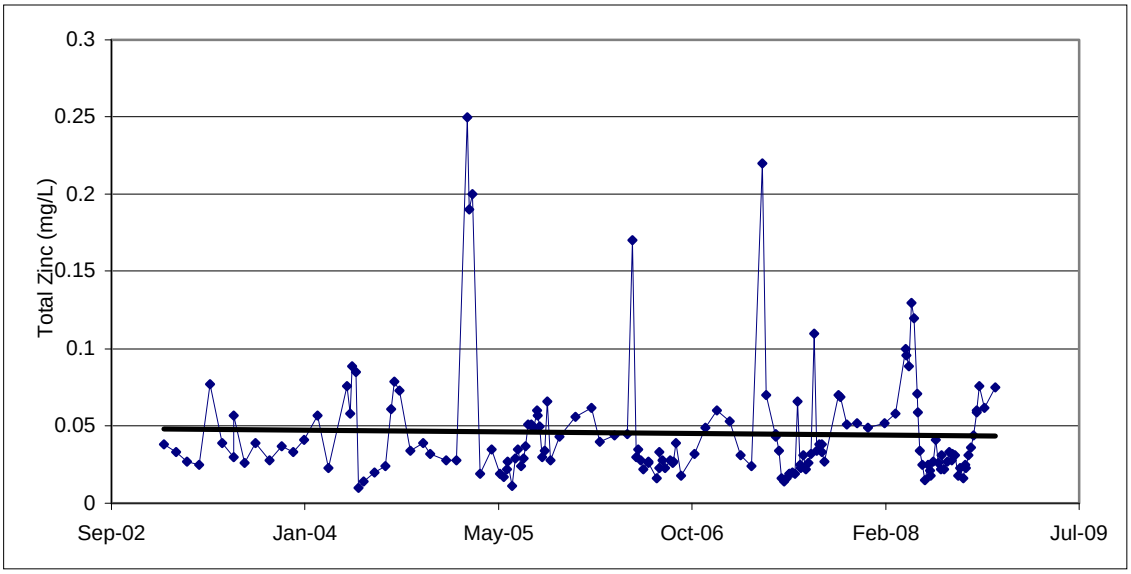


Figure 4-2. Rose Creek (X14) Total Zinc (2003 – 2008)



5. AMP Event 4, Degraded Seepage Quality from the Grum Rock Dump

5.1 Description

Surface and subsurface seepage from the Grum Rock Dump contains contaminants that are released from the waste rock dump. The water quality of Grum Dump seepage is measured monthly at V2 for total metals, dissolved metals, pH, temperature, conductivity, total suspended solids, sulphate, ammonia and hardness (YWB, 2004). This seepage water flows into Vangorda Creek and has the potential to become contaminated to the degree where the receiving environment in Vangorda Creek is adversely affected. The trigger for the implementation of contingency measures is proposed to be surface water quality in Grum Creek prior to discharging into Vangorda Creek.

5.2 Summary of Implementation Protocol Information

The following is a summary of the AMP Implementation Protocol information for this event to serve as a quick reference for the review that follows.

Indicators	Locations	Thresholds	Monitoring
$Zn_{(T)}$, $Cu_{(T)}$, and SO_4	V2	• 3 consecutive results > 75th percentile of reference period; or • statistically significant trend projects >75th percentile of reference period within three years.	Twice monthly

5.3 Background

Review of the reference period data (1998 to 2002) carried out as part of the development of the AMP Implementation Protocol indicated that both water quality thresholds had been exceeded for sulphate at Station V2 below the Grum Rock Dump. Since 2000, the concentrations of sulphate at V2 have remained elevated. This resulted in the immediate triggering of the AMP as of the date of implementation, July 1, 2004. A letter of notification was provided to the Government of Yukon, Water Resources Branch, on July 15, 2004 from SRK Consulting on behalf of the Interim Receiver.

On August 16, 2004 an additional notification was provided to the Government of Yukon from SRK Consulting, outlining the proposed response plan to address this issue. The response plan outlines a staged approach to investigating the increase sulphate concentrations at V2. The following outlines the key components of the response plan:

- Collection of Routine Water Quality Samples;
- Review of Existing Water Quality Record;
- Detailed Contaminant Pathway Survey;
- Installation of Flow Monitoring Station on Grum Creek;
- Groundwater Monitoring Well Installation; and
- Preparation of Status Report.

In May 2005, a status report was submitted to Government of Yukon, Water Resources Branch, Water Inspector from SRK Consulting on behalf of the Interim Receiver and the Water Board which address five of the six key components of the response plan. The main findings in the status report were as follows:

- sulphate and zinc concentrations at V2 and V2A have increased over a period of several years;
- flow from V2A infiltrates into the base of Moose Pond. Downgradient seepage at Moose Seep was noted to have elevated sulphate and low zinc concentrations, which indicated that zinc attenuation was occurring along the groundwater flow path;
- sampling at the toe of the Grum Dump indicates that dump is generating zinc loads on the order of 1,700 kg/year;
- sampling downgradient of the dump showed that zinc loading from Grum Dump into Vangorda Creek is about 5 kg/year. Significant attenuation was noted along of the potential surface and shallow subsurface flow paths that were monitored;
- monitoring of Vangorda Creek at V1, upstream of the mine site, has shown that background concentrations of zinc loads in Vangorda Creek are on the order of 140 kg/year; and
- monitoring of Vangorda Creek at V27, downstream of the mine site, has had variable concentrations of zinc and sulphate, with no discernable trends since the start of mining.

Based on the review of water quality and available discharge data for Grum Dump catchments and Vangorda Creek, the May 2005 status report recommended the following actions:

- Increase surface and groundwater monitoring downgradient of Grum Dump;
- Discuss options for collection and transfer or surface water with site management;
- Adopt a zinc concentration of 0.5 mg/L in three consecutive samples as an interim threshold for the implementation of water collection activities;
- Continue Spring/Fall monitoring of seepage and surface water locations downgradient of Grum Dump that are not sampled as part of routine or AMP monitoring programs;
- Install additional monitoring wells, including a well downgradient of Moose Pond; and
- Continue Grum Creek flow monitoring.

During 2005, all the actions listed above were implemented. Frequency of surface water monitoring at AMP reference water quality stations V15, V2, and V2A was increased to bi-weekly, and bi-weekly sampling of Moose Seep was initiated, in September 2005. Results of this sampling were screened as part of the monthly review of site-wide routine water quality data, to identify exceedances of thresholds for implementation of water collection. No thresholds were exceeded in 2005. A detailed summary of 2005 response activities was submitted to the Water Board and Government of Yukon, Water Resources Branch in October 2006.

In 2006, water quality at Station V2 continued to show that sulphate concentrations continued to exceed the initial trigger established in the AMP. There were no additional triggers beyond that identified for sulphate in 2004, and zinc concentrations did not show the same increasing trend observed for sulphate.

Results of 2006 dump toe seepage surveys indicated that zinc concentrations in dump seepage were stabilizing, with dissolved zinc concentrations at all toe seepage stations within the previously-observed ranges. In particular, zinc concentrations in Grum Creek (the largest discharge from Grum Dump) in 2006 were within the previously observed range.

Downgradient monitoring stations east of V2 below Moose Pond and west of V2 near Vangorda Creek showed similar elevated sulphate concentrations, but zinc concentrations were typically at or near detection levels (0.005 mg/L). The 2006 monitoring data thus showed that zinc loading from Grum Dump to Vangorda Creek continued to be minimal (~5 kg/yr, as estimated from the water and load balance) and that significant attenuation was occurring along surface and shallow subsurface flowpaths.

However, the dramatic and consistent rise in dissolved zinc concentration observed at V15 in 2006 was noteworthy. The data appeared to show a classic case of breakthrough of attenuated chemical species, and the results reviewed as of the end of 2006 did not suggest that the breakthrough process has run its course. Therefore at that time it was reasonable to expect to see some measure of continued increase in zinc concentrations at V15, and that increases at V15 would lead to an increase in zinc concentrations observed at V2. A detailed summary of 2006 response activities was submitted to the Water Board as part of the 2006 AMP Annual Report.

In response to the increasing concentrations of zinc observed at the outlet of the V15 sedimentation pond in 2006, an interim collections system was installed in January 2007 to divert this seepage into an existing ditch below the V-Notch weir on Grum Creek which routes water from Grum Creek to Moose Pond at Station V2A. This interim system consisted of a pump and pipeline to convey the water. In August 2007, this system was upgraded to a diversion ditch.

The ongoing management review of the relevant water quality data from the Grum Dump area was carried out monthly in 2007. Full details of the water quality data were presented in the AMP Event #4 Response: 2007 Status Report prepared by SRK Consulting and presented in the 2007 AMP Annual Report.

In 2007, water quality at Station V2 continued to show that sulphate concentrations continued to exceed the initial trigger established in the AMP. There were no additional triggers in 2007, beyond that identified for sulphate in 2004, and zinc concentrations did not show the same increasing trend observed for sulphate.

Results of the 2007 dump toe seepage surveys continued to indicate that the zinc concentrations in dump seepage may be stabilizing, with dissolved zinc concentrations at all stations within the previously observed ranges.

The consistent rise in dissolved zinc concentration observed at V15 remained noteworthy in 2007 with the data continuing to show a classic case of breakthrough of attenuated chemical species, and the results

reviewed, as of the end of 2007, did not suggest that the breakthrough process had run its course. It was reasonable to expect to see some measure of continued increase in zinc concentrations at V15.

Despite the increases in zinc concentrations at V15 in 2007, zinc concentrations at V2 have remained very low throughout the 2007 monitoring period.

Overall, in 2007, it appeared that the partial diversion of water from Station V15 to Station V2A via Grum Creek diversion was successful in controlling the amount of zinc reporting to station V2, without having a noticeable effect on concentrations at Station V2A in Grum Creek. In 2007, as in 2006, downgradient monitoring stations east of V2 below Moose Pond and west of V2 near Vangorda Creek show elevated sulphate concentrations, but zinc concentrations were typically at or near detection levels (0.005 mg/L). The 2007 monitoring data, as in 2006, thus showed that zinc loading from Grum Dump to Vangorda Creek continued to be minimal (~5 kg/yr), as estimated from the water and load balance) and that significant attenuation was occurring along surface and shallow subsurface flowpaths.

5.4 2008 Review

The ongoing review of the relevant water quality data from the Grum Dump area was carried out monthly in 2008. Full details of the water quality data are presented in the AMP Event #4 Response: 2008 Status Report prepared by SRK Consulting and presented in Appendix A of this AMP Review.

In 2008, water quality at Station V2 showed that sulphate concentrations continued to exceed the initial trigger established in the AMP. There were no additional triggers beyond that identified for sulphate in 2004. Since mid-2007, sulphate concentrations at V2 decreased and have stabilized around 700 mg/L. In 2008, the range of zinc concentrations at V2 was similar to that observed in 2004 through 2007, between 0.05 and 0.06 mg/L, indicating that the partial diversion for flows from V15 to Moose Pond was successful in controlling zinc concentrations, in the downstream receiving environment.

Results of the 2008 dump toe seepage surveys indicate that the zinc concentrations in dump seepage have not stabilized, with the highest observed dissolved zinc concentrations occurring at several toe seepage stations in 2008.

The rise in dissolved zinc concentration observed at V15 in 2006 and 2007 remains noteworthy. The data continue to show a classic case of breakthrough of attenuated chemical species. Zinc concentrations reached a maximum in October 2007 (1.2 mg/L) before appearing to stabilize at approximately 1 mg/L throughout 2008.

Despite the increase in zinc concentrations at V15, zinc concentrations at V2 have remained very low throughout the 2008 monitoring period. The data suggests that the partial diversion of water from Station V15 to Station V2A via the Grum Creek diversion has been successful in controlling the amount of zinc reporting to station V2, however it appears as though concentrations at Station V2A in Grum Creek have increased as a result of this diversion. Since June 2008, dissolved zinc concentrations at V2A have increased from below 0.2 mg/L to between 1 and 2 mg/L.

Downgradient monitoring stations east of V2 below Moose Pond and west of V2 near Vangorda Creek show elevated sulphate concentrations, but zinc concentrations are typically at or near detection levels (0.005 mg/L). The 2008 monitoring data showed that zinc loading from Grum Dump to Vangorda Creek continued to be minimal (~5 kg/yr, as estimated from the water and load balance) and that significant attenuation was occurring along surface and shallow subsurface flowpaths.

The following summarizes recommendations for continued monitoring of water quality downgradient of Grum Dump, and for implementation of additional water management if zinc concentrations exceed acceptable levels. Details are provided in Appendix A.

1. Continue monitoring Reference Water Quality Stations, as required under the AMP, by site environmental staff on a twice-monthly basis.
2. Continue to divert seepage from station V15 (the sedimentation pond) to station V2A in 2008, via Grum Creek diversion, as a pro-active short-term mitigation strategy to minimize zinc concentrations at station V2 until a final closure plan can be implemented.
3. Implement collection and transfer of water to Vangorda Pit or Little Creek Pond if zinc concentrations exceed acceptable levels at station V2, at Moose Seep, or at Moose Well.

    a. In the absence of site specific water quality objectives, the discharge water quality criteria of 0.5 mg/L zinc will be used as an interim threshold for implementation of water collection activities. Surface water collection and transfer would be implemented if three consecutive samples either at Station V2, at Moose Seep, or at Moose Well 2 exceed 0.5 mg/L zinc.

    b. Once a site-specific water quality objective has been developed for Vangorda Creek, the threshold for implementation of contingency measures should be re-evaluated to ensure that loading from this flow pathway is within acceptable limits.

    c. In the event that the interim threshold is exceeded, notification will be sent to the Water Board within 30 days.
4. Continue Spring/ Fall downgradient pathway and dump toe seepage surveys.
5. Reinstall Grum Creek weir flow-monitoring instrumentation and continue monitoring.
6. Review monitoring data on an ongoing basis. Results of the Reference Water Quality Station monitoring data should continue to be included as part of the regular monthly report to the Water Board.
7. Summarize the 2009 monitoring results in an annual AMP Event #4 Status Report.

6. AMP Event 5, Degraded Water Quality in the North Fork of Rose Creek

6.1 Description

Water quality in the North Fork of Rose Creek could be negatively affected by rock dump seepage, seepage or overflow from the Zone 2 Pit, seepage from the disturbed area between the creek and the Zone 2 Pit and the rock drain at the haul road crossing, and contaminated groundwater from the Main/Intermediate waste rock dumps. The water quality in the North Fork of Rose Creek is measured monthly at Station X2 (YWB 2004) for total metals, dissolved metals, pH, temperature, conductivity, total suspended solids (TSS), sulphate, hardness and ammonia. The flow rate is also measured monthly at X2.

The environmental consequence of degraded water quality in the North Fork of Rose Creek is the potential exposure of aquatic resources, terrestrial resources and human resources to increased levels of contaminants in the North Fork, Rose Creek Diversion canal and, possibly, further downstream in Rose Creek, Anvil Creek and the Pelly River. Zinc is currently the primary contaminant of concern and zinc and sulphate are currently the primary indicators of acid rock drainage. However, the consideration of degraded water quality should include other metals and contaminants which could source from the rock dumps, open pits and other mine facilities.

6.2 Summary of Implementation Protocol Information

As part of the 2005 Annual Review, an assessment was carried out to determine if there were any statistically significant seasonal differences in the sulphate concentrations at X2, and if necessary determine seasonally based threshold values for sulphate at X2 based on the reference period (1998 – 2002). Concentrations of sulphate during the reference period were found to exhibit seasonal variations. Using the Analysis of Variance and Multiple Comparisons (Least Significant Difference) at a 5 % significance level, statistically higher concentrations are observed in the winter months (November – April) compared to the open water months (May – October). Given this seasonal variability, it was recommended that the AMP Protocol for X2 be modified for sulphate to include two seasonal components: open water season (May – October) and winter (November – April). The following is a summary of the modified AMP Implementation Protocol information for this event to serve as a quick reference for the review that follows.

Indicators	Locations	Thresholds	Monitoring
$Zn_{(T)}$, and $Cu_{(T)}$	X2	• three consecutive results > 75th percentile of reference period; or • statistically significant trend projects >75th percentile of reference period within three years.	Monthly
SO_4	X2	• three consecutive results > 75th percentile of reference period (15 mg/L); or • statistically significant trend projects >75th percentile of reference period within three years.	Monthly (May – October)
SO_4	X2	• three consecutive results > 75th percentile of reference period (30 mg/L); or • statistically significant trend projects >75th percentile of reference period within three years.	Monthly (November – April)

6.3 Background

Review of the April 2006 water quality data from X2 against the winter seasonal threshold indicated that the concentration of sulphate was greater than the trigger level for three consecutive monthly samples (January 23rd, February 14th and April 25th). No sample was collected in March due to the sample location being frozen. This was documented in the monthly data report to the Yukon Water Board dated May 29, 2006. This trend in elevated sulphate concentrations during the winter low flow months was consistent with historical trends due to influence of groundwater "baseflow" during the winter season. Although present at concentrations above the winter seasonal threshold value, the levels were within the range of those seen historically during the winter months at X2 (1998 – present).

The following short term management plan was outlined for this trigger event:

> ***Upon receipt and analysis of the upcoming monthly samples for May at location X2, an assessment will be provided to the Water Inspector if the trigger continues (per the AMP Protocol).***

As expected the sulphate concentration at X2 in May 2006 showed that with the onset of spring freshet the concentrations of sulphate dropped to 4.85 mg/L, well below the open water threshold value of 15 mg/L. Trend analysis carried out on the 2003 to 2006 winter low-flow sulphate data indicated that there is a statistically significant increasing trend in sulphate concentrations at X2. When carried forward, this trend indicated that winter sulphate concentrations will remain above the threshold of 30 mg/L. This same trend was not seen in the corresponding open water sulphate data (2003 to 2006).

In May 2006, another trigger was identified at X2 for zinc. This was documented in the monthly data report to the Yukon Water Board dated June 29, 2006. After incorporating the May 2006 data, there was a statistically significant increasing trend in the concentration of total zinc that estimated the concentration of total zinc would exceed the threshold concentration of 0.06 mg/L in April 2007. In response to this trigger the following short term management plan was outlined:

Upon receipt and analysis of the upcoming monthly samples for June at location X2, an assessment will be provided to the Water Inspector if the trigger continues (per the AMP Protocol).

Subsequent analysis of monthly samples for total zinc at location X2 confirmed the continuation of this trigger and in October 2006 concentration of total zinc reached the threshold value.

There were, therefore, two confirmed and outstanding triggers for location X2 in 2006, projected continued elevated winter sulphate concentrations and increasing zinc concentrations.

Review of the April 2007 data found that three consecutive monthly total zinc concentrations exceeded the threshold value of 0.06 mg/L (0.065 mg/L in October 2006, 0.064 mg/L in November 2006 and 0.18 mg/L in April 2007). Glaciation and ice conditions at this location limited sample collection between December 2006 and March 2007. This was documented in the monthly data report to the Yukon Water Board dated May 28, 2007. After incorporating the May 2007 data, there continued to be concentrations of total zinc that exceeded the threshold concentration of 0.06 mg/L. In response to this trigger the following management plan was outlined:

In response to this trigger, and as outlined in the 2007 AMP Annual Review, a comprehensive assessment is being carried out including analysis of water quality from related monitoring locations. The goal of this assessment is to provide for a preliminary identification of the dominant source of the increase concentrations. This analysis will incorporate new information that has been generated as part of the ongoing development of the Final Closure and Reclamation Plan, specifically the ongoing seepage investigation in the area below the Faro Waste Rock Dump. Based on this analysis, an appropriate response plan will be developed and filed with the Water Board, the timing of which is dependent on the closure planning process.

Preliminary assessment of the May 2007 data indicates that the total zinc concentration of 0.18 mg/L at X2 in April may be somewhat of an anomaly with the May monthly concentration being substantially lower at 0.068 mg/L and within the range of concentrations at this location in late 2006. It is thought that the reason for this substantially higher concentration in April is primarily associated with the conditions that were encountered at this location during sampling. The site was ice covered with minimal flow. Under these low flow conditions, there is minimal surface water contribution to the creek at this location and the flow is dominated by the influence of groundwater "baseflow".

Trend analysis carried out on the 2003 to 2007 winter low-flow sulphate data indicated that there was no longer a statistically significant increasing trend in sulphate concentrations at X2. Although, this was most likely confounded by the lack of winter data in 2007.

6.4 2008 Review

A management review of the relevant water quality data from X2 was carried out on a monthly basis in 2008. This data review included assessment of the two following specific thresholds for total copper, total zinc and sulphate:

- Three consecutive monitoring results greater than the upper 75th percentile of the reference period (1998 – 2002); or
- A statistically significant trend in the monitoring results (from 2003 and on) which, when extrapolated forward three years, would result in values greater than the upper 75th percentile of the reference period.

For sulphate, the data review included the assessment based on two seasonal components: open water season (May – October) and winter (November – April).

The results of the review are summarized in Table 6-1 and in Figure 6-1 and Figure 6-2. In 2008, although there were no new triggers, ongoing increased concentrations, particularly zinc during winter low flow conditions, continued to occur at X2.

Table 6-1. Summary of AMP Data at X2 (2008)

Date	Total Zinc (mg/L)	Total Copper (mg/L)	Sulphate (mg/L)
1/7/08	0.056	<0.0010	*30.9*
2/18/08	*0.099*	<0.0010	*36.4*
3/17/08	*0.094*	<0.0010	*38.2*
4/14/08	*0.097*	<0.0010	*36.3*
5/14/08	*0.076*	0.0030	6.12
6/16/08	0.037	0.0020	8.35
7/14/08	0.024	0.0010	7.3
8/11/08	0.03	<0.0010	11.7
9/15/08	0.024	0.0020	10.1
10/15/08	0.039	<0.0010	14.6
11/3/08	*0.1*	<0.0010	22.2
12/1/08	*0.092*	<0.0010	23.7
Trigger	**0.06**	**0.028**	**15[a]/30[b]**

Notes:
Italics = Exceeds Trigger Value.
a. Open Water Trigger Value.
b. Winter Trigger Value.

Figure 6-1. North Fork Rose Creek (X2) Sulphate (2003 – 2008)

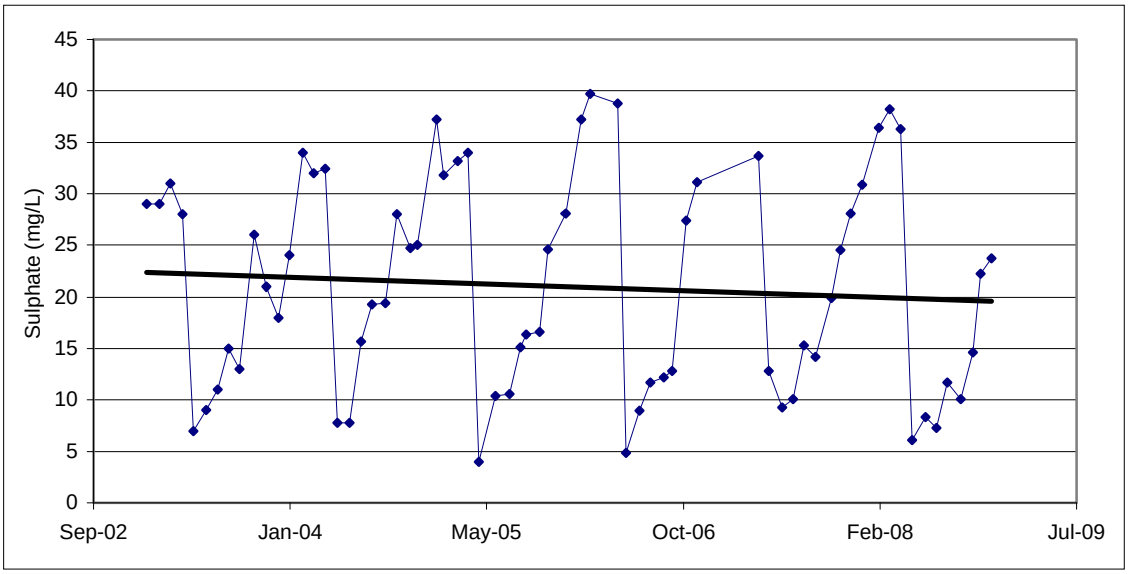
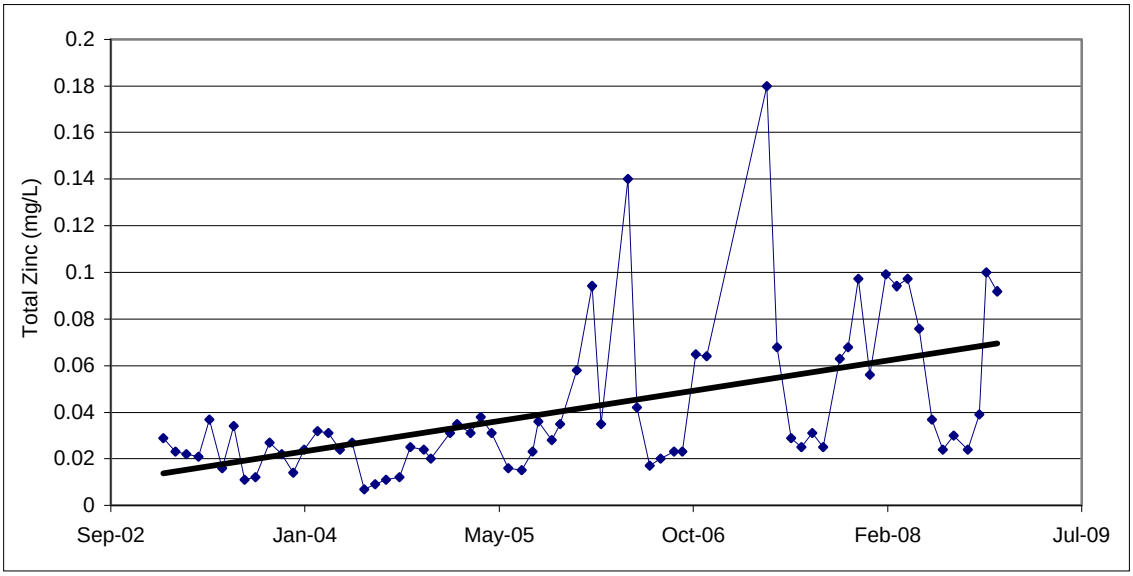


Figure 6-2. North Fork Rose Creek (X2) Zinc (2003 – 2008)



In response to the ongoing triggers at X2, a detailed assessment was carried out in 2008 incorporated the following:

- Water quality data from the key Reference Water Quality Stations outlined in the AMPIP, including X2;
- Flow data for the North Fork of Rose Creek upstream at R7 and at X2;
- Initial Review of Groundwater Quality Downstream of Faro, Grum and Vangorda WRD's Yukon Territory (Robertson GeoConsultants Inc. (RGC) 2004) as part of Task 14d Preliminary Seepage Collection Options Faro and Grum Waste Rock Dumps (SRK 2006a);
- Task 20e Anvil Range Mining Complex 2005 Seepage Investigation at the S-Cluster Area below the Faro Waste Rock Dump (SRK and RGC 2006);
- 2007 Groundwater Review Anvil Range Mining Complex, Yukon Territory (RGC 2008); and
- 2008 North Fork of Rose Creek June Surface Water Survey (Laberge 2008).

Full details of this assessment are in the Anvil Range AMP Event #5 Follow-Up Work Report prepared by Gartner Lee (now AECOM) and submitted to the Water Board on September 30, 2008. In summary, this assessment confirmed the presence of highly impacted groundwater in the S-Well area adjacent to the North Fork of Rose Creek and projected continued deterioration of the groundwater quality, particularly zinc concentrations. The likely source of the contaminant loading to this area is the Main and Intermediate Rock Dumps. The impact of this on the North Fork of Rose Creek is most evident during the winter, when flows in the creek are dominated by groundwater base flow.

There were also concerns noted in the May 2008 environmental report prepared by site management relating to elevated zinc levels in the S-wells area and the possibility of migration of contaminated water to the North Fork of Rose Creek. As a result of discussions with SRK in May 2008, it was noted that they were in the process of preparing a proposal for mitigating the risk of further contamination to the area. It was noted that in preparing a draft budget for the 2008 operating year, SRK had written the following relating to the S cluster groundwater. "Previous investigations found that concentrations of zinc and other metals (Fe, Mn) in the S-well area were highly elevated and likely contributing to loads within the North Fork of Rose Creek (NFRC)". Preliminary review of the data collected since completion of the 2005 S-well report indicated that zinc levels have continued to increase significantly over the last 2 years.

It was recommended by SRK that during the 2008 operating season further investigation of the S-wells subsurface bedrock topography and ground water quality should be carried out including significant drilling activity. In addition, engineering designs would be developed for the Seepage Interception System (SIS) in the S cluster area with focus on interim measures that target areas of high contaminate loading. Pump tests would be performed and assessed relating to the feasibility of active recovery by pumping of the contaminated water. Following several discussions between the Faro Technical Advisory Team (TAT) and the Faro Project Management Team (FPMT), during April and May, a revised project scope was recommended relating to an intervention system. Deloitte & Touche Inc. received a copy of this recommendation on June 6, 2008. On June 17, 2008, Deloitte & Touche Inc. received from SRK a proposal entitled "S-wells groundwater investigations and options for collection and treatment". The ultimate objective of the project was to determine an approach on collecting and treating contaminated groundwater in the S cluster area. Following further discussions between the TAT and SRK, a final proposal dated August 5, 2008

was received by Deloitte & Touche Inc. A portion of the delay was due to confirming availability of the required drilling rigs and scheduling them for the site. The FPMT approved the proposal on August 12, 2008 and the drilling rigs arrived mid August and the contractor completed the field work on September 17, 2008.

In late September water samples were collected from the S-wells area including surface water nearby and in close proximity to the North Fork of Rose Creek. The results of the laboratory analysis showed significant levels of zinc in both the ground water and the surface water. On October 3, 2008 Deloitte & Touche Inc. received notification by the FPMT relating to the elevated levels of zinc and a preliminary proposal prepared by the TAT relating to an intervention system in the S-well area to capture the contaminated water and send it by a pipeline to the Faro Pit as an interim measure. It was suggested that Deloitte & Touche Inc. consider setting up this intervention program this fall and winter rather than waiting until next spring, if practically possible.

Deloitte & Touche Inc. contacted the FPMT and SRK along with individuals from TAT to discuss the issues and difficulties relating to an intervention program that late in the season due to winter conditions. A conference call was arranged on October 9, 2008 with the following participants; representatives from Deloitte & Touche Inc., FPMT, SRK, and TAT. It was concluded during the conference call that an intervention should take place regarding the S-wells contaminated water and that a technical sub-committee made up of the members noted above hold a conference call following the meeting to begin the planning and initiation of the project. The technical sub-group had a conference call on the afternoon of October 9, 2008 and subsequent conference calls to formalize a planned intervention including system design, equipment requirements and all associated costs. The goal was to put in place a remedial intervention system to capture the contaminated waters at the S-wells and pump the water to the Faro Pit. It was intended to have the system operational prior to February 28, 2009. The system design and installation would be managed by SRK.

The recommendation was accepted by both Deloitte and Touche Inc. and the pertinent government agencies. A design and implementation program for the S-wells intervention was prepared by SRK with assistance from Hatch Engineering. Two Yukon contractors were asked to quote on the installation with Pelly Construction of Whitehorse receiving the contract. Installation activities were carried out in January and February 2009 under severe weather conditions, a portion of the time. The installation is on schedule with initial start-up planned, prior to February 28, 2009. Full details of this program are presented in the S-cluster Groundwater and Option Assessment Report prepared by SRK Consulting and presented in Appendix B of this report.

7. AMP Event 6, Water level in Grum Pit Reaches Maximum Desired Elevation

7.1 Description

Water quality in the Grum Pit is currently non compliant with the discharge criteria in Water Licence QZ03-059 for the Faro and Vangorda Plateau mine sites (YWB 2004) and can not, therefore, be directly released to the receiving environment. The water elevation in the Grum Pit has been rising since mine shut down in 1998 but remained safely below an overflow level at the end of 2006. Further, a report has been completed (GLL 2003a) that indicated that it is unlikely that the pit will fill to a level requiring active management before 2011, under a conservative long-term projection. Nonetheless, it remains possible that a series of extreme natural events could cause the in-pit water level to rise to a maximum desired operating range during the term of the current Water Licence and, therefore, an AMP is required to ensure that appropriate responses are implemented if necessary.

The environmental consequences of the water elevation in the Grum Pit reaching the maximum desired elevation could result in the absence of adequate emergency storage capacity for containment of a flood event and, ultimately, a release of non-compliant water to the receiving environment, Vangorda Creek. This could result in the exposure of aquatic resources, terrestrial resources and human resource users to increased levels of contaminants in Vangorda Creek and the Pelly River.

Zinc is currently the primary contaminant of concern and zinc and sulphate are currently the primary indicators of acid rock drainage. However, the consideration of degraded water quality should include other metals and contaminants that could source from the pit.

7.2 Summary of Implementation Protocol Information

The following is a summary of the AMP Implementation Protocol information for this event to serve as a quick reference for the review that follows.

Indicators	Locations	Thresholds	Monitoring
Pit water elevation and projected timeframe to maximum desired water elevation	Grum Pit	• Water level of 1,210.8 m asl; or • Projected timeframe of 1 year or less to maximum desired water level.	• Monthly; and • Annual.

7.3 Review

Water elevations were measured by mine personnel through 2008 and are illustrated on Figure 7-1. The maximum measured elevation was 1203.476 m asl, which is well below the threshold elevation of 1,210.8 m asl. Therefore, the first trigger for pit water elevation was not activated in 2008. The threshold elevation was previously determined as a "safe" elevation that is below the level where any surface or subsurface seepages would occur. As illustrated on Figure 7-1, the threshold elevation is 2.6 m below the maximum desired water level elevation (1213.4 m asl), based on the till contact elevation and allowance for emergency diversions into the pit during flooding, and is approximately 21.5 m below the elevation at which surface outflow would occur. This threshold, once reached, was established to provide preparatory time of approximately 1 to 1.5 years to develop plans for the management pit water prior to any water releases.

The timeframe for reaching the maximum desired elevation was projected using the observed rate of increase from 2003 through 2008. The measured rate of rise is illustrated on Figure 7-2, as are a best-fit power function and the projected rate of rise used for assessment of the AMP trigger. As illustrated in Figure 7-2, the rate of rise of Grum Pit increased dramatically in 2008, due in part, to the higher levels of rainfall at the site during 2008 (about 2 times normal summer precipitation). In addition, there was an increase in the amount of sloughing of till in the Grum Pit from the east pit wall. This sloughing could cause an increase in the pit lake as well as cause a possible narrowing or decrease in the surface area of the pit at the water surface area levels (SRK 2009). Therefore, with this decrease in surface area, the rate of rise from the same inflow would be higher.

The "incremental" line on Figure 7-2 indicates the rate of rise for each individual (primarily monthly measurement). The "cumulative" line on Figure 7-2 indicates the cumulative rate of rise for each measurement as compared to the initial survey in 2003. The "power" curve illustrated on Figure 7-2 is a best fit curve based on the cumulative rate of rise data, which shows the "best fit" rate of rise projected into the future. Finally, the "long term projection used" curve illustrated on Figure 7-2 shows the projected rate of rise that has been used to project future water levels (as illustrated on Figure 7-1). The power curve and the long-term projection curve both begin at the most recent water level measurement, December 2008. Figure 7-2 demonstrates that the projected rate of rise that was used for this assessment is more conservative (i.e., a greater rate of rise) than would be projected from the best-fit power curve.

The projection for the pit water level is illustrated on Figure 7-1 and demonstrates that the timeframe for reaching the AMP threshold elevation of 1,210.8 m asl is by January 2011. Therefore, the second trigger outlined in Table 7-1 was not reached in 2008. Once the trigger elevation is reached in 2011, another year is available to develop and implement appropriate systems for the management, including possible lime treatment, of Grum Pit Water. In summary, based on the projected water levels, it is anticipated that active management of the Grum Pit water will be required in 3 years time.

It has been suggested that prior to commencing conventional lime treatment, assuming this is part of the future required water management systems for Grum pit water, a time period of at least one year without biological treatment is required. If this is the case, and assuming the projected timing for active intervention is the start of 2012, then the ongoing biological treatment of Grum pit should be stopped at the end of the 2010 treatment season.

The projection presented in Figure 7-1 is considered to be conservative (i.e., overestimating the rate of rise). Additional information is being developed regarding the water balance for the Grum pit through the studies that are underway for development of the Final Closure and Reclamation Plan. However, the information is not available for reporting at this time. Regardless, the conservative projection provided here is considered to provide a lower "bound" for the timeframes required to reach the stated elevations.

Figure 7-1. Grum Pit Water Elevations and Projection

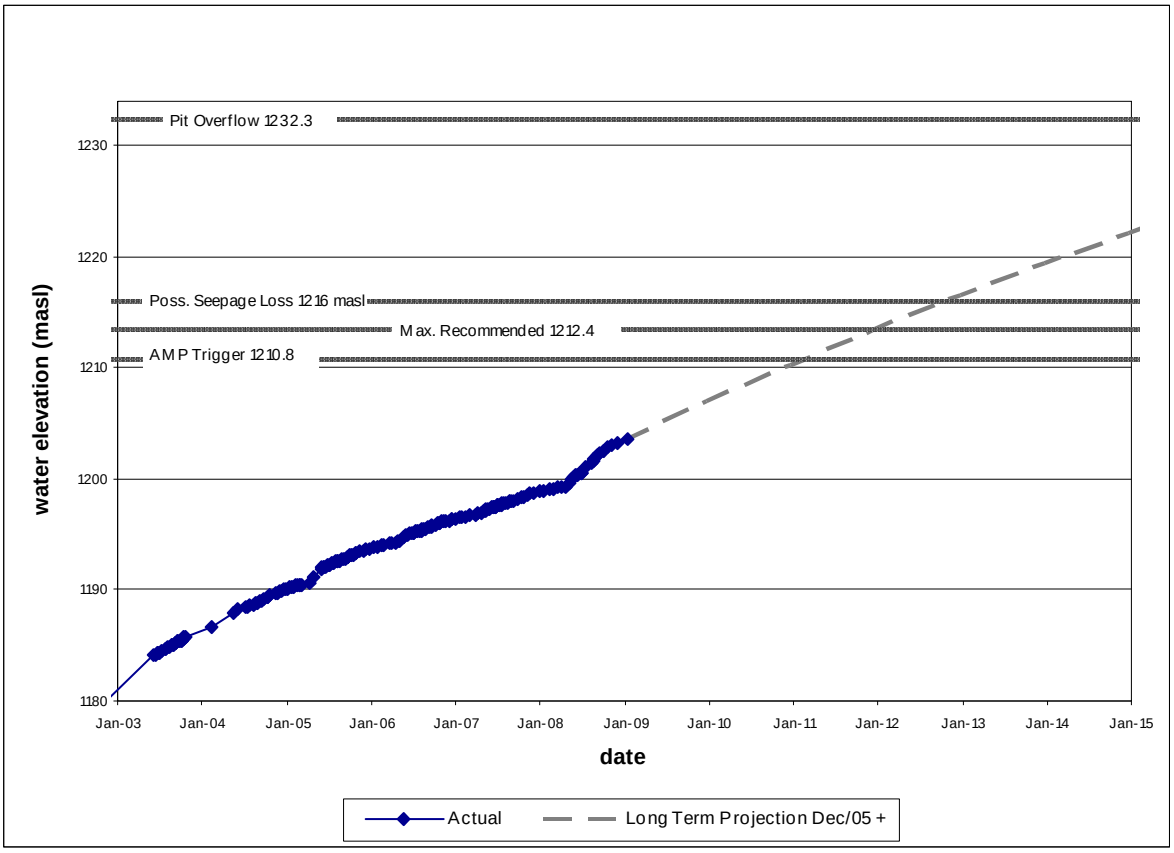
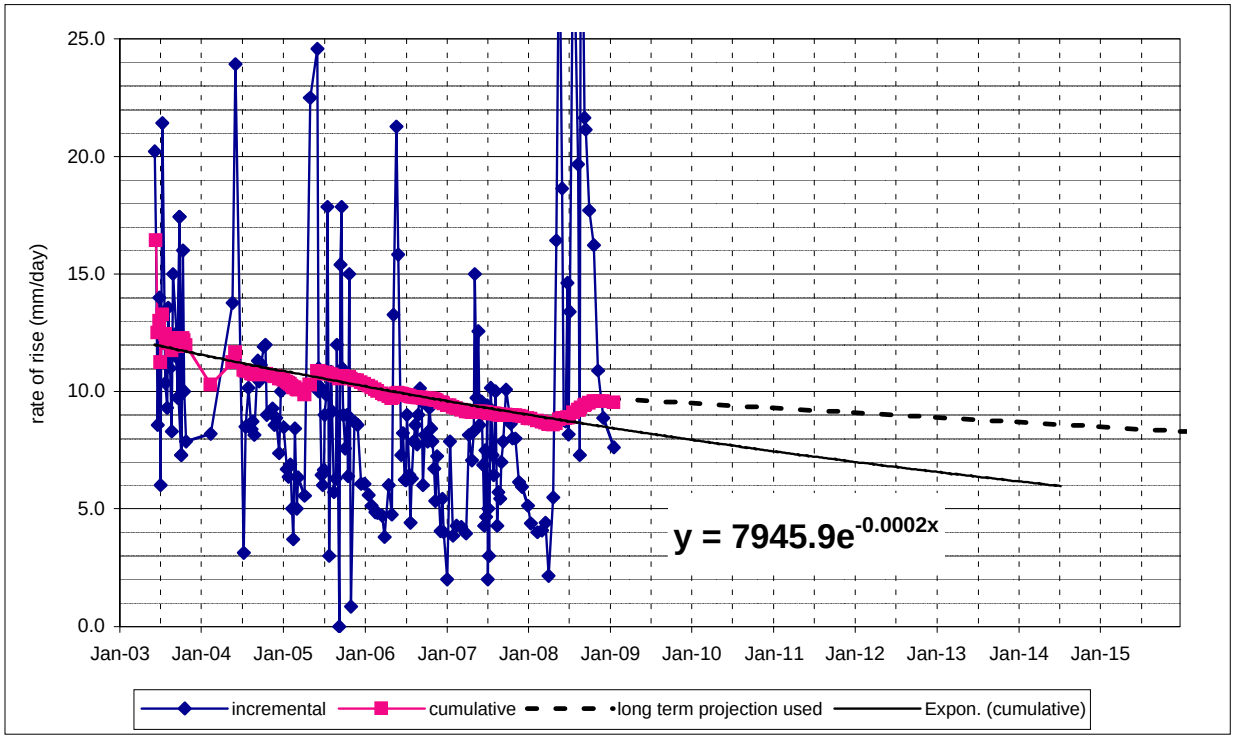


Figure 7-2. Grum Pit Water, Rate of Rise



8. AMP Event 7, Disruption of Fannin Sheep Migration Through the Mine Site

8.1 Description

It is well documented that the Fannin sheep seasonal migration route between winter and summer areas passes through the Vangorda Plateau mine site and that the sheep have continued their migration pattern through the period of mine operations and care and maintenance activities. Mine personnel routinely observe the sheep migration during the course of their activities on the mine site.

The experience gained during the 1998 to 2002 care and maintenance period indicates that the proposed continuation of care and maintenance activities should not disrupt the sheep migration patterns. The wide ranging land use by the Fannin sheep suggests that a disruption or irregularity in the migration pattern would more likely be caused by off-site effects.

However, regardless of the source, an irregularity or disruption in the migration pattern could negatively affect the health of the herd by delaying or preventing their established pattern of land use. Alternatively, an irregularity in the sheep migration could be an indicator of a previously unidentified affect on the health of the herd.

8.2 Summary of Implementation Protocol Information

The following is a summary of the AMP Implementation Protocol information for this event to serve as a quick reference for the review that follows.

Indicators	Locations	Thresholds	Monitoring
Locations, time and conditions of Fannin Sheep sightings, number and behaviour of animals	Vangorda Plateau	Determination of specific thresholds will be done by the licencee in conjunction with YG DOE	Ongoing

8.3 Review

Wildlife observations at the site are recorded in a “Wildlife Observations Logbook”. The information recorded was passed on the YG DOE Conservation Officer every three months, with no triggers being activated.

9. AMP Event 8, Wind Dispersed Tailings Result in Adverse Effects in the Terrestrial Environment

9.1 Description

At the time the AMP Implementation Protocol was originally developed, the available information demonstrated that wind dispersed contaminants (i.e., heavy metals) were present in the terrestrial environment near the mine site. This information is described in the Water Licence Renewal Environmental Assessment Report. However, at that time, this data did not clearly identify the source of the contaminants (i.e., tailings, waste rock, mining activities or emissions from the concentrator during operating periods, for example), the extent of their distribution, or whether the effects have increased, diminished or remained static through the care and maintenance timeframe (i.e., post-1998) in comparison to the operating period of the mine.

In response to concerns with respect to this issue, the Terrestrial Effects Study was initiated under the recommendation of the Environmental Assessment conducted for the Water Licence Renewal for ongoing care and maintenance activities at the Anvil Range Mine Complex (Deloitte & Touche Inc. and Gartner Lee Limited, 2003). The broad goal of the study is to answer two fundamental questions:

1. Are there any existing and ongoing impacts to the terrestrial environment (i.e., animals, vegetation and land users) that need to be addressed during the care-and-maintenance phase, while the Final Closure and Reclamation Plan is being prepared?
2. What are the impacts of the past mining operations on the terrestrial environment (animals, vegetation and land users) that should be addressed in the Final Closure and Reclamation Plan?

9.2 Summary of Implementation Protocol Information

The trigger for implementation of contingency measures under the AMP is “the 2005 Terrestrial Effects Study Report concludes that current and on-going wind dispersion of tailings is having a negative effect on the environment such that short term mitigation measures for a reduction in wind dispersion are recommended”.

9.3 Review

In September 2006, the two following reports were submitted to the Water Board as per Part F, Item 49 of Water Licence QZ03-059:

1. *Anvil Range Mine Complex – Terrestrial Effects Study: Investigation into Metal Concentration in Vegetation, Wildlife and Soils*, prepared by Gartner Lee Limited (now AECOM); and
2. *Summary Report Anvil Range Mine Tier 2 Risk Assessment of Current Conditions*, prepared by SENES Consultants Ltd.

The two combined reports fulfilled the requirements of the Water Licence. The first report presented the findings of a two-year study for gathering information on terrestrial resources (such as animals, soil, vegetation and air). The second report assessed that information for potential risks to people and wildlife. These reports, along with attached cover letter, provided a comprehensive summary of the results of the studies with respect to the requirements of the Water Licence. A copy of this was provided to the Water Board as part of the 2006 Annual Report. The key findings are presented below.

The specific objectives of the Terrestrial Effects Study were:

1. Definition of the spatial distribution of elevated metal concentrations in the terrestrial environment;
2. Determination of whether the elevated metal levels are related to historic mine activities and/or current care and maintenance activities;
3. Improvement of the characterization of natural background (reference) metal concentrations;
4. Investigation of metal levels in vegetation species of importance to humans and wildlife;
5. Investigation of metal levels in wildlife tissues, including species of importance to humans;
6. Determination of ambient air metal concentrations (required information for the Human Health and Ecological Risk Assessment (HHERA)); and
7. Identification of potential sources of ongoing metal deposition.

This work relied on the participation provided by the Ross River Dena, Selkirk First Nation, Town of Faro and scientific experts to guide the collection of information, including metal levels in small mammals, large animals, soil, vegetation, berries, and air quality.

The information collected in the terrestrial environment showed that past operations at the Anvil Range Mine have resulted in metal concentrations in the mine area that are greater than the reference/background levels. For example, lead concentrations near the mine are up to 450 times those at reference sites and the lead isotope analysis indicates that the majority of the lead deposited in the study area was from mine ores. The concentrations of metals that originated from the mine site are generally higher near the mine and decline with distance from the mine. Deposition of some metals from the mine site is still occurring in the immediate area, mostly during the snow-free period.

Metal concentrations that were greater than the reference/background levels were detected in plants, small mammals and other wildlife in the area. This information does not necessarily indicate a high risk to wildlife or people but reinforces the appropriateness of conducting a human health and ecological risk assessment, as described below.

The HHERA for the current conditions at the site was developed using the information collected at the Anvil Range mine as supplemented by other general information where necessary to complete the assessment.

The assessment was based on the current care and maintenance activities being carried out at the site, as is appropriate to the requirements of the Water Licence.

The results of the ecological risk assessment indicate that no adverse health effects are expected in fish and animals that are currently present on the site. The human health risk assessment indicates that humans who use the site for approximately 1.5 months per year to gather berries and trap animals and also hunt and eat animals from the site are not at risk from adverse health effects.

Although based on the results of the HHERA, there is no need for short-term mitigation to ensure animals and people are adequately protected from risks associated with on-going wind dispersion of tailings while the Final Closure and Reclamation Plan is being developed, due to the ongoing concerns related to dusting from the tailings area at the site, a Tailings Dust Control Project was initiated in 2008 (Appendix C). The main area of concern for wind erosion has been identified as the Original and Secondary tailings impoundments with smaller contributions from parts of the Intermediate impoundment. All together these areas cover approximately 196 hectares but due to parts of the impoundments being covered by water, the maximum potential area requiring dust control was found to be 136 hectares.

Despite the fact that the tailings areas are covered by snow for a portion of the year, the potential for dust generation during the summer months was considered to be significant enough to justify investigating potential remediation methods. A number of physical and chemical control options were considered as part of this project. Soil Sement, a water-soluble liquid polymer, was selected as it was expected to have the best results in the unique environment at Anvil Range. A test application was proposed to determine how effective Soil Sement will be and how long the service life for a single application is.

Sufficient Soil Sement was procured to conduct tests over approximately 16 hectares of the tailings and three areas on the various impoundments were identified as having the highest dust generation potential. A delivery system was developed on site based on the equipment used at the Giant mine site. All of the preparations for the test project were completed by the end of July. Due to the consistently wet conditions meaning minimal dust and to the limited window of time available for testing before cold weather and snow were expected the, actual testing has been postponed until the summer of 2009.

10. Recommendations

Based on the information assessed and described in this report, we feel that the AMP program is functioning as intended.

As outlined in Section 2 we recommend that the following modifications be implemented at this time, specifically:

- AMP Event 1– Degraded Groundwater Quality in Rose Creek Valley Aquifer – add P03-06 and X21 as trigger locations.

Other than these specific recommendations, the AMP program functioned as intended in 2008 and no other changes should be made.

Appendix A

AMP Event #4 Response: 2008 Status Report

Prepared by SRK Consulting

Appendix A AMP Event#4 Response: 2008 Status Report

Found in digital file AppxA_Event4_2008StatusReport_SRK

AECOM

Appendix B

2008 S-cluster Groundwater Investigation and Option Assessment

Prepared by SRK Consulting

Appendix C

Tailings Dust Control Project

Appendix B 2008 S-cluster Groundwater Investigation and Option Assessment
Found in digital file AppxB_S-Cluster_2008_SRK

DELOITTE & TOUCHE INC.

ANVIL RANGE MINE SITE
TAILINGS DUST CONTROL
TEST PROJECT

FARO MINE, YT

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1.0 INTRODUCTION

The Anvil Range mine site is situated roughly 20 kilometers to the north of the town of Faro and the tailings impoundments are situated adjacent to the Rose Creek Diversion on the western end of the site. The main area of concern for wind erosion has been identified as the Original and Secondary tailings impoundments with smaller contributions from parts of the Intermediate impoundment. All together these areas cover approximately 196 hectares but due to parts of the impoundments being covered by water, the maximum potential area requiring dust control was found to be 136 hectares.

Despite the fact that the tailings areas are covered by snow for a portion of the year, the potential for dust generation during the summer months is considered to be significant enough to justify investigating potential remediation methods. A number of physical and chemical control options were considered with Soil Sement, a water-soluble liquid polymer, expected to have the best results in the unique environment at Anvil Range. A test application is required to determine how effective Soil Sement will be and how long the service life for a single application is.

Sufficient Soil Sement was procured to conduct tests over approximately 16 hectares worth of the tailings and three areas on the various impoundments were identified as having the highest dust generation potential. A delivery system was developed on site based on the equipment used at the Giant mine site. All of the preparations for the test project were completed by the end of July. Due to the consistently wet conditions meaning minimal dust and to the limited window of time available for testing before cold weather and snow were expected the, actual testing has been postponed until the summer of 2009.

2.0 PROJECT BACKGROUND

2.1 Alternatives Considered

The report prepared by Brodie Consulting outlined a number of dust control methods commonly used and assessed their suitability for the tailings at the Anvil Range mine. All of the methods presented were divided into two categories: physical or chemical control.

Physical dust control methods such as increasing surface roughness or tilling in mulch or straw are not recommended for use at the Faro site because of the potential for release of oxidation products that the soil disturbance would cause. The construction of wind breaks or installation of a rip rap cover are two other commonly used methods of dust control but both are generally better suited to smaller areas than what is at the Anvil Range site. Both of these two methods are also generally longer term than what is required currently at this site where it is anticipated that a long term plan for the tailings will be

2.0 PROJECT BACKGROUND (continued)

developed in the near future. The final physical approach discussed is the planting of grass to help bind the surface material. This is not feasible as the tailings are toxic to grass.

Chemical dust control strategies fall in to two categories: water based or glues and binders. Water based dust suppression requires some sort of system that can apply water to the target area on a continuous basis. There are several wetting agents, foams and humicants that can be added to enhance the effectiveness of plain water. It was observed that because of a wetter than average summer in 2008, the rainfall provided adequate dust control for more than half of the time that the tailings weren't covered by snow anyway. Glues and binding agents work by forming the surface particles into larger masses that are less likely to become airborne or by forming a crust over top of native soil. As most of the products available in this category can typically function for a period of months to years before requiring reapplication, this was considered to be the best method of dust control for the Anvil Range mine site.

Soil Sement is applied by mixing with water and then spraying over the target area. After the water evaporates, the polymer remains in place to bind the soil and prevent dust generation. The effective service life of this product typically varies from site to site so testing at the Faro location is required to determine its effectiveness and the required re-application period.

2.2 Application Requirements

A very light application rate of 1000 L/ha was chosen for the test project primarily since the areas being considered are relatively large and it would be very costly to apply a heavier coating. The equipment that was available on site, which will be discussed further in the following section, presented some additional constraints:

1) It was observed that a full tank of water can provide continuous spray out of four nozzles for roughly 30 minutes.
2) Based on the volume of the tank it was decided that adding two barrels of product to the tank and then filling it with water would give the desired mix.
3) The spray arms mounted on the back of the tank provide roughly 6.5 metres of effective coverage when spraying.

Using these conditions it was calculated that one full tank can cover an area of roughly 4200m^2 or one strip of tailings 6.5m wide and 640m in length. To ensure that the desired thickness is achieved, the tank should travel at 1.3km/h while spraying.

3.0 PROJECT PREPARATIONS

3.1 Overview

Preparations for the test project began the week of July 13th, 2008. Over a period of four days, preliminary tests were conducted and appropriate adjustments were made to calibrate the tank and its components for the spraying of the tailings. During this time, arrangements were also made for all equipment and materials needed to be properly stationed for the spraying of the tailings. This included procuring pumps and hoses to pump fresh water from Rose Creek to where the tank would be filled and the relocation of the Soil Sement from storage to the first spraying location.

The three selected areas of the tailings impoundments, which can be seen in Appendix B, were staked out for testing. At all three of the areas identified the stakes were placed in rows spaced at intervals of 6.5m marking the path that should be followed when spraying to ensure the best coverage. Rows of stakes were placed every 25m along the bottoms of the different impoundment dams.

The spraying of the tailings was intended to take place starting the week of July 20, 2008. However, due to continuous rainfall with only brief periods of dry weather, the spraying was delayed and eventually postponed until the spring of 2009.

3.2 Equipment

Tank on Chassis

Some of the equipment needed for the spraying such as pumps and hoses for drawing fresh water from Rose Creek was readily available on site and was procured with the assistance of Anvil Range personnel. The actual tank system that holds the water and Soil Sement mixture had to be constructed specifically for the spraying project.

A 1000 U.S. gallon tank was available on site and was mounted onto a chassis with a hitch and axel to provide mobility for the tank when spraying, and when moving to and from site. Two spray arms with several nozzles that can be opened and closed individually as required were mounted to a valve at the back end of the tank. These bars, when not in use, can be detached and placed on the side of the tank along with any hoses. A pump sits on the back end of the chassis where the spray bars connect to the tank.

Spray Pattern of Nozzles

3.3 Preliminary Testing

On Monday, July 14th, 2008, the dimensions of the tank were measured and the preferred sections of the tailings impoundments to be sprayed were chosen. The tank was hitched to the hiab and brought

3.0 PROJECT PREPARATIONS (continued)

down to the lime bay at the mill where the tank was filled with water. It was then relocated behind bay 14 and a test run was performed to

determine the effectiveness of the spray pattern. The results showed that the spray pattern provided adequate coverage along the length of the spray bars, although there was substantial overlap of the water coming out of each of the nozzles. Half-inch spray valves and plugs were added to solve this issue by allowing for fine-tuning of the spray and the tank was then filled again with water from the lime bay. The tank was placed behind bay 14 for continued testing the next day.

Spray Valve

The morning of July 16th, the valves were installed on the spray nozzles and various combinations of open and closed valves were tested to determine what would provide minimal overlap while still maintaining sufficient coverage. It was found that having 4 of the 10 valves full open with the remainder closed was the optimal arrangement. Next a test run was performed to determine the volumetric flow rate with this configuration of nozzles. A pump was then brought down to Rose Creek and set up to pump water up to the first tailings impoundment. The tank was also placed by the turnoff to the first tailings impoundment from the main road. The hiab was then loaded up with 8 skids of Soil Sement barrels, which were delivered to the first tailings impoundment. All of the Soil Sement was later moved to the Yates guest house for storage over the winter months when the project was postponed.

The staking out of the three areas began on July 17th, and carried on into the following week. One at the toe of the first impoundment has a length of 600m resulting in a 6ha area. Another along the toe of the damn at the second impoundment running 300m, contributes another 3ha of test area. The final area was staked out alongside the main road to the Guard House going past the first tailings impoundment at a length of 300m. The total area identified for test coverage is 12ha.

4.0 CONTINUING OPERATION

In order for the spraying of the tailings to take place, certain conditions must be satisfied prior to operation.

1) The Soil Sement must be brought to the site where spraying will take place.
2) A supply of water must be made available.
3) The tank system requires some form of machinery that can pull it across the tailings.

Currently, 80 barrels of Soil Sement are in storage at the Yates guest house and should be brought to the mine site where the spraying will occur. A pump and a sufficient length of hose may be set up to draw water out of Rose Creek and into the tailings impoundment, where

4.0 CONTINUING OPERATION (continued)

the tank can be filled up. Alternatively, the vacuum truck located on site could be used to collect water and then fill up the tank. This second option although more difficult will likely be required for the

spraying of the area located on the Intermediate impoundment. A second pump is required to draw the Soil Sement out from the barrels and into the tank. With the selected test areas already staked out, it is then just a matter of spraying these areas with the appropriate application rate (see preliminary calculations in Appendix A). The rate of application can be adjusted both with the spray valves and the pump. Recirculating the tank contents with the pump can accomplish the required mixing in the tank.

5.0 CLOSURE

This report summarizes the process leading to the selection of Soil Sement as the dust control method of choice for the Anvil Range Mine site as previously discussed in greater detail in the report submitted by Brodie Consulting Ltd. It also outlines the preparations made on site for a test application prior to the project being postponed because of ongoing unfavorable weather conditions. Recommendations and guidance for operation have also been discussed in this report. All of the preparations should allow for the testing to begin as soon as the snow cover recedes from the tailings in the summer of 2009.

We trust that the information presented herein meets your current requirements. If you have any questions or require further information, please contact the undersigned.

Respectively submitted,

Michael Brewer, BASc

Civil Engineer

Chris Croy

Environmental Technician

6.0
REFERENCES

Brodie, J. Brodie Consulting Limited. (2008). *Tailings Dust Control*. Retrieved July 7th, 2008

APPENDIX A:

PRELIMINARY CALCULATIONS

Required Application Rate:	1000 L/ha undilute	
Dilution when adding 2 barrels per tank:	(2 x 55 gal)/(1000 gal) x 100% = 11%	
	→ 9000 L/ha dilute	(2377 gal/ha)
	→ 0.9 L/m²	(0.24 gal/m²)
Observed Spray Rate:	1000 gal/30 min	(33 gal/min)
Spray Arm:	21 ft	(assume 6.5 m coverage)
Coverage Per Tank:	(1000 gal/tank)/(0.24 gal/m²) = 4167 m²/tank	
	→ 641 m x 6.5 m	
Required Speed of tank and machine	(641 m)/(30 min) = 1.3 km/h	

APPENDIX B:

TAILINGS PERIMETERS

100m x 600m
100m x 300m
100m x 300m

Deloitte & Touche

AMP Event #4 Response: 2008 Status Report

FINAL

Prepared for

Deloitte and Touche Inc.

On behalf of

Faro Mine Closure Planning Office

Prepared by

SRK Consulting
Engineers and Scientists

Project Reference Number
SRK 1CD003.110

December 2008

AMP Event #4 Response: 2008 Status Report

FINAL

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SRK Project Number 1CD003.110

December 2008

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Appendix A: Water Quality Monitoring Results
Appendix A1: 2002-2008 Waste Rock Seepage Survey Results
Appendix A2: 2003-2008 Downgradient Seepage Pathways South of Grum Dump
Appendix A3: 2005-2008 Groundwater Data

Executive Summary

Title: Faro Mine Complex: AMP Event #4 Response 2008 Status Report

Consultant: SRK Consulting (Canada) Inc.

Status: Final

Date: December 2008

Size: 23 Pages of text (including cover, introductory and reference list); 15 Pages of Figures (including one flysheet), 3 Appendices containing 3 pages (including 3 non-standard 11 x 17 pages and 5 flysheets).

Digital File: PDF format; 9.3 MB

Objectives and Primary Findings:

This report provides an update on the 2008 field activities and monitoring results relating to Adaptive Management Plan (AMP) Event #4 ("*Degraded Seepage Quality from the Grum Rock Dump"*) and compares the current year's results with results from previous monitoring.

Results of 2008 dump toe seepage surveys indicate that zinc concentrations in dump seepage have not stabilized, with the highest observed dissolved zinc concentrations occurring at several toe seepage stations in 2008.

It appears that partial diversion of water from station V15 to station V2A via the Grum Creek diversion has been successful in controlling the amount of zinc reporting to station V2, however it appears as though concentrations at Station V2A in Grum Creek have increased in corresponding fashion.

Downgradient monitoring stations indicate that zinc loading from Grum Dump to Vangorda Creek continues to be minimal (~5 kg/yr, as estimated from the water and load balance) and that significant attenuation is occurring along surface and shallow subsurface flowpaths.

Future Work Recommendations:

It is recommended that waste rock and seepage monitoring be continued at the same level as carried out since 2004. Grum Creek weir flow-monitoring instrumentation should be reinstalled.

1 Introduction

As required under Water Licence QZ03-059, an Adaptive Management Plan (AMP) for the Anvil Range Mine was submitted to the Yukon Territory Water Board on June 30, 2004 (GLL, 2004). The AMP outlines the short-term mine management strategies that have been instituted to ensure environmental protection during the period leading up to the implementation of a Final Closure and Reclamation Plan.

Event #4, *"Degraded Seepage Quality from the Grum Rock Dump"*, addresses the potential for increased contaminant loadings from Grum Dump to levels which could have an adverse impact on the receiving environment in Vangorda Creek. The initial trigger for the implementation of the AMP was a sustained and statistically significant increase in concentrations of sulphate, copper or zinc in seepage from the Grum Dump.

The trigger established for sulphate was exceeded on the date of AMP implementation (July 1, 2004). In response, a plan detailing additional monitoring efforts and further investigations was developed to obtain a better understanding of hydrological and geochemical conditions downgradient of the Grum Dump, and to assess the level of environmental impact of Grum Dump loadings on Vangorda Creek. The response plan (SRK 2004) was initiated in the fall of 2004, with ongoing monitoring continuing since that time. The 2004 through 2007 activities are documented in a series of annual status reports (SRK 2005, SRK 2006, SRK 2007 and SRK 2008).

This report provides an update on the 2008 field activities and monitoring results. The document is organized as follows:

- Summary of 2008 field activities that were completed as part of AMP response and other programs relevant to Grum Dump seepage;
- Discussion of 2008 monitoring activity results, review of historical water quality at selected stations, and conclusions from 2008 water quality monitoring;
- Summary of 2008 Response Plan activities, and
- Recommendations for further activities.

2 Summary of 2008 Field Activities

2.1 Water Quality Monitoring

2.1.1 Reference Water Quality Stations

Monitoring of the nine Reference Water Quality Stations (RWQSs) (Figure 1) identified in the AMP and in subsequent follow-up work was carried out by site environmental staff or by Gartner Lee Limited (GLL) during 2008. Table 1 provides a description of each of these stations.

Table 1: Locations of Reference Water Quality Stations

Station Name	Location	Frequency
V15	Outlet of the Tributary A sedimentation pond.	Biweekly (year round)
V2	Main stem of Grum Creek, below Tributary A.	Biweekly (May to Oct.)
P96-9A and BH05-9b	Adjacent to Tributary A, downgradient from V15.	Semi-annual (spring/fall)
V2A	Culvert outfall of the ditch that presently diverts Grum Creek into Moose Pond.	Biweekly (May to Oct.)
Moose Seep	Between Moose Pond and Vangorda Creek.	Biweekly (May to Oct.)
Moose Well 2	Between Moose Pond and Vangorda Creek.	Biweekly (year round)
V14	Grum Dump Toe Access Road downgradient of SRK-GD05. This station appears to have changed locations over the course of the monitoring period, and may also have been monitored on the road upgradient of Sheep Creek, and upstream of V15 at the dump toe.	Semi-annual
V16	Ditch adjacent to the Grum Toe Access Road between V15 and Grum Creek.	Semi-annual (spring/fall)

2.1.2 Waste Rock Seepage Survey

Seepage from the toe of the Grum waste rock dump has been monitored as part of the semi-annual seepage survey that has been carried out since 2002. Seepage from the southern toe of the dump is monitored at stations SRK-GD1, SRK-GD4, SRK-GD5, SRK-GD6, SRK-GD-16 and SRK-GD21 (Figure 1).

Monitoring results are discussed in the Results section of this report. A broader discussion of waste rock dump seepage will be included in the 2008 Waste Rock and Seepage Monitoring Report (SRK, in progress).

2.1.3 Downgradient Pathways Survey

Selected seepage monitoring stations downgradient of the Grum waste rock dump (GD05 d/s, Sweet Creek, Sheep Creek) have been monitored on a spring/ fall basis since 2003. Two additional stations were added to the program starting in 2004 (WGD01 and WTA-02). Station locations are shown in Figure 1.

Monitoring results are discussed in Section 3.1.3.

2.1.4 Additional Groundwater Monitoring

Five additional groundwater monitoring wells that are not included in the list of reference water quality stations were installed in 2004 and 2005. These five wells (SRK04-5A, SRK04-5B, SRK05-5C, SRK05-07, and SRK05-08) are located adjacent to the Grum Dump Toe Access Road, as shown in Figure 1.

2.1.5 Quality Assurance and Quality Control

For the waste rock seepage survey and downgradient pathways survey, duplicates and field blanks were collected as a check on the quality of the field methods and laboratory results.

Ion balances were calculated for all samples to ensure total anions were in balance with total cations in solution. During evaluation of September 2008 water analyses, it was found that ion balances were very poor when they were calculated using reported sulphate concentrations. The balances were greatly improved when sulphate was calculated from total dissolved sulphur concentrations; therefore, reported sulphate concentrations were replaced with calculated sulphate values for the September 2008 sampling round.

2.2 Flow Monitoring at the Grum Creek Weir

A 90° V-notch weir was installed on Grum Creek at the upstream end of the Grum Creek Diversion in September 2004. In 2005, the water level was recorded using a Thalimedes water level monitoring instrument, with a built-in data logger. The Thalimedes required removal prior to winter freeze-up and reinstallation prior to spring freshet if peak flows were to be recorded. However, due to variable timing of spring melt, it was found to be difficult to schedule the spring reinstallation exercise. The Thalimedes was removed in September 2005 for data recovery and over-winter storage, and was replaced in 2006 with a vented pressure transducer (model INW PT2X, manufactured by Instrumentation Northwest) with an integrated data logger that was intended to withstand winter conditions.

The data downloaded in 2007 indicated that freezing conditions had occurred around the sensor which resulted in erroneous pressure readings over the period October 27, 2006 to June 13, 2007. Once water temperatures rose above zero in mid June, 2007, readings returned to normal. However, it appeared that the snow pack had caused the transducer to shift vertically. The 2007 readings were then re-calibrated using water level and spot flow measurements collected in September 2007.

The data logger was not accessible in May 2008 due to snowpack. When the logger was checked during the September AMP sampling round it was found to be non-functional and it was removed and sent for servicing. Data was recovered from the logger up to September 15, 2008.

The data downloaded in 2008 indicated that freezing conditions had occurred which resulted in erroneous pressure readings over the period October 22, 2007 to May 31, 2008. The 2008 readings

were re-calibrated using water level and spot flow measurements collected in September 2008 to account for vertical shifts due to snow pack.

2.3 Diversion of Seepage from Station V15

In 2006, increasing concentrations of zinc were observed at the outlet of the V15 sedimentation pond upstream of Tributary A. In response to this finding, Deloitte and Touche Inc. (D&T) installed an interim collection system to divert this seepage into an existing ditch below the V-Notch weir on Grum Creek, which routes water from Grum Creek to Moose Pond at Station V2A. The interim system consisted of a pump and pipeline to convey water from the sedimentation pond into the existing ditch.

No water was pumped in 2006. However, D&T began pumping on January 28, 2007. They ran the pump on Mondays and Thursdays for a couple of hours each day to lower the pond level so as to avoid any spill.

This system was upgraded to a diversion ditch in August, 2007. A conceptual design for the diversion ditch was presented as Appendix B in SRK 2008. Photos taken during the construction of the diversion ditches are presented in Appendix A of the 2007 Vangorda Geotechnical Inspection Report.

3 Results of 2008 Monitoring, Field Activities, and Data Review

3.1 Water Quality Monitoring

3.1.1 Reference Water Quality Stations

Station V15

Station V15 is located at the outlet of the Tributary A sedimentation pond, upstream of Station V2 (Figure 1), and has been a reliable sampling point since pond construction in 1995. The V15 sedimentation pond is thought to be directly downgradient from the Grum sulphide cell via a groundwater pathway, and water chemistry at this location is expected to be a good indicator of the arrival and loading of oxidation products from the sulphide cell. Sulphate and total and dissolved zinc concentrations measured at V15 is shown in Figure 2.

Sulphate concentrations at V15 steadily increased over the 1995 through 2001 period. From 2001 through early 2004, sulphate concentrations at V15 were within a stable range (700 to 1050 mg/L). This stable period was followed by a period of increasing concentrations from around 1000 mg/L to around 2000 mg/L by June 2005, with a single high result of 2990 mg/L recorded in February 2005. Samples collected since June 2005 have indicated relatively stable sulphate concentrations in the range of 1300 to 2100 mg/L. Future monitoring will be necessary to verify the observation of a stable trend.

Dissolved and total zinc concentrations at V15 were high variably from 1995 to 2002, typically in the range of 0.01 to 0.1 mg/L, with occasional values as high as 1 mg/L. This variability was the result of operational and post-operational water management, as discussed below for Station V2. Following the implementation of dump runoff control in 2002, zinc concentrations were lower and more uniform, ranging between 0.006 and 0.05 mg/L. Starting in 2006, there was a dramatic trend of increasing zinc concentrations from 0.07 mg/L in January 2006 to 0.68 mg/L in October 2006. Zinc concentrations then levelled off over the winter months and decreased to approximately 0.4 mg/L during the 2007 spring freshet. During the summer of 2007, the concentrations started to increase again, reaching 1.2 mg/L by October 2007 and remaining at approximately 1 mg/L throughout 2008. The pattern of increasing zinc concentrations appears to be a textbook case of breakthrough of an attenuated chemical species. Future monitoring at V15 is critical for understanding retardation factors and evolution of water chemistry downgradient of Grum Dump.

Historical pH values were in the neutral to slightly alkaline range (7.1 to 8.5) from 2000 to mid-2007. From May 2007 to April 2008, pHs were somewhat lower (typically between 6.7 and 7.2), with a minimum pH of 6.3 recorded in September 2007. Since May 2008, pHs have increased again to between 7 and 7.8.

Station V2

Sulphate and zinc concentrations measured at Station V2 are shown in Figure 3.

Sulphate concentrations at V2 showed a consistent increase from the initial pre-mining period through to mid-2004, and were responsible for triggering Event #4 of the Adaptive Management Plan. From mid-2004 until mid-2007, sulphate concentrations stabilized within a seasonably-variable range of 900 to 1100 mg/L. Since mid-2007, sulphate concentrations have decreased to stable concentrations of approximately 700 mg/L.

Total and dissolved zinc concentrations were highly variable during mining operations, and runoff and erosion from the Grum Dump led to continued variable and elevated zinc concentrations at V2 during the period from the cessation of mining through 2002. Improved runoff management since 2002 resulted in total and dissolved zinc concentrations within a much narrower range at V2. Zinc concentrations have demonstrated a slight increasing trend since 2004 but total and dissolved zinc concentrations have generally remained below 0.06 and 0.05 mg/L, respectively indicating that the partial diversion of flows from the V15 sedimentation pond to Moose Pond in 2007 was successful in maintaining zinc concentrations at V2 well below the discharge limit of 0.5 mg/L.

Water at V2 continues to show slightly alkaline pH conditions.

Station V2A

Zinc and sulphate concentrations at Station V2A are shown in Figure 4.

Sulphate concentrations at V2A increased steadily between 1997 and 2005, and more gradually from 2005 to 2008, reaching a maximum concentration of 1050 mg/L in June and September 2008.

Zinc concentrations were generally within the range of 0.05 to 2 mg/L over the period of 2001 through 2007, demonstrating a slightly decreasing trend since 2004 to concentrations generally below 0.2 mg/L since mid-2006. Since June 2008 however, dissolved zinc concentrations have increased to between 1 and 2 mg/L. A maximum total zinc concentration of 2.8 mg/L was recorded in June 2008. These results reflect the partial diversion of the flows from Station V15 into Moose Pond.

Water at Station V2A continues to show slightly alkaline pH conditions.

Station V14 and V16

Stations V14 and V16 have been historically monitored on a sporadic basis, from 1989 in the case of V14 and from 1995 in the case of V16. Station V16 has been monitored on a more consistent basis since 2004. There is no data from V14 for 2007 or 2008. Sulphate and zinc data for Stations V14 and V16 are shown in Figure 5.

The 2008 sulphate and zinc concentrations from V16 were within previously observed ranges.

Moose Seep

Moose Seep is located below Moose Pond approximately 25 m upslope from Vangorda Creek just upstream of Grum Creek (Figure 1), and has been monitored since Fall 2003. Monitoring frequency increased from twice-yearly to twice-monthly in 2005 as part of the AMP Event #4 Response.

Zinc and sulphate concentrations measured at Moose Seep are shown in Figure 6.

Sulphate concentrations ranged between about 400 to 800 mg/L until June 2008 when concentrations increased to between 800 and 1000 mg/L. Strong seasonal variations have been evident since 2006, with the lowest concentrations occurring during spring freshet, and maximum concentrations occurring in the late fall. The observed 2008 increase may be the result of diversion of water from V15 into Moose Pond.

Zinc concentrations have ranged from less than detection (0.005 mg/L) to a maximum of 0.026 mg/L (recorded in June 2008).

Moose Seep had neutral to slightly alkaline pH during all monitoring rounds.

Moose Well

Moose Well 2 was installed in September 2005, and has been sampled regularly since that time. Results are presented in Figure 6.

Sulphate concentrations have shown a cyclical pattern, with peak concentrations occurring in the late summer and fall, and minimum concentrations occurring in the early spring. The seasonal variation in sulphate concentrations was similar to the pattern observed upgradient at V2A (the point of Grum Creek discharge into Moose Pond), and support the assumption that infiltration into Moose Pond reports to Vangorda Creek via a diffuse shallow groundwater pathway.

Dissolved zinc concentrations varied from less than detection (0.005 mg/L) to 0.015 mg/L with one outlier of 0.07 mg/L. Unlike sulphate, there were no strong seasonal trends. These results suggest that there is significant attenuation along the seepage pathway between Moose Pond and Moose Well 2.

Field pHs have been between 7 and 8.

Station P96-9A and P96-9B/BH05-9B

Groundwater was historically monitored via one shallow (P96-9A) and one deeper piezometer (P96-9B) located adjacent to Tributary A, immediately downstream of the Grum Dump toe access road (Figure 1). These wells were intended to monitor the early arrival of oxidation products from the Grum sulphide cell in groundwater, in the same way that V15 was intended to monitor surface seepage. P96-9B became non-functional in 2001 and no samples have been collected from the deeper well since that time. In 2005, BH05-9B was installed to replace the damaged P96-9B.

Sulphate concentrations in the shallow unconfined aquifer at P96-9A show an increasing trend over the 1996-2001 period (Figure 7), and then show a period of stable concentrations with seasonal variations (950 to 1800 mg/L) from 2001 through 2008. Field pHs have varied between 5.9 and 7.7 since installation. Dissolved iron concentrations have been somewhat variable, but have remained below 0.2 mg/L since 2001. Zinc concentrations have remained low (less than 0.1 mg/L). Concentrations were somewhat higher in 2006 and 2007 in comparison to the 1999 through 2005 data. The increase in concentrations coincides with the increase in zinc concentrations observed in surface seepage at the upgradient station V15 in 2006 and it was thought that a breakthrough in zinc concentrations may be starting in the shallow groundwater in this area; however, zinc concentrations decreased again in 2008 to less than 0.02 mg/L (although this may be an artefact of diverting water from V15 to Moose Pond).

Sulphate concentrations in the deeper confined aquifer (P96-9B), which experienced flowing artesian conditions, were between 100 and 200 mg/L from 1996 through 2001, (with one outlier of 320 mg/L), and were similar in the replacement well BH-05-09B (Figure 8). From 1996 through 2001, dissolved iron concentrations varied from 0.01 mg/L to 0.31 mg/L, and dissolved zinc concentrations ranged from below the detection limit of 0.01 mg/L to 0.04 mg/L. Dissolved iron values from the replacement well have been higher, with values ranging from 0.5 to 0.8 mg/L, while dissolved zinc concentrations have been at or near the detection limit.

Field pH reported ranged from 7.1 to 8.3 standard pH units, and showed no discernable trend.

3.1.2 Grum Dump Toe Seeps

SRK-GD01

SRK-GD01 is located where the main stem of Grum Creek emerges from the toe of Grum Dump (Figure 1). This is the largest surface flow identified at the toe of Grum Dump, and is considered to be the most important source of surface flows originating from the dump. Sulphate and zinc concentrations at SRK-GD01 are summarized in Figure 9. Complete results are provided in Appendix A1.

Sulphate concentrations have ranged between 890 and 1686 mg/L over the monitoring period (2002 through 2008), with the lowest observed sulphate concentration occurring in May 2008 and the highest occurring in September 2008. Dissolved zinc have typically varied between 2.5 to 4 mg/L over this period, with isolated peaks of 17 and 11 mg/L recorded during the 2004 and 2005 freshet surveys, respectively, and a high value of 6.7 mg/L in September 2008.

Circum-neutral pH conditions were observed during all sampling rounds.

SRK-GD05

Station SRK-GD05 is located at the dump toe directly upgradient of the swale shown on Figure 1 as No Fork Creek, and has been monitored on a semi-annual basis since 2002. Sulphate and dissolved zinc data are summarized in Figure 10.

The results indicate slightly alkaline pHs during all sampling rounds. Sulphate concentrations increased from approximately 1100 mg/L in 2002 to stabilize within the range of 1400 to 1800 mg/L since 2004. The sample collected in September 2008 had a slightly higher sulphate concentration of 2034 mg/L. Zinc concentrations ranged from 1.7 to 5.9 mg/L, with the highest concentrations measured in September 2008.

Flows at SRK-GD05 are low compared to flows in Grum Creek, but have been observed consistently during all sampling rounds. The seepage infiltrates into the ground within a few metres of the dump toe. However, emergent seepage is observed topographically downgradient in No Fork Creek at station GD05 d/s, with seepage volumes that exceed those observed at the toe on the basis of visual observation and crude field measurements. It is inferred that subsurface flow is more significant than surface flow at SRK-GD05, and that the No Fork Creek drainage is a preferred groundwater flowpath from Grum Dump to Vangorda Creek. Sampling results from No Fork Creek are discussed under station GD05 d/s.

SRK-GD16

SRK-GD16 is located at the toe of Grum Dump topographically upgradient from the linear depression shown on Figure 1 as Sweet Creek. Flows were observed during only four of fourteen sampling rounds. Results for this station are provided in Appendix A1.

The results indicate pHs ranging from 7.3 to 7.5, sulphate concentrations of 1680 to 4100 mg/L, and highly variable dissolved zinc concentrations ranging from 10.4 to 139 mg/L. The sample with the highest zinc and sulphate concentrations was collected in May 2008, and represents the highest sulphate and zinc concentrations observed from any external toe seep from Grum Dump.

SRK-GD04 and SRK-GD21

SRK-GD04 and SRK-GD21 are located immediately upgradient of V15 and Tributary A (Figure 1) at a minor topographic low along the dump toe. Surface flows in this area were observed during only seven of fourteen sampling rounds. Field pH values have been circum-neutral at these stations ranging from 6.8 to 8.1. Sulphate concentrations have ranged from 1350 to 2500 mg/L and zinc concentrations have ranged from 1.1 to 6.6 mg/L. The lowest field pH and highest sulphate and zinc concentrations were reported for SRK-GD21B in Fall 2008, however an increasing trend has not been observed. Complete results for this station are provided in Appendix A1.

3.1.3 Downgradient Pathways Survey

GD05 d/s

Station GD05 d/s is located in the topographic depression shown as No Fork Creek, downgradient from the toe seep station SRK-GD05 (Figure 1). This station has been monitored on a semi-annual basis since fall of 2003. Results for sulphate and zinc are shown in Figure 11, with complete results provided in Appendix A2.

The 2008 monitoring results were generally consistent with results from previous monitoring, with field pHs in the range of 6.9 to 8.2, sulphate concentrations of 834 to 1360 mg/L, and dissolved zinc concentrations near or less than the detection limit (previously 0.005 mg/L, lowered in 2008 to 0.0005 mg/L). The one exception was the spring 2008 sample, which had a zinc concentration of 0.026 mg/L. The Fall 2008 sample, however, had a zinc concentration of 0.0014 mg/L.

Sweet Creek

Sweet Creek, located downgradient of dump toe seepage station SRK-GD16, has been monitored on a semi-annual basis since September 2004. Sulphate and dissolved zinc concentrations are shown in Figure 12. Complete results are provided in Appendix A2.

Monitoring results from this station have typically had field pHs in the range of 7.7 to 8.3, sulphate concentrations of 847 to 1260 mg/L, and dissolved zinc concentrations generally less than the detection limit of 0.005 mg/L. Zinc concentrations in May 2007 and 2008 indicated low but detectable dissolved zinc concentrations of 0.006 and 0.0075 mg/L, respectively. The sulphate concentration in September 2008 was higher than previously recorded at 1563 mg/L.

Sheep Creek

Sheep Creek has been monitored on a semi-annual basis since fall 2003. Sulphate and dissolved zinc concentrations are shown in Figure 13. Complete results are provided in Appendix A2.

The results indicated consistently neutral to slightly alkaline pHs in all of the samples. Sulphate concentrations have demonstrated an increasing trend from 43 mg/L in the spring 2004 sample to 99 mg/L in the Fall 2008 sample. Dissolved zinc concentrations have ranged from less than detection limit (0.005 mg/L) to 0.007 mg/L. No clear trends in zinc concentrations have been observed.

WTA02

Station WTA02 represents seepage ponded on the roadway of the Grum Dump toe access road near the upper end of Sheep Creek (Figure 1). This station has been monitored at least once per year since 2004. Results are provided in Appendix A2.

The 2008 monitoring results were in the range of previous results at this station, with field pHs ranging from 7.6 and 8.3, sulphate concentrations ranging from 18 to 286 mg/L, and dissolved zinc concentrations typically at or near the detection limit of 0.005 mg/L. A single outlier of 0.038 mg/L was recorded in September 2006.

The cause, and significance, of detectable zinc at this station in 2006 is not presently known. Based on topographic considerations, it appears unlikely that this location is influenced by seepage from the Grum dump.

WGD01

Station WGD01 is located above Sheep Creek west of Grum Dump (Figure 1). This station has been measured at least annually since 2004.

Results of the 2008 monitoring are generally consistent with those from previous years, with field pH ranging from 7.6 to 8.2, sulphate concentrations ranging from 252 to 384 mg/L, and dissolved zinc concentrations typically in the range of the detection limit (0.005 mg/L). One exception was the sulphate concentration recorded in September 2008 which was an order of magnitude higher than previously recorded concentrations at 2955 mg/L. Complete monitoring results are provided in Appendix A2.

3.1.4 Additional Groundwater Monitoring

Most groundwater monitoring wells downgradient of Grum Dump are Reference Water Quality Stations, and results for these stations have already been discussed. The following discussion is limited to groundwater monitoring results from wells installed in 2004 and 2005. Complete results for these stations are provided in Appendix A3.

SRK04-05a and -05b

SRK04-05a and b are nested wells that were installed adjacent to Grum Creek and the Grum Dump Toe Access Road in 2004 (Figure 1). Flowing artesian conditions were encountered at a depth of 12.5 m. The deep monitoring well (SRK04-05a) was completed in weathered bedrock and the shallow piezometer was completed immediately below the inferred aquitard (SRK 2005). It is therefore likely that the two wells are hydraulically connected.

Samples were not collected at either of these locations in 2007 or 2008.

SRK05-05c

Installation of SRK05-05c was completed in August, 2005, and has been monitored annually since that time.

The 2008 results indicated sulphate concentrations of 340 to 410 mg/L and zinc concentrations of 0.006 to 0.007 mg/L. These were within the range previously observed at this station.

Although Grum Creek is within 10 m of SRK05-05c and is slightly topographically upgradient, the much higher sulphate and zinc concentrations in the creek (~900 mg/L sulphate and 0.1 to 0.2 mg/L Zn at V2A) suggest that the shallow groundwater at SRK05-05c has a significant component of the flow that originates from some other source that is isolated from the creek.

SRK05-07

SRK05-07 was installed in shallow bedrock on the south side of the Grum Dump Toe Access Road, downgradient of the dump toe seep location SRK-GD16 and upgradient of the Sweet Creek sample station (Figure 1).

2008 monitoring results indicated neutral pH conditions, sulphate concentrations in the range of 1140 to 1600 mg/L, and zinc concentrations between 0.028 and 0.029 mg/L. The 2008 sulphate concentrations were slightly higher than 2006 and 2007 concentrations.

SRK05-08

SRK05-08 was installed in shallow bedrock on the south side of the Grum Dump Toe Access Road, at the intersection of the road and a ridge that runs perpendicular from the dump toe to Vangorda Creek (Figure 1).

Monitoring of results from 2005 to 2008 indicated sulphate concentrations ranging from 458 to 780 mg/L, and dissolved zinc concentrations ranging from <0.005 to 0.052 mg/L. Sulphate concentrations have demonstrated an increasing trend over the monitoring period.

3.1.5 Summary of Water Quality Monitoring Results

Results of 2008 dump toe seepage surveys indicate that zinc concentrations in dump seepage have not stabilized, with the highest observed dissolved zinc concentrations occurring at several toe seepage stations (SRK-GD05, SRK-GD06, SRK-GD16 and SRK-GD21) in 2008.

The dramatic and consistent rise in dissolved zinc concentration observed at V15 in 2006 and 2007 remains noteworthy. The data appear to show a classic case of breakthrough of attenuated chemical species. Zinc concentrations reached a maximum value of 1.2 mg/L in Oct. 2007 before appearing to stabilize at approximately 1 mg/L throughout 2008. The 2008 monitoring results suggest that Zn concentrations have stabilized around 1 mg/L.

Despite the increase in zinc concentrations observed at Station V15, zinc concentrations at Station V2, downstream of this location, have remained very low throughout the monitoring period. Sulphate concentrations at Station V2 remain in excess of the initial trigger established in the AMP.

It appears that partial diversion of water from station V15 to station V2A via the Grum Creek diversion has been successful in controlling the amount of zinc reporting to station V2, however it appears as though concentrations at Station V2A in Grum Creek have increased in corresponding fashion. In 2006 through early 2008, dissolved zinc concentrations at V2A have typically been below 0.2 mg/L, but since June 2008, zinc concentrations have increased dramatically to between 1

and 2 mg/L. Zinc concentrations are currently attenuated between Moose Pond and Vangorda Creek, and are not having a measurable impact on Vangorda Creek.

Downgradient monitoring stations east of V2 below Moose Pond and west of V2 near Vangorda Creek show elevated sulphate concentrations, but zinc concentrations are typically at or near detection levels (0.005 mg/L). The monitoring data thus shows that zinc loading from Grum Dump to Vangorda Creek continues to be minimal (~5 kg/yr, as estimated from the water and load balance) and that significant attenuation is occurring along surface and shallow subsurface flowpaths.

3.2 Grum Creek Flow Monitoring

As mentioned previously, results of the 2008 flow monitoring at the Grum Creek weir were complicated by problems with the instrumentation and staff gauge over the winter months. Data from October 21, 2007 to May 31, 2008 were removed from the database due to erroneous pressure readings resulting from freezing conditions. Data from June 1, 2007 to September 15, 2007 was calibrated to match a spot flow measurement collected in September 2008.

The calibrated flows are shown in Figure 14.

Peak 2008 flows ranged from approximately 15 L/s during spring freshet to 8 L/s during the early fall; however, unlike other years, maximum flows up to 30 L/s were recorded during mid-July. Flows were similar in magnitude to results of the 2005 monitoring, and somewhat higher than results of 2006 and 2007 monitoring. Annual flow rates are correlated to precipitation rates. Precipitation recorded over the 2008 monitoring period was nearly twice as much as was recorded over the same period in 2007 (www.theweathernetwork.com).

The 2008 measurements of Grum Creek discharge are somewhat lower than the estimates of runoff from the upgradient catchment that were incorporated into the water and load balance (average annual runoff at the weir (Catchments 1+2) was estimated to be 6.3 L/s (SRK 2005)). The discharge data will be used to calibrate the runoff model at a later date, along with precipitation records from the station installed on the Grum Dump near toe seep station SRK-GD01, when revisions to the Grum Dump water and load balance are required.

3.3 Diversion of Seepage from Station V15

As mentioned previously, flows from the V15 sedimentation pond were pumped to the existing diversion ditch from Grum Creek to Moose pond starting in January 28, 2007 to minimize the potential for impacts to water quality at Station V2.

Upgrades to the interim seepage collection system used to divert flows from the Station V15 sedimentation pond were implemented in August, 2007, and flows were regularly diverted starting August 27, 2007.

The conceptual design for the diversion ditch was presented as Appendix B in SRK 2008.

4 Summary and Conclusions

4.1 Final Implementation of AMP Event #4 Response Plan

The final components of the AMP Response Plan were implemented in 2005. The following summary addresses the points raised in "*Section 5: Recommendation"*, in the 2007 AMP Event #4 Status Report (SRK 2008), and the actions taken in 2008 to address these commitments.

Recommendation #1: Continue monitoring of Reference Water Quality Stations, as required under the AMP

Response actions in 2008:

- Continued monitoring all of the Reference Water Quality Stations as flow conditions permitted.
- Reviewed monitoring data and included monitoring results as part of the regular monthly report to the Water Board.

Recommendation #2: Continue to divert seepage from station V15 to station V2A in 2008, as a pro-active short-term mitigation strategy to minimize zinc concentrations at Station V2 until a final closure plan can be implemented.

Response actions in 2008:

- Continued diversion from Station V15 to Station V2A.

Recommendation #3: Collection and transfer of water to Vangorda Pit if zinc concentrations exceed acceptable levels at station V2, at Moose Seep, or at Moose Well 2.

Response actions in 2008:

- Monitored the water quality stations discussed above. Monitoring results showed that all of the drainage downgradient from the Grum Dump was fit for discharge, and that no collection and transfer of water was necessary.

Recommendation #4: Continue Spring/Fall downgradient pathway and dump toe seepage surveys

Response actions in 2008:

- Carried out May and September monitoring of Grum Dump toe seeps and previously-identified downgradient stations between Grum Dump and Vangorda Creek.

Recommendation #5: Continue monitoring and maintenance of the Grum Creek weir flow monitoring instrumentation

Response actions in 2008:

- Data logger was removed for servicing in September 2008 as the instrument was no longer able to be downloaded. The manufacturer retrieved the 2008 water level data, repaired the instrument's communication capabilities and replaced the batteries.

Recommendation #6: Review monitoring data on an ongoing basis and report Reference Water Quality Station monitoring data in the regular monthly report to the Water Board

Response actions in 2008:

- D&T reported results of 2008 monitoring activities to Water Board in regular monthly report.

- Prepared this report to document 2008 response activities in detail.

Recommendation #7: Present 2008 monitoring results in an annual AMP Event #4 Status report to be included with the annual AMP report prepared by GLL

Response actions in 2008:

- Results from this report will be included in the AMP report.

5 Recommendations

The following points summarize recommendations for continued monitoring of water quality downgradient of Grum Dump, and for implementation of additional water management if zinc concentrations exceed acceptable levels.

1. Continue monitoring Reference Water Quality Stations, as required under the AMP, by site environmental staff on a twice-monthly basis.

2. Continue to divert seepage from station V15 (the sedimentation pond) towards station V2A as a short term mitigation strategy to minimize zinc concentrations at station V2 until a final closure plan can be implemented.

3. Implement collection and transfer of water to Vangorda Pit or Little Creek Pond if zinc concentrations exceed acceptable levels at station V2, at Moose Seep, or at Moose Well.

    a. In the absence of site specific water quality objectives, the discharge water quality criteria of 0.5 mg/L zinc will be used as an interim threshold for implementation of water collection activities. Surface water collection and transfer would be implemented if three consecutive samples either at Station V2, at Moose Seep, or at Moose Well 2 exceed 0.5 mg/L zinc.

    b. Once a site-specific water quality objective has been developed for Vangorda Creek, the threshold for implementation of contingency measures should be re-evaluated to ensure that loading from this flow pathway is within acceptable limits.

    c. In the event that the interim threshold is exceeded, notification will be sent to the Water Board within 30 days.

4. Continue Spring/Fall downgradient pathway and dump toe seepage surveys.

5. Reinstall Grum Creek weir flow-monitoring instrumentation.

6. Review monitoring data on an ongoing basis. Results of the Reference Water Quality Station monitoring data should continue to be included as part of the regular monthly report to the Water Board.

7. Present 2009 monitoring results in an annual AMP Event #4 Status report.

This report, **"AMP Event #4 Response: 2008 Status Report-final"**, has been prepared by SRK Consulting (Canada) Inc.

Prepared by:

_____
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Dylan MacGregor, GIT (BC)

Reviewed by:

_____
Peter Healey, P.Eng.

6 References

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SRK Consulting 2004b. Letter to Tony Polyck, Manager: Water Inspections Section, Department of Environment, Government of Yukon, RE: AMP Event #4, Seepage Water Quality from Grum Rock Dump, Anvil Range Mine, Yukon. August 16, 2004.

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SRK Consulting, in progress. 2008 Waste Rock and Seepage Monitoring Report. In preparation for Deloitte & Touche, on behalf of the Faro Mine Closure Planning Office.

Figures

J:\01_SITES\FARO\1000_Deloitte_from GE_Projects\Acad-Vangorda-Grum\2006 Acad Drawings\site_plan_2006-Photo.dwg

Legend

- Reference Water Quality Stations
- Dump Toe Seeps
- Downgradient Monitoring Stations
- Groundwater Monitoring Well

Note:

Sulphide cell outline from as-built drawing, Feb. 1996, as reported in Figure 1, Anvil Range Mining Corporation, May 1996.

0 50 100 150 200 250 300 Metres

Scale 1:5000

Date of Photography: 03/07/25
Scale of Photography: 1:20000
Survey control derived from existing 1:20000 photography
Survey control based on: UTM Projection, NAD27
Compiled by The ORTHOSHOP, Calgary, September 2003
WO 8856

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SRK JOB NO.: 1CD003.110

FILENAME: site_plan_2006-Photo.dwg

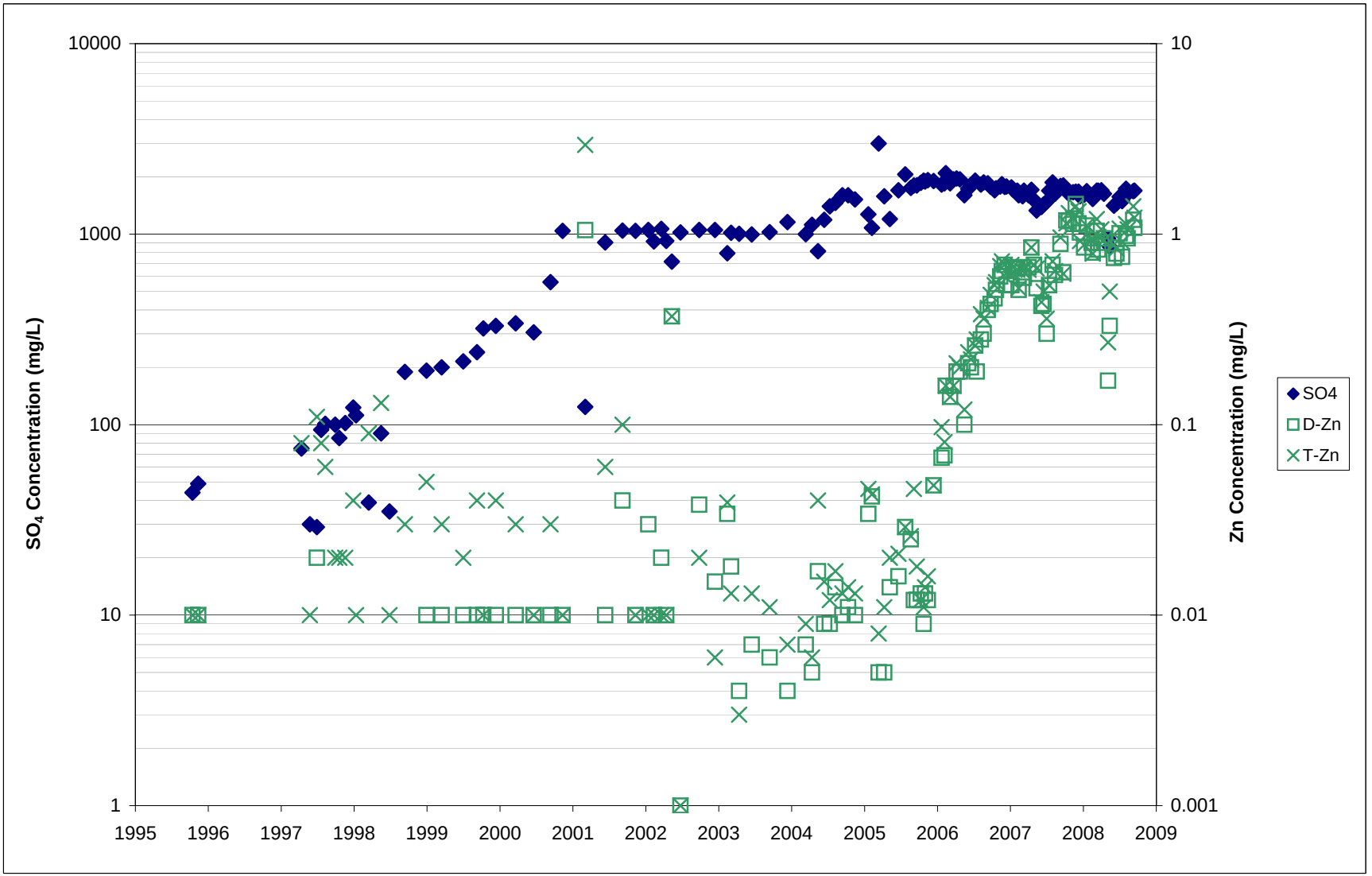
Deloitte & Touche

Anvil Range Mining Complex

2008 AMP Event #4 Response: Status Report

2008 Borehole and Water Sampling Stations

DATE:	APPROVED:	FIGURE:
Dec. 2008	M.C.C.	1



Note: Dissolved zinc concentrations are plotted at the detection limit where values were reported as less than detection.

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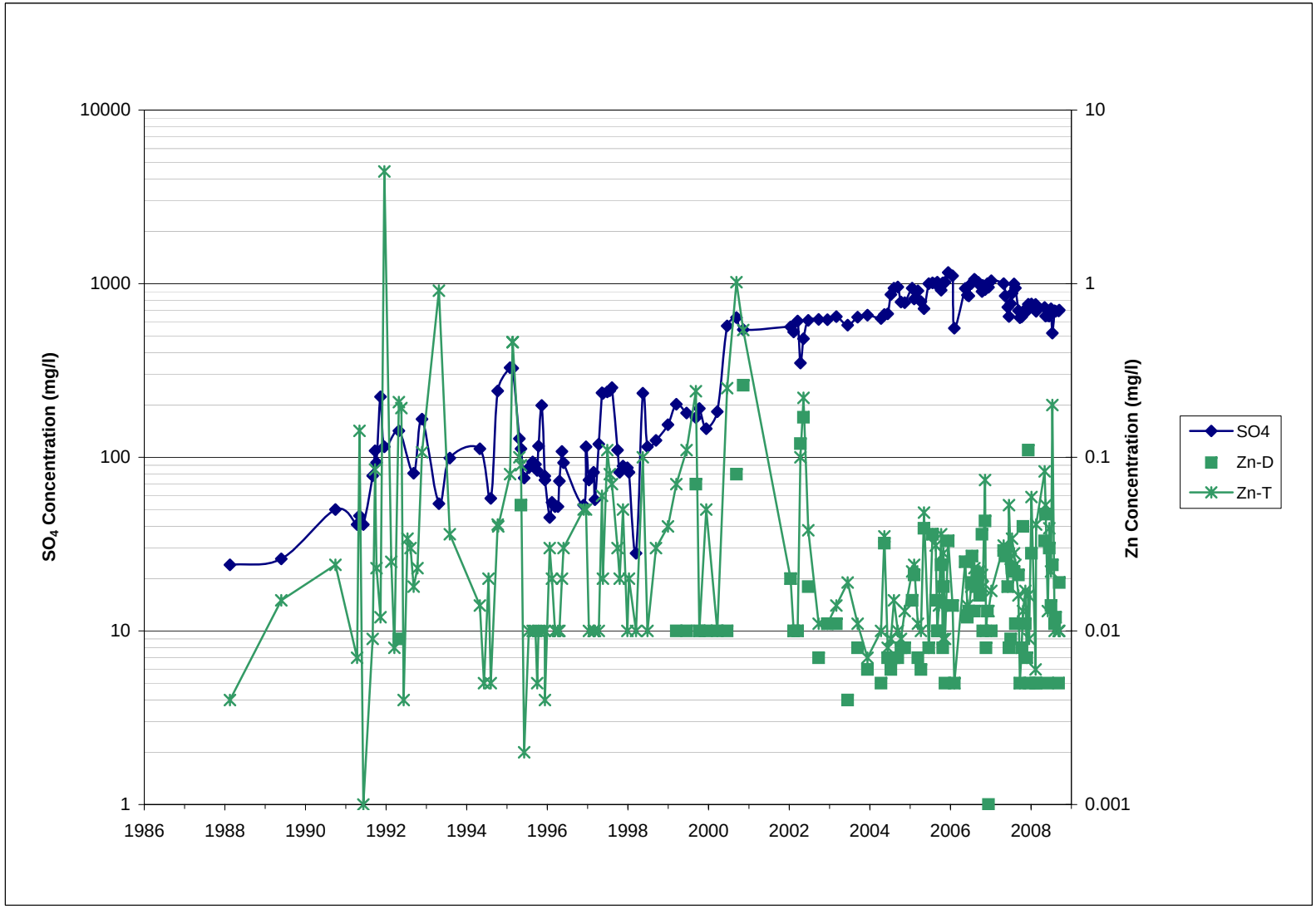
2008 AMP Event #4 Response: Status Report

Zinc and Sulphate Concentrations at V15

Job No: 1CD003.110
File: 2008 AMP Water Quality Figures

Faro Mine Complex

Date:	Approved:	Figure:
December 2008	MCC	2



Note: Dissolved zinc concentrations are plotted at the detection limit where values were reported as less than detection.

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Job No: 1CD003.110
File: 2008 AMP Water Quality Figures

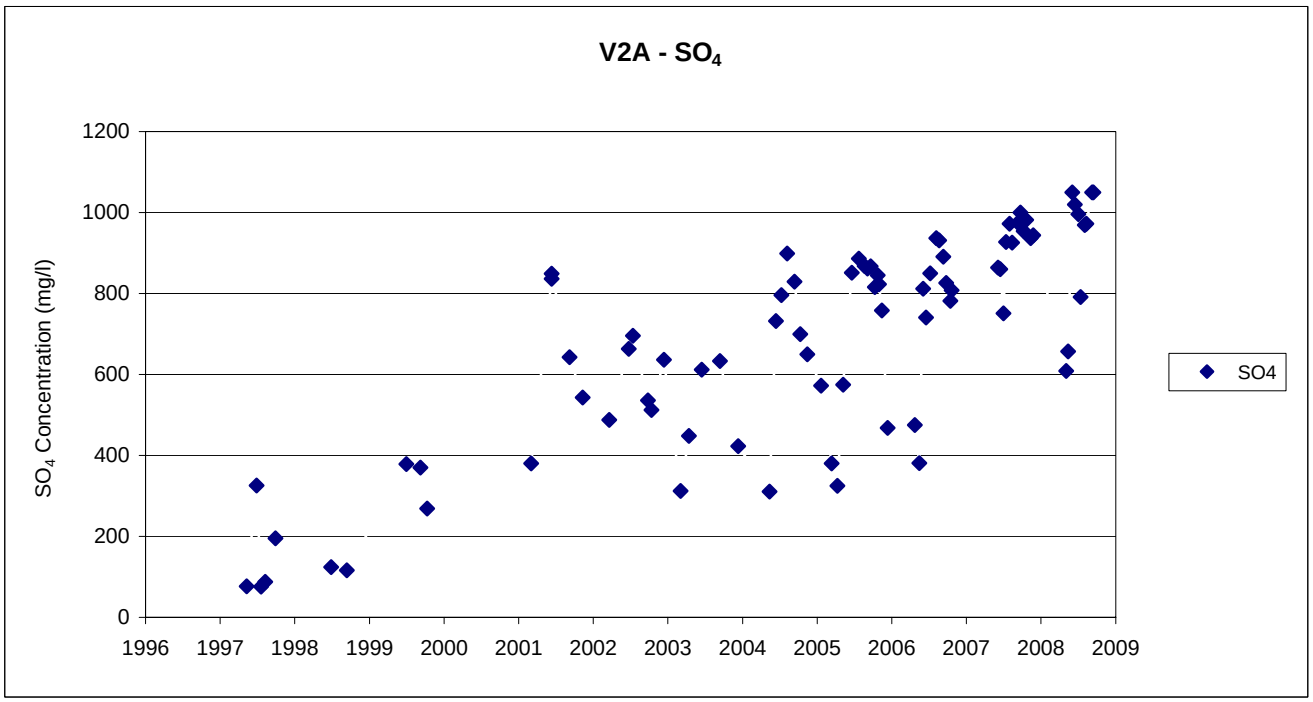
Deloitte & Touche

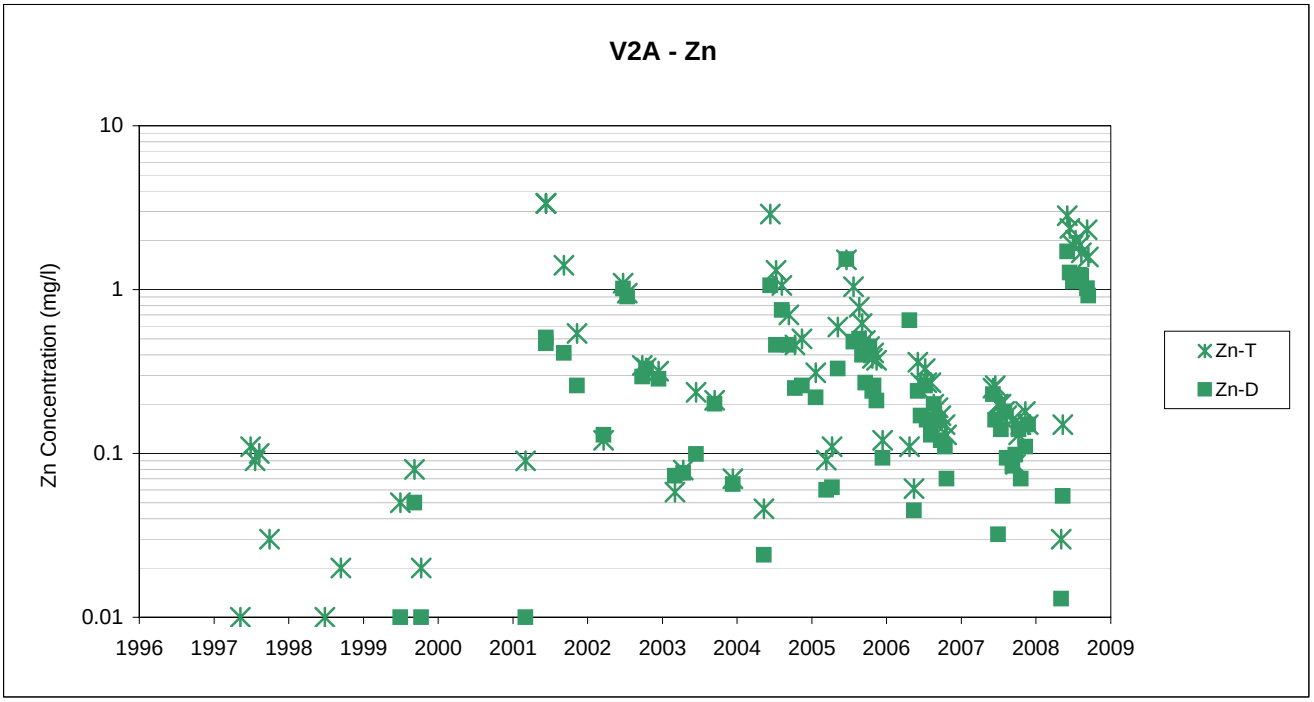
Faro Mine Complex

2008 AMP Event #4 Response: Status Report

Zinc and Sulphate Concentrations at V2

Date:	Approved:	Figure:
December 2008	MCC	3





Note: Dissolved zinc concentrations are plotted at the detection limit where values were reported as less than detection.

SRK Consulting Engineers and Scientists VANCOUVER	Deloitte & Touche	2008 AMP Event #4 Response: Status Report
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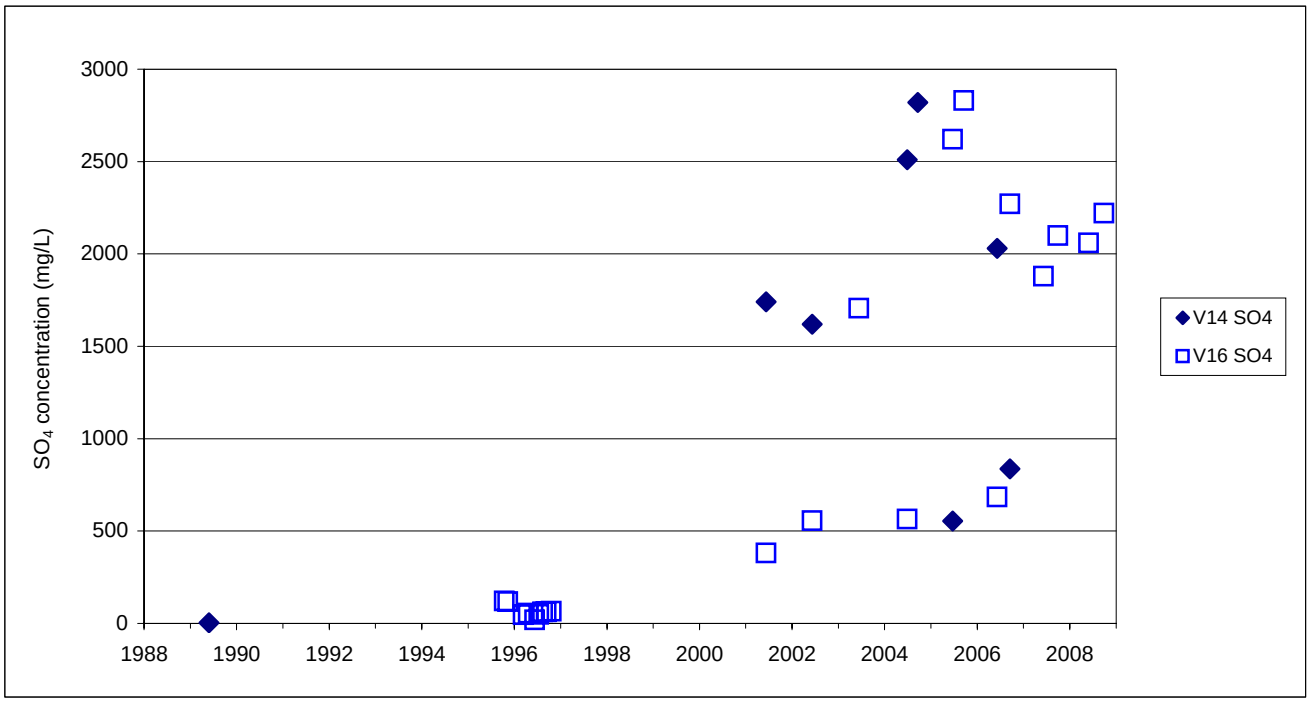
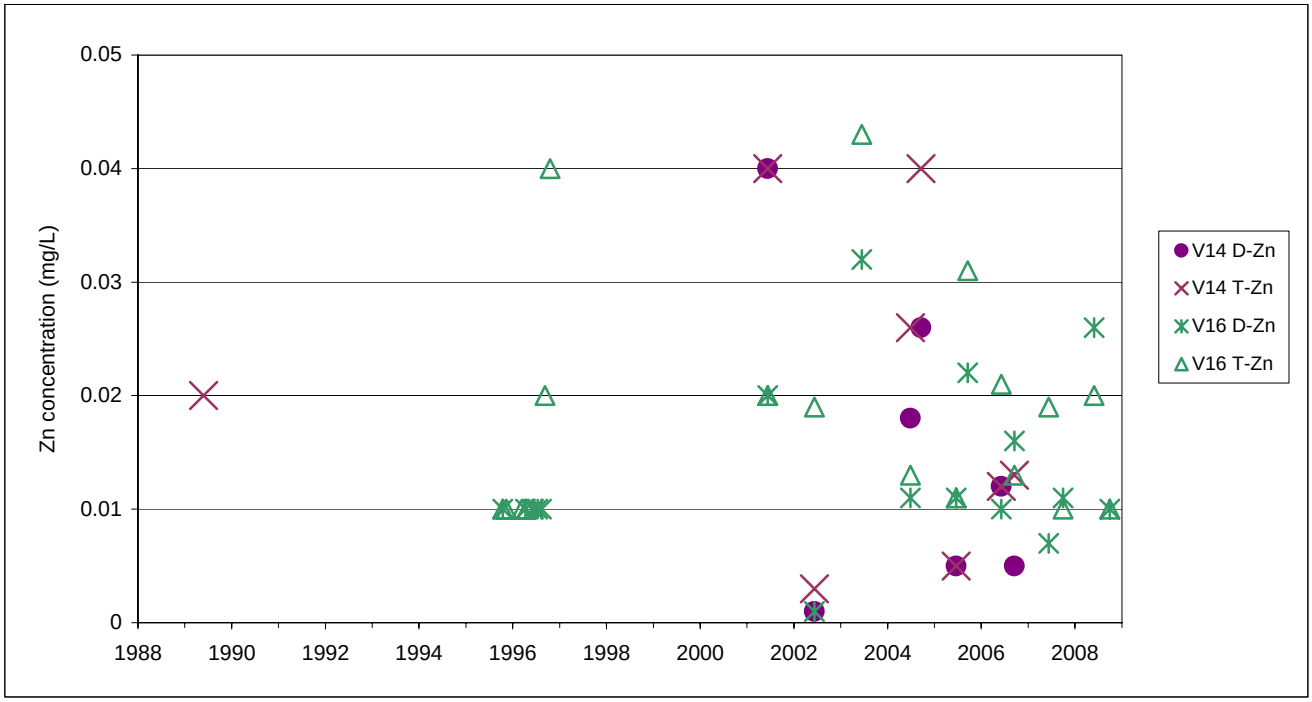
Job No: 1CD003.110 File:	Faro Mine Complex	Date: December 2008 | Approved: MCC | Figure: **4**





Note: Dissolved zinc concentrations are plotted at the detection limit where values were reported as less than detection.

SRK Consulting Engineers and Scientists VANCOUVER	Deloitte & Touche	2008 AMP Event #4 Response: Status Report
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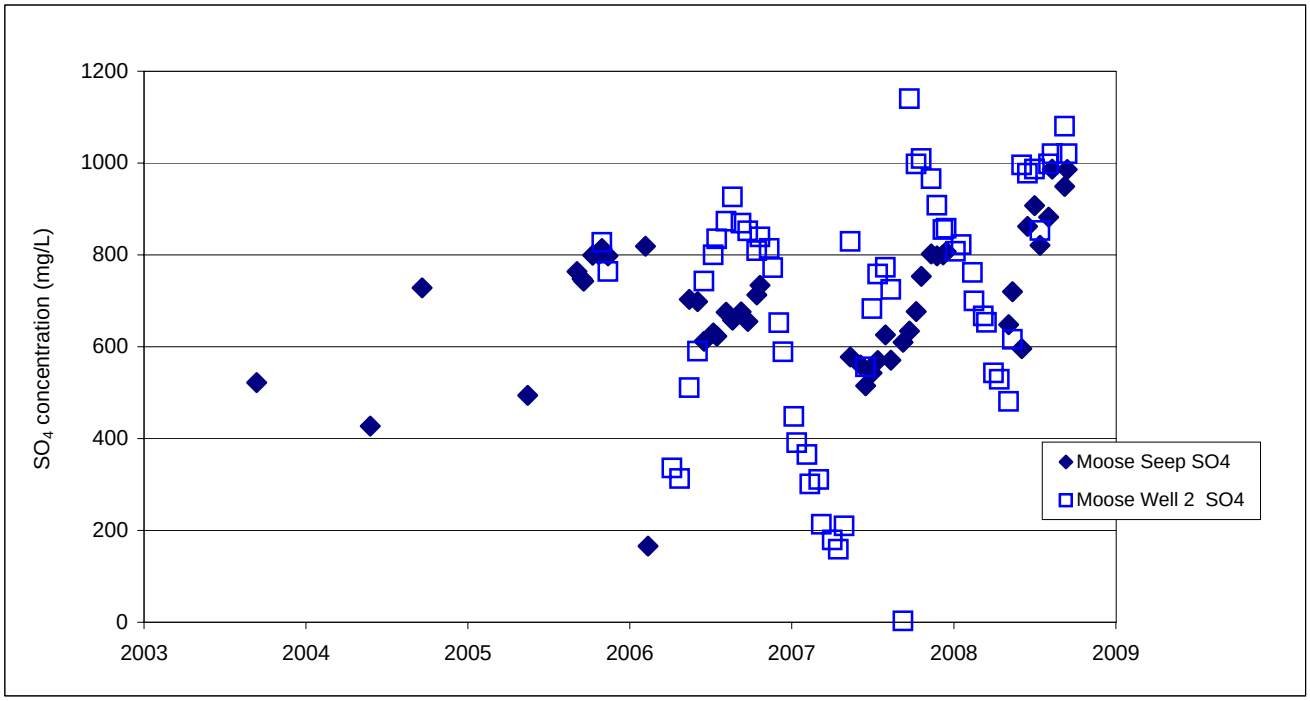
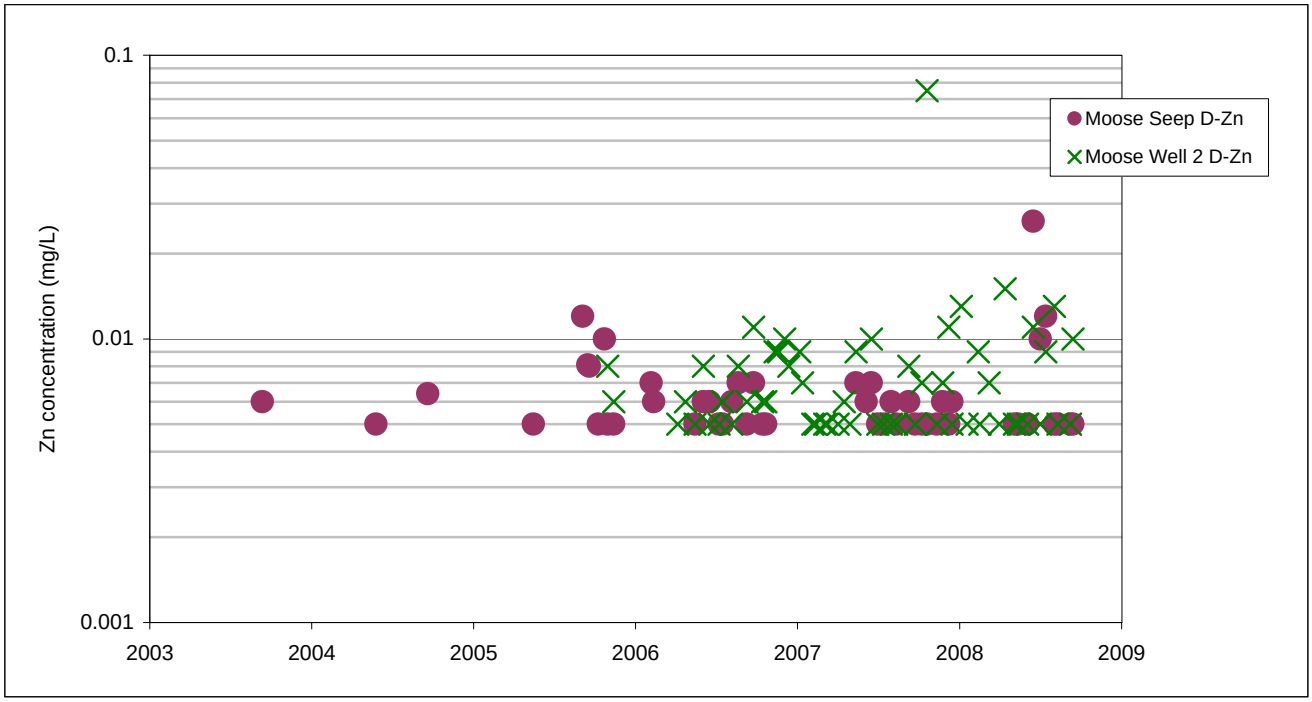
Job No: 1CD003.110 File: 2008 AMP Water Quality Figures	Faro Mine Complex	Date: December 2008 | Approved: MCC | Figure: **5**





Note: Dissolved zinc concentrations are plotted at the detection limit where values were reported as less than detection.

SRK Consulting Engineers and Scientists VANCOUVER	Deloitte & Touche	2008 AMP Event #4 Response: Status Report
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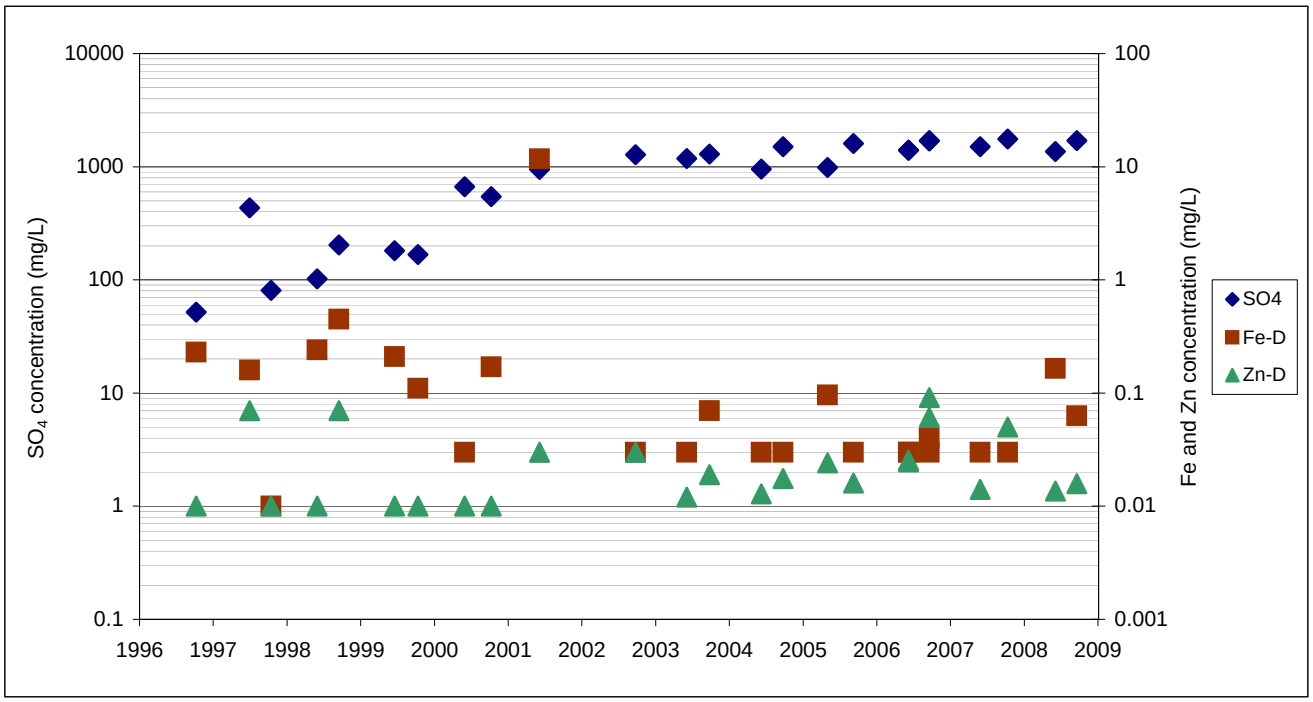
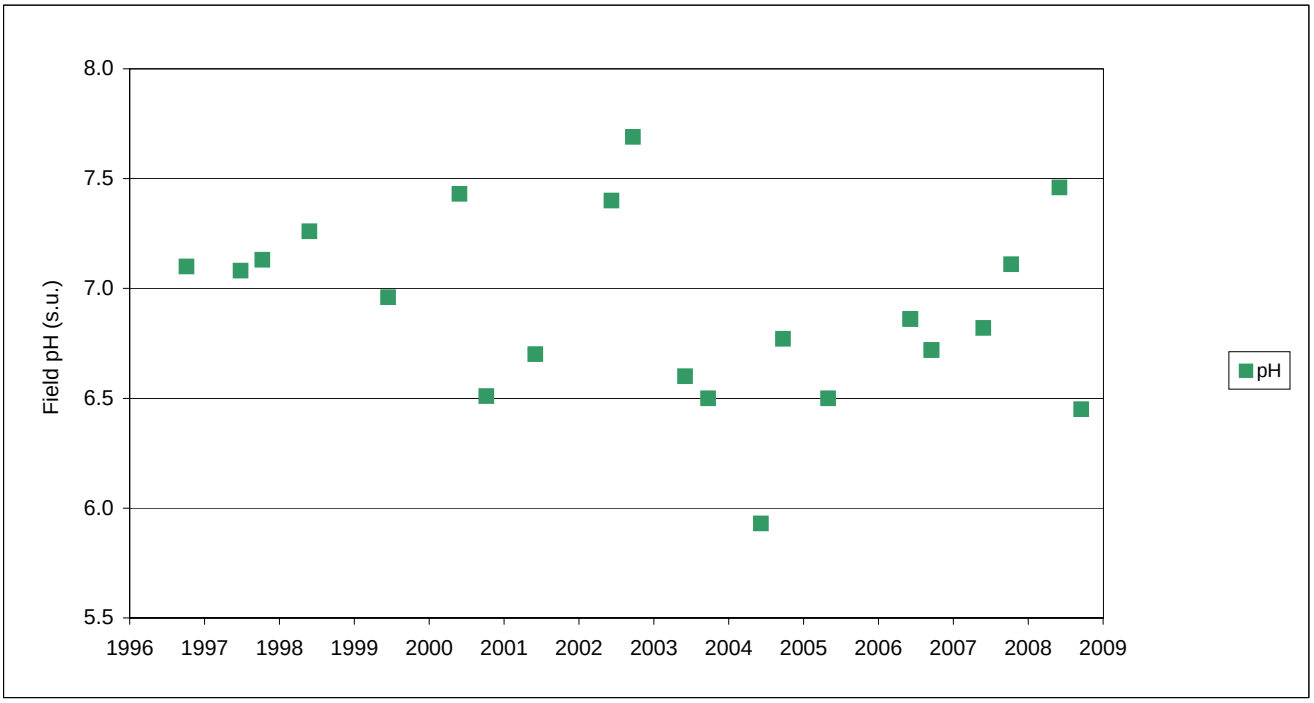
Job No: 1CD003.110 File: 2008 AMP Water Quality Figures	Faro Mine Complex	Date: December 2008 / Approved: MCC / Figure: **6**





Note: Dissolved zinc concentrations are plotted at the detection limit where values were reported as less than detection.

SRK Consulting Engineers and Scientists VANCOUVER	Deloitte & Touche	2008 AMP Event #4 Response: Status Report
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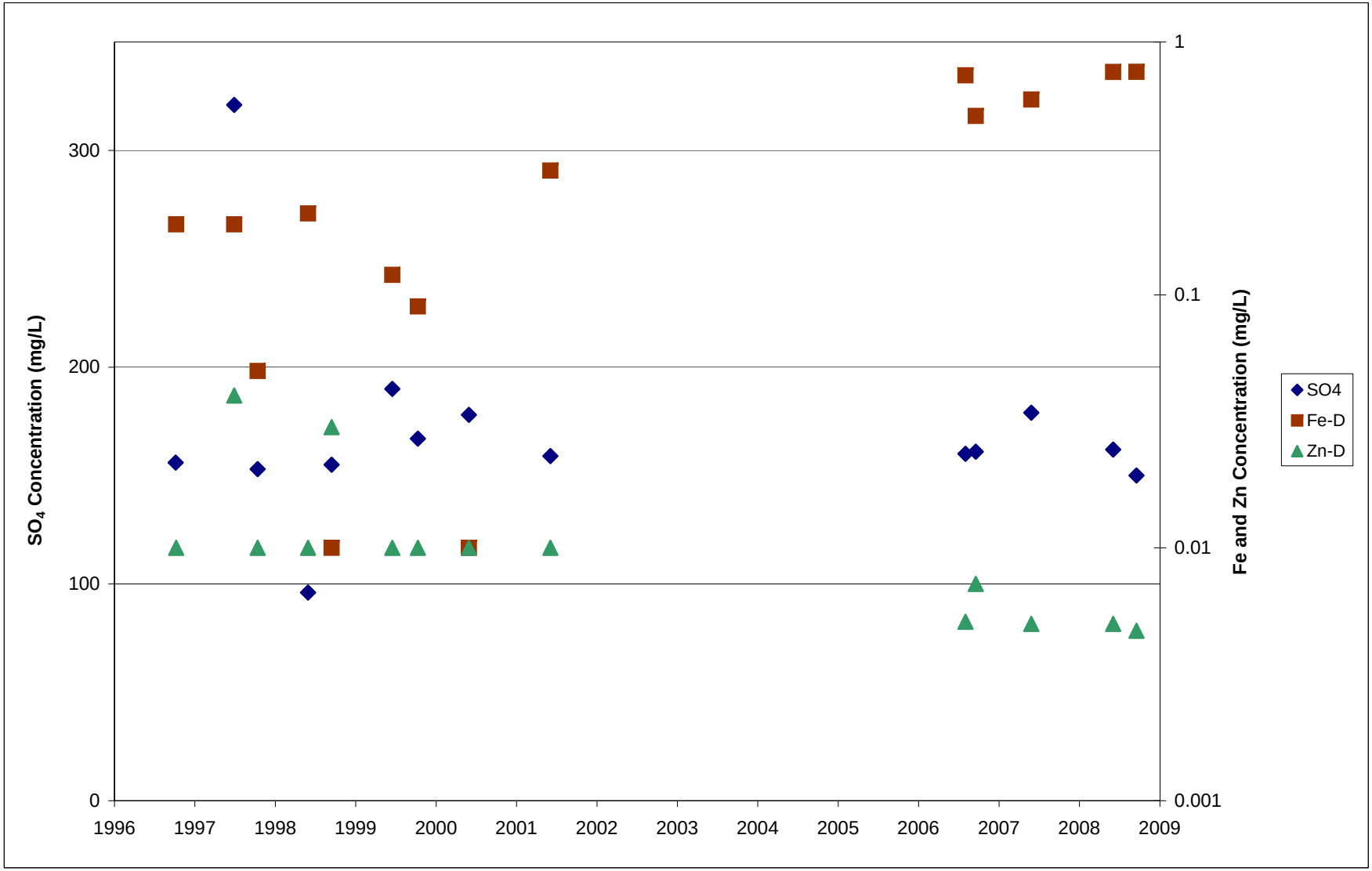
Job No: 1CD003.110 File: 2008 AMP Water Quality Figures	Faro Mine Complex	Date: December 2008 | Approved: MCC | Figure: **7**



Note: Dissolved zinc concentrations are plotted at the detection limit where values were reported as less than detection.

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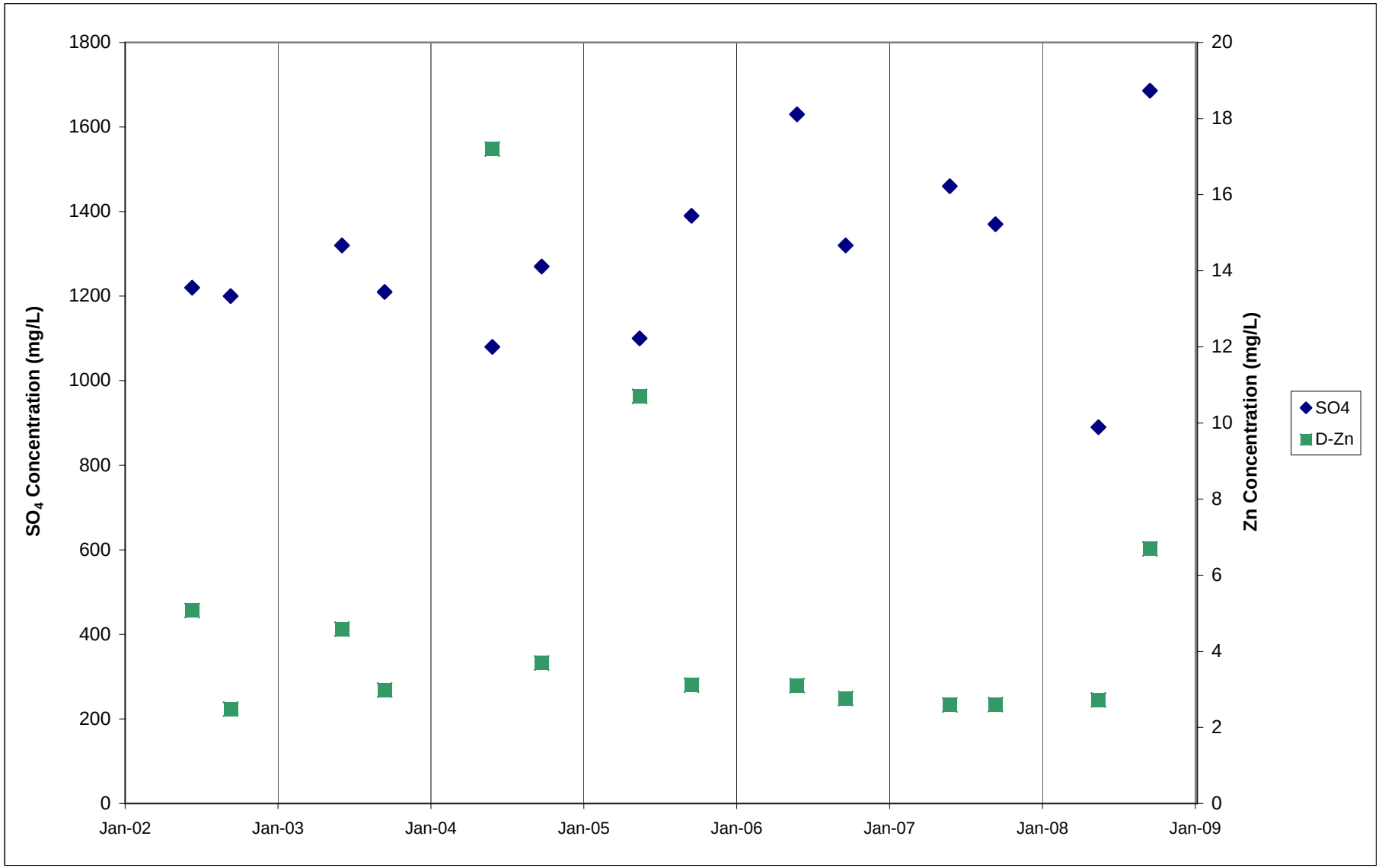
2008 AMP Event #4 Response: Status Report

Zinc, Iron, and Sulphate Concentrations at P96-9B/BH05-9b

Job No: 1CD003.110
File: 2008 AMP Water Quality Figures

Faro Mine Complex

Date:	Approved:	Figure:
December 2008	MCC	8



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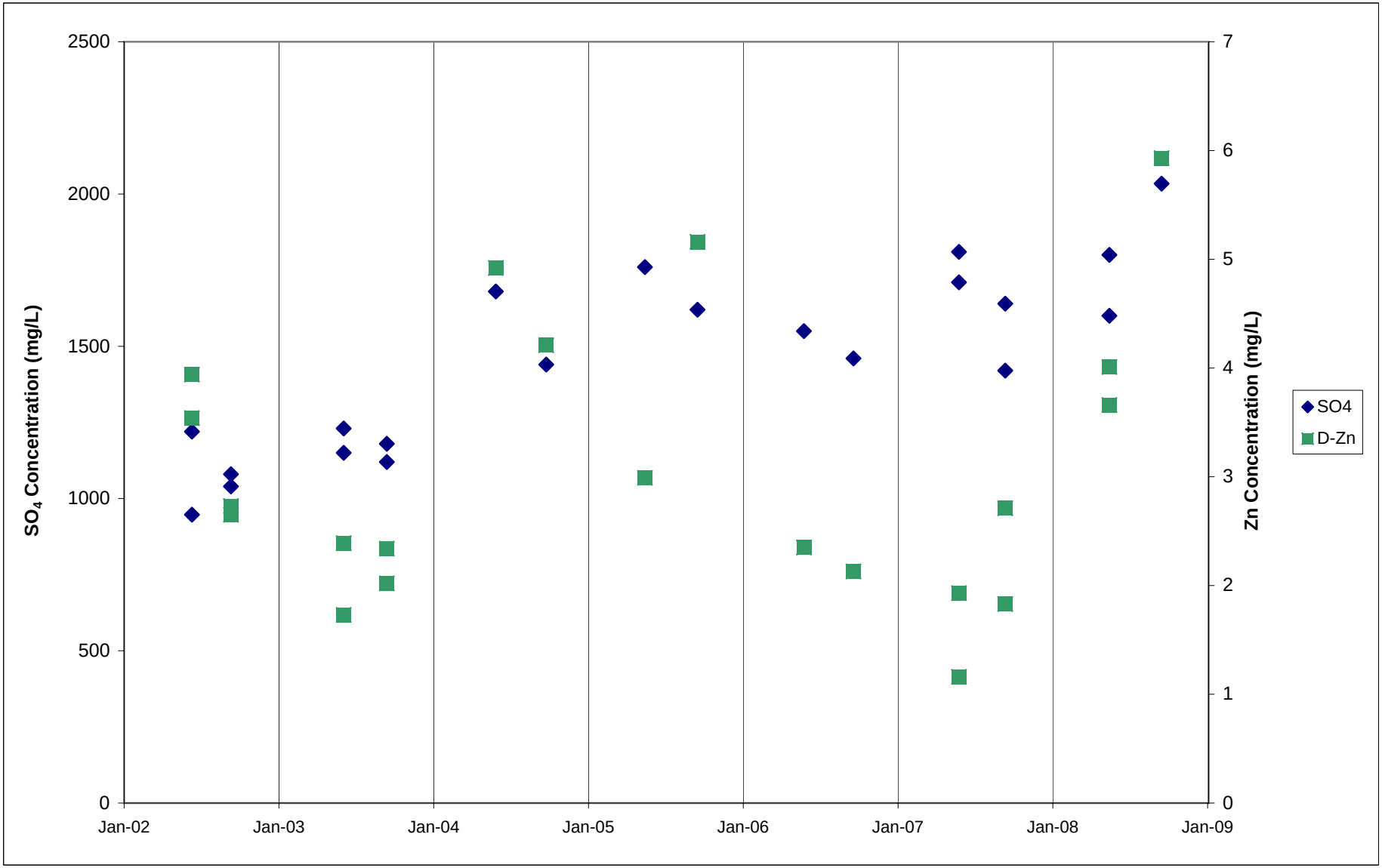
2008 AMP Event #4 Response:
Status Report

Zinc and Sulphate Concentrations at SRK-GD01

Job No: 1CD003.110
File: 2008 AMP Water Quality Figures

Faro Mine Complex

Date:	Approved:	Figure:
December 2008	MCC	9



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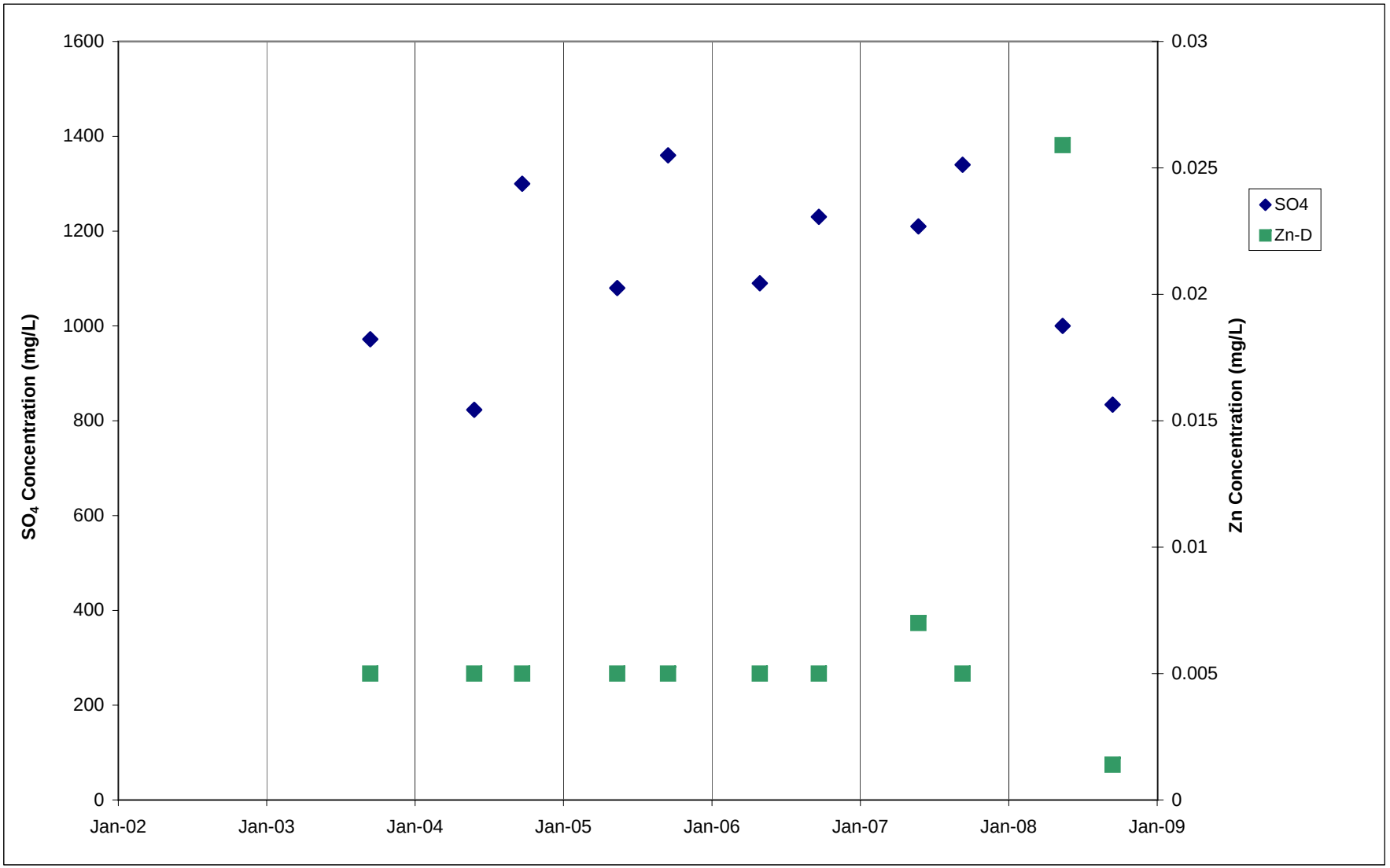
2008 AMP Event #4 Response:
Status Report

Zinc and Sulphate Concentrations at SRK-GD05

Job No: 1CD003.110
File: 2008 AMP Water Quality Figures

Faro Mine Complex

Date: December 2008
Approved: MCC
Figure: **10**



Note: Dissolved zinc concentrations are plotted at the detection limit where values were reported as less than detection.

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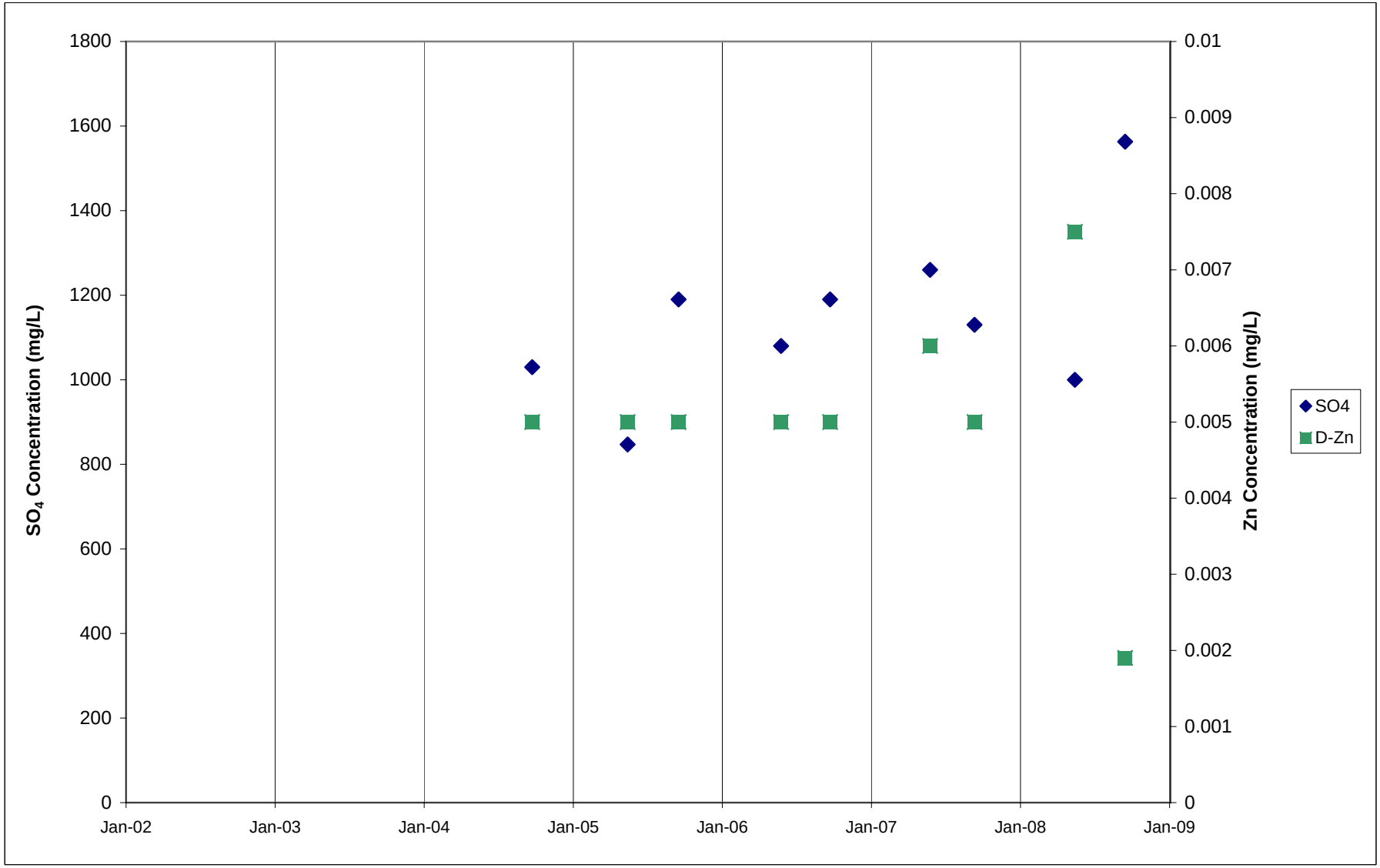
2008 AMP Event #4 Response: Status Report

Zinc and Sulphate Concentrations at SRK-GD05 d/s

Job No: 1CD003.110
File: 2008 AMP Water Quality Figures

Faro Mine Complex

Date:	Approved:	Figure:
December 2008	MCC	**11**



Note: Dissolved zinc concentrations are plotted at the detection limit where values were reported as less than detection.

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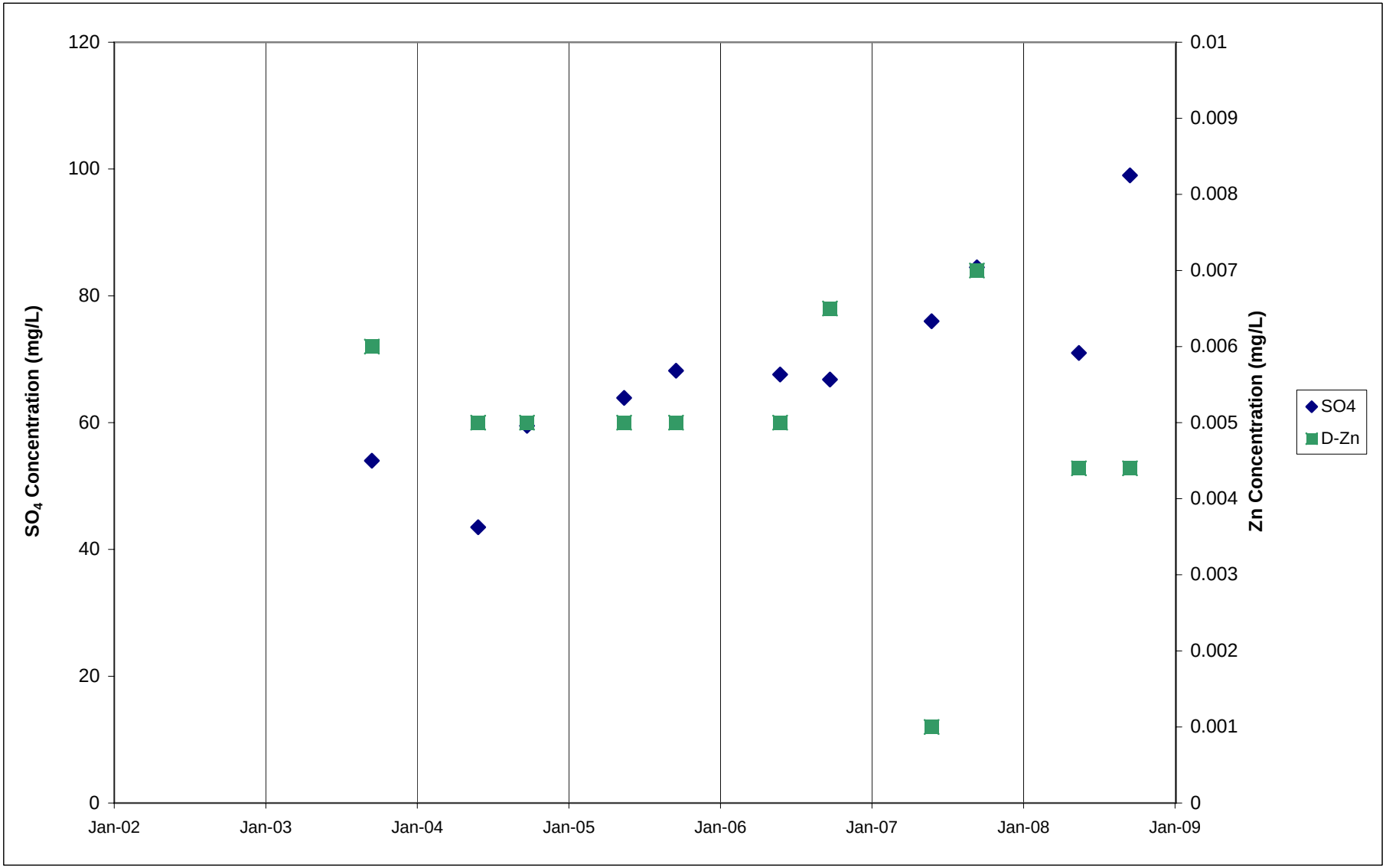
2008 AMP Event #4 Response: Status Report

Zinc and Sulphate Concentrations at Sweet Creek

Job No: 1CD003.110
File: 2008 AMP Water Quality Figures

Faro Mine Complex

Date:	Approved:	Figure:
December 2008	MCC	12



Note: Dissolved zinc concentrations are plotted at the detection limit where values were reported as less than detection.

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2008 AMP Event #4 Response: Status Report

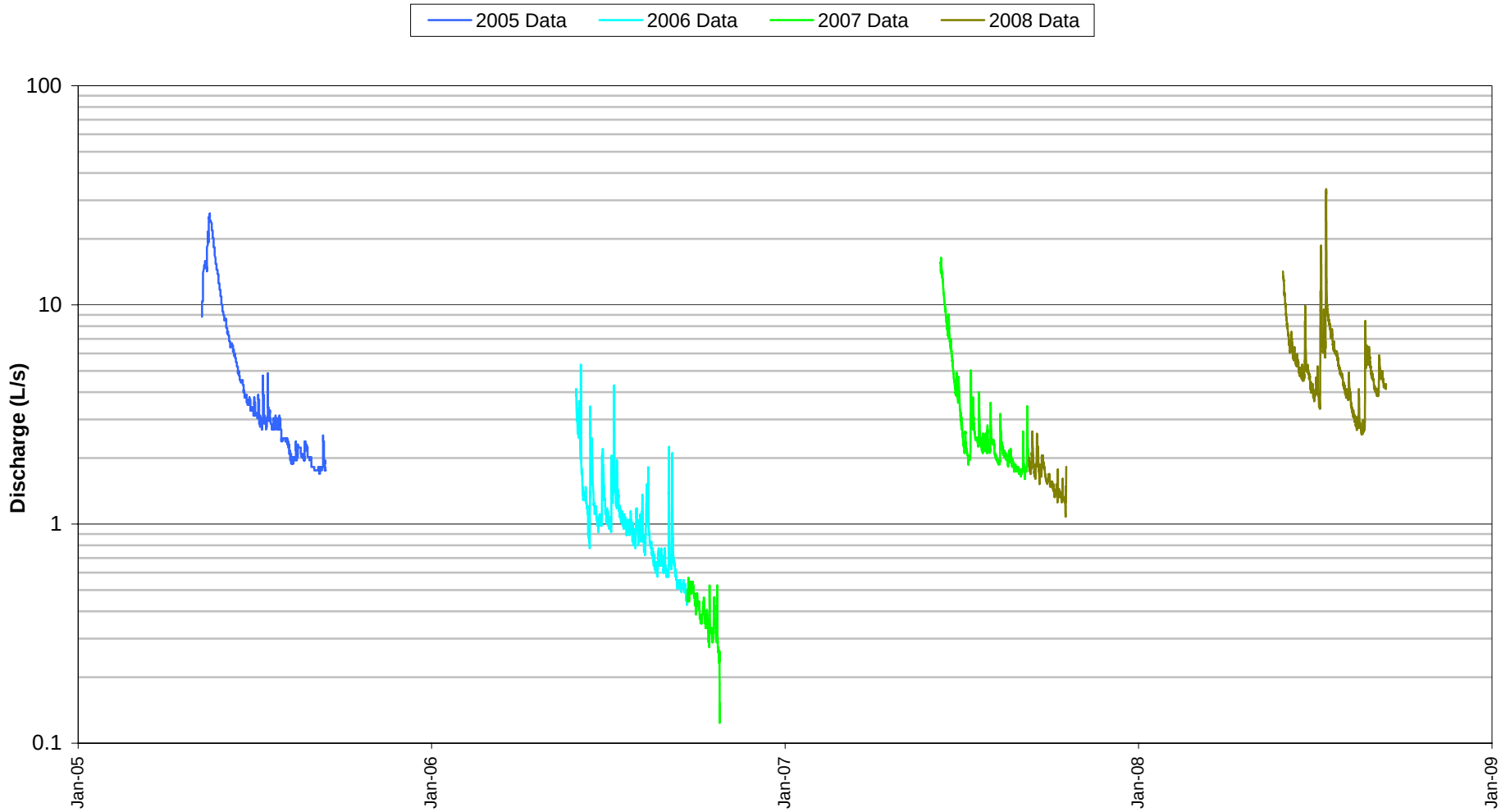
Zinc and Sulphate Concentrations at Sheep Creek

Job No: 1CD003.110
File: 2008 AMP Water Quality Figures

Faro Mine Complex

Date:	Approved:	Figure:
December 2008	MCC	13

Grum Creek Weir
2005 - 2008 Flow Monitoring Results



SRK Consulting Engineers and Scientists VANCOUVER	Deloitte & Touche	2008 AMP Event #4 Response: Status Report
Job No: 1CD003.110 File: 2008 AMP Water Quality Figures.xls	Faro Mine Complex	**Grum Creek Discharge** Date: December 2008 / Approved: MCC / Figure: **14**

Appendices

Appendix A
Water Quality Monitoring Results

Appendix A1
2002-2008 Waste Rock Seepage Survey Results

		Field Parameters					**Physical Tests**		**Dissolved Anions**				**Dissolved Metals**																															
Sample ID	**Date Sampled**	pH (WTW)	Cond (uS/cm)	Temp (C)	ORP (mV)	Flow (L/min)	Cond (uS/cm)	Lab pH	Acidity (to pH 8.3) CaCO3	Alkalinity-Total CaCO3	Chloride Cl	Sulphate SO4	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	U	V	Zn
Min. detection level							2.0	0.010	1.0	1.0	0.50	0.50	0.20	0.20	0.20	0.010	0.0050	0.20	0.10	0.010	0.050	0.010	0.010	0.010	0.030	0.050	0.010	0.10	0.0050	0.030	0.050	0.30	2.0	0.20	0.050	0.010	2.0	0.0050	0.20	0.030	0.010		0.03	0.005
Units		s.u.	uS/cm	0C	mV	L/min	uS/cm	s.u.	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SRKGD01	6/11/2002	6.69	2170	1.8	272	100	2080	7.66	38	337	1.7	1220	0.2	0.2	0.2	0.03	0.005	0.2	0.1	0.01	283	0.01	0.01	0.01	0.03	0.05	0.02	141	0.059	0.03	0.26	0.3	5	0.2	3.98	0.01	7	0.914	0.2	0.03	0.01		<0.03	5.07
SRKGD01	9/11/2002	6.91	2490	2.5	272	340	2460	7.27	69	497	1.5	1200	0.2	0.2	0.2	0.06	0.005	0.4	0.1	0.01	351	0.01	0.01	0.01	0.03	0.05	0.02	216	0.062	0.03	0.29	0.3	8	0.2	4.09	0.01	9	1.31	0.2	0.03	0.01		<0.03	2.48
SRKGD01	6/4/2003	6.93	2670	2.4	488	105	2530	7.82	25	534	2.2	1320	0.2	0.2	0.2	0.05	0.005	0.2	0.1	0.01	316	0.01	0.01	0.01	0.03	0.05	0.03	223	0.044	0.03	0.43	0.3	8	0.2	4.36	0.01	10	1.3	0.2	0.03	0.01		<0.03	4.58
SRKGD01	9/14/2003	7.26	2610	2.5	459	150	2530	8.09	16	559	2.4	1210	0.2	0.2	0.2	0.05	0.005	0.2	0.1	0.01	367	0.01	0.01	0.01	0.03	0.05	0.02	233	0.053	0.03	0.34	0.3	8	0.2	4.46	0.01	10	1.48	0.2	0.03	0.01		<0.03	2.98
SRKGD01	5/28/2004	7.71	2110	2.1	414	400	2030	7.44	44.2	255	1.17	1080	0.2	0.2	0.2	0.037	0.005	0.2	0.1	0.01	259	0.01	0.05	0.01	0.03	0.05	0.018	146	0.998	0.03	0.43	0.3	5.4	0.2	2.83	0.01	5	0.912	0.2	0.03	0.01		<0.03	17.2
SRKGD01	9/23/2004	7.06	2780	3.6	285	180	2700	7.77	23	583	5	1270	0.2	0.2	0.2	0.043	0.005	0.2	0.1	0.01	348	0.01	0.01	0.01	0.03	0.05	0.027	239	0.056	0.03	0.351	0.3	8.3	0.2	4.08	0.01	10.1	1.36	0.2	0.03	0.01		<0.03	3.69
SRKGD01	5/15/2005	7.06	2220	1.6	460	0	2170	7.69	21.8	290	5	1100	0.2	0.2	0.2	0.051	0.005	0.2	0.1	0.01	291	0.01	0.016	0.01	0.03	0.05	0.022	173	0.353	0.03	0.295	0.3	4.2	0.2	2.93	0.01	5.3	0.897	0.2	0.03	0.01		0.037	10.7
SRKGD01	9/16/2005	7.63	2540	2.9	402	100	2730	7.79	19.1	566	5	1390	0.2	0.2	0.2	0.035	0.005	0.2	0.1	0.01	332	0.01	0.01	0.01	0.03	0.05	0.022	248	0.0502	0.03	0.355	0.3	5.7	0.2	3.9	0.01	9.1	1.14	0.2	0.03	0.01		<0.050	3.11
SRKGD01	5/26/2006	6.76	2360	2.5	317	30	3130	7.85	34.9	588	5	1630	0.2	0.2	0.2	0.04	0.005	0.2	0.1	0.01	343	0.01	0.01	0.01	0.038	0.05	0.015	289	0.0828	0.03	0.336	0.3	8	0.2	3.23	0.01	11.1	1.19	0.2	0.03	0.01		<0.03	3.1
SRKGD01	9/19/2006	7.17	2420	3	187	30	2620	7.63	22.5	552	1.23	1320	0.2	0.2	0.2	0.043	0.005	0.2	0.1	0.01	317	0.01	0.01	0.01	0.03	0.05	0.03	253	0.0449	0.03	0.334	0.3	6.9	0.2	3.83	0.01	10	1.23	0.2	0.099	0.01		<0.030	2.76
SRKGD01	9/12/2007						2700	7.68	40.3	570	50	1370	0.005	1E-03	0.003	0.033	0.0025	0.003	0.05	0.0012	349	0.0025	0.0013	0.002	0.03	0.0015	0.027	274	0.0299	0.0009	0.278	0.3	7.5	0.005	4.16	5E-05	10.3	1.29	5E-04	0.0005	0.01		0.005	2.6
SRKGD01	5/26/2007	7.33	24	2.6	298	2	2880	7.61	65	535	1.28	1460	0.002	9E-04	0.003	0.033	0.0002	2E-04	0.01	0.0008	328	0.0002	0.0026	0.0033	0.77	0.0013	0.032	280	0.03	0.0012	0.337	0.03	7.18	0.003	4.57	5E-05	10.3	1.19	3E-04	0.0002	0.0005		0.0005	2.59
SRKGD01	5/15/2008	7.78	2100	2.1	72	20	2100	8.2	8.9	350	1.4	890	0.002	9E-04	0.003	0.032	ND	ND	ND	0.002	255	ND	0.0018	0.003	0.009	0.001	0.0245	182	0.0236	0.0013	0.213	ND	6.28	0.001	3.59	ND	6.99	0.908	3E-04	ND	ND	0.0287	ND	2.72
SRKGD01	9/15/2008	6.78	1988	3.6	187	300	2700	7.9	58.1	430	1.6	1686	0.003	0.001	0.003	0.028	ND	ND	ND	0.0021	355	ND	0.0047	0.0021	0.011	0.0013	0.03	286	0.0593	0.0012	0.411	ND	6.57	0.001	4.05	ND	9.26	1.23	3E-04	ND	0.003	0.0428	ND	6.69
SRKGD05	6/11/2002	7.74	2670	3.1	273	7.5	2570	8.14	13	527	2.2	1220	0.2	0.2	0.2	0.03	0.005	0.2	0.1	0.01	358	0.01	0.01	0.01	0.03	0.05	0.04	211	0.189	0.03	0.59	0.3	8	0.2	5.66	0.01	14	1.52	0.2	0.03	0.01		<0.03	3.54
SRKGD05	9/11/2002	7.45	2550	3.7	292	30	2470	7.88	28	600	1.9	1080	0.2	0.2	0.2	0.02	0.005	0.3	0.1	0.01	349	0.01	0.01	0.01	0.03	0.05	0.03	199	0.008	0.03	0.51	0.3	7	0.2	6.06	0.01	11	1.41	0.2	0.03	0.01		<0.03	2.65
SRKGD05B	6/4/2003	7.8	2550	3.9	421	20	2480	8.04	15	638	2.4	1230	0.2	0.2	0.2	0.03	0.005	0.2	0.1	0.01	312	0.01	0.01	0.01	0.03	0.05	0.03	199	0.007	0.03	0.38	0.3	7	0.2	5.51	0.01	12	1.36	0.2	0.03	0.01		<0.03	1.73
SRKGD05B	9/14/2003	7.84	2610	1.7	402	21	2510	8.11	14	627	2.8	1180	0.2	0.2	0.2	0.03	0.005	0.2	0.1	0.01	337	0.01	0.01	0.01	0.03	0.05	0.03	212	0.013	0.03	0.44	0.3	7	0.2	5.66	0.01	11	1.48	0.2	0.03	0.01		<0.03	2.02
SRKGD05	5/28/2004	7.83	3180	4.9	399	20	2960	8.03	19.9	583	2.09	1680	0.2	0.2	0.2	0.038	0.005	0.2	0.1	0.01	392	0.01	0.01	0.01	0.03	0.05	0.043	269	0.0931	0.03	0.644	0.3	7.8	0.2	5.48	0.01	12.8	1.68	0.2	0.033	0.01		<0.03	4.92
SRKGD05	9/24/2004	7.64	3010	4.7	577	10	2930	8.01	4.8	609	5	1440	0.2	0.2	0.2	0.034	0.0056	0.2	0.1	0.01	361	0.01	0.01	0.01	0.03	0.05	0.052	263	0.009	0.03	0.705	0.3	8.3	0.2	5.07	0.01	13.5	1.6	0.2	0.03	0.01		<0.03	4.21
SRKGD05	5/15/2005	7.96	2520	3.7	413	8	3240	8.14	10.3	541	0.5	1760	0.2	0.2	0.2	0.026	0.005	0.2	0.1	0.01	363	0.01	0.01	0.01	0.03	0.05	0.044	298	0.013	0.03	0.54	0.3	6.4	0.2	3.9	0.01	12.8	1.42	0.2	0.03	0.01		0.059	2.99
SRKGD05	9/16/2005	7.86	2550	6	386	3.6	3010	8.1	9.6	610	5	1620	0.2	0.2	0.2	0.029	0.005	0.2	0.1	0.01	477	0.01	0.01	0.01	0.03	0.05	0.056	341	0.0127	0.03	0.917	0.3	8.9	0.2	6.25	0.011	17.9	1.81	0.2	0.03	0.01		<0.07	5.16
SRKGD05	5/25/2006	7.71	2350	5.2	97	3.7	2950	8.07	22.3	586	2.5	1550	0.2	0.2	0.2	0.029	0.005	0.2	0.1	0.01	391	0.01	0.01	0.01	0.03	0.05	0.034	302	0.0064	0.03	0.493	0.3	7.5	0.2	4.74	0.01	16	1.7	0.2	0.03	0.01		<0.03	2.35
SRKGD05	9/19/2006	8.06	2420	4.7	174	4	2820	8	10.4	589	5	1460	0.2	0.2	0.2	0.017	0.005	0.2	0.1	0.01	310	0.01	0.01	0.01	0.03	0.05	0.034	234	0.005	0.03	0.448	0.3	5.5	0.2	4.29	0.01	11.2	1.17	0.2	0.092	0.01		<0.03	2.13
SRKGD05	5/26/2007	7.98	242	9.1	356	2	3730	7.89	39	538	2.08	1810	0.001	0.002	0.005	0.021	0.0002	2E-04	0.01	0.0003	433	0.0002	0.001	0.0027	0.8	0.0008	0.033	330	0.0048	0.0012	0.413	0.03	6.74	0.003	5.84	5E-05	13.5	1.59	4E-04	0.0002	0.0005		0.0006	1.16
SRKGD05	9/12/2007						2880	8.08	17	592	50	1640	0.005	0.002	0.005	0.017	0.0025	0.003	0.05	0.0006	375	0.0025	0.0006	0.0016	0.03	0.0015	0.038	284	0.00589	0.001	0.413	0.3	7	0.005	5.3	5E-05	13.3	1.48	5E-04	0.0005	0.01		0.005	1.83
GD05	5/15/2008	8.17	3200	4.4	65	1	3200	8.3	ND	460	1.8	1800	0.004	0.002	0.004	0.029	ND	ND	ND	0.0019	414	ND	0.0044	0.0024	0.028	0.0011	0.048	312	0.0347	0.0013	0.348	ND	7.3	0.002	4.1	ND	11.2	1.33	5E-04	ND	ND	0.0462	ND	3.66
GD05dup	9/15/2008	7.47	2595	4.1	182	7.2	3400	7.7	32.6	600	2.1	2034	ND	ND	0.008	0.03	ND	ND	ND	0.0025	432	ND	0.0024	ND	ND	0.0019	ND	354	0.131	ND	0.632	ND	8	ND	ND	ND	14	1.69	3E-04	ND	0.086	0.056	ND	5.93
SRKGD06	6/11/2002	7.62	2640	3.5	269	15	2540	8.1	17	557	2.5	947	0.2	0.2	0.2	0.03	0.005	0.3	0.1	0.01	361	0.01	0.01	0.01	0.03	0.05	0.04	209	0.23	0.03	0.52	0.3	9	0.2	5.87	0.01	14	1.56	0.2	0.04	0.01		<0.03	3.94
SRKGD06	9/11/2002	7.35	2540	3.1	314	30	2480	8	26	700	1.8	1040	0.2	0.2	0.2	0.03	0.005	0.3	0.1	0.01	348	0.01	0.01	0.01	0.03	0.05	0.02	196	0.008	0.03	0.42	0.3	7	0.2	6.07	0.01	11	1.39	0.2	0.03	0.01		<0.03	2.73
SRKGD06	6/4/2003	7.67	2510	3.1	473	0	2430	8.02	18	643	2.6	1150	0.2	0.2	0.2	0.03	0.005	0.2	0.1	0.01	337	0.01	0.01	0.01	0.03	0.05	0.03	214	0.011	0.03	0.38	0.3	7	0.2	6.15	0.01	13	1.49	0.2	0.03	0.01		<0.03	2.39
SRKGD06	9/14/2003	7.74	2540	3.1	486	15	2500	8.28	1	646	2.5	1120	0.2	0.2	0.2	0.03	0.005	0.2	0.1	0.01	325	0.01	0.01	0.01	0.03	0.05	0.03	199	0.008	0.03	0.41	0.3	7	0.2	5.64	0.01	11	1.41	0.2	0.03	0.01		<0.03	2.34
SRKGD06	5/26/2007	7.69	243	3.4	321	trace	3570	7.95	40	677	2.08	1710	0.001	0.001	0.005	0.026	0.0002	2E-04	0.01	0.0007	466	0.0002	0.0004	0.0021	0.71	0.0008	0.028	320	0.0016	0.0006	0.428	0.03	6.4	0.003	5.87	5E-05	12.3	1.63	3E-04	0.0002	0.0005		0.0008	1.93
SRKGD06	9/12/2007						2820	8.04	21.9	635	50	1420	0.005	0.001	0.004	0.019	0.0025	0.003	0.05	0.0015	385	0.0025	0.0005	0.002	0.03	0.001	0.035	272	0.00272	0.0005	0.449	0.3	6.8	0.005	5.52	5E-05	13.4	1.47	5E-04	0.0005	0.01		0.005	2.71
GD06	5/15/2008	7.86	3300	3.2	85	2	3100	8.3	1.8	610	2.4	1600	0.002	0.001	0.005	0.026	ND	ND	ND	0.002	469	ND	0.0014	0.0016	0.011	0.0016	0.038	293	0.0113	0.0006	0.547	ND	7.37	ND	5.42	ND	13.6	1.57	4E-04	ND	ND	0.0516	ND	4.01
SRK-GD16	5/28/2004	7.47	3280	3.4	504	30	3040	7.72	43	619	2.14	1680	<0.2	<0.2	<0.2	0.041	<0.005	<0.2	<0.1	<0.01	382	<0.01	0.03	<0.01	<0.03	<0.05	0.048	253	1.75	<0.03	0.701	<0.3	7	<0.2	4.59	<0.01	12	1.67	<0.2	<0.03	<0.01		<0.03	10.4
SRK-GD16	5/18/2005	7.28			439	2.1	3480	7.62	93.2	602	<5.0	2090	<0.20	<0.20	<0.20	0.032	<0.0050	<0.20	<0.10	0.089	416	<0.010	0.096	0.026	<0.030	<0.050	0.045	338	4.93	<0.030	0.501	<0.30	6.1	<0.20	6.71	<0.010	15.4	1.69	<0.20	<0.030	<0.010		<0.030	59.9
SRK-GD16	5/26/2007	7.6	24	3.6	322	trace	3710	7.67	92.0	659	2.6	1730	0.002	6E-04	0.005	0.027	-0.0002	-0	-0.01	0.008	461	-2E-04	0.008	0.004	0.86	0.0049	0.022	302	0.69	0.0008	0.214	-0.03	4.3	0.003	8.28	-5E-05	12.9	1.51	6E-04	-2E-04	0.0006		0.0007	16.5
GD16	5/15/2008	7.45	4300	2	160	trickle	5000	7.50	151.0	290	1	4100	0.003	9E-04	0.002	0.044	ND	ND	ND	0.045	462	ND	0.186	0.004	0.015	0.0073	0.087	570	1.73	0.0034	0.803	ND	7.0	0.009	3.99	ND	09.8	1.81	9E-04	ND	ND	0.0329	ND	139
SRK-GD04	6/11/2002	7.6	3260	2.5	248	1.5	3220	8.06	18	477	1.9	1350	<0.2	<0.2	<0.2	0.02	<0.005	<0.2	<0.1	<0.01	352	<0.01	0.03	<0.01	<0.03	<0.05	0.04	347	0.207	<0.03	0.42	<0.3	10	<0.2	3.65	<0.01	16	1.59	<0.2	<0.03	<0.01		<0.03	3.68
SRK-GD21	5/28/2004	7.47	3390	3.4	394	7.5	3140	7.86	27.6	393	1.26	1990	<0.2	<0.2	<0.2	0.036	<0.005	<0.2	<0.1	<0.01	315	<0.01	0.026	<0.01	<0.03	<0.05	0.066	403	0.271	<0.03	0.345	<0.3	12.3	<0.2	2.3	<0.01	14.9	1.53	<0.2	<0.03	<0.01		<0.03	2.52
SRK-GD21	9/24/2004	7.1	3860	4	536	Trace	3770	8.1	6.3	628	<5	2170	<0.2	<0.2	<0.2	0.016	<0.005	<0.2	<0.1	<0.01	365	<0.01	<0.01	<0.01	<0.03	<0.05	0.041	438	0.0619	<0.03	0.409	<0.3	10	<0.2	3.89	<0.01	17.1	1.63	<0.2	<0.03	<0.01		<0.03	1.82
SRK-GD21	5/15/2005	7.74	2490	2.7	438	6	2950	8.10	7.9	356	<5.0	1770	<0.20	<0.20	<0.20	0.025	<0.0050	<0.20	<0.10	<0.010	277	<0.010	0.012	<0.010	<0.030	<0.050	0.047	340	0.0983	<0.030	0.290	<0.30	8.2	<0.20	1.66	<0.010	11.4	1.16	<0.20	<0.030	<0.010		0.053	2.63
SRK-GD21	5/25/2006	7.85	2370	10.5	118	trace	2890	8.08	9.8	400	<2.5	1670	<0.2	<0.2	<0.2	0.018	<0.005	<0.2	<0.1	<0.01	287	<0.01	0.014	<0.01	<0.03	<0.05	0.043	342	0.0643	<0.03	0.330	<0.3	10.0	<0.2	2.18	<0.01	12.2	1.28	<0.2	<0.03	<0.01		<0.03	3.42
SRK-GD21	5/26/2007	8.14	242	11	364	trickle	3500	8.17	8.0	470	-2	1820	0.001	0.002	0.003	0.020	-0.0002	-0	-0.01	0.0008	346	-2E-04	0.006	0.0023	0.63	0.0008	0.034	362	0.0190	0.0033	0.253	-0.03	8.3	0.005	3.24	-5E-05	10.8	1.34	5E-04	-2E-04	0.0004		0.0006	1.08
GD21B	9/15/2008	6.83	3012	6.7	196	Trace	3600	8.00	37.9	340	0.9	2496	0.003	0.002	0.005	0.017	ND	ND	ND	0.0025	443	ND	0.001	0.0017	0.008	0.004	0.052	396	0.0839	0.0007	0.213	ND	10.6	0.001	3.44	ND	11.7	1.48	0.000	ND	0.003	0.0215	ND	6.58

Appendix A2

2003-2008 Downgradient Seepage Pathways South of Grum Dump

Appendix A2: Water Quality of Downgradient Seepage Pathways South of Grum Dump

		Field Parameters					Physical Tests		Dissolved Anions				Dissolved Metals																															
Sample ID	Date Sampled	pH	Conducti	Temperat	ORP	Flow	Conductivity	pH	Acidity (	Alkalini	Cl	SO4	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	U	V	Zn
			uS/cm	°C	mV	L/min	uS/cm		mg CaC(	mg CaC(	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
						Method Detection Limit:	2.0	0.010	1.0	1.0	0.50	0.50	0.20	0.20	0.20	0.010	0.0050	0.20	0.10	0.010	0.050	0.010	0.010	0.010	0.030	0.050	0.010	0.10	0.0050	0.030	0.050	0.30	2.0	0.20	0.050	0.010	2.0	0.0050	0.20	0.030	0.010		0.030	0.0050
GD05 D/S	9/15/2003	7.66	2140	3.7	424	60	2070	8.11	15	421	2.4	972	0.2	0.2	0.2	0.06	0.005	0.2	0.1	0.01	277	0.01	0.01	0.01	0.03	0.05	0.01	166	0.005	0.03	0.05	0.3	3	0.2	5.84	0.01	10	1.04	0.2	0.03	0.01		0.03	0.005
GD05 D/S	5/28/2004	7.79	1884	2.9	190	30	1760	8.13	6.6	373	2.03	823	0.2	0.2	0.2	0.052	0.005	0.2	0.1	0.01	264	0.01	0.01	0.01	0.03	0.05	0.01	129	0.005	0.03	0.05	0.3	2.6	0.2	5.4	0.01	8.4	0.985	0.2	0.03	0.01		0.03	0.005
GD05 D/S	9/23/2004	6.9	2430	4.3	69	2.25	2390	8.07	8	434	5	1300	0.2	0.2	0.2	0.06	0.006	0.2	0.1	0.01	330	0.01	0.01	0.01	0.03	0.05	0.013	192	0.005	0.03	0.05	0.3	2.6	0.3	6.06	0.02	11.7	1.21	0.2	0.03	0.01		0.03	0.005
GD05 D/S	5/15/2005	7.94	2170	3.6	478	0	2200	8.1	7.5	406	5	1080	0.2	0.2	0.2	0.048	0.005	0.2	0.1	0.01	305	0.01	0.01	0.01	0.03	0.05	0.011	171	0.005	0.03	0.05	0.3	2.3	0.2	5	0.01	9.8	1.03	0.2	0.03	0.01		0.046	0.005
GD05 D/S	9/17/2005						2480	8.07	8.8	449	5	1360	0.2	0.2	0.2	0.057	0.005	0.2	0.1	0.01	340	0.01	0.01	0.01	0.03	0.05	0.015	217	0.005	0.03	0.05	0.3	2.9	0.2	5.94	0.01	12.3	1.17	0.2	0.03	0.01		0.055	0.005
GD05 D/S	5/1/2006	7.71	2350	5.2	97	3.7	2290	8.17	7.4	416	1.58	1090	0.2	0.2	0.2	0.034	0.005	0.2	0.1	0.01	332	0.01	0.01	0.01	0.03	0.05	0.01	184	0.0056	0.03	0.05	0.3	3.5	0.2	5.43	0.01	11	0.978	0.2	0.03	0.01		0.03	0.005
GD05 D/S	9/23/2006	8.02	2480	4.3	0	1	2510	8.15	8.4	466	3.4	1230	0.2	0.2	0.2	0.043	0.005	0.2	0.1	0.01	301	0.01	0.01	0.01	0.03	0.05	0.017	191	0.005	0.03	0.05	0.3	2.8	0.2	5.32	0.01	10.9	0.982	0.2	0.079	0.01		0.03	0.005
GD05 D/S	5/26/2007	7.74	22	1.4	38	trace	2370	7.87	27	354	1.66	1210	0.001	2E-04	0.001	0.029	0.0002	2E-04	0.01	1E-05	309	0.0002	0.0002	0.0013	0.43	0.0002	0.009	216	0.0048	0.0005	0.0009	0.03	3.42	0.002	5.69	0.00005	9.07	0.975	0.00002	0.0002	0.0004	0.022	0.0005	0.007
GD05 D/S	9/12/2007						2630	8.05	14.7	484	2.03	1340	0.005	5E-04	0.001	0.0403	0.0025	0.003	0.05	0.0003	364	0.0025	0.0005	0.0007	0.03	0.00025	0.025	233	0.00049	0.0005	0.0025	0.3	3.7	0.005	6.3	0.00005	12.8	1.25	0.0005	0.0005	0.011	0.0366	0.005	0.005
GD05 D/S	5/15/2008	8.24	2400	0.1	95	4	8.2	2200	9.5	390	2	1000	0.004	2E-04	0.001	0.0328	ND	ND	ND	4E-05	288	ND	0.0001	0.0009	0.02	0.00021	0.012	157	0.0014	ND	0.0007	ND	ND	4E-04	5.04	ND	8.69	1.05	ND	ND	ND	0.0313	ND	0.0259
GD05 D/S	9/15/2008	7.9	5	2145	144	14	8.1	2800	15.4	480	2	834	0.002	1E-04	6E-04	0.0217	ND	ND	ND	ND	194	ND	ND	0.0005	0.005	0.0001	0.008	127	ND	ND	0.0005	ND	2.04	ND	3.15	ND	6.52	0.663	ND	ND	ND	0.0205	ND	0.0014
Moose Seep	9/15/2003	7.61	1310	3.4	406	1	1280	8.2	5	288	1.5	522	0.2	0.2	0.2	0.05	0.005	0.2	0.1	0.01	174	0.01	0.01	0.01	0.03	0.05	0.01	72.9	0.005	0.03	0.05	0.3	2	0.2	4.84	0.01	7	0.491	0.2	0.03	0.01		0.03	0.006
Moose Seep	5/28/2004	7.79	465	3.6	167	Trace	1120	8.08	5.2	236	1.52	427	0.2	0.2	0.2	0.057	0.005	0.2	0.1	0.01	157	0.01	0.01	0.01	0.03	0.05	0.01	62.6	0.005	0.03	0.05	0.3	2.1	0.2	4.38	0.01	6.1	0.453	0.2	0.03	0.01		0.03	0.005
Moose Seep	9/22/2004	7.32	1573	6.4	48	1	1540	8.08	5.4	296	5	728	0.2	0.2	0.2	0.078	0.006	0.2	0.1	0.01	235	0.01	0.01	0.01	0.03	0.05	0.01	97.6	0.005	0.03	0.05	0.3	2.1	0.3	5.45	0.02	7.8	0.679	0.2	0.03	0.01		0.03	0.0064
Moose Seep	5/18/2005	7.7	0	0	415	0	1240	8.2	3	245	0.79	494	0.2	0.2	0.2	0.048	0.005	0.2	0.1	0.01	168	0.01	0.01	0.01	0.03	0.05	0.01	69.2	0.005	0.03	0.05	0.3	2	0.2	3.81	0.01	5	0.433	0.2	0.03	0.01		0.03	0.005
Moose Seep	9/17/2005						1590	8.05	6.8	320	5	748	0.2	0.2	0.2	0.087	0.005	0.2	0.1	0.01	293	0.01	0.01	0.01	0.03	0.05	0.01	117	0.0055	0.03	0.05	0.3	2.3	0.2	6.1	0.01	8.3	0.73	0.2	0.03	0.01		0.04	0.0081
Sheep Seep	9/15/2003	7.3	557	2.4	450	45	539	8.36	1	262	0.7	54	0.2	0.2	0.2	0.17	0.005	0.2	0.1	0.01	88.5	0.01	0.01	0.01	0.03	0.05	0.01	21	0.005	0.03	0.05	0.3	2	0.2	4.73	0.01	2	0.369	0.2	0.03	0.01		0.03	0.006
Sheep Seep	5/28/2004	7.51	458	1.9	208	270	420	8.24	1.6	205	0.72	43.5	0.2	0.2	0.2	0.135	0.005	0.2	0.1	0.01	72	0.01	0.01	0.01	0.03	0.05	0.01	15.9	0.005	0.03	0.05	0.3	2	0.2	4.48	0.01	2	0.297	0.2	0.03	0.01		0.03	0.005
Sheep Seep	9/23/2004	8.02	571	4.1	76	4.5	580	8.36	1	268	2.5	59.5	0.2	0.2	0.2	0.171	0.005	0.2	0.1	0.01	89	0.01	0.01	0.01	0.03	0.05	0.01	19.7	0.005	0.03	0.05	0.3	3	0.3	4.61	0.02	2.4	0.364	0.2	0.03	0.01		0.03	0.005
Sheep Creek	5/15/2005	8.34	576	2.4	434	0	581	8.34	1	269	0.5	63.9	0.2	0.2	0.2	0.176	0.005	0.2	0.1	0.01	96.2	0.01	0.01	0.01	0.03	0.05	0.01	23.3	0.005	0.03	0.05	0.3	2	0.2	3.77	0.01	2	0.394	0.2	0.03	0.01		0.03	0.005
Sheep Creek	9/17/2005						565	8.28	1	294	0.5	68.2	0.2	0.2	0.2	0.195	0.005	0.2	0.1	0.01	105	0.01	0.01	0.01	0.03	0.05	0.01	23.6	0.005	0.03	0.05	0.3	2	0.2	4.9	0.01	2.2	0.414	0.2	0.03	0.01		0.03	0.005
Sheep Creek	9/23/2006	8.35	589	3.4	0	3	561	8.23	3.5	254	0.5	66.8	0.2	0.2	0.2	0.197	0.005	0.2	0.1	0.01	101	0.01	0.01	0.01	0.03	0.05	0.01	22.8	0.005	0.03	0.05	0.3	2	0.2	4.78	0.01	2.1	0.395	0.2	0.03	0.01		0.03	0.0065
Sheep Creek	5/26/2006	7.83	575	0.7	188	1	558	8.32	1	258	0.5	67.6	0.2	0.2	0.2	0.144	0.005	0.2	0.1	0.01	92.9	0.01	0.01	0.01	0.03	0.05	0.01	21	0.005	0.03	0.05	0.3	2	0.2	4.04	0.01	2.1	0.331	0.2	0.03	0.01		0.03	0.005
Sheep Creek	5/26/2007	7.86	567	1.6	47	2	512	8.15	4	247	0.4	76	0.001	2E-04	5E-04	0.109	0.0002	2E-04	0.01	1E-05	94.1	0.0002	0.0002	0.0007	0.12	0.0002	0.002	23.1	0.0002	0.0009	0.0004	0.03	0.94	0.002	3.93	0.00005	1.85	0.331	0.00002	0.0002	0.0002	0.0042	0.0003	0.001
Sheep Creek	9/12/2007						582	8.24	1.5	265	0.5	84.5	0.0021	2E-04	3E-04	0.166	0.001	0.001	0.02	0.0001	101	0.001	0.0002	0.0006	0.032	0.0001	0.01	23.5	0.00039	0.0009	0.001	0.3	2	0.002	5.13	0.00002	2.6	0.383	0.0002	0.0002	0.01	0.0047	0.002	0.007
Sheep Creek	5/15/2008	8.28	500	4	49	20	8.4	480	ND	190	0.7	71	0.003	1E-04	3E-04	0.128	ND	ND	ND	2E-05	77.5	0.0002	3E-05	0.0007	0.005	8.4E-05	0.0022	17.3	0.00017	ND	0.0004	ND	ND	0.002	4.03	ND	1.69	0.322	ND	ND	ND	0.0035	ND	0.0044
Sheep Creek	9/15/2008	8	5.2	405	146	60	8.3	550	ND	220	0.9	99	0.004	1E-04	4E-04	0.13	ND	ND	ND	2E-05	98.9	ND	3E-05	0.0006	0.004	0.00017	0.0016	19	0.00017	0.0009	0.0005	ND	0.82	7E-04	4.85	ND	2.25	0.37	0.000007	ND	ND	0.0045	ND	0.0044
Sweet Creek	9/23/2004	8.03	2260	4.3	114	90	2180	8.1	7.4	418	5	1030	0.2	0.2	0.2	0.071	0.005	0.2	0.1	0.01	336	0.01	0.01	0.01	0.03	0.05	0.01	152	0.005	0.03	0.05	0.3	2	0.2	6.03	0.01	9.6	1.14	0.2	0.03	0.01		0.03	0.005
Sweet Creek	5/15/2005	8.11	1935	3	474	0	1930	8.12	6.5	417	5	847	0.2	0.2	0.2	0.055	0.005	0.2	0.1	0.01	305	0.01	0.01	0.01	0.03	0.05	0.01	138	0.005	0.03	0.05	0.3	2	0.2	5.18	0.01	8.1	0.989	0.2	0.03	0.01		0.037	0.005
Sweet Creek	9/17/2005	0	0	0	0	0	2300	8.1	8	390	5	1190	0.2	0.2	0.2	0.065	0.005	0.2	0.1	0.01	349	0.01	0.01	0.01	0.03	0.05	0.01	180	0.005	0.03	0.05	0.3	2	0.2	5.85	0.01	10.3	1.1	0.2	0.03	0.01		0.047	0.005
Sweet Creek	5/26/2006	7.85	2230	4.3	141	39.25	2210	8.14	10.4	428	0.5	1080	0.2	0.2	0.2	0.043	0.005	0.2	0.1	0.01	329	0.01	0.01	0.01	0.03	0.05	0.01	156	0.005	0.03	0.05	0.3	2.1	0.2	5.56	0.01	9.9	0.945	0.2	0.03	0.01		0.03	0.005
Sweet Creek	9/23/2006	8.31	2450	3	0	40.8	2330	8.04	12.9	448	1.68	1190	0.2	0.2	0.2	0.055	0.005	0.2	0.1	0.01	351	0.01	0.01	0.01	0.03	0.05	0.015	184	0.005	0.03	0.05	0.3	2	0.2	6.12	0.01	11.1	1.06	0.2	0.074	0.01		0.03	0.005
Sweet Creek	5/26/2007	7.66	231	3.3	44	15	2440	7.9	20	438	2.25	1260	0.001	2E-04	8E-04	0.044	0.0002	2E-04	0.01	1E-05	365	0.0002	0.0002	0.0012	0.49	0.0002	0.007	194	0.0002	0.0009	0.0038	0.03	1.99	0.003	5.69	0.00005	8.26	1.1	0.00002	0.0002	0.0003	0.026	0.0006	0.006
Sweet Creek	9/12/2007						2490	8.11	12.1	483	2.17	1130	0.005	5E-04	5E-04	0.0444	0.0025	0.003	0.05	0.0003	380	0.0025	0.0005	0.0006	0.03	0.00071	0.025	208	0.0012	0.0009	0.0048	0.3	2.6	0.005	6.35	0.00005	12.1	1.18	0.0005	0.0005	0.011	0.0324	0.005	0.005
Sweet Creek	5/15/2008	8.34	2200	1	41	50	8.2	2300	9.5	410	1.9	1000	0.002	3E-04	6E-04	0.0395	ND	ND	ND	ND	331	ND	0.0001	0.0008	0.009	0.00011	0.009	153	0.0005	ND	0.0038	ND	ND	7E-04	5.4	ND	8.89	1.14	ND	ND	ND	0.0336	ND	0.0075
Sweet Creek	9/15/2008	8.19	4.5	2016	155	240	8.1	2700	11.4	480	2.1	1563	0.002	3E-04	6E-04	0.0557	ND	ND	ND	ND	418	ND	0.0001	0.0007	0.01	0.00007	0.012	225	ND	0.001	0.0047	ND	2.85	8E-04	6.51	ND	12.1	1.33	ND	ND	0.004	0.0361	0.001	0.0019
WTA02	9/23/2004	8.05	450	5	69	1	447	8.39	1	232	2.5	18	0.2	0.2	0.2	0.093	0.005	0.2	0.1	0.01	81.3	0.01	0.01	0.01	0.03	0.05	0.01	9.52	0.005	0.03	0.05	0.3	2	0.2	4.4	0.01	2	0.291	0.2	0.03	0.01		0.03	0.005
WTA02	5/18/2005	7.55	0	0	389	0	931	8.2	3.3	258	0.55	286	0.2	0.2	0.2	0.126	0.005	0.2	0.1	0.01	152	0.01	0.01	0.01	0.03	0.05	0.01	37.9	0.005	0.03	0.05	0.3	2	0.2	4.31	0.01	3.1	0.677	0.2	0.03	0.01		0.03	0.005
WTA02	5/26/2006	8	413	13.8	160	trace	414	7.17	34.5	203	0.5	19.8	0.2	0.2	0.2	0.123	0.005	0.2	0.1	0.01	85.1	0.01	0.01	0.01	0.03	0.05	0.01	11.1	0.005	0.03	0.05	0.3	2	0.2	4.2	0.01	2	0.324	0.2	0.03	0.01		0.03	0.005
WTA02	9/24/2006	8.16	427	0.4	0	2	412	8.24	3	220	0.5	19.4	0.2	0.2	0.2	0.088	0.005	0.2	0.1	0.01	76.7	0.01	0.01	0.01	0.03	0.05	0.01	10.3	0.0182	0.03	0.05	0.3	2	0.2	3.97	0.01	2	0.294	0.2	0.03	0.01		0.03	0.0375
WTA02	5/26/2007	8.8	47	12.1	33	trickle	350	8.23	0.5	210	0.2	25.1	0.002	2E-04	4E-04	0.092	0.0002	2E-04	0.01	1E-05	77	0.0002	0.0002	0.0008	0.12	0.0002	0.001	9.2	0.0005	0.001	0.0003	0.03	0.47	0.001	3.99	0.00005	1.44	0.276	0.00002	0.0002	0.0002	0.0021	0.0003	0.001
WTA02	9/12/2007						452	7.99	7.2	236	0.5	23.3	0.001	1E-04	1E-04	0.092	0.0005	5E-04	0.01	5E-05	89.4	0.0005	0.0001	0.0005	0.261	0.00005	0.005	10.7	0.00238	0.0007	0.0005	0.3	2	0.001	4.71	0.00001	2	0.283	0.0001	0.0001	0.01	0.002	0.001	0.006
WTA02	5/15/2008	8.34	410	3.2	53	0.5	8.4	390	ND	180	ND	24	0.0058	2E-04	2E-04	0.0791	ND	ND	ND	ND	74.8	ND	3E-05	0.0004	0.007	9.7E-05	0.0011	7.84	0.00036	ND	0.0002	ND	ND	0.001	3.96	ND	1.37	0.252	ND	ND	ND	0.0024	ND	0.0005
WTA02	9/15/2008	7.9	5.8	308	159	10	8.3	420	ND	220	ND	21	0.0017	1E-04	2E-04	0.0921	ND	ND	ND	5E-06	80.8	ND	3E-05	0.0006	0.002	4.1E-05	0.0011	9.21	0.00014	0.0009	0.0003	ND	0.46	8E-04	4.49	ND	1.65	0.282	0.000006	ND	ND	0.0021	ND	0.0005
WGD01	9/23/2004	7.71	1115	6.8	64	2	1120	8.18	2.6	277	5	384	0.2	0.2	0.2	0.165	0.005	0.2	0.1	0.01	172	0.01	0.01	0.01	0.03	0.05	0.012	54.1	0.005	0.03	0.05	0.3	2	0.2	5.09	0.01	3.8	0.957	0.2	0.03	0.01		0.03	0.005
WGD01	9/16/2005						1100	8.13	3.8	286	0.82	380	0.2	0.2	0.2	0.173	0.005	0.2	0.1	0.01	186	0.01	0.01	0.01	0.03	0.05	0.01	56	0.005	0.03	0.05	0.3	2	0.2	5.03	0.01	3.4	0.89	0.2	0.03	0.01		0.03	0.005
WGD01	5/26/2006	7.62	1008	8.1	282	trace	1010	8.07	10.1	278	0.62	308	0.2	0.2	0.2	0.102	0.005	0.2	0.1	0.01	158	0.01	0.01	0.01	0.09	0.05	0.01	44	0.0813	0.03	0.05	0.3	2	0.2	4.79	0.01	3.7	0.711	0.2	0.03	0.01		0.03	0.005
WGD01	9/23/2006	8.14	1144	4.5	0	2	1130	8.21	4.5	278	0.89	358	0.2	0.2	0.2	0.13	0.005	0.2	0.1	0.01	190	0.01	0.01	0.01	0.03	0.05	0.01	58.4	0.005	0.03	0.05	0.3	2	0.2	5.17	0.01	3.6	0.856	0.2	0.03	0.01		0.03	0.0059
WGD01	5/26/2007	8.1	882	4.5	44	trickle	856	8.03	10	245	0.46	252	0.002	2E-04	4E-04	0.091	0.0002	2E-04	0.01	1E-05	144	0.0002	0.0002	0.0008	0.18	0.0002	0.004	43.8	0.0005	0.0004	0.0007	0.03	1.01	0.002	3.92	0.00005	2.42	0.594	0.00002	0.0002	0.0002	0.0053	0.0003	0.002
WGD01	9/12/2007						1060	8.08	6	268	0.97	365	0.0037	2E-04	2E-04	0.0847	0.001	0.001	0.02	0.0001	171	0.001	0.0002	0.0017	0.068	0.00052	0.01	58.5	0.00723	0.0005	0.001	0.3	2	0.002	5.45	0.00002	4	0.802	0.0002	0.0002	0.01	0.0078	0.002	0.0392
WGD01	5/15/2008	8	1200	4.7	86	2	8.3	1000	ND	260	0.6	330	0.0033	2E-04	2E-04	0.163	ND	ND	ND	1E-05	173	ND	1E-04	0.0006	0.005	0.00011	0.006	44.5	0.00162	ND	0.001	ND	ND	0.002	4.86	ND	4.62	0.839	ND	ND	ND	0.0072	ND	0.0014
WGD01	9/15/2008	7.73	7.9	984	173	3	8.1	1300	5.3	270	0.9	2955	0.0171	7E-04	0.001	0.946	0.00002	ND	ND	9E-05	1200	0.0006	0.0003	0.0035	0.02	0.00015	0.0394	336	0.00045	0.0024	0.0054	ND	7.99	0.008	28.2	ND	24	5.54	0.000013	2E-05	0.001	0.0463	ND	0.0048

Appendix A3
2005-2008 Groundwater Data

STATION	DATE	Field Parameters			Physical Tests			Anions		Dissolved Metals																												
		pH	Cond	Temp	pH	Cond	Hardness	Alk-T	SO4-D	Ag	Al	As	Ba	B	Be	Ca	Cd	Co	Cr	Cu	Fe	Hg	K	Li	Mg	Mn	Mo	Na	Ni	Pb	Sb	Se	Sn	Ti	Tl	U	V	Zn
		s.u.	uS/cm	oC		µS/cm	meq/L	meq/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SRK04-5A	25-Sep-04				8.34	459	198	140	108	<0.000050	<0.010	0.0079	0.046	<0.10	<0.0050	54.2	50	0	0	<0.0010	0.272	0		<0.050	15.3	0.063	0.0186	17.7	<0.0050	<0.0010	0.00068	<0.0010		<0.050	0	0.00489	<0.030	0.0081
SRK-04-ARTA	9-May-05				7.96	449	172	154	89.8	<0.000050	<0.010	0.0121	0.032	<0.10	<0.0050	47.5	50	0	0	<0.0010	0.701		n/a	<0.050	13	0.08	0.0179	13.2	<0.0050	<0.0010	0	<0.0010	n/a	<0.050	0	0.00114	<0.030	0.0105
SRK04-5A	7-Jun-06	8	434.9	3.9		448	197	144	98.4	< 0.00002	0.012	0.0126	0.056	< 0.1	< 0.001	53.8	2.4E-05	< 0.0003	< 0.001	< 0.001	1.27	0.00002	< 2	0.0078	15.3	0.0887	0.0199	19.5	< 0.001	0.00138	< 0.0005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.00117	< 0.03	0.053
SRK04-5A	19-Sep-06	7.9	418	4.5		439	212	149	94.9	< 0.00002	0.0075	0.00822	0.038	< 0.1	< 0.001	56.7	0.00001	< 0.0003	< 0.001	< 0.001	0.744	0.00002	< 2	0.0106	17	0.0487	0.0178	19.1	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.00216	< 0.03	0.0064
SRK04-5B	25-Sep-04				8.31	450	185	138	100	<0.000050	<0.010	0.012	0.058	<0.10	<0.0050	51.1	50	0	0	<0.0010	0.316	0		<0.050	14.1	0.069	0.0236	18.6	<0.0050	<0.0010	0.00088	<0.0010		<0.050	0	0.00727	<0.030	0.0154
SRK-04-ARTB	9-May-05				8.08	435	172	153	85.3	<0.000050	<0.010	0.0169	0.049	<0.10	<0.0050	47.6	50	0	0	<0.0010	0.479		n/a	<0.050	12.9	0.08	0.0204	15.8	<0.0050	<0.0010	50	<0.0010	n/a	<0.050	0	0.00201	<0.030	0.0066
SRK04-5B	7-Jun-06	7.75	219.8	4.8		430	206	140	89	< 0.00002	< 0.005	0.00593	0.031	< 0.1	< 0.001	55.5	2.1E-05	0.00033	< 0.001	< 0.001	1.42	0.00002	< 2	0.0101	16.3	0.0536	0.0174	18.6	< 0.001	0.00064	< 0.0005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.00142	< 0.03	0.402
SRK04-5B	19-Sep-06	7.88	418	3.6		465	219	144	109	< 0.00002	0.0071	0.0148	0.083	< 0.1	< 0.001	58.6	2.2E-05	< 0.0003	< 0.001	< 0.001	0.205	0.00002	< 2	0.0095	17.5	0.0811	0.0231	24.2	< 0.001	< 0.0005	0.00076	< 0.001	< 0.0005	< 0.01	< 0.0002	0.00318	< 0.03	0.0062
SRK05-5c	22-Nov-05				7.51	651	n/a	187	173	<0.010	<0.20	<0.20	0.091	<0.10	<0.0050	78.6	<0.010	<0.010	<0.010	<0.010	0.055		<2.0	<0.010	26.8	1.05	<0.030	16.8	<0.050	<0.050	<0.20	<0.20	<0.030	<0.010	<0.20	n/a	<0.030	<0.0050	
SRK05-05C	21-Sep-06	6.81	1175	5.9		1040	591	240	387	< 0.0001	< 0.02	0.0053	0.17	< 0.1	< 0.005	143	< 0.0001	0.0037	< 0.001	< 0.002	1.24	< 0.0002		< 0.05	56.7	3.97	0.0123	<=> 13.6	< 0.01	< 0.002	< 0.001	< 0.002		< 0.05	< 0.0004	0.00337	< 0.03	0.0195
SRK05-05C	12-Oct-07	7.64	915	2.3		1080	664	218	372	< 0.00004	< 0.01	0.0079	0.146	< 0.1	< 0.002	156	9.5E-05	0.00231	< 0.002	< 0.002	0.775	0.00002	2.1	< 0.01	66.7	2.41	0.0139	14.7	0.0053	< 0.001	< 0.001	< 0.002	< 0.001	< 0.01	< 0.0004	0.00543	< 0.002	0.012
SRK05-05C	4-Jun-08	7.79	1145		7.78	1120			410	< 0.00004	< 0.01	0.0037	0.164	< 0.1	< 0.002	174	7.9E-05	0.00184	< 0.002	< 0.002	0.609	0.00002	2.6	< 0.01	76.2	1.8	0.0131	13.8	0.0035	< 0.001	< 0.001	< 0.002	< 0.001	< 0.01	< 0.0004	0.00833	< 0.002	0.007
SRK05-05C	18-Sep-08	6.66	974		8.1	990		210	340	0.000013	0.0262	0.00701	0.143	< 0.05	0.00001	132	2.3E-05	0.00147	< 0.0001	0.00041	0.735	0.00001	2.14	0.0057	54.1	1.75	0.0159	14.4	0.00334	0.00122	0.00047	0.00007	0.00003	0.0014	0.00001	0.00726	0.0012	0.0062
SRK05-06	8-Jun-06	7.61	1453	4.3		1260	790	246	450	< 0.0001	< 0.025	< 0.0025	0.044	< 0.1	< 0.005	163	0.00008	< 0.0015	< 0.005	< 0.005	< 0.03	0.00002	2.1	< 0.025	92.9	0.0504	< 0.005	7	< 0.005	< 0.0025	< 0.0025	< 0.005	< 0.0025	< 0.01	< 0.001	0.0157	< 0.03	0.131
SRK05-06	19-Sep-06	7.48	1531	8.4						< 0.0001	< 0.025	< 0.0025	0.055	< 0.1	< 0.005	226	0.00043	< 0.0015	< 0.005	0.0092	< 0.03	0.00002	3.5	< 0.025	124	0.0316	< 0.005	10	< 0.005	0.0041	< 0.0025	< 0.005	< 0.0025	< 0.01	< 0.001	0.0253	< 0.03	0.055
SRK05-06	30-May-07	7.67	1142	2.3		1050	764	224	444	< 0.00004	< 0.01	< 0.001	< 0.02	< 0.1	< 0.002	165	0.00018	< 0.0006	< 0.002	0.0029	0.392	0.00002	< 2	< 0.01	85.4	0.00357	< 0.002	6.3	< 0.002	< 0.001	< 0.001	< 0.002	< 0.001	< 0.01	< 0.0004	0.016	< 0.03	< 0.017
SRK05-06	12-Oct-07	8.15	1766	2.5		2030	1385	352	916	< 0.0001	< 0.025	< 0.0025	0.049	< 0.1	< 0.005	276	0.00027	< 0.0015	< 0.005	< 0.005	< 0.03	0.00002	3.6	< 0.025	169	0.0035	< 0.005	10.5	< 0.005	< 0.0025	< 0.0025	< 0.005	< 0.0025	< 0.01	< 0.001	0.0319	< 0.005	0.0173
SRK05-07	19-Sep-06	6.71	2580	6.2		2560	1784	765	1080	< 0.0001	0.033	0.0266	0.141	< 0.1	< 0.005	340	0.00008	0.0146	< 0.005	< 0.005	1.82	0.00002	3.2	< 0.025	227	1.15	0.0188	13.4	0.0715	< 0.0025	0.0032	< 0.005	< 0.0025	< 0.01	< 0.001	0.016	< 0.03	< 0.025
SRK05-07	30-May-07					1600	1338	532	706	< 0.0001	0.059	0.0073	0.126	< 0.1	< 0.005	290	0.00008	0.0077	< 0.005	< 0.005	0.575	0.00002	3.5	< 0.025	149	0.421	0.0102	7.5	0.0936	< 0.0025	< 0.0025	< 0.005	< 0.0025	< 0.01	< 0.001	0.0142	< 0.03	< 0.025
SRK05-07	12-Oct-07	7.38	2250	1.8		2680	1929	735	1080	< 0.0002	< 0.05	< 0.005	0.074	< 0.1	< 0.01	408	0.0003	0.0097	< 0.01	< 0.01	< 0.03	0.00002	3.6	< 0.05	221	0.692	< 0.01	10.6	0.147	< 0.005	< 0.005	< 0.01	< 0.005	< 0.01	< 0.002	0.0157	< 0.01	0.0269
SRK05-07	4-Jun-08	7.04	2090		7.54	2340			1140	< 0.0001	0.302	0.0075	0.059	< 0.1	< 0.005	373	0.00011	0.0048	< 0.005	< 0.005	0.354	0.00002	2.2	< 0.025	161	0.0831	< 0.005	7.6	0.0888	0.0048	0.0025	< 0.005	< 0.0025	0.011	< 0.001	0.0134	< 0.005	0.028
SRK05-07	18-Sep-08	6.52	2040		7.9	3000		560	1600	0.00012	0.006	0.0059	0.0727	< 0.3	0.00005	510	0.00015	0.00424	< 0.0005	0.0011	0.015	0.00005	1.63	0.006	227	0.106	0.001	13.9	0.113	0.00037	0.0016	0.0007	0.00011	0.007	0.00003	0.0214	< 0.001	0.0293
SRK05-08	7-Jun-06	7.04	876	4.5		1510	917	500	458	< 0.00004	0.016	< 0.001	0.057	< 0.1	< 0.002	194	4.2E-05	0.00128	< 0.002	< 0.002	< 0.03	0.00002	< 2	0.011	105	0.0161	< 0.002	7.4	< 0.002	< 0.001	< 0.001	< 0.002	< 0.001	< 0.01	< 0.0004	0.0132	< 0.03	0.0092
SRK05-08	19-Sep-06	7.3	1501		7.78	1600		516	494	< 0.0001	< 0.025	< 0.0025	0.032	< 0.1	< 0.005	212	0.00008	< 0.0015	< 0.005	< 0.005	< 0.03	0.00002	< 2	< 0.025	108	0.0198	< 0.005	7.2	< 0.005	< 0.0025	< 0.0025	< 0.005	< 0.0025	< 0.01	< 0.001	0.0143	< 0.03	0.052
SRK05-08	30-May-07	7.09	1779		7.84	1540		514	634	< 0.0001	< 0.025	< 0.0025	0.028	< 0.1	< 0.005	243	0.00008	< 0.0015	< 0.005	< 0.005	< 0.03	0.00002	< 2	< 0.025	126	0.003	< 0.005	7.5	< 0.005	< 0.0025	< 0.0025	< 0.005	< 0.0025	< 0.01	< 0.001	0.0174	< 0.03	0.013
SRK05-08	12-Oct-07	7.5	1755		7.8	1980		558	664	< 0.0001	< 0.025	< 0.0025	< 0.02	< 0.1	< 0.005	282	0.00008	< 0.0015	< 0.005	< 0.005	< 0.03	0.00002	< 2	< 0.025	156	0.0017	< 0.005	8.9	< 0.005	< 0.0025	< 0.0025	< 0.005	< 0.0025	< 0.01	< 0.001	0.0181	< 0.005	0.0088
SRK05-08	4-Jun-08	7.22	1940		7.56	2060			758	< 0.0001	< 0.025	< 0.0025	< 0.02	< 0.1	< 0.005	281	0.00008	< 0.0015	< 0.005	< 0.005	< 0.03	0.00002	< 2	< 0.025	160	< 0.0015	< 0.005	9.1	< 0.005	< 0.0025	< 0.0025	< 0.005	< 0.0025	< 0.01	< 0.001	0.0188	< 0.005	< 0.005
SRK05-08	18-Sep-08	6.66	1857		7.9	1900		500	780	0.000005	0.0037	0.00027	0.0153	< 0.05	0.00001	303	1.7E-05	0.00062	0.0005	0.00166	0.003	0.00001	1.75	0.016	159	0.00022	0.0006	9.54	0.00098	4.5E-05	0.0001	0.00068	0.00001	< 0.0005	2E-06	0.02	< 0.0002	0.0047

Deloitte & Touche

Faro Mine Complex
2008 S-Cluster Groundwater Investigation and Option Assessment

2008/09 Task 24 - FINAL

Prepared for

Deloitte and Touche Inc.

On behalf of

Faro Mine Closure Planning Office

Prepared by

SRK Consulting
Engineers and Scientists

Project Reference Number
SRK 1CD003.112

February 2009

Faro Mine Complex

2008 S-Cluster Groundwater Investigation and Option Assessment

2008/09 Task 24 - FINAL

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Executive Summary

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The objectives of the 2008 S-cluster program were to provide additional lithologic, water quality and hydraulic information for the Shallow and Deep Aquifers, as well as to assess the feasibility of using pumping wells for groundwater interception. Based on this information, an assessment of collection options was completed.

Eight monitoring wells were installed using sonic and diamond drilling methods and four pumping wells were attempted using air-rotary drilling methods. Two pairs of nested monitoring wells were installed in close proximity to the North Fork of Rose Creek (NFRC). An additional three drillholes were completed in weathered bedrock using diamond drilling techniques with core recovery. A fourth diamond drillhole was attempted but had to be terminated in sediments due to drilling problems.

Three pumping wells were installed, two in weathered bedrock and overlying permeable sediments of the Deep Aquifer, and the third in the Shallow Aquifer. The three pumping wells were pump tested to assess performance. All water collected during pumping tests had zinc concentrations greater than 1 mg/L and was collected and disposed of in the Rose Creek tailings facility.

Results of the Shallow Aquifer pumping test indicated that pumping as an interception method was not feasible due to the low saturated thickness (ie. there was not enough water depth, nor optimal hydraulic parameters, to operate the pumping well efficiently). Results of the Deep Aquifer pumping tests suggest that interception by pumping is feasible, but would likely require pumping wells with spacing on the order of 10m.

Water quality data collected from the 2008 nested monitoring wells close to the NFRC indicate that groundwater with zinc concentrations greater than 100 mg/L is within approximately 5m of the NFRC in the immediate S-cluster area. Water quality at the nested monitoring wells located 200m down gradient of the S-cluster suggest that the groundwater at this distance is impacted (zinc concentrations of about 0.5 mg/L), but not nearly as significantly as in the S-cluster area (zinc concentrations up to 400 mg/L). The plume of contaminated groundwater is likely moving underneath the NFRC in permeable materials and discharging to the NFRC at indeterminate locations.

The options assessment concluded that a shallow sump or interceptor trench is the most appropriate method for interception in the Shallow Aquifer. In the Deep Aquifer, pumping wells could be used for interception. For both aquifers, an adaptive management approach is recommended, culminating in the use of cut-off walls if the interceptor trench and pumping wells are determined to be insufficient. Ultimately, as part of the closure plan, the NFRC in this area will be isolated in a lined channel, therefore protecting the NFRC itself. Contaminated groundwater will continue to move down the NFRC valley and long-term groundwater interception will still be required, though complete capture may not be necessary due to the planned installation of a collection system below the Intermediate Dam.

The Faro Technical Advisory Team (TAT) recommended immediate installation of the Shallow Aquifer interception sump and activation of the two Deep Aquifer pumping wells. Deloitte & Touche accepted these recommendations and construction of the Shallow Aquifer System commenced in January 2009. The system is intended to be in operation by February 28, 2009, with contaminated water discharged to the Faro Pit via a heat traced, insulated pipeline.

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1 Introduction and Scope of Report

The North Fork of Rose Creek (NFRC) is in close proximity to the toe of the Faro Waste Rock Dump at the Faro Mine Complex in the south central Yukon. Previous investigations found that concentrations of zinc and other metals, such as iron and manganese, in the area known as the S-cluster or S-wells area (Figure 1), were highly elevated and likely contributing to loads within the NFRC. Immediate implementation of a seepage interception system (SIS) was recommended in the report entitled "Seepage Investigation at the S – Cluster Area below the Faro Waste Dump" (SRK, 2006b). A preliminary review of data collected since completion of that report indicates zinc levels have continued to increase significantly in 2006 and 2007 (with zinc concentrations reaching up to 360 mg/L in June 2007).

In early 2008, a program of work was developed that would provide an assessment of collection/treatment options for the S-cluster area and, based on this assessment, to facilitate the development and execution of a field program that would guide the detailed design of a seepage collection system. This work was carried out under Deloitte & Touche Task 24, which is identified as Project 1.12 by the Faro Mine Closure Planning Office.

The scope of the program included:

- Groundwater collection system options assessment;
- Field program design and execution;
- Data analysis; and
- Reporting and recommendations.

The options assessment considered the following specific issues:

- The feasibility of using a passive collection and treatment method (bioreactor) for the shallow aquifer system; and
- For the deep aquifer, whether or not collection is warranted, whether or not active operation would be required through the winter and whether passive treatment methods would be feasible.

A surface and groundwater monitoring program is presented as part of the recommended options.

The report is organized as follows:

- A background review is presented of previous investigations and conclusions on groundwater conditions in the S-cluster area.
- The objectives and scope of the 2008 field program are described.
- The results of the 2008 field program and interpretations are presented.

- An updated assessment of groundwater management options is presented, including detailed conceptual designs.
- A description of the proposed groundwater management actions at the S-cluster area is provided in the context of the overall management options assessment.
- Conclusions and recommendations for future work.

Drill logs, testing results and water quality analyses are compiled in the appendices.

2 Background

The S-cluster area at the Faro Mine has been the focus of field investigations and various assessments since 2004, when Dr. Christoph Wels of Robertson GeoConsultants (RGC) identified significant increases in groundwater contaminant concentrations in the historic S-wells (RGC, 2004). Groundwater quality data for the original S-wells are available from 1986 to present. Since 2004, it has been recognized that groundwater in the S-cluster area is becoming increasingly contaminated by seepage from the adjacent waste rock dumps. Detailed surveys of NFRC surface water in the S-cluster area clearly indicated a significant increase in contaminant load as the NFRC passes through this area.

In 2004 and 2005, SRK completed a field programs consisting of the installation of monitoring wells, hydraulic testing, test pitting and seismic surveys (SRK, 2006a, 2006b). The results of these studies identified the presence of two aquifers: a narrow sand and gravel "shallow aquifer" and a more widespread "deep aquifer", consisting of weathered bedrock and permeable sand and gravel immediately overlying bedrock. The two aquifers are separated by 10+ meters of relatively low permeability sandy silt to silt. The proximity of highly contaminated water to the NFRC, and the possibility that this groundwater was or could discharge directly into the NFRC, led to the conclusion that seepage interception was probably necessary.

Conceptual options for seepage collection were presented in the form of an adaptive management plan (AMP). This AMP outlined a relatively simple initial SIS, monitoring and triggers that would require review and, potentially, system upgrade or modification. Multiple levels of system upgrade were identified, in the event that system bypass or failure occurred, culminating in what was considered the final step of isolating the NFRC from groundwater through re-engineering of the stream channel.

Subsequent to the 2005 program, multiple discussions with Deloitte & Touche, the Technical Advisory Team (TAT) and the Independent Peer Review Panel (IPRP) were held regarding uncertainties with regards to contaminant distribution, methods for, and effectiveness of, seepage collection options, as well as how seepage collection would integrate with the final mine closure plan. The primary concerns focused on the potential for bedrock flow and the anticipated capture efficiencies of the proposed systems. Under the mine closure options that were being reviewed, it was expected that capture efficiencies of greater than 99% would be required to achieve closure objectives. It was recommended that further study focus on characterizing potential bedrock flow.

In 2008, the broad closure plan concepts for the Faro Mine were selected. In terms of contaminated groundwater, the primary groundwater collection system in this plan includes a cutoff wall and groundwater collection system below the Rose Creek Tailings Facility (Down Valley SIS), towards which contaminated groundwater coming out of the Faro mine area will trend. Additional groundwater collection systems would be installed in areas of highly contaminated groundwater, such as the S-cluster. The purpose of these relatively small collection systems will be to capture

highly contaminated groundwater closer to the source, in areas where groundwater collection could be focused, before groundwater becomes diluted with relatively lower concentration groundwater or becomes relatively difficult to intercept until reporting to the final Down Valley system.

Contaminated groundwater reports to the NFRC valley from multiple, known, high concentration areas (e.g., S-cluster, Zone II) and may also get to the valley in lower concentrations as more spatially dispersed groundwater flow. As the NFRC is a tributary to Rose Creek, the primary surface water feature crossing below the site, and is itself considered an important ecological component in the area, further protection of the NFRC against the effects of contaminated groundwater seepage were presented in the closure plan. This protection consists of isolating the NFRC by re-aligning it in a lined channel, to separate it from groundwater. Implementation of this re-alignment will likely be some years in the future and implementation of local groundwater interception could be initiated relatively sooner. This would provide both the opportunity to start collecting contaminated groundwater immediately and allow time to "fine tune" the systems themselves, which could prove beneficial to future groundwater collection system designs.

Water quality at X2, the NFRC surface water monitoring station down gradient of the S-cluster, has been monitored since the late 1980's. In September 2008, Gartner Lee Limited presented a report titled "***Anvil Range Adaptive Management Plan – Event #5 Follow-up Work, Water License QZ03-059***", which presented a comprehensive summary of trends in water quality at X2, but also discussed certain contaminant concentrations which had exceeded trigger levels. Sulphate concentrations had exceeded trigger levels in 2005, 2006 and 2007 and an increasing trend in sulphate levels was observed, based on 2003 to 2006 data. Zinc concentrations reached a threshold concentration exceedence in October 2006. Both sulphate and zinc concentrations were found to peak during winter low flow, when groundwater contributions are at their maximum. Contaminant loads in the NFRC were recognized as increasing where the NFRC passes below the S-cluster area.

The purpose of the 2008 field program was to obtain more detailed information regarding the distribution of contaminants and to identify seepage collection options that could be implemented as soon as possible.

3 Field Program and Results

3.1 Program Objectives

The 2008 field program was designed to both provide information to further the understanding of hydraulic connection and contaminant distribution between and within the shallow and deep aquifers, and assess potential effectiveness of deep pumping systems. The program had the following specific components and objectives:

1. Provide better delineation of the shallow aquifer by completing a test pitting program in the shallow aquifer.
2. Gain a better understanding of contaminant distribution along the NFRC. Install monitoring wells close to the NFRC both within the S-cluster area and down gradient.
3. Provide improved hydrogeologic characterization of weathered bedrock in the deep aquifer by completing diamond drillholes and packer testing.
4. Develop improved understanding of both shallow and deep aquifer hydraulic parameters and connectivity by completing pumping tests in both aquifers.

In the following sections, general program results and methodologies are presented, followed by results specific to each of the shallow and deep aquifer. Figure 2 is a site map, which includes the locations of all test borings that will be described in the following sections, including those completed as part of the 2008 program.

3.2 Drilling and Installations

Both monitoring wells (8) and pumping wells (4) were completed for the 2008 program, using two different drills and drilling methods:

- Sonic drilling was completed by SDS-Boart Drilling Services of Calgary, Alberta. Drilling equipment included one Nodwell-mounted sonic drill and one Nodwell-mounted support vehicle.
- Air rotary / diamond drilling was completed by Geotech Drilling of Prince George, BC. Drilling equipment included one track-mounted Fraste drilling unit capable of 4-inch and 6-inch ODEX air-rotary and HQ/NQ diamond drilling, a 900 CFM/350psi air compressor to support air-rotary drilling and one Marooka tracked support vehicle.

Drilling was overseen by Dan Mackie and Jacek Scibek of SRK. Table 1 summarises the drilling results. The twelve drill hole locations are shown on Figure 2.

Table 1: 2008 Drillhole Summary

ID	Type	Easting	Northing	Grnd Elev. (masl)	Stick-up Elevation (masl)	Screen Depth (mbgs)	Material
SRK08-SP7a	Sonic MW	584429.0	6913095.0	1081.00	1081.74	14.02 to 17.07	W. BR
SRK08-SP7b	Sonic MW	584432.5	6913094.0	1081.00	1081.73	4.88 to 7.92	Silty sand & gravel
SRK08-SP8a	Sonic MW	584294.0	6912955.0	1077.00	1077.74	3.05 to 6.10	W. BR
SRK08-SP8b	Sonic MW	584291.0	6912951.0	1077.00	1077.78	7.62 to 10.67	Sand
SRK08-BR1	Bedrock MW (core)	584477.8	6913127.8	1086.50	1087.30	27.74 to 33.83	W. BR
SRK08-BR2	Attempted Bedrock MW	584487.6	6913125.0	1086.50	1087.00	12.19 to 18.29	sand & gravel
SRK08-BR3	Bedrock MW	584397.4	6913150.8	1096.30	1096.90	6.10 to 12.19	W. BR
SRK08-BR4	Bedrock MW (core)	584449.5	6913138.5	1087.30	1088.00	15.09 to 21.49	W. BR
SPW1	Deep Aquifer PW	584509.9	6913113.0	1086.50	1087.45	19.51 to 24.23	W. BR & overlying snd & grvl
SPW2	Deep Aquifer PW	584467.2	6913132.0	1086.53	1087.53	9.75 to 12.95	W. BR
SPW4	Shallow Aquifer PW	584503.0	6913115.0	1086.40	1087.16	2.44 to 3.96	Silty snd & grvl

Notes and Abbreviations:
Coordinates are UTM NAD 83; elevations meters above sea level (masl); meters below ground surface (mbgs)
Coordinates based on hand-held GPS readings. Accuracy generally +/- 5m
MW = Monitoring Well PW = Pumping Well
BR = Bedrock W.BR = Weathered Bedrock Snd = Sand Grvl = Gravel

For drillholes completed using sonic methods, continuous soil and rock samples were logged for lithology and photographed as they came out of the ground. Upon reaching the drillhole target depth, the inner core casing was removed and monitoring wells installed through the outer casing. Monitoring wells completed in sonic drillholes are 2-inch diameter PVC with 10 or 20-slot PVC screens. Screen sandpacks use 10/20 or 20/40 filter sand, cover the area of each screen and extend a minimum of 0.5 m above the top of the screen. A 0.5 m bentonite chip seal was installed on top of filter sand and the remaining annular space was filled with bentonite grout, to ground surface.

For drillholes completed using the 4-inch air-rotary down hole hammer and ODEX casing advancer through overburden, soil and rock cuttings were collected from return air at the wellhead. Cuttings were logged for lithology and photographed. The drilling "fluid" is air, so drilling water is not introduced to the formation.

For drillholes completed using HQ wireline triple tube diamond drilling methods, core was recovered from the drill, photographed and measured in the split tube, moved to core boxes, then photographed and measured again. Core logging was completed on each 1.5m drill run, using the

"basic" SRK geotechnical logging procedures, which included Total Core Recovery (TCR), lithology, Rock Quality Designation (RQD), fracture frequency, field Intact Rock Strength (IRS), joint type and qualitative number of sets, foliation and mechanical breaks, and qualitative strength of micro defects. All core was photographed as splits and in core boxes. Monitoring wells installed after diamond or air-rotary drilling are 2-inch diameter PVC with similar sand pack and annular seals to completions in sonic drillholes.

Pumping well drillholes were completed using a 6-inch down hole air-hammer with an ODEX casing advancer. Pumping wells were completed with 4-inch construction, using stainless steel, continuous wrap Johnson screens connected to 4-inch threaded PVC riser pipe. PVC sumps were included on each pumping well. Table 2 summarises pumping well completion details.

Table 2: Pumping Well Construction Details

ID	Screen Depth (mbgs)	Screen Length (m)	Screen Slot Size (slots/inch)	Sump Length (m)
SPW1	19.51 to 24.23	4.72	15	1.68
SPW2	9.75 to 12.95	3.20	15	1.07
SPW4	2.44 to 3.96	1.52	15	1.52

Abbreviations:
meters (m)
meters below ground surface (mbgs)

In general, pumping wells were completed within weathered bedrock. In SPW2, the down hole hammer was lost in the drillhole and could not be retrieved. The annular space around the lost hammer was backfilled with filter sand, but used a larger volume than estimated, indicating that the drillhole had been washed out to some degree. The well screen was installed on top of this sand backfill.

SPW1 and SPW2 well screens were developed using a jet tool and surging water pressures, then airlifted. SPW4 has a very limited available drawdown (i.e. there is not a very significant water column in the well) and was developed using a Waterra Hydrolift pump.

Well logs for all drillholes are included in Appendix A-1. Photographs of sonic and diamond drill core are included on the CD in Appendix D. Figures 3 and 4 are geologic cross-sections through the S-wells area based on all available data. Cross-section locations are shown on Figure 2.

3.3 Hydraulic Testing Methodologies

All new installations were tested using one or more methods. Falling head slug tests were conducted on bedrock drillholes during drilling using a pneumatic packer to isolate test zones. Once monitoring wells were installed, multiple slug tests were conducted in each location using solid PVC slugs. In each pumping well, constant drawdown tests were conducted once the well was developed. Methodologies and results for each test type are described below. Data sheets with hydraulic test analyses are included in Appendix B.

Packer-Isolated Falling Head Tests

In bedrock drillholes BR1, BR3 and BR4, packer isolated, falling head slug tests were completed over various intervals as they were drilled. BR2 did not reach bedrock due to drilling difficulties. Bedrock drillhole falling head test methodology included:

- Upon drilling to the bottom depth of a desired test zone, rods were pulled back approximately one meter and the drillhole was flushed with fresh water until water returning to surface was clear and relatively free of suspended material;
- Drill rods were pulled back to expose the desired test zone;
- A pneumatic wireline packer was installed in the drillhole and inflated;
- A vented datalogger was installed down the drill rods and water levels monitored until stable;
- The drill rods were quickly filled with water;
- Water levels were recorded until re-attaining the static level; and
- Equipment was withdrawn and drilling re-started.

Slug Tests

Each of the new 2-inch PVC overburden and bedrock monitoring wells was slug tested once the monitoring well was installed and developed. Slug tests in each drillhole included:

- Static water levels were measured prior to each test and a datalogger installed;
- A solid PVC slug was introduced or withdrawn from the monitoring well as quickly as possible by either dropping the slug directly in the monitoring well for falling head tests or rapidly pulling the slug out using a rope for rising head tests; and
- Wherever possible, falling head and rising head tests were completed in each monitoring well using two different size slugs, for a total of four tests.

Pumping Tests

Pumping tests were conducted in pumping wells PW1, PW2 and PW4. PW1 and PW2 were tested using 0.75 horsepower Grundfos submersible pumps purchased for this and subsequent projects. PW4 was tested using a Waterra Hydrolift pump as there was insufficient water depth in the well to use a submersible pump. Initial pumping rates were estimated from water levels monitored during development and adjusted during pumping. Pumped water was directed to a series of storage tanks and was disposed of periodically in the Rose Creek Valley tailings impoundment. Test duration was limited by available storage tank volume. Flows were measured with a combination of manual measurements made by timing the filling of a bucket at the discharge line and an inline electromagnetic flow meter. Water levels were monitored at multiple locations using dataloggers with periodic manual measurements, though problems occurred with settings on some of the dataloggers, limiting utility of all the data. Testing incorporated a combination of step tests to assess

well efficiency and relatively longer constant rate tests to observe drawdown at distant monitoring wells. The following summarises pumping tests completed:

- In PW1, a step test was conducted for a total of 313 minutes with four approximately one hour-long rate steps of 0.3, 0.6, 1.0 and 1.3 L/s.
- In PW1, a 400 minute "constant" rate test was conducted using a rate of approximately 0.88 L/s from time 0 to 300 minutes and approximately 1.25 L/s from 300 to 400 minutes. Recovery was monitored for approximately 800 minutes.
- During the PW1 constant rate test, drawdown and recovery were monitored in six observation wells, including bedrock monitoring well BR1.
- In PW2, a three hour step test was continued as a constant rate test for an additional five hours.
- The PW2 rates for each one-hour long step were approximately 0.3, 0.6 and 1.0 L/s. The constant rate test following the step test had a discharge rate of 0.6 L/s.
- During the PW2 step and constant rate test, drawdown and recovery are available from the pumping well and one observation well. Data from additional observation wells could not be used.
- In PW4 a constant rate test was conducted using a Waterra Hydrolift pump at a rate of about 0.03 L/s (0.5 USgpm) for approximately 171 minutes. There was insufficient water depth in the well to use a submersible pump.
- During the PW4 constant rate test, drawdown and recovery was observed in the pumping well and at one observation well, SRK05-SP4b, located about 3 m from PW4.

3.4 Shallow Aquifer

The shallow aquifer is a relatively shallow, narrow feature (base ~3.5 meters below ground surface and only about 20 to 30 meters wide) identified in the 2005 program and interpreted to be the remnant of a pre-mining surface drainage that was covered by the Faro waste rock dumps. A single monitoring well intersects this aquifer, SRK05-SP4b, and has shown some of the highest zinc concentrations in the S-wells area (>350 mg/L). Prior to the 2008 program, the aquifer was not well delineated.

3.4.1 Test Pitting

A test pitting program was completed in August, 2008 to provide better delineation of the shallow aquifer. Test pits were completed using the site excavator, a John Deere 345. Nine test pits were completed, positioned along two alignments. Test pit locations are shown on Figure2. Figure 5 shows cross sections through the test pits. Test pit logs are included in Appendix A-2.

Test pitting allowed the lateral extent of the shallow aquifer to be fairly well constrained. On the west side, test pits TP08-2 and TP08-6 were relatively very dry compared to the next test pit to the east and remained open to maximum excavation depth of about six to seven meters (m) below the

ground surface. On the east side, test pits TP08-4 and TP08-9 were similar to TP08-2 and TP08-6, relatively dry and stable at maximum excavation depths. Lithologies in all of these test pits were dominated by sandy silts with occasional cobbles or boulders.

Test pits between those mentioned above all had water inflows at varying rates. Test pits TP08-1, TP08-7 and TP08-8 had significant inflow leading to sloughing of test pit walls and significant test pit instability. Inflow was on the order of one litre/second (L/s), coming from sand and gravel units, often at two to three meters below ground surface. A dark brown to black horizon with organics was typically intersected immediately above water bearing units. The depth to water bearing units increases upslope, from less than 1 m below ground surface near the alignment of the 2005 monitoring wells, up to two to three meters below the ground surface towards the toe of the waste rock dump.

Overall, the shallow aquifer has an approximate width of 25 m and maximum thickness of about 3.5 m (as measured at SRK05-SP4b).

3.4.2 Drilling and Testing

A single pumping well was completed in the shallow aquifer, PW4, and one steel piezometer was installed in an excavated pit, SRK08-DP1. Table 3 summarizes shallow aquifer completions. Locations are shown on Figure 2.

Table 3: Shallow Aquifer Details

ID	Completion Date	Type*	Screen Depth (mbgs)	Screen Length (m)	Screen Slot Size (PW-slots/inch MW-slot width)	Sump Length (m)
PW4	2008	PW	2.44 to 3.96	1.52	15	1.52
SP4b	2005	MW	0.6 to 3.5	2.9	0.010 or 0.020	0.6
SRK08-DP1	2008	MW	5.0 to 5.4	0.4	n/a – 1/8” holes	0.0

PW4 is located less than five meters to the west of SP4b. Drill cuttings collected during air-rotary drilling for PW4 identified dominantly silt to fine sand to a depth of about 2 meters, overlying a water bearing silty medium sand with gravel. Materials became increasingly silty below approximately 3 meters, producing less water than materials above. The pumping well screen was set in water bearing materials with a sump in the underlying silts. Static water level measurements indicated a saturated thickness on the order of 1.5 to 2 meters.

During development of PW4, the water level in the pumping well was rapidly drawn down. Approximately 1,900 litres were removed from the well during development, the water clear at the end with a zinc concentration >400 mg/L, as measured by the Faro lab. The potentially low yield, combined with the low saturated thickness, indicated that use of an available Grundfos submersible pump to conduct a pumping test would likely dry out the pump. An electric Waterra Hydrolift pump was used to conduct a pumping test.

PW4 was pumped at an average rate of approximately 0.03 L/s (0.4 USgpm) for 170 minutes, when the generator ran out of fuel. Water levels were monitored in the pumping well and SP4b. Drawdown data and straight line curve matches to PW4 and SP4b are shown on Figure 6.

Straight line curve matches suggest that the same T and S parameters cannot be used to match data to both drawdown curves. It is possible that, had the test been continued for a longer period of time, additional drawdown at SP4b may have occurred, but data suggests drawdown at both locations had stabilized. Transmissivity at PW4 is approximately $2x10^{-5}$ m^2/s (K of $6x10^{-6}$ m/s) with a high storativity value of 0.013, while at SP4b about $2x10^{-4}$ m^2/s (K of $6x10^{-5}$ m/s) with a storativity of $6x10^{-3}$.

Four slug tests were conducted on SP4b. Results had a tight range of parameters when curves were matched, with transmissivity values ranging from $1x10^{-4}$ to $2x10^{-4}$ m^2/s (K from $4x10^{-5}$ to $6x10^{-5}$ m/s). Slug testing results compare well with slug tests completed in 2005. Slug testing results are compiled in Appendix B.

These results suggest that, while heterogeneity may be present in the shallow aquifer, as could be expected, PW4 may be a relatively inefficient pumping well due to the position of the screen. It is possible that the shallow aquifer is characterized by vertical heterogeneity. Pumping wells installed in the shallow aquifer are not considered to be a practical interception methodology.

3.4.3 NFRC Marsh Observations

In the past, the marshy area between the lower road and the NFRC has been a challenge in terms of site access, but has not been the focus of specific investigation. During the 2008 program, this marshy area was particularly wet due to unusually high summer precipitation. During drilling of SPW1 and SPW4, springs and seeps were observed when the drilling was progressing through the shallow aquifer. Air being pushed into the aquifer materials during drilling caused flows at some seeps to visibly increase as well as the formation of a few new seeps, including air bubbling up through the lower road itself.

These observations suggest that some percentage of the shallow aquifer flux “daylights” or discharges directly into the marshy areas. Seeps and standing water were surveyed with a Garmin hand-held GPS and are included on Figure 2. Samples were collected from four locations, A-SC to D-SC, including active springs and standing water, and submitted to the site lab for analysis. Results are presented in Section 3.7. All of these surface water samples had total zinc concentrations greater than 50 mg/L.

3.5 Deep Aquifer

The deep aquifer has been characterized along the alignment of 2005 drilling as a relatively less permeable unit than the Shallow Aquifer, consisting of weathered bedrock, immediately overlying permeable sediments and isolated permeable lenses. The objective of the 2008 program was to

further characterize the weathered bedrock and assess the feasibility of using pumping wells for interception.

3.5.1 Bedrock Drilling and Testing

Four bedrock holes were attempted in 2008. Three, BR1, BR3 and BR4, successfully reached bedrock. Details of all bedrock drillholes are listed in Table 4.

Table 4: Bedrock Drillholes

ID	Completion Date	Drilled Length (m)	Bedrock Depth (m)	Cored Interval (m)	MW Screen Depth (m.b.g.s.)
BR1	2008	34.4	12.2	12.2 – 34.4	26 – 31.8
BR2	2008	25.3	n/a	n/a	11 – 16
BR3	2008	14.3	4.0	n/a	6.1 – 12.2
BR4	2008	46.6	15.2	15.2 – 46.6	15.1 – 21.5

BR1 and BR4 were cored to depth, with hydraulic testing conducted during drilling. BR1 was drilled at an inclination of 70 degrees from horizontal, on an azimuth directed towards and below SP5 and PW2. BR3 encountered significant weathered bedrock and coring was not possible. Additionally, due to the depth of water in BR3 and high permeabilities, hydraulic testing was difficult. All water used during drilling of BR3 was lost to the formation. BR2 was attempted with lesser success. BR2, inclined at 60 degrees from horizontal and oriented towards SP4a, was terminated at a drill length of approximately 25 meters in overburden materials due to drilling difficulties. The relatively soft and bouldery overburden led to numerous casing breaks and the drillhole was terminated after multiple attempts to reach bedrock. Drilling logs for all four bedrock holes are included in Appendix A-1. BR4 was cored and tested successfully.

Drill core from BR1 and BR4 provide the best indications of bedrock characteristics. Qualitative observations in BR3 that weathered bedrock was weak and permeable are also indicative of shallow bedrock conditions, but are not as useful as results from BR1 and BR4.

In BR1, oxidized joint surfaces were observed to a depth of approximately 8 meters drilled below the overburden – bedrock contact. RQD averaged 30% with a high of 48%. Core recovery was moderate. Joint counts ranged from 5 to a high of 22 per 1.5 meter run and were oriented dominantly about 45 degrees to core axis. Breaks along foliation surfaces were also common. Below 8 meters drilled depth, joint counts decreased significantly, often to 0, with no indications of oxidation, but rock became significantly weaker, characterized as leached or decomposed, often clayey gouge. Core recovery was poorer than in shallower zones. Rubble zones became more predominant. The clayey gouge and very weak rock intersected between about 22 and 25 meters drilled depth (73-85 ft) is interpreted as a fault zone (Photo 1, below).

Photo 1: Close-ups of BR1 Fault Zone

Above and below this likely fault zone, bedrock is more competent. Photo 2 shows core from above and below the fault, including the highly weathered bedrock near the overburden-bedrock contact.

Photo 2: BR1 Core with Fault and Weathered Zone

In BR4, a vertical drillhole, oxidized joint surfaces were observed to a depth of approximately 4 meters below the overburden – bedrock contact. RQD average 50% in these rocks, but ranged from a low of 0 just below the contact to highs of about 80%. Core recovery was poor to moderate with joint counts ranging to a high of about 10 per run, with some foliation breaks and many mechanical breaks. Rock strength generally did not deteriorate with depth. Below the apparent weathered zone, joint counts averaged about 3 per 1.5 meter run, with RQD values in the 90 to 100% range. Mechanical break counts were high, averaging 20 per 1.5 meter run. As with BR1, rock became greyish and "leached" at depth with numerous quartz veins, but strength remained relatively high.

Photo 3: BR4 Core

Packer-isolated falling head tests were conducted over multiple depth ranges in both BR1 and BR4. Data were analyzed using the Bower-Rice method for slug tests. Curve matches were made to the normalized head range of 0.2 to 0.3 of normalized head, as recommended by Butler (1998). Slug tests were also conducted in monitoring wells, once installed. Table 4 summarizes all test results.

Table 5: Bedrock Drillhole Hydraulic Testing Results

Packer-isolated Falling Head Tests					
	Test Vertical Depth (m.b.g.s.)		Zone Depth in Bedrock (m)		
ID	From	To	From	To	K (m/s)
BR1	22.3	32.3	10.8	20.9	$9x10^{-6}$
BR1	17.4	32.3	5.9	20.9	$2x10^{-6}$
BR1	17.4	22.3	5.9	10.8	$4x10^{-6}$
BR1	12.6	16.6	1.1	5.2	$9x10^{-6}$
BR4	34.4	46.6	19.2	31.4	$4x10^{-5}$
BR4	30.7	37.5	15.5	22.3	$1x10^{-5}$
BR4	22.2	28.3	7.0	13.1	$5x10^{-6}$
BR4	16.1	22.2	0.9	7.0	$3x10^{-5}$
Monitoring Well Slug Tests					
BR1	26.0	31.8	14.6	20.3	$2x10^{-5}$
BR3	6.1	12.2	2.1	8.2	$2x10^{-5}$
BR4	15.1	21.5	-0.1	6.3	n/a

Analysis of the bedrock testing data suggests:

- Bedrock hydraulic conductivity is consistently high to depths of 30 meters into bedrock.
- Bedrock hydraulic conductivity varies laterally.

The tight range of bedrock K values is somewhat suspect, as all observations suggest that K should have decreased at greater depths. Precautions were taken during testing to ensure proper test procedures, such as surface testing of the packer equipment, test inflation pressures of a minimum of 200 psi and, in certain instances, multiple tests completed with the packer slightly offset, to ensure that high apparent test flows were not due to packer bypass.

Similarity between the slug test data and packer-isolated falling head test data for BR1 provides further support for validity of packer testing data, albeit only a single value. The slug test data is about 25% higher than the falling head test data in the similar test interval. While it is somewhat surprising that the relatively shorter slug testing zone has a higher K value than the longer falling head test zone, the numbers are considered close when taking into account potential analytical error in the falling head tests.

In sum, these data suggest that shallow bedrock in the S-wells area, at a minimum, does have the potential to transmit significant flow.

3.5.2 Pumping Wells and Testing

Two pumping wells were installed in the deep aquifer, PW1 and PW2. Details were presented in Section 3.4.2 and are repeated in Table 5 for these two wells.

Table 6: Deep Aquifer Pumping Wells

ID	Screen Depth (mbgs)	Screen Length (m)	Screen Slot Size (slots/inch)	Sump Length (m)
SPW1	19.51 to 24.23	4.72	15	1.68
SPW2	9.75 to 12.95	3.20	15	1.07

PW1 was screened in weathered bedrock and immediately overlying sediments. Drilling problems were encountered on PW2. Loose sediments resulted in the ODEX casing snapping and then, later, the downhole hammer was lost in the drillhole. The pumping well screen was constructed on top of the hammer, the entire area around the hammer filled with sand. The ultimate result of this is that the screen was not installed to as great a depth as desired, but is still within the upper weathered bedrock. Bedrock was intersected at a depth of 11.3 meters. The overlying materials are boulders with gravel and silt.

As described in section 3.3, pumping tests were completed in both PW1 and PW2. Step tests were conducted first, to allow determination of appropriate pumping rates for longer term tests. Constant rate tests followed. In the case of the PW2, the constant rate test was essentially a continuation of the step test. Total duration of constant rate tests was limited by available storage for discharge

water. Both pumping wells had zinc concentrations of greater than 1 mg/L (as measured at the site lab), requiring all discharge water to be collected and disposed of in the Rose Creek Valley tailings impoundment. Two storage tanks were available for discharge water management: a 1,000 litre wheeled tank and a second 4,000 litre stationary plastic tank. Water was discharged directly into the smaller tank, and then periodically pumped to the larger tank. Generally speaking, it took longer to move and dump the larger tank that it did to fill the smaller one, so test duration was limited to a maximum equivalent to the time it took to fill the larger tank. In summary:

- PW1 was tested for 400 minutes at rates up to a maximum of approximately 1.25 L/s (20 USgpm).
- PW2 was pumped at rates up to 0.95 L/s (15 USgpm) for a three hour step test, then a constant rate test was conducted for an additional 4.5 hours at a rate of 0.6 L/s (9.4 USgpm).

Step test results indicate that PW1 is generally more efficient than PW2. This may be due in some part to the screen placement in PW2. Based on the available drawdown at the time of testing, PW1 is capable of a sustained pumping rate on the order of 0.6 to 1.2 L/s (10 to 20 USgpm) and PW2 is capable of a sustained pumping rate on the order of 0.6 L/s (10 USgpm). Step test results are summarised in Figure 7.

Results of the PW1 constant rate test are summarised in Figure 8. Observation data is available from the pumping well and 5 deep aquifer monitoring wells: SP4a, BR1, SP5, S3 and SP7a. The following general observations are presented:

- Maximum drawdown at PW1 was on the order of 10m. Drawdown at SP4a, ~3 m from PW1, was approximately 6 m.
- Drawdown at distances on the order of 40 m was 0.1 m. Minor, but measureable.
- Drawdown on the order of 10 cm was observed in BR1, which is screened approximately 14 m below the overburden – bedrock interface and has a grout annular seal above the screen. This drawdown response suggests reasonable connectivity in reasonably deep weathered bedrock.
- Water levels in monitoring wells at distance from PW1 show recovery after test termination, but then water levels continue to decline, suggesting the local water table was declining during the test.
- Data for PW1 and SP4a on the composite plot should overlap to a close degree if the aquifer is truly homogeneous and isotropic. The fact that they don't supports the idea that the aquifer is somewhat heterogeneous, though still with reasonable connectivity.
- Generally wet conditions at site could be expected to have influenced test results, but leakage effects cannot be assumed with confidence.

Monitoring well SP4b, located in the shallow aquifer, almost immediately above PW1, did show a very minor change in water level during the test (max of 1 cm) but did not recover on test termination. Considering the reasonably high transmissivity of the shallow aquifer, it is reasonable

to think that a drawdown of this magnitude would have recovered on test termination. Additionally, at such a close distance (< 5m horizontally) much greater drawdown would have been expected if there were any significant connectivity between the aquifers. The observed change in water level may have been due to a general water table decline in the S-cluster area. Therefore, it is considered reasonable to assume that the shallow and deep aquifers are not well connected, if connected at all.

Results of the PW2 test are shown on Figure 9. Unfortunately, observation data is only available from SP5. The composite plot (top) provides insight into aquifer heterogeneity. As with PW1 test results, the two data plots do not overlap, suggesting aquifer heterogeneity. While curve matches on the composite plot are imperfect, matches to late time data are generally reasonable. For PW2 itself, mismatch with earlier time data may be a result of well inefficiency, or of error with flow measurements. Recovery data match reasonably well for both data sets at late times and is considered the most reliable. The storativity value in this match is anomalously high and considered unreasonable. Cause is unknown at this time.

Aquifer parameters from the two tests are summarised in Table 7. For the PW1 test, parameters were determined from PW1 and SP4a.

Table 7: Aquifer Parameters from Pumping Tests

Test	Transmissivity (m^2/s)	Hydraulic Conductivity (K)	Specific Capacity (L/s/m)
PW1	$2x10^{-4}$	$1x10^{-5}$	0.13
PW2	$5x10^{-4}$	$5x10^{-5}$	0.25

In general, pumping wells in the deep aquifer could be effective for interception if spaced closely, on the order of 10m. Heterogeneity could result in some wells being more effective than others, but this can only be assessed by pumping of any individual well. Based on weathered bedrock conductivities, pumping wells completed in weathered bedrock may be effective, at least in the areas that have been assessed. Available drawdown (saturated thickness) above the bedrock interface may have a significant influence on capture efficiency.

3.6 Areas Down Gradient of the S-wells

Two sets of nested monitoring wells were completed at locations down gradient of the primary S-wells alignment, SRK08-SP7a&7b and SRK08-SP8a&8b. At both locations, the "a" monitoring well is the deeper of the completions and was screened in weathered bedrock. The purpose of these two locations was to obtain lithologic and water quality information closer to the NFRC. Locations are shown on Figure 2. Completion logs are included in Appendix A-2. Photos of sonic core are included with site photos on the CD in Appendix D. Completion details are summarised in Table 7, including hydraulic conductivity values obtained through slug testing.

Table 8: Down Gradient Monitoring Well Details

ID	Screen Lithology	Screen Depth (mbgs)	Hydraulic Conductivity (m/s)	Depth to Water (m.b.g.s.)*
SP7a	W. BR	14.02 to 17.07	$4x10^{-7}$	1.17
SP7b	Silty sand & gravel	4.88 to 7.92	$8x10^{-7}$	1.15
SP8a	W. BR	3.05 to 6.10	$1x10^{-6}$	0.71
SP8b	Sand	7.62 to 10.67	$8x10^{-6}$	0.95

*Static water levels taken multiple days after installation and prior to slug testing.

SRK08-SP7a was screened in relatively dry, grey-brown weathered bedrock. While oxidized fractures were noted in the first meter of bedrock, weathering was not as pervasive at this location as was observed in the bedrock drillholes up gradient (ie. BR1, BR4, etc.). Water produced from this zone had a field pH of 5.9 and an EC of 2,880 µS.

SRK08-SP7b was screened in a rusty orange stained coarse sand and gravel lens. Water produced from this zone was also a rusty orange color and had a field pH of 6 and EC of 6,200 µS. This shallow water bearing zone was separated from the deeper monitoring well completion by approximately 6 m of compact, grey silty sand to sandy silt with gravel. Above this monitoring zone, materials were grey, wet sand and gravel with silt. Lithology in this drillhole was generally heterogeneous, with no significant aquitard layer between the permeable materials in which the screen was set and ground surface.

The SRK08-SP7 monitoring wells are located within 5 m of the bank of the NFRC. While surveys of monitoring well elevations, nor the NFRC in this vicinity, have yet been completed, field observation suggests that these water levels are very close to that of the NFRC itself. The water levels are too close to determine gradient between the monitoring wells at this time.

SRK08-SP8a was screened in weathered bedrock with similar appearance to that found at SP7a. Weathered bedrock with oxidized fractures was found in the upper 1 m of bedrock, below which bedrock became greyish and generally more competent. Water from this monitoring well had a field pH of about 6 and EC of 1,720 µS.

SRK08-SP8b was screened across multiple layers of rusty orange medium to coarse sand and gravel separated by a 30 cm layer of greyish sandy silt diamict. In sharp contrast to the SP7 location, sandy materials are generally present at all depths and lie directly on bedrock. Above the 8b screen zone, materials were mixed organics and fine sand, likely representing various buried meanders of the NFRC. Water from this monitoring well had a field pH of about 6 and EC of 1,220 µS.

The SRK08-SP8 monitoring wells are approximately 10 m from the bank of the NFRC and again, surveys have not yet been completed, though monitoring well water levels may be higher than the NFRC water level. The two monitoring wells are completed on relatively level ground, and a downwards gradient between the monitoring wells is considered a reasonable assumption at this

time. Compared to the NFRC, qualitative observations suggest that groundwater gradients may be appropriate to have groundwater discharging into the NFRC at this location.

3.7 Water Quality

Water samples have been collected twice from the wells installed in 2008, the first time as part of the field program and a second time on November 3, 2008 by AECOM, which included all of the 2008 locations, plus selected 2005 monitoring wells. Sulphate and zinc results from the November 3 sampling round (with a few noted exceptions) are summarized in Table 9. Results from May 2008 are reported for the remaining 2005 monitoring wells that were not sampled in the autumn. Results from sampling of surface seeps and standing water in the marshy area between the lower road and NFRC are also included. It should be noted that the site lab typically analyzes only for total metals. The marsh samples were not filtered or treated with preservatives, so should be viewed only as indicative of potential groundwater influence.

Laboratory analysis reporting sheets for samples collected as part of the field program are located in Appendix C.

Figures 10 to 13 show updated mps of zinc and sulphate concentration distribution for the shallow and deep aquifers. Figure 14 is a cross-section along section line 4, showing zinc concentration.

Table 9: Summary of Groundwater Quality

ID	Field pH	Field EC (µS/cm)	Sulphate (mg/L)	Zinc (mg/L)
S1a	6.06	6475	6100	288
S1b	n/a	n/a	500	0.0528
S2a	6.74	6085	5000	325
S2b	6.62	5877	5900	375
S3	7.1	6380	5900	422
SRK05-SP4a	6.48	894	190	1.03
SRK05-SP4b	6.92	6055	5600	368
SRK05-SP5	5.97	6380	6100	367
SRK08-SP6	6.85	2436	1200	0.0083
SRK08-SP7a	6.81	3503	2300	2.56
SRK08-SP7b	7.36	6010	5300	125
SRK08-SP8a*	6.19	1720	1470	0.444
SRK08-SP8b*	6.25	1220	481	0.359
SRK08-BR1	6.07	3705	3300	1.13
SRK08-BR2	6.98	4100	2400	36.3
SRK08-BR3	6.52	3520	1800	0.0426
SRK08-BR4	6.06	6556	6500	367
SPW1	6.08	940	210	1.14
SPW2	7.03	6402	5900	336
SPW4*	n/a	6260	5780	355
Marsh Samples				
A-SC	5.40	>4000	n/a	>50
B-SC	5.88	>4000	n/a	>50
C-SC	6.61	>4000	n/a	>50
D-SC	6.62	>4000	n/a	>50
May 2008 Sampling				
SRK05-SP1a	5.69	1432	629	1.78
SRK05-SP1b	6.1	1021	277	0.254
SRK05-SP2	6.5	386	35.3	0.172
SRK05-SP3a	n/a	1123	362	1.22
SRK05-SP3b	n/a	967	283	0.692

Notes and Abbreviations:
* SRK-08SP8a & 8b and SPW4 were not sampled on November 3, 2008. Results from the 2008 field program are presented.
Milligrams per litre = mg/L.

Water quality and flows were measured in June 2008 at the four NFRC S-cluster stations used as part of the 2005 program. These stations, shown on Figure 2, were used to assess changes in loading to the NFRC as it passes below the S-cluster area. Table 10 summarises water quality results for these stations for the June 2008 monitoring round. As surface water sampling dates did not coincide with groundwater sampling, zinc and sulphate concentrations at X2 are listed in Table 11 for the period overlapping the field program for reference. These results provide an indication of variation that was observed at X2 during the field program period.

Table 10: June 2008 NFRC Surface Water Flow and Quality

ID	Discharge (m^3/s)	Sulphate (mg/L)	Zinc (mg/L)
SC-1	3.206	6.52	0.0059
SC-2	3.314	6.54	0.0133
SC-3	3.19	7.43	0.0196
SC-4	2.766	7.53	0.0229
X2	n/a	7.92	0.0229

Notes and Abbreviations:
Cubic metres per second = m^3/s
Milligrams per litre = mg/L

Table 11: X2 Water Quality for 2008 Field Program Period

Date	Sulphate (mg/L)	Zinc - D (mg/L)
June 12, 2008	7.92	0.0229
June 16, 2008	8.35	0.015
July 14, 2008	7.3	0.018
August 11, 2008	11.7	0.022
September 15, 2008	10.1	0.016
October 15, 2008	14.6	0.032

The following observations are presented regarding water quality:

- NFRC surface water sulphate and dissolved zinc concentrations are generally much lower than S-cluster groundwater concentrations.
- In June 2008, NFRC dissolved zinc concentrations increased by almost four times between the upper and lower S-cluster station. Sulphate concentrations increased, but by a much lower factor.
- X2 water quality data suggests that conditions were reasonably stable during the 2008 field program, such that the June 2008 surface water quality data could be used to assess conditions during the period of the 2008 field program.
- The pH for all groundwater monitoring locations remains circum-neutral, with the exception SRK05-SP5 and SRK05-SP1a. SRK05-SP5 coincides with the highest concentrations in the deep aquifer while SRK05-SP1a has relatively low concentrations and is distant from the areas of high concentrations (>100 m). The cause for these low pH values is uncertain, but considering other areas with high contaminant concentrations do not necessarily have low pHs (eg. SP4b), the levels may not indicate anything about development of ARD chemistry.
- Contaminant concentrations at the historic S-wells (S1, S2 and S3) continue to remain high, with the exception of S1b, the shallow completion at that location.
- The shallow aquifer (SRK05-SP4b and PW4) has some of the highest concentrations.
- SRK08-BR2, the failed bedrock drillhole with a screen completed in overburden approximately 5 m above the inferred bedrock contact, but in reasonably close proximity to SP4a, has highly

elevated zinc and sulphate concentrations relative to SP4a. This may indicate hydraulic connection between weathered bedrock and permeable lenses somewhat above the immediate bedrock – overburden contact. Some of these potential lenses or relatively coarse grained areas have been interpreted from drill logs and are shown on Figures 3 and 4.

- Zinc concentrations in marsh surface water samples are much higher than NFRC concentrations.
- Along the primary monitoring well alignment (along the access road) high concentrations in the deep aquifer are relatively constrained spatially. High concentrations (on the order of 367 mg/L) are focused in the vicinity of SRK05-SP5 and BR4 and decrease rapidly laterally. At SRK08-SP6, about 40 m to the west of BR4, the zinc concentration is 0.0083 mg/L. At SRK05-SP4a, about 30 m to the east of SRK05-SP5, the zinc concentration is about 1 mg/L. Further to the east, SRK05-SP1, SP2 and SP3 indicate variability but the highest values remain less than 2 mg/L. Zinc concentrations in BR1, screened deep in weathered bedrock below SP5, has a zinc concentration of about 1 mg/L, suggesting that deeper weathered bedrock is less impacted.
- Data from SRK08-SP7a & 7b, located close to the NFRC, down gradient of the primary monitoring well alignment and SRK08-SP8a & 8b, located approximately 200 m down stream of the S-cluster, suggest that the contaminant plume at least extends to, and most likely under, the NFRC. SRK08-SP7b, the shallow monitoring well on the edge of the NFRC at the S-cluster, has a zinc concentration of 125 mg/L, about half that observed at the historic S-wells, but still highly elevated. Further down gradient, at SRK08-SP8a & 8b, sulphate and zinc concentrations are low relative to SRK08-SP7 and the historic S-wells, but are elevated, suggesting that the front edge of the contaminant plume extends to this distance. The fact that the concentrations are relatively low here suggests that either the main plume has not broken through to this distance or that the groundwater is being diluted by water from the NFRC.

Water quality data was compared over time and between stations to determine if different sources or characteristics for the shallow vs. deep aquifer could be identified. Comparison of element ratios, general composition in Piper plots and spatial variation was assessed. No specific distinguishing characteristic could be identified that clearly shows differentiation between the shallow and deep aquifers. Figure 15 shows plots of sulphate to zinc ratios for all of the S-cluster monitoring wells. The time trends of SO4/Zn-D ratio for the historic S-wells shows a similar pattern as has been described before, with breakthrough of zinc (ie. rapid decrease of ratio) occurring around 2000 at most locations.

S1B is somewhat anomalous compared to other historic S-wells, with much lower zinc and sulphate concentrations.

Comparing ratios using the November 2008 data, no clear distinction can be seen between the shallow and deep aquifers.

3.8 Updated Hydrogeologic Conceptual Model

Based on additional data collected in 2008, the hydrogeologic conceptual model for the S-wells area can be updated. A primary conclusion of the 2005 investigation was the identification of two distinct

aquifers, the shallow and deep aquifers that have been discussed earlier. Data from 2008 program suggests that, while the two aquifers are present and separated along the primary alignment of 2005 drilling, the distinction becomes blurred down gradient, closer to the NFRC.

Two aquifers emerge from the waste rock dumps: the shallow aquifer and the deep aquifer. Both receive recharge and contaminant influx from the up gradient waste rock dumps. The Shallow Aquifer is an approximately 25m wide by 3m thick sand and gravel lens, with a hydraulic conductivity on the order of $1x10^{-4}$ m/s. The entire aquifer is considered to be highly contaminated, with zinc concentrations ranging up to 400 mg/L.

Immediately down gradient of the 2005/2008 alignment, where the shallow aquifer was initially identified, ground surface drops on the order of a meter into the marshy areas adjacent to the NFRC. It is in this area that, during 2008 drilling through the shallow aquifer, springs were noted, due to the compressed air used with the rotary drilling. The shallow aquifer is interpreted to daylight, at least in part, to ground surface in this area.

The Deep Aquifer is laterally extensive, characterized as weathered bedrock and overlying permeable sediments. The deep aquifer essentially extends across the entire S-wells area, a length on the order of 350m, but the area currently delineated by a zinc concentration of 1 mg/L is approximately 250m wide with an average thickness on the order of 15m, including the portion of weathered bedrock that is currently highly contaminated. Hydraulic conductivity of the permeable sediments and upper weathered bedrock portion (to a depth of 10m) is approximately $1x10^{-5}$ m/s, decreasing to $1x10^{-6}$ m/s below 10m.

Depth to bedrock decreases away from the waste rock dumps, from on the order of 20m near the 2005/2008 drilling alignment to less than 15m near the NFRC in the S-wells area and less than 10 m further down the NFRC valley.

In the area immediately adjacent to the NFRC, the shallow aquifer is considered to pinch out and only a single, heterogeneous aquifer is present below the NFRC itself. This single aquifer is comprised of weathered bedrock and interbedded heterogeneous permeable sediments. Hydraulic conductivity is assumed to range between 1x10-5 and 1x10-6 m/s, similar to and possibly slightly lower than areas closer to the waste rock dumps.

Groundwater entering the S-wells area in permeable materials below the bed of the NFRC combines with groundwater flowing into the area via the Shallow and Deep Aquifers described herein. Groundwater departing the S-wells area may be affected by a rising bedrock surface and relatively constricted nature of the valley itself, with a component potentially up welling into the NFRC channel and some component flowing in permeable materials below the creek bed.

3.9 Updated Load Estimates

Loading estimates for the shallow and deep aquifers, as well as estimates of loading to the NFRC in the S-cluster area, were presented with data from the 2005 field program. Data collected during 2008 was used to update these estimates.

In 2005, the shallow aquifer was estimated to have a cross-sectional area of approximately 75 m^2. 2008 data suggests that this area remains appropriate. In 2005, the deep aquifer was subdivided into high and low concentration areas, the cutoff between the two given a value of 1 mg/L. The high concentration area was estimated in 2005 as 90 m^2. The low concentration area was estimated as 595 m^2. Based on 2008 data, the area of the shallow aquifer is considered reasonable, but both the high and low concentration areas for the Deep Aquifer are significantly larger. Based on the interpreted concentration contours shown on Figure 14, areas for different zinc concentration zones were calculated and are tabulated in Table 12.

Table 12: S-Cluster Aquifer Areas

	Zinc Concentration (mg/L)				
Aquifer	**≥ 300**	**10 to 300**	**1 to 10**	**0.1 to 1**	**Total**
Shallow (m^2)	75	n/a	n/a	n/a	75
Deep (m^2)	800	1,450	5,200	7,500	~15,000

Based on concentration data listed previously in Table 8, the aquifer dimension data from Table 12 and 2008 data on aquifer characteristics, loading from the S-wells area is significant:

Table 13: Maximum Loads for Shallow and Deep Aquifer

	mg/L		m^2		m/s	L/s	Load (t/yr)	
Aquifer	**Zn**	**SO4**	**Area**	**Gradient**	**K**	**Flux**	**Zn**	**SO4**
Shallow	300	5600	75	0.086	1.0E-04	$6.5x10^{-1}$	6	1078
Deep V. High Concentration	300	6000	800	0.04	1.0E-05	$3.2x10^{-1}$	3	573
Deep High Concentration	1	500	7000	0.04	1.0E-05	$2.8x10^{0}$	0	1
Deep Low Concentration	0.1	100	7500	0.04	1.0E-06	$3.0x10^{-1}$	0.001	0.003

NFRC flow and water quality from the four stations below the S-wells area were used to update the assessment of loading to the NFRC in the S-wells area. The same survey locations were measured in June, 2008. Table 14 summarises loading for each year.

Table 14: Summary of Zinc and Sulphate Loading to NFRC from S-Cluster Area

	NFRC Station	SC-1	SC-2	SC-3	SC-4
August, 2005	Flow (m^3/s)	1.656	1.346	1.496	1.51
	Zn-D (mg/L)	0.0063	0.0079	0.0158	0.0168
	SO4 (mg/L)	10.8	10.8	12.7	13.5
	Zn Load (mg/s)	10	11	24	25
	SO_4 Load (mg/s)	17885	14537	18999	20385
June, 2008	Flow (m^3/s)	3.206	3.314	3.19	2.766
	Zn-D (mg/L)	0.0059	0.0133	0.0196	0.0229
	SO4 (mg/L)	6.52	6.54	7.43	7.53
	Zn Load (mg/s)	19	44	63	63
	SO_4 Load (mg/s)	20903	21674	23702	20828
Increase in load from upstream station					
August, 2005	Zn-D (mg/s)	n/a	0.2	13.0	1.7
June, 2008		n/a	25.2	18.4	0.8
August, 2005	SO_4 (mg/s)	n/a	-3348	4462	1386
June, 2008		n/a	770	2028	-2874

Abbreviations:
Cubic metres per second = m^3/s
Milligrams per litre = mg/L
Milligrams per second = mg/s

It should be noted that NFRC flows in June 2008 were roughly twice as high as measured in August 2005. In fact, the summer of 2008 was very wet and the NFRC had very high flows for a significant portion of the summer. In addition, the relative change in flows between stations is essentially opposite between the two years. In 2005, flows decreased between stations SC-1 and SC-2, then increased to SC-4. In 2008, the flows increased from SC-1 to SC-2, then decreased to SC-4.

In terms of water quality, comparison of zinc and sulphate concentrations at each station indicates some significant differences. Sulphate concentrations were higher at all stations in 2005 compared to 2008. In 2008, zinc concentrations were lower at SC-1 than in 2005, but are higher in 2008 at the other three stations. In terms of load, 2008 had higher zinc and sulphate loads at all stations.

In the 2005 assessment, downstream changes in load were interpreted to be affected to some degree by variations in stream loss and stream gain between reaches, resulting from a complex system of groundwater – surface water interaction. While these mechanisms likely still exist in 2008, the relationship appears different. In 2005, decrease in discharge occurred only between stations SC-1 and SC-2. In 2008, discharge increased from SC-1 to SC-2, then decreased to SC-4. Despite this loss in flow, the only decrease in load is that of sulphate between stations SC-3 and SC-4. It should be noted that measurement error on these streamflow values is approximately +/- 10%, so the flow could essentially be about the same between SC-1 and SC-4. The apparent switch in gains and losses between 2005 and 2008 may just be measurement noise and the flows relatively similar through each of these reaches on both years.

In 2005, multiple loading scenarios were used to assess potential contributions of the shallow and deep aquifers to the NFRC. Results of these scenarios suggested that seepage from the shallow and deep aquifers, diluted with clean groundwater, could result in the observed increase in NFRC load. These scenarios, plus additional scenarios, have been used with 2008 data to improve understanding of the system.

Four scenarios were assessed in 2005:

1. The required groundwater concentrations to match observed changes in concentrations between SC-2 and SC-4 with the measured increase in NFRC discharge between those two stations.
2. The required shallow aquifer groundwater concentrations to match observed changes in concentrations between SC-2 and SC-4 using the estimated shallow aquifer flux.
3. The required groundwater concentrations to match observed changes in concentrations between SC-2 and SC-4 using the combined shallow and deep aquifer flux.
4. The flux of "unimpacted" groundwater needed to mix with estimated shallow groundwater load to match observed changes in concentration between SC-2 and SC-4.

These scenarios were re-assessed using 2008 data, with some modification. The updated scenarios are based on the 2005 scenarios, when plausible, with modifications indicated by the letter "B". "A" scenarios are those of the 2005 assessment. Numbering for additional scenarios begins at 5.

1a. Not feasible with 2008 data. Flows decrease.

1b. Similar to 2005 scenario "1" using increase in flow measured between SC-1 and SC-2.

2a. Same as 2005 scenario "2" using updated shallow aquifer flux.

2b. Similar to 2005 scenario "2" using load increase from SC-1 to SC-4.

3. Same as 2005 scenario "3" using updated estimate of combined shallow and deep aquifer flux.

4. Same as 2005 scenario "4" using updated estimate of shallow aquifer flux.

5. Modified version of 2005 scenario "4" using load increase from SC-1 to SC-4, instead of increase from SC-2 to SC-4.

6. Modified version of 2005 scenario "2" using load increase from SC-1 to SC-2.

7. Modified version of 2005 scenario "4" using load increase from SC-1 to SC-2.

The results of these scenarios are presented in Table 15. Red numbers are inputs; black numbers are calculated.

Table 15: Results of NFRC Loading Scenarios

Scenario	Assumed Seepage Contributions		Inferred Seepage Concentrations	
	Description	L/s	SO_4 (mg/L)	Zn_D (mg/L)
1A	"Observed" Gain in Q SC-2 to SC-4	Flow Decreases		
1B	"Observed" Gain in Q SC-1 to SC-2	108	-8	0.18
2A	Shallow GW Concentrations if Shallow GW Seepage	0.75	-1,127	26
2B	Required Shallow Seepage for SC-1 to SC-4 Load Increase	0.12	6,200	360.0
3	GW Concentrations if All GW reports to NFRC btwn SC-2 to SC-4	8.4	-101	2.3
4	Shallow S-Cluster Seepage Plus	0.75	6,200	360.0
	Unimpacted GW for SC-2 to SC-4	71	100	0.00
5	Shallow S-cluster Seepage Plus	0.75	6,200	360.0
	Unimpacted GW for SC-1 to SC-4	16	100	0.01
6	Required Shallow Seepage for SC-1 to SC-2 Load Increase	0.07	6,200	360.0
7	Shallow S-cluster Seepage Plus	0.75	6,200	360.0
	Unimpacted GW for SC-1 to SC-2	9.3	100	0.01

Abbreviations: Litres per second = L/s Milligrams per litre = mg/L

The results of these scenarios provide a number of insights into the interaction of groundwater with the NFRC and, consequently, the flow dynamics of the S-cluster groundwater system. Most importantly, the updated scenarios support the previous conclusions that A. either a large percentage of contaminated groundwater is NOT reporting to the NFRC, or B. contaminated groundwater is being diluted by relatively "unimpacted" inflows.

Water quality results from some of the 2008 monitoring locations provide further constraint on possible loading. The down-gradient monitoring wells installed in 2008 (SRK08-SP7a & 7b and SRK08-SP8a & 8b) indicate that contaminant plumes have reached the NFRC, but are most likely to be trending underneath the NFRC itself, to some degree at least. Water quality measured in seeps and marsh water immediately below the lower road and in-line with the shallow aquifer, suggest that the shallow aquifer is daylighting to some degree into the marshy area itself.

These results and observations suggest that, of all the scenarios presented, scenarios 4, 5 and 7 could be considered the most probable. In these scenarios, discharge from the shallow aquifer could explain the observed NFRC loads. While a relatively minor flux from the deep aquifer could be contributing to observed loads, particularly further down gradient from the S-cluster area itself, it is not considered to be a significant component of the loading directly at the S-cluster area, at this time.

It should be noted that sulphate and zinc concentrations at the SRK08-SP8a&b locations suggest that, while zinc concentrations are not yet highly elevated, they could increase to 100's of mg/L. This could likely result in not only greater contamination of the NFRC, but contamination of groundwater from the S-wells area to X2 and perhaps beyond.

4 Options Assessment

An objective of the 2008 program was to assess a number of seepage collection options that could be implemented in the S-cluster area. These options included:

- Pumping wells;
- Cut-off walls;
- Shallow sumps and trenches;
- Permeable reactive barriers; and
- Stream isolation.

As stream isolation has been included in the final mine closure plan, it is not discussed here. Isolation will be a specific engineering issue and is not within the scope of this report. The effectiveness of stream isolation is considered good.

In order to determine the most appropriate groundwater collection option, it is important to clearly define the objectives of collection. Based on the results presented herein and the anticipated final mine closure plan, the following points are considered to define the objectives for groundwater collection:

1. Reduce groundwater loading to the NFRC to get concentrations at X2 below trigger levels.
2. Minimize risk of loading to NFRC down gradient of X2.
3. Reduce groundwater load as much as practically feasible ("ALARA" approach – As Low As is Reasonably Achievable).

As the Down Valley groundwater collection system will be designed to capture whatever load may escape from the mine, capture efficiencies approaching 99% are not required at the S-cluster. That being said, it is still important that collection systems be sufficient to minimize loading to the NFRC up gradient of the Down Valley collection system.

Collection options are presented by aquifer, but the separate collection systems will in reality be combined to some degree.

The shallow aquifer characteristics can be summarised as:

- 25 m wide and a maximum of 3.5 m deep, immediately below ground surface in the vicinity of the lower road.
- Relatively high permeability sand and gravel aquifer.
- Maximum flux is estimated as ~0.75 L/s.
- Average zinc concentrations are 360 mg/L.
- Average sulphate concentrations 6,000 mg/L.

The deep aquifer characteristics can be summarised as:

- Total area on the order of 15,000m^2. High to very high concentration zones (>1 mg/L) have combined area on the order of 8,000m^2.
- The deep aquifer is lower permeability than the shallow aquifer, and characterized as weathered bedrock and overlying permeable sediments. Sediments can be heterogeneous and weathered bedrock may extend to depths of at least 10m.
- Flux from the high and very high concentration zones is about 3 L/s.
- Maximum zinc concentration for the very high concentration zone is about 350 mg/L.
- Maximum sulphate concentration for the very high concentration zone is about 6,000 mg/L.

Interaction between the two aquifers is limited to the relatively flat boggy area alongside the NFRC in the S-cluster area, if interaction occurs at all. Up-gradient, the aquifers are separated by 10+ m of silty fine sand to silt materials.

In both the Shallow and Deep Aquifers, contaminant concentrations are continuing to increase, such that current load estimates do not indicate peaks.

Available options are discussed in Tables 16 and 17, for the Shallow and Deep Aquifers, respectively.

The majority of the options presented could be utilized successfully if sufficient time and funds were available. From a practicality perspective, a shallow sump for the Shallow Aquifer would be the simplest and likely most successful approach to take at this time. The bioreactor concept should be assessed if possible, to potentially alleviate long term water treatment requirements, but at this time cannot be assumed to be a workable option. Pumping wells are not recommended for the Shallow Aquifer due to the limited available drawdown. A high number of wells would be required to fully intercept groundwater without causing frequent equipment failures due to high on/off cycling rates. A down gradient cutoff wall would significantly improve collection effectiveness.

In terms of the deep aquifer, the sump, permeable reactive barrier and bioreactor options are not considered practical, due to the depth of the aquifer and extension into the underlying weathered bedrock. A stable sump would likely have very large dimensions and is not considered practical. The permeable reactive barrier and bioreactor options would likely be difficult to implement to the required depths, require additional feasibility studies and, likely, extensive long term maintenance.

Pumping wells and/or a cut-off wall with bedrock grouting are considered viable options. Pumping wells with a spacing of less than 10m and completed a minimum of 10m into weathered bedrock could be implemented relatively easily, and use relatively simple technologies.

Considering the uncertainty in regards to option performance, an adaptive management approach is recommended for both the Shallow and Deep Aquifers. As will be described in Section 5, a shallow

collector trench has been installed in the shallow aquifer. Monitoring of pumped water and water quality down gradient of the collector trench will be used to assess system performance. If monitoring indicates that interception is insufficient, a cut-off wall can be installed on the down gradient side of the sump. Conceptual designs for the Shallow Aquifer collector trench are presented in Figures 16 and 17.

For the Deep Aquifer, existing pumping wells are appropriately positioned for immediate interception of highly contaminated groundwater. Monitoring of pumping at these two locations and water quality at nearby monitoring wells can provide information on pumping effectiveness. As will be described in Section 5, these wells will be integrated into the system currently being installed. In general, the following general adaptive management approach could be implemented:

1. Use existing pumping wells for at least a couple of months to determine capture efficiency and areal coverage. If determined to be insufficient,

2. Install additional pumping wells in areas of known high contaminant levels with reasonable hydraulic parameters. If determined to be insufficient,

3. Install additional pumping wells in intermediate positions. If determined to be insufficient,

4. Install cut-off wall and permeable collector trench.

A final Adaptive Management Plan should be developed incorporating current water quality triggers. The AMP presented in the 2006 S-cluster report (SRK, 2006) could be used as a base.

In the lower elevation, marshy area closer to the NFRC, the effects of up gradient pumping may not provide an adequate level of collection to decrease groundwater load close to the NFRC. If pumping of existing wells was determined to be insufficient, additional pumping wells would be installed closer to the NFRC. These wells may only need to be operated until groundwater in this area was determined to be of sufficient quality to minimize risk to the NFRC. Before implementing these additional wells, pumping wells located in the up gradient high concentration areas should be operated for a sufficient period of time to allow assessment of effectiveness.

Ultimately, the NFRC will be re-aligned into a lined channel. This will protect the NFRC, but contaminated groundwater would continue to flow down the existing NFRC valley. Groundwater collection in the S-Cluster area would be continued in perpetuity.

In addition, a groundwater collection system will be installed down gradient of the Intermediate Dam. This system will be designed to provide a high level of interception. Therefore, while collection at the S-Cluster is still recommended, bypass of a relatively low amount of contaminated groundwater would not be considered to indicate system failure. The required level of collection in the S-cluster area will have to be determined based on ecological requirements.

Figure 18 is a map showing the conceptual layout of Deep Aquifer collection components.

Table 16: Shallow Aquifer Collection Options

Option	Description	Water Disposal	Comments
Pumping Wells	10 to 15 shallow, low yield pumping wells capture water. Water directed to central transfer station for pumping to treatment location.	Pipeline required to treatment location. Final treatment location uncertain.	Effectiveness of pumping wells limited by low available drawdown. Numerous pumping wells required to attain significant capture, but achievable. Pumping system consisting of numerous wells would likely require a high level of active management to optimize. Periodic replacement of pumps and treatment of well screens would be required. Power required.
Sump	Permeable collector trench or pit backfilled with permeable material intersecting entire aquifer with central pumping station.	Pipeline required to treatment location. Final treatment location uncertain.	Limited aquifer depth and width suggest sump could intersect entire aquifer. Effectiveness limited only by efficiency of porous drain material and positioning of pump. Fine materials must be filtered out to keep efficiency high. Single pumping station simplifies active management. Power required.
Cut-off Wall	Sheet pile or slurry cut-off wall with up-gradient collector system (sump or permeable trench with pump) installed to aquifer bottom across entire aquifer width.	Pipeline required to treatment location. Final treatment location uncertain.	Limited depth of aquifer simplifies installation. After installation of cut-off wall, installation of up-gradient collector system would be simplified. Low permeability materials below aquifer provide good base. Proper construction minimizes potential for contaminant bypass. Cut-off wall could be combined with pumping wells or sump options. Power required.
Permeable Reactive Barrier	Reactive media installed either across entire aquifer area or used with funnel and gate system. Reactive material causes contaminants to precipitate in place.	In-situ treatment. No pipeline required.	Type and source of reactive material unknown. Additional testing required to determine feasibility. Periodic replacement of reactive material required. Technology has been proven at other sites in North America but a high level of uncertainty exists regarding feasibility. Significant active management required at onset. Benefit is in-situ treatment.
Bioreactor	A series of trenches intersecting the aquifer are used to inject nutrients that allow bacteria to chemically alter water quality causing contaminants to precipitate in place.	In-situ treatment. No pipeline required.	Uncertainty with groundwater travel times and DO present most significant challenge to assessing feasibility. Technology in use at other sites in Yukon. Test system could be installed relatively easily using sumps. Contaminant precipitation could cause long term decrease in aquifer permeability. Long term effectiveness uncertain. High level of active management required at onset.

Table 17: Deep Aquifer Collection Options

Option	Description	Water Disposal	Comments
Pumping Wells	Upwards of 5-10 pumping wells in high concentration zone connected to central transfer pumping station.	Pipeline required to treatment location. Final treatment location uncertain.	Pumping tests indicate reasonable aquifer lateral connectivity. Pumping wells will work in deep aquifer but somewhat limited by available drawdown. Permeable bedrock may provide opportunity to have deep well sumps, thereby improving available drawdown. Active management required at onset. Automatic pumping controls recommended. Power required.
Sump	Permeable collector trench or pit backfilled with permeable material intersecting entire aquifer with central pumping station.	Pipeline required to treatment location. Final treatment location uncertain.	Not practical given significant depth of aquifer, even if limited to high concentration zone. Permeable trench option feasible but may not capture bedrock contamination. Grouting of bedrock along alignment may be required. Fewer pumps required that pumping wells alone. Power required.
Cut-off Wall	Sheet pile or slurry cutoff wall with upgradient collector system (sump or permeable trench with pump) installed to aquifer bottom across entire aquifer width.	Pipeline required to treatment location. Final treatment location uncertain.	Significant depth and need to capture weathered bedrock groundwater complicates approach. Grouting of bedrock likely required if cannot be excavated or deep pumping water levels cannot be maintained.
Permeable Reactive Barrier	Reactive media installed either across entire aquifer area or used with funnel and gate system. Reactive material causes contaminants to precipitate in place.	In-situ treatment. No pipeline required.	Type and source of reactive material unknown. Depth requirements may be too challenging. Additional testing required to determine feasibility. Periodic replacement of reactive material required. Technology has been proven at other sites in North America but a high level of uncertainty exists regarding feasibility. Significant active management required at onset. Benefit is in-situ treatment.
Bioreactor	A series of trenches or pumps intersecting the aquifer are used to inject nutrients that allow bacteria to chemically alter water quality causing contaminants to precipitate in place.	In-situ treatment. No pipeline required.	Uncertainty with groundwater travel times and DO present most significant challenge to assessing feasibility. Technology in use at other sites in Yukon. System test more difficult than shallow aquifer due to depth. Contaminant precipitation could cause long term decrease in aquifer permeability. Long term effectiveness uncertain. Not considered viable option.

5 Short-term Actions

Based on the field program results, the Faro Technical Advisory Team (TAT), the TAT provided the following recommendations in October 2008:

- Collection of near surface aquifer water from S-cluster area should be implemented as soon as practicable. In addition to the concerns about gradual increases in zinc loadings via groundwater and the associated AMP requirements, the work this summer has shown that that there is a high likelihood of surface discharges. The water license prohibits discharge of water exceeding 0.5 mg/L zinc to Rose Creek and specifically references "all points of entry" which would include diffuse surface discharge from the S-cluster area.
- A conceptual S-cluster capture system is expected to consist of:
  - Install interim collection system this fall – sump/trench in the shallow aquifer, pump from 2 existing deep aquifer wells to the sump. Pump from sump to Faro Pit.
  - This would constitute a first phase of groundwater collection system that would be expanded/improved as necessary in 2009.
  - Opportunities for alternate treatment methods which would compliment the collection system should be investigated beginning in 2009.
  - Further details on the collection system components are described below.
- The water collected from the S-cluster area should be directed to the Faro pit in the short term.
- Discharge of the S-cluster water to the Faro Pit for more than two years will cause the currently estimated treatment capacity of the Faro mill system to be exceeded. Several options for the longer term management of the S-cluster water need to be considered:
  - The basis for the current estimates of treatment capacity need to be re-examined, and options for upgrading the Faro mill system to treat the additional load should be considered.
  - The S-cluster area will be a source of relatively low flow – high strength water, similar to the interim collection system at the Emergency Tailings Area (ETA) and the Zone II pit pumpback. In general, it is more efficient to collect and treat high strength sources directly rather than diluting them first. As the proportion of these low flow – high strength sources increases, storing and diluting them in the Faro Pit or Intermediate Pond becomes less efficient. Options for a separate treatment system for roughly 200 gpm of high strength sources should be considered.
  - The S-cluster water will require year-round collection. The ETA water is in fact also a year-round source, and the current approach of collecting only the summer flow is a compromise. As the year-round proportion of the sources increases, the economics of instituting year-round treatment improve. Options for year-round treatment should be considered.

Based on these recommendations, it is expected that the contaminated water collection system will consist of the following components:

- A 6 to 7 m deep sump should be constructed to intercept the shallow aquifer and covered with an insulated shack.
- Pump from two groundwater wells using pumps already on-site. These should be re-installed and set up to discharge to the sump. The well-heads and the piping from the wells to the sump will need to be insulated and heat traced.
- A pump should be installed in this sump and sized to be capable of pumping 50 USgpm to the Faro pit.
- Temporary (08/09 winter) power from diesel generator situated on haul road above S-Wells. Fuel consumption is expected to be in the range of 2- 3 litres per hour. Capacity for up to 4 days (300 litres) would allow unattended operation over weekend periods through the winter.
- The collected water should flow via insulated and heat traced pipeline to Faro Pit. The pipeline must gravity drain in both directions if there is a system failure.
- Consider installing a steel section in the pipeline as it passes the generator. This would allow use of exhaust heat to warm the flow.
- A control system should be designed for subsequent integration into a sitewide system, The minimum components include:
    - Low water shut off.
    - System off - warning light (= high water alert).
    - Remote alarm (to guardhouse – minimum, to pager or phone alert in Faro – strongly preferred).
    - Flow meter with totalizer.
- An oxygen sensor is required at the shack as this system will be situated at the toe of an ARD rock pile, or staff should use personal gas monitors.

Deloitte & Touche accepted these recommendations and, during the winter of 2008/2009, construction of the shallow aquifer collection system was initiated. As of February 10, 2009, the shallow collection sump has been constructed, a heat traced and insulated pipeline has been installed from the S-cluster area to the Faro Pit and an automated pumping control system is under construction. The two existing Deep Aquifer pumping wells will be connected to the Shallow Aquifer pumping system, which will direct contaminated water to the Faro Pit. The system is intended to be operational by February 28, 2009. Photo 4 shows the exterior of the pumping/control container that will be located at the S-cluster.

Photo 4: Shallow Aquifer Pumping System Under Construction

6 Conclusions and Recommendations

The results of the 2008 investigation indicate that highly contaminated groundwater is localized within the Shallow Aquifer and a limited area of the Deep Aquifer. Lesser contaminated water in the Deep Aquifer is extensive. Contaminated groundwater is in close proximity to the NFRC and likely flowing underneath the NFRC itself. The Shallow Aquifer is interpreted to daylight below the primary 2005/2008 drilling alignment and the two aquifers merge into a single aquifer just up gradient of the NFRC.

Weathered bedrock is relatively permeable to depths of at least 10m along the primary 2005/2008 drilling alignment, becoming on the order of 1m closer to the NFRC. Pumping well tests indicate that interception of contaminated water in weathered bedrock, and overlying sediments is feasible but will require additional wells to be completely effective. The use of pumping wells in the Shallow Aquifer is not considered feasible.

An assessment of interception options suggests that a sump/collector trench would be most practical for interception in the Shallow Aquifer. Interception in the Deep Aquifer could be initiated with the existing pumping wells, but will require additional wells to attain better effectiveness.

An adaptive management approach is recommended, focusing initially on the Shallow Aquifer collection sump and Deep Aquifer pumping wells. Additional pumping wells in the Deep Aquifer would be added as required. If monitoring indicated that pumping alone was not achieving interception requirements, cut-off walls should be installed. Additional pumping wells may be required closer to the NFRC, at least temporarily.

In October, 2008 the TAT recommended immediate installation of the Shallow Aquifer interception sump and use of the existing Deep Aquifer pumping wells. Following the installation of this system, a monitoring program should be initiated, including both regular water quality sampling of existing monitoring wells and the installation of water level dataloggers to assess seasonal water level fluctuations and, once operational, the effectiveness of the existing Deep Aquifer pumping wells. Deloitte & Touche accepted these recommendations and construction of the Shallow Aquifer System commenced in January 2009, and the system is intended to be in operation by February 28, 2009.

This report, "**Faro Mine Complex, 2008 S-Cluster Groundwater Investigation and Option Assessment, 2008/09 Task 24 - FINAL**," was prepared by SRK Consulting (Canada) Inc.

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Reviewed by

Cam Scott, P.Eng.
Principal Engineer

7 References

Butler, 1998. The Design, Performance, and Analysis of Slug Tests. Lewis Publishers. Boca Raton.

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Figures

584600 E
584800 E
585000 E
6912800 N
Pre-Mining Creek Alignment
Pond 1090.01
Marshy Area
North Fork Rock Drain
Haul Road to Vangorda Plateau
North Fork of Rose Creek
1160
1150
1140
1130
1120
1110
1100
1090

LEGEND

- 2005 Groundwater Monitoring Well
- Other Groundwater Monitoring Well
- Shallow Drivepoint
- NFRC Monitoring Station (NFRC_SC-4 = FLOW/SAMPLING) (SCS_1 = SURFACE SEEP)
- S-Cluster Monitoring Well
- 2008 Well Location
- Pipeline

SRK CONSULTING
Faro Mine, Yukon

Contour Interval: 2m
Date of Photography: 03/07/25
Scale of Photography: 1:20,000
Survey control derived from existing 1:20,000 photography
Survey control based on: UTM Projection, NAD27, Zone 8
Compiled by The ORTHOSHOP, Calgary, September 2003 WO 8856

Notes:

1. All dimensions and elevations are in Metres.

1:2,000 0 50 100 150 Metres

SRK Consulting Engineers and Scientists Vancouver B.C.

SRK JOB NO.: 1CD003.112
FILE NAME: S-Wells location map.dwg

Deloitte & Touche

FARO MINE COMPLEX

S-Wells Shallow Aquifer Groundwater Collection

S-Wells Area
General Location Map

DATE:	APPROVED:	FIGURE:
Jan. 2009	DM	1

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584200 E
584400 E
584600 E
584800 E
6913000 N
6912800 N
P96-7
Pre-Mining Creek Alignment
SRK08-SBR3
SRK08-SPW3
SRK08-SBR4
SRK08-SPW2
SRK08-SBR1
SRK05-SP5
TP08-6
TP08-7
TP08-8
SRK08-SBR2
SRK08-DPI
TP08-5
TP08-9
SRK05-SP4A&B
SRK08-SPW1
S1A-B
S2A-B
TP08-2
TP08-1
S3
SRK08-SP7A
SRK08-SP7B
SRK05-DP4
SRK05-DP3
SRK05-DP2
North Fork Rose Creek
NFRC_SC-3
SRK08-SPW4
TP08-4
TP08-3
SRK05-SP3A&B
SRK05-SP1A&B
SRK05-DP1
NFRC_SC-2
SRK05-SP2
NFRC_SC-1
North Fork Rock Drain
SCS_2
SCS_3
SRK08-SP8A
SRK08-SP8B
North Fork of Rose Creek
SCS_1
NFRC_SC-4

LEGEND

- 2005 Groundwater Monitoring Well
- Other Groundwater Monitoring Well
- Shallow Drivepoint
- NFRC Monitoring Station (NFRC_SC-4 = FLOW/SAMPLING) (SCS_1 = SURFACE SEEP)
- S-Cluster Monitoring Well
- SRK08-SP8B 2008 Well Location
- TP08-4 2008 Test Pit Location

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Faro Mine, Yukon

Contour Interval: 2m
Date of Photography: 03/07/25
Scale of Photography: 1:20,000
Survey control derived from existing 1:20,000 photography
Survey control based on: UTM Projection, NAD27, Zone 8
Compiled by The ORTHOSHOP, Calgary, September 2003
WO 8856

1:2,000 0 20 40 60 80 100 M

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SRK JOB NO.: 1CD003.112
FILE NAME: 2008 FARO SITE PLAN DM2.dwg

Deloitte & Touche

FARO MINE COMPLEX

2008 S-Cluster Groundwater Investigation

S-Well Site Map

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Jan. 2009	DM	2

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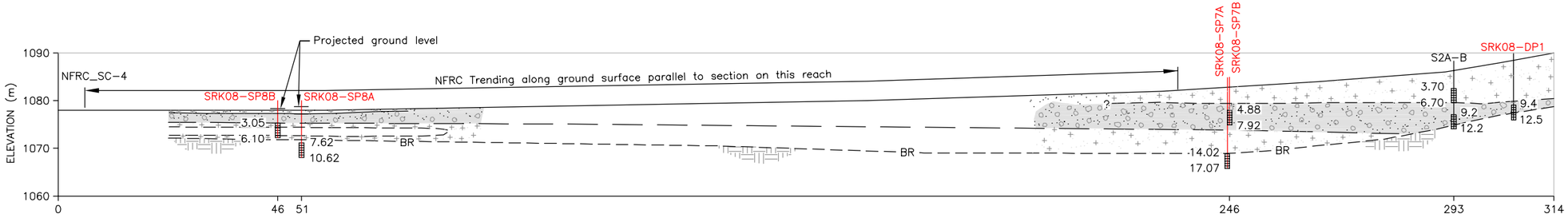
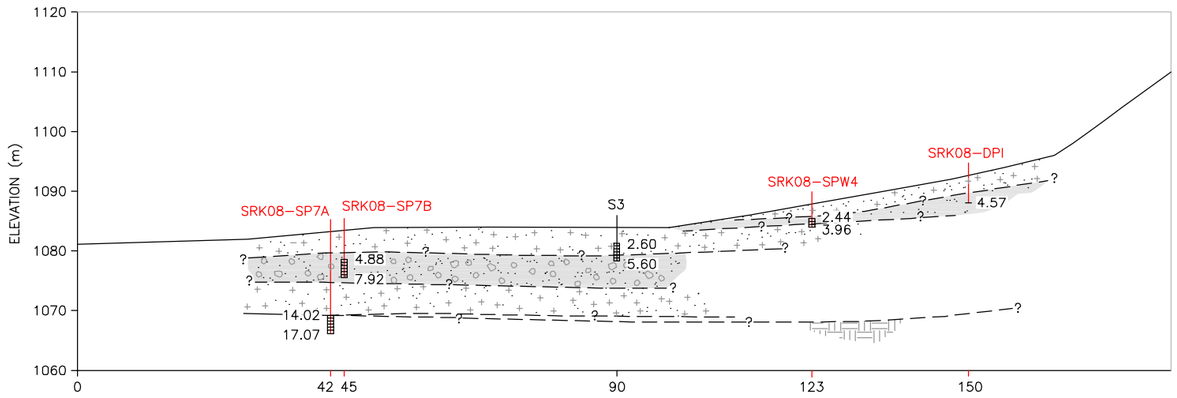


SECTION 1



SECTION 2

Legend:

- Silty Sand
- Sand and Gravel
- Bedrock
- 7.62 / 10.62 — Top of Screen (metres below ground surface) / Bottom of Screen (metres below ground surface)
- SRK08-DP1 — 2008 Drillhole
- S3 — Previous Drillhole

1:1000

0 10 20 30 40 Meters

SRK Consulting Engineers and Scientists, Vancouver B.C.

SRK JOB NO.: 1CD003.112

FILE NAME: 2008 FARO SITE PLAN DM2.dwg

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FARO MINE COMPLEX

2008 S-Cluster Groundwater Investigation

Cross Sections 1 and 2

DATE:	APPROVED:	FIGURE:
Jan. 2009	DM	3

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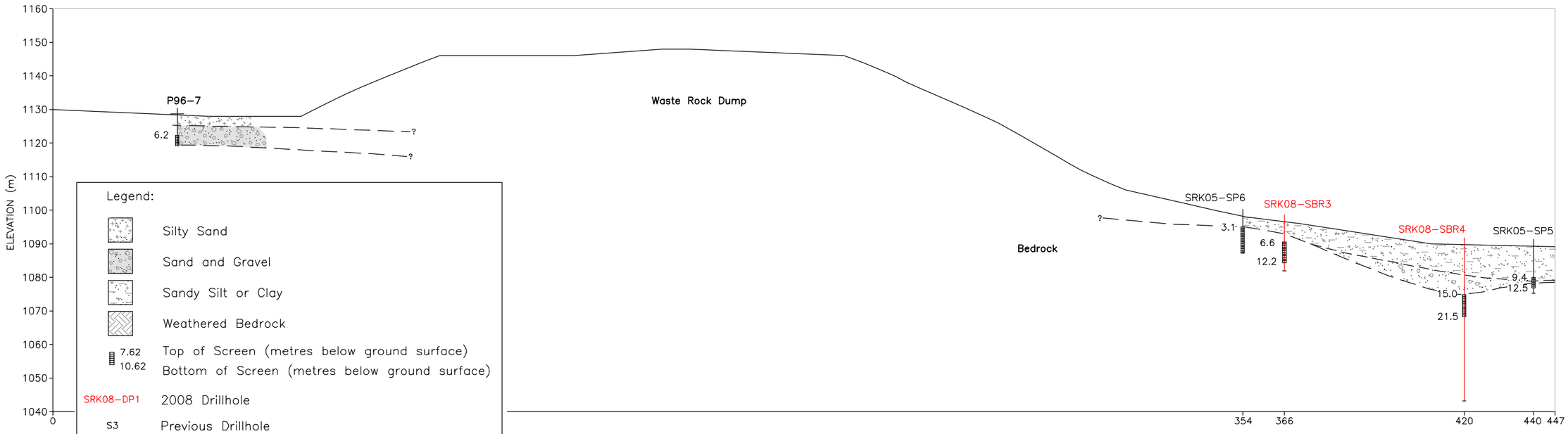

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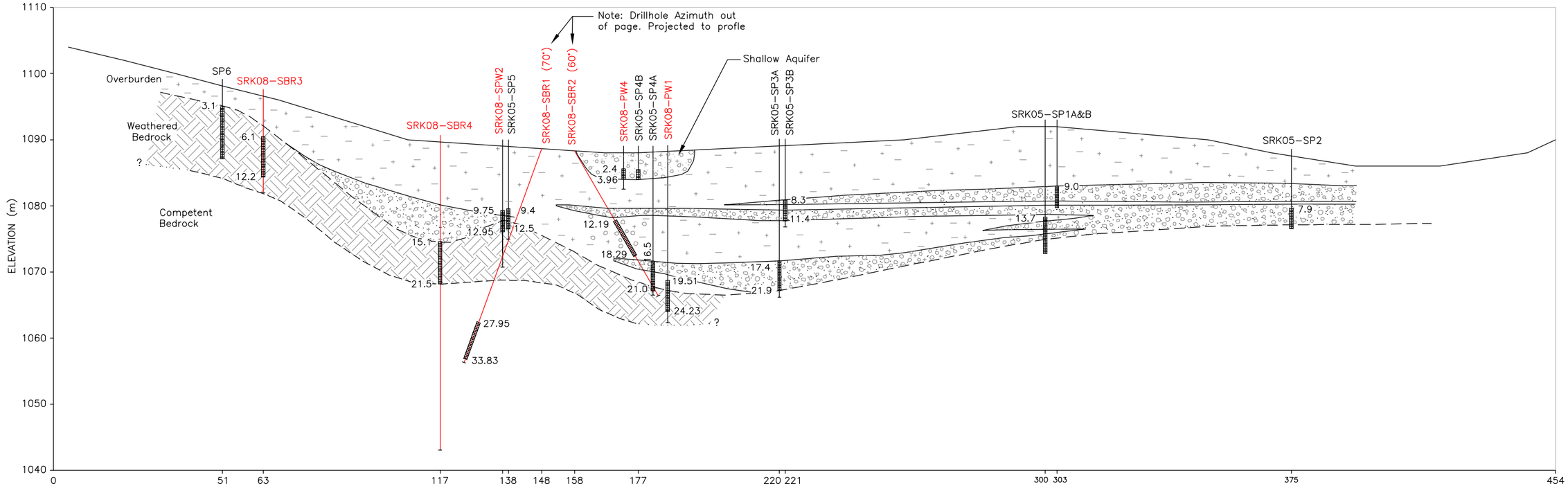

SECTION 4
(2X Vertical exaggeration)

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SRK JOB NO.: 1CD003.112
FILE NAME: 2008 FARO SITE PLAN DM2.dwg

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FARO MINE COMPLEX

2008 S-Cluster Groundwater Investigation

Cross Sections 3 and 4

DATE: Jan. 2009 | APPROVED: DM | FIGURE: 4

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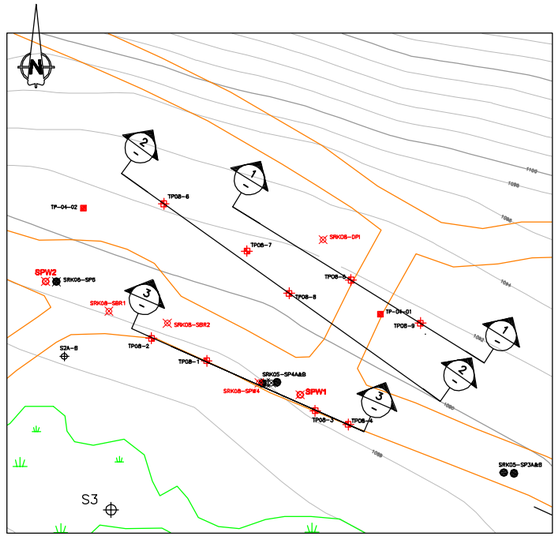
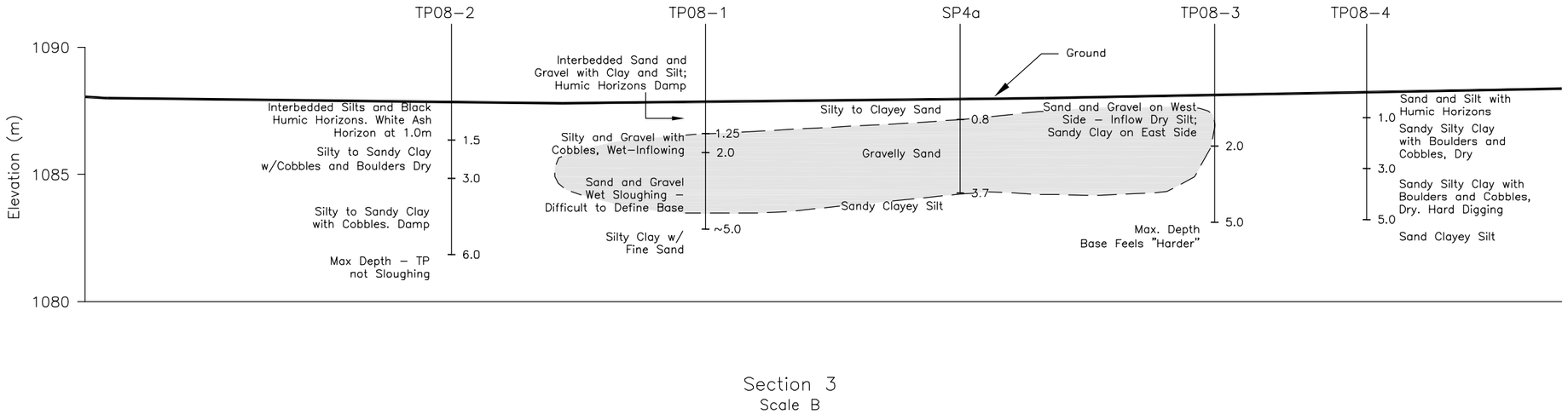


Cross Section Locations
(All Sections Looking North)
Scale A



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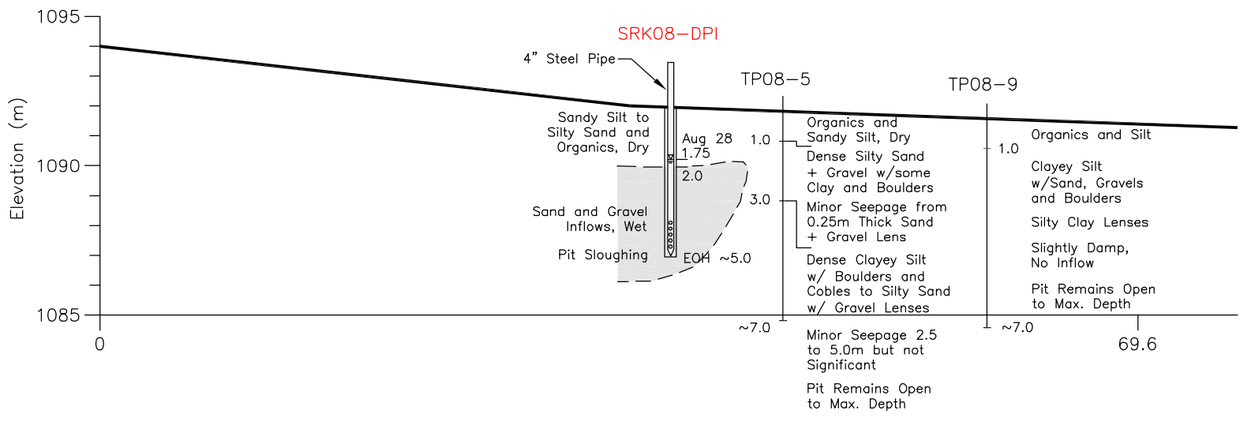
Scale B



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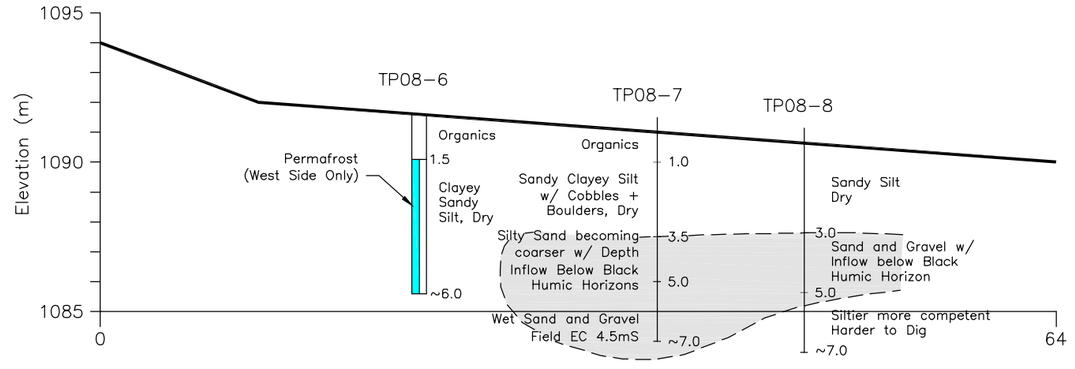
Scale C – 2X Vertical Exaggeration



Section 2
Scale C – 2X Vertical Exaggeration

Scale C 0 5 10 15 20 Metres
Scale B 0 5 10 Metres
Scale A 0 10 20 30 40 50 Metres

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SRK JOB NO.: 1CD003.112
FILE NAME: S–Aquifer_Location and profiles.dwg

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FARO MINE COMPLEX

S-Wells Shallow Aquifer Groundwater Collection

Shallow Aquifer Test Pit Cross Sections

DATE:	APPROVED:	FIGURE:
Jan. 2009	DM	5

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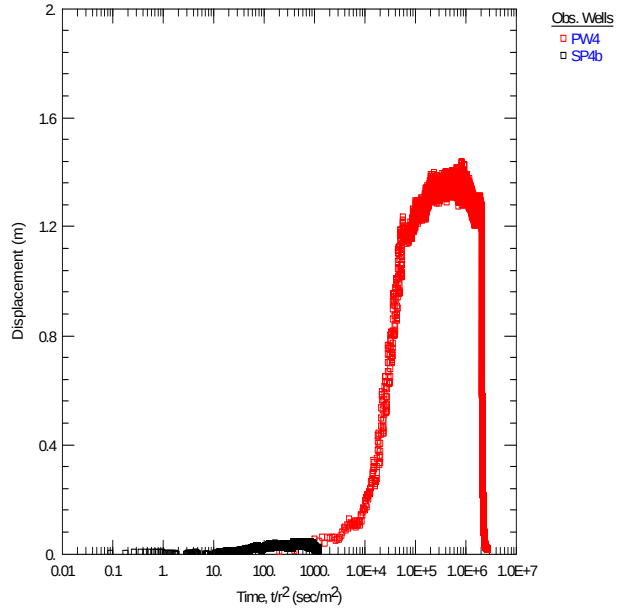
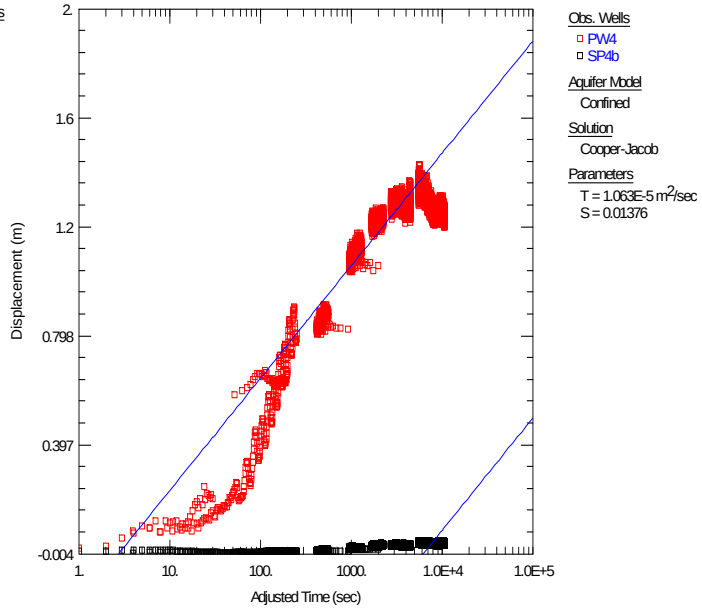
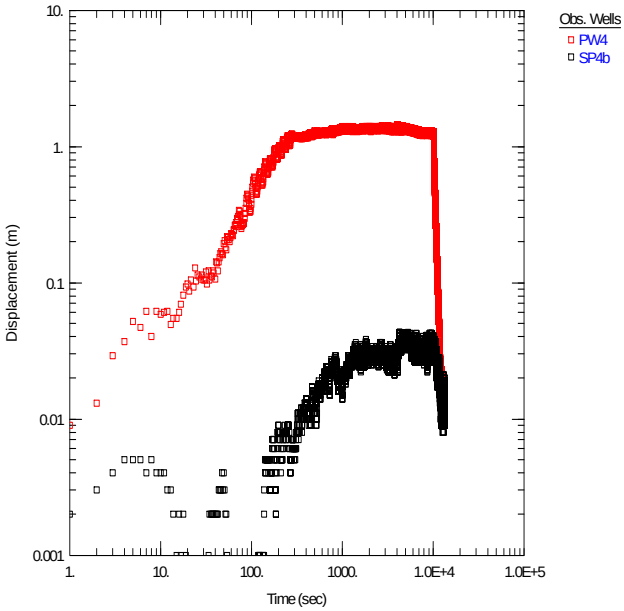
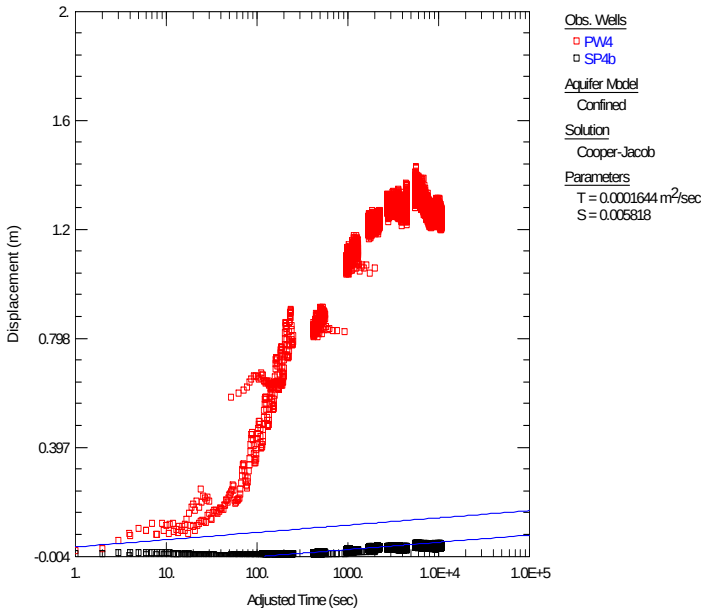
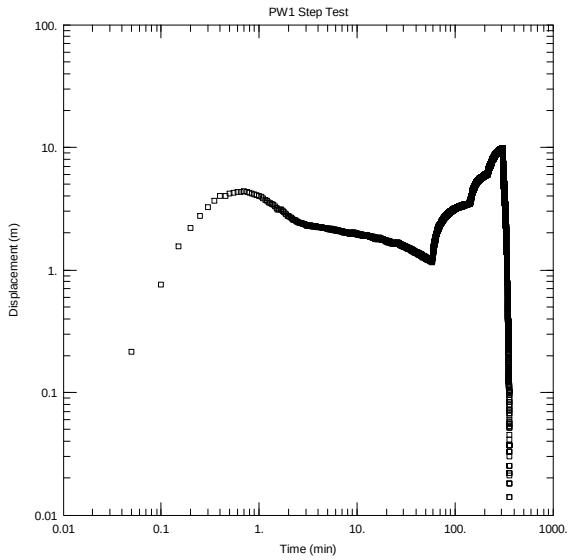


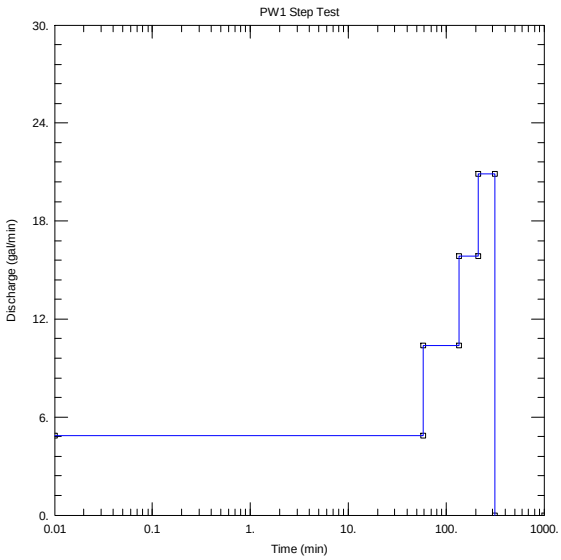


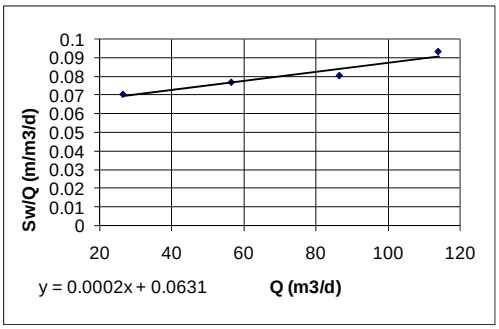




SRK Consulting Engineers and Scientists VANCOUVER	Deloitte & Touche	S-Well Shallow Aquifer Groundwater Collection
		PW4 Pumping Test Data
Job No: 1CD003.112 Filename: Fig 6-7-9-15_test results_20090211. ppt	FARO MINE COMPLEX	Date: January 2009 / Approved: DM / Figure: **6**

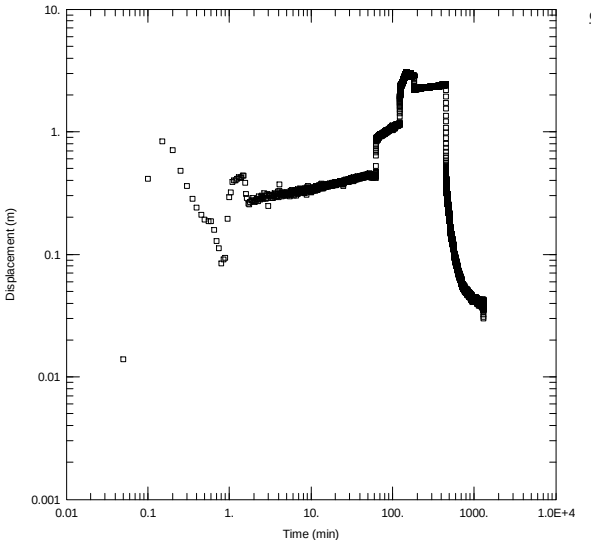


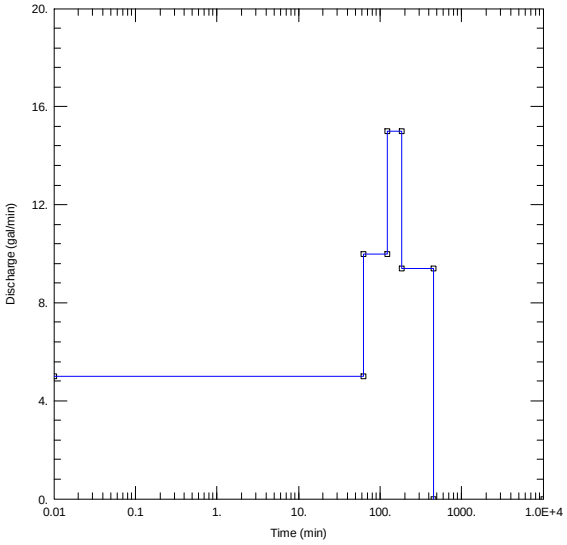


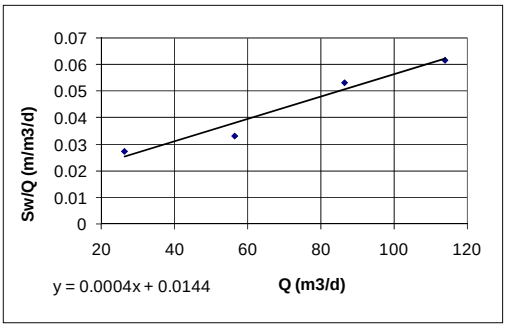


Q (m3/d)	Q (g/min)	Borehole Efficiency (%)
5	1	98
10	2	97
15	3	95
20	4	94
25	5	93

PW1







Q (m3/d)	Q (g/min)	Borehole Efficiency (%)
5	1	88
10	2	78
15	3	71
20	4	64
25	5	59

PW2

SRK Consulting
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VANCOUVER

Deloitte & Touche

S-Well Shallow Aquifer Groundwater Collection

PW1 and PW2 Step Test Results

Job No: 1CD003.112

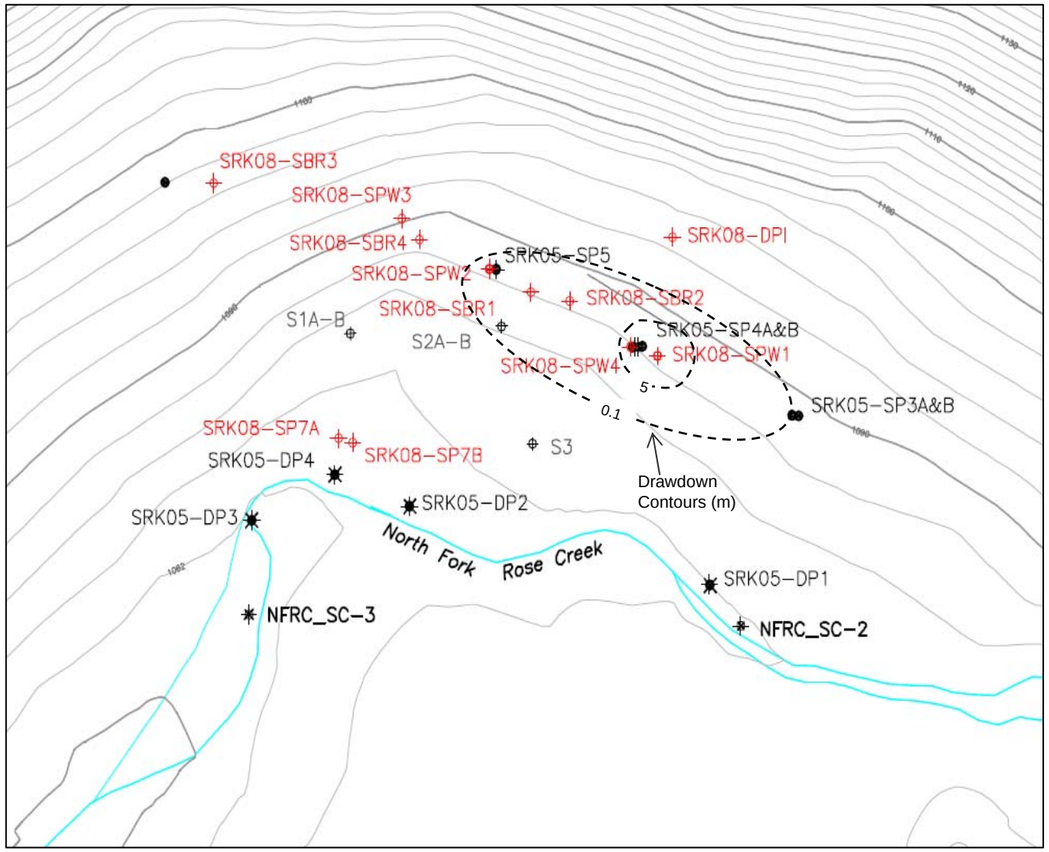
Filename: Fig 6-7-9-15_test results_20090211.ppt

FARO MINE COMPLEX

Date: January 2009

Approved: DM

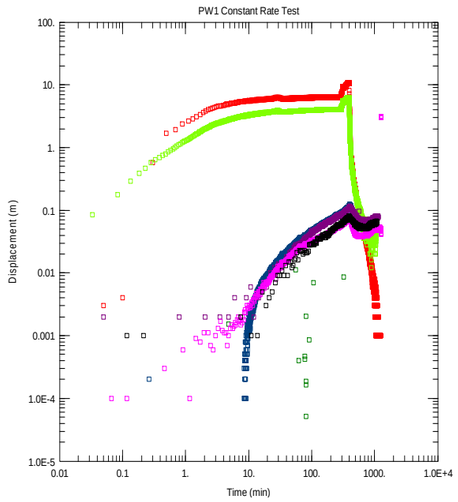
Figure: 7



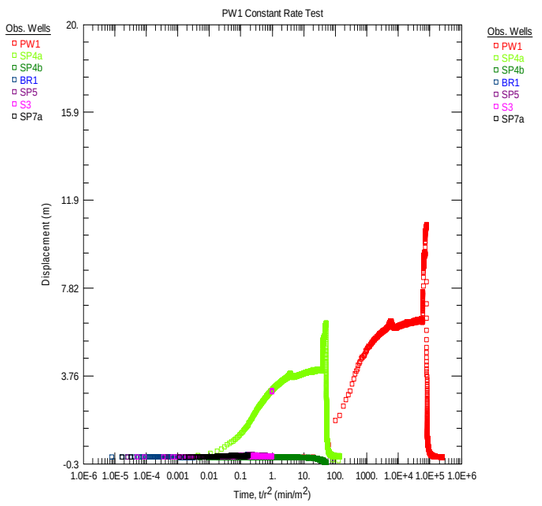
Drawdown @ ~398 minutes

Well	Drawdown (m)	Distance from PW1 (m)
PW1	10.74	n/a
SP4a	6.19	4.4
BR1	0.12	47
SP5	0.11	45
S3	0.07	37
SP7a	0.07	82

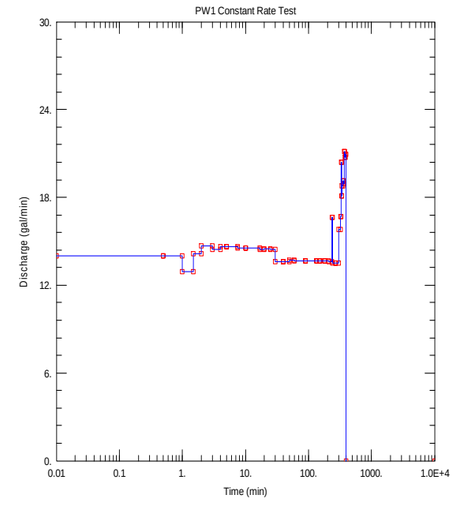
Drawdown



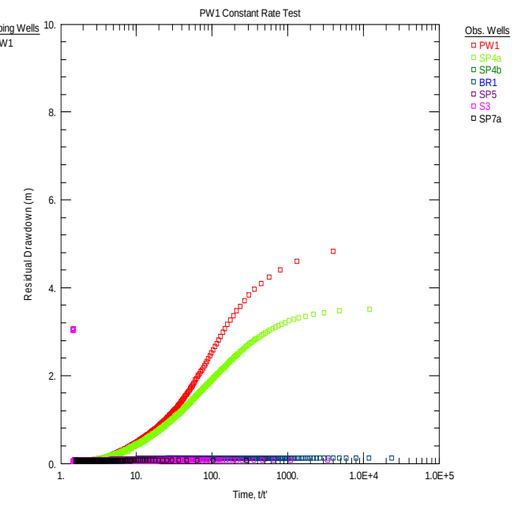
Composite Drawdown



Pumping Rate



Recovery



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Deloitte & Touche

S-Well Shallow Aquifer Groundwater Collection

PW1 Constant Rate Test

Job No: 1CD003.112

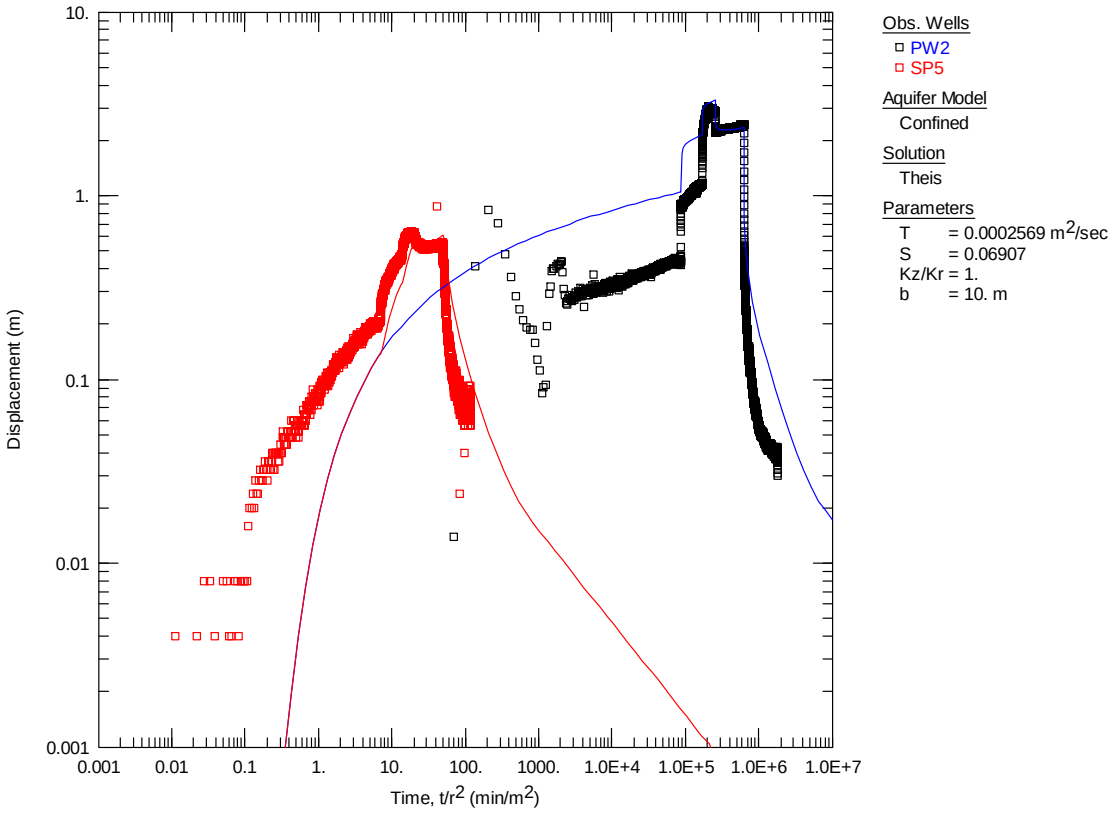
Filename: Fig 8_PW1 drawdown data.ppt

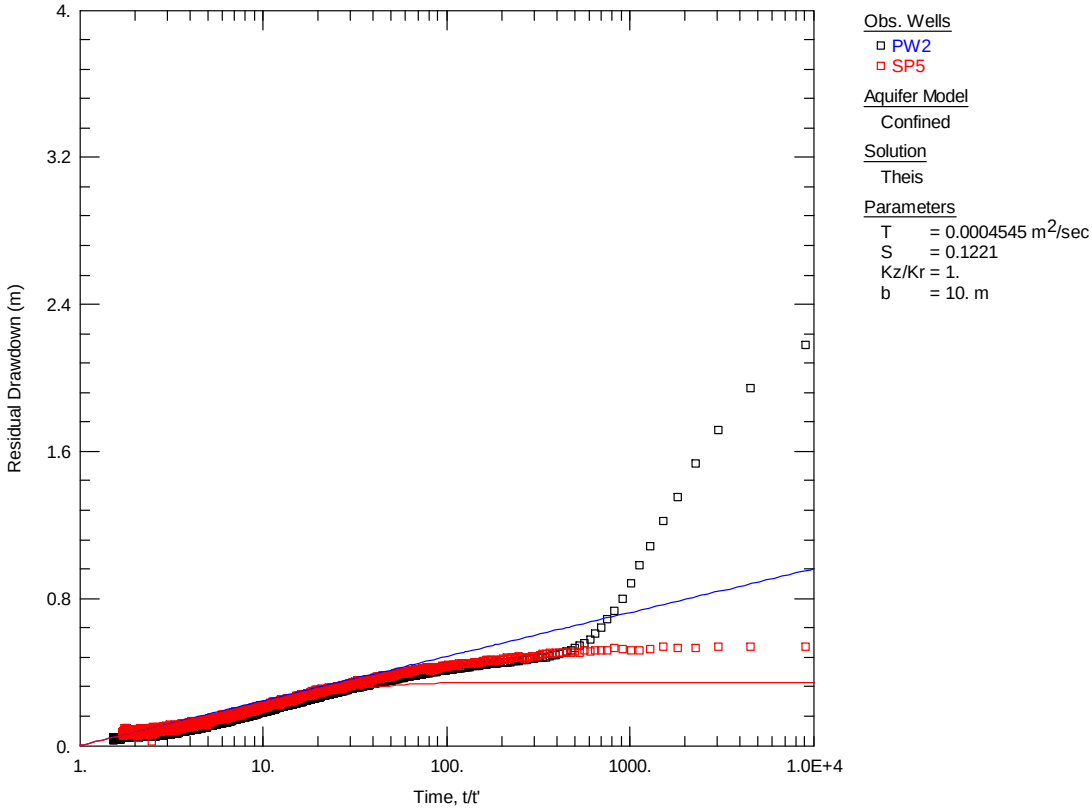
FARO MINE COMPLEX

Date: January 2009

Approved: DM

Figure: **8**





SRK Consulting Engineers and Scientists VANCOUVER	Deloitte & Touche	S-Well Shallow Aquifer Groundwater Collection
		PW2 constant Rate Test Results
Job No: 1CD003.112 Filename: Fig 6-7-9-15_test results_20090211.ppt	FARO MINE COMPLEX	Date: January 2009 / Approved: DM / Figure: **9**

P96-7

Pre-Mining
Creek Alignment

Pond
1090.01

North Fork
Rock Drain

Haul Road to Vangorda Plateau

North Fork of Rose Creek

SRK05-SP6
SRK08-SBR3
SRK05-SP5
SRK08-SPW3
SRK08-SBR2
SRK08-DPI
SRK08-SBR4
SRK08-SPW2
SRK08-SBR1
S1A-B
S2A-B
5,000
500
SRK05-SP4A&B
SRK08-SPW1
SRK05-SP3A&B
SRK08-SP7A
SRK08-SP7B
S3
SRK08-SPW4
SRK05-SP1A&B
SRK05-DP3
SRK05-DP2
SRK05-DP4
SRK05-DP1
NFRC_SC-3
NFRC_SC-2
SRK04-2
SRK05-SP2
NFRC_SC-1
SCS_2
SCS_3
SRK08-SP8A
SRK08-SP8B
SCS_1
NFRC_SC-4

ID	SO4 (mg/L)
S1B	500
S2B	5900
S3	5900
SRK05-SP-4B	5600
SRK08-SP7B	5300

LEGEND

- 2005 Groundwater Monitoring Well
- Other Groundwater Monitoring Well
- Shallow Drivepoint
- NFRC Monitoring Station (NFRC_SC-4 = FLOW/SAMPLING) (SCS_1 = SURFACE SEEP)
- S-Cluster Monitoring Well
- SRK08-SP8A 2008 Well Location

SRK CONSULTING
Faro Mine, Yukon

Contour Interval: 2m
Date of Photography: 03/07/25
Scale of Photography: 1:20,000
Survey control derived from existing 1:20,000 photography
Survey control based on: UTM Projection, NAD27, Zone 8
Compiled by The ORTHOSHOP, Calgary, September 2003
WO 8856

1:2500

0 50 100 150 Metres

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Engineers and Scientists
Vancouver B.C.

SRK JOB NO.: 1CD003.112
FILE NAME: S-Cluster Conc Maps.dwg

Deloitte & Touche

FARO MINE COMPLEX

S-Wells Shallow Aquifer Groundwater Collection

Shallow Sulphate

DATE:	APPROVED:	FIGURE:
Jan. 2009	DM	10

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P96-7

Pre-Mining
Creek Alignment

Pond
1090.01

SRK05-SP6
SRK08-SBR3
SRK05-SP5
SRK08-SBR2
SRK08-DPI
SRK08-SBR4
SRK08-SPW2
SRK08-SBR1
S2A-B
S1A-B
SRK05-SP4A&B
SRK08-SPW1
SRK08-SP7A
SRK08-SP7B
S3
SRK05-SP3A&B
SRK08-SPW4
SRK05-SP1A&B
SRK05-DP4
NFRC_SC-3
NFRC_SC-2
SRK05-SP2
NFRC_SC-1
SRK04-2
SRK08-SP8A
SRK08-SP8B
NFRC_SC-4

North Fork Rock Drain

North Fork of Rose Creek

Haul Road to Vangorda Plateau

ID	Zn (mg/L)
S1B	0.0528
S2B	375
S3	422
SRK05-SP-4B	368
SRK08-SP7B	125
SRK08-SP7B	123

LEGEND

- 2005 Groundwater Monitoring Well
- Other Groundwater Monitoring Well
- Shallow Drivepoint
- NFRC Monitoring Station (NFRC_SC-4 = FLOW/SAMPLING) (SCS_1 = SURFACE SEEP)
- S-Cluster Monitoring Well
- SRK08-SP8A 2008 Well Location

SRK CONSULTING
Faro Mine, Yukon

Contour Interval: 2m
Date of Photography: 03/07/25
Scale of Photography: 1:20,000
Survey control derived from existing 1:20,000 photography
Survey control based on: UTM Projection, NAD27, Zone 8
Compiled by The ORTHOSHOP, Calgary, September 2003
WO 8856

1:2500

0 50 100 150 Metres

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Engineers and Scientists
Vancouver B.C.

SRK JOB NO.: 1CD003.112
FILE NAME: S-Cluster Conc Maps.dwg

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FARO MINE COMPLEX

S-Wells Shallow Aquifer Groundwater Collection

Shallow Zinc

DATE:	APPROVED:	FIGURE:
Jan. 2009	DM	11

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P96-7

Pre-Mining
Creek Alignment

Pond
1090.01

North Fork
Rock Drain

Haul Road to Vangorda Plateau

North Fork of Rose Creek

SRK04-2

SRK05-SP6
SRK08-SBR3
SRK08-SBR4
SRK08-SPW2
SRK08-SBR1
S1A-B
SRK05-SP5
SRK08-SBR2
SRK08-DPI
S2A-B
SRK05-SP4A&B
SRK08-SPW1
SRK05-SP3A&B
SRK08-SP7A
SRK08-SP7B
S3
SRK08-SPW4
SRK05-SP1A&B
SRK05-DP4
NFRC_SC-3
NFRC_SC-2
SRK05-SP2
NFRC_SC-1
SRK08-SP8A
SRK08-SP8B
NFRC_SC-4

ID	SO4 (mg/L)
S1A	6100
S2A	5000
S2A	5700
SRK05-SP-4A	190
SRK05-SP-5	6100
SRK05-SP-6	1200
SRK08-SBR1	3300
SRK08-SBR2	2400
SRK08-SBR3	1800
SRK08-SBR4	6500
SRK08-SP7A	2300
SRK08-SPW1	210
SRK08-SPW2	5900

LEGEND

- 2005 Groundwater Monitoring Well
- Other Groundwater Monitoring Well
- Shallow Drivepoint
- NFRC Monitoring Station (NFRC_SC-4 = FLOW/SAMPLING) (SCS_1 = SURFACE SEEP)
- S-Cluster Monitoring Well
- SRK08-SP8A 2008 Well Location

SRK CONSULTING
Faro Mine, Yukon

Contour Interval: 2m
Date of Photography: 03/07/25
Scale of Photography: 1:20,000
Survey control derived from existing 1:20,000 photography
Survey control based on: UTM Projection, NAD27, Zone 8
Compiled by The ORTHOSHOP, Calgary, September 2003
WO 8856

1:2500

0 50 100 150 Metres

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Vancouver B.C.

SRK JOB NO.: 1CD003.112
FILE NAME: S-Cluster Conc Maps.dwg

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FARO MINE COMPLEX

S-Wells Shallow Aquifer Groundwater Collection

Deep Sulphate

DATE:	APPROVED:	FIGURE:
Jan. 2009	DM	12

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P96-7

Pre-Mining
Creek Alignment

Pond
1090.01

SRK05-SP6
SRK08-SBR3
SRK08-SBR4
SRK08-SPW2
SRK08-SBR1
SRK05-SP5
SRK08-SBR2
SRK08-DPI
S1A-B
S2A-B
SRK05-SP4A&B
SRK08-SPW1
SRK05-SP3A&B
SRK08-SP7A
SRK08-SP7B
S3
SRK08-SPW4
SRK05-SP1A&B
SRK05-DP4
SRK04-2
NFRC_SC-3
NFRC_SC-2
SRK05-SP2
NFRC_SC-1
SRK08-SP8A
SRK08-SP8B
NFRC_SC-4
North Fork of Rose Creek
North Fork
Rock Drain
Haul Road to Vangorda Plateau

ID	Zn (mg/L)
S1A	288
S2A	325
S2A	329
SRK05-SP-4A	1.03
SRK05-SP-5	367
SRK05-SP-6	0.0083
SRK08-SBR1	1.13
SRK08-SBR2	36.3
SRK08-SBR3	0.0426
SRK08-SBR4	367
SRK08-SP7A	2.56
SRK08-SPW1	1.14
SRK08-SPW2	336

LEGEND

- 2005 Groundwater Monitoring Well
- Other Groundwater Monitoring Well
- Shallow Drivepoint
- NFRC Monitoring Station (NFRC_SC-4 = FLOW/SAMPLING) (SCS_1 = SURFACE SEEP)
- S-Cluster Monitoring Well
- SRK08-SP8A 2008 Well Location

SRK CONSULTING
Faro Mine, Yukon

Contour Interval: 2m
Date of Photography: 03/07/25
Scale of Photography: 1:20,000
Survey control derived from existing 1:20,000 photography
Survey control based on: UTM Projection, NAD27, Zone 8
Compiled by The ORTHOSHOP, Calgary, September 2003
WO 8856

1:2500

0 50 100 150 Metres

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Vancouver B.C.

SRK JOB NO.: 1CD003.112
FILE NAME: S-Cluster Conc Maps.dwg

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FARO MINE COMPLEX

S-Wells Shallow Aquifer Groundwater Collection

Deep Zinc

DATE:	APPROVED:	FIGURE:
Jan. 2009	DM	13

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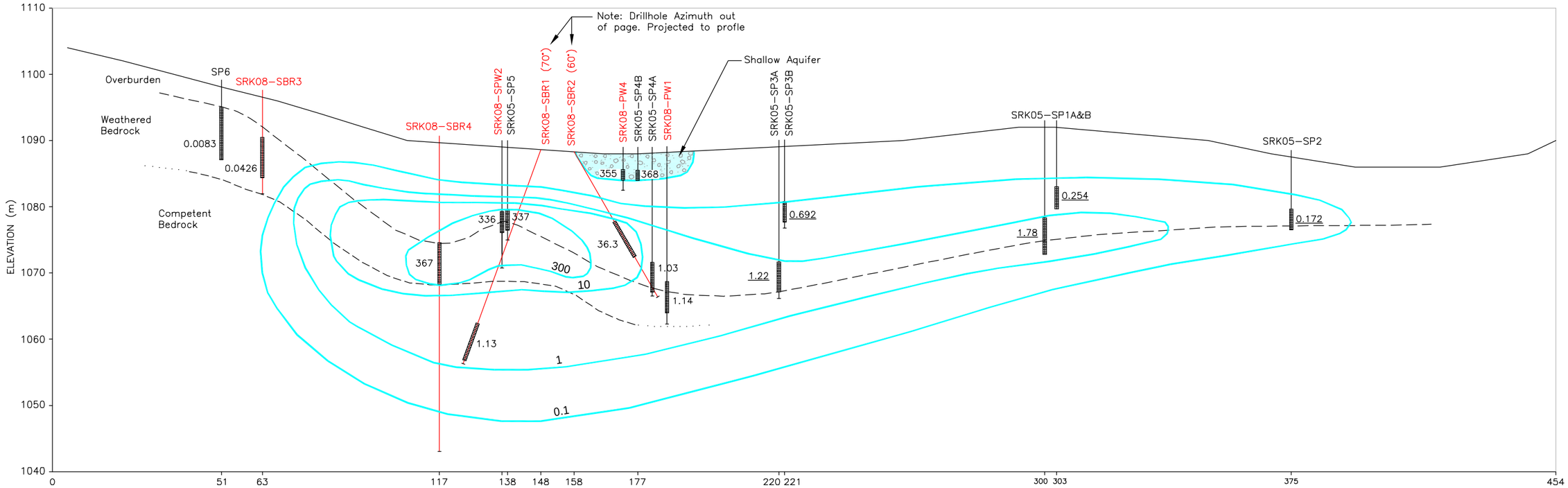

SECTION 4
(2X Vertical exaggeration)

Legend:

- Silty Sand
- Sand and Gravel
- Sandy Silt or Clay
- 367 — Zinc Concentration (mg/L) from Nov. 2008
- 1.78 — Zinc Concentration (mg/L) from May 2008
- 1 — Zinc Concentration Contour (mg/Zn)
- SRK08-DP1 — 2008 Drillhole
- S3 — Previous Drillhole

1:1250 0 25 50 75 100 Meters

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Vancouver B.C.

SRK JOB NO.: 1CD003.112
FILE NAME: 2008 FARO SITE PLAN DM2.dwg

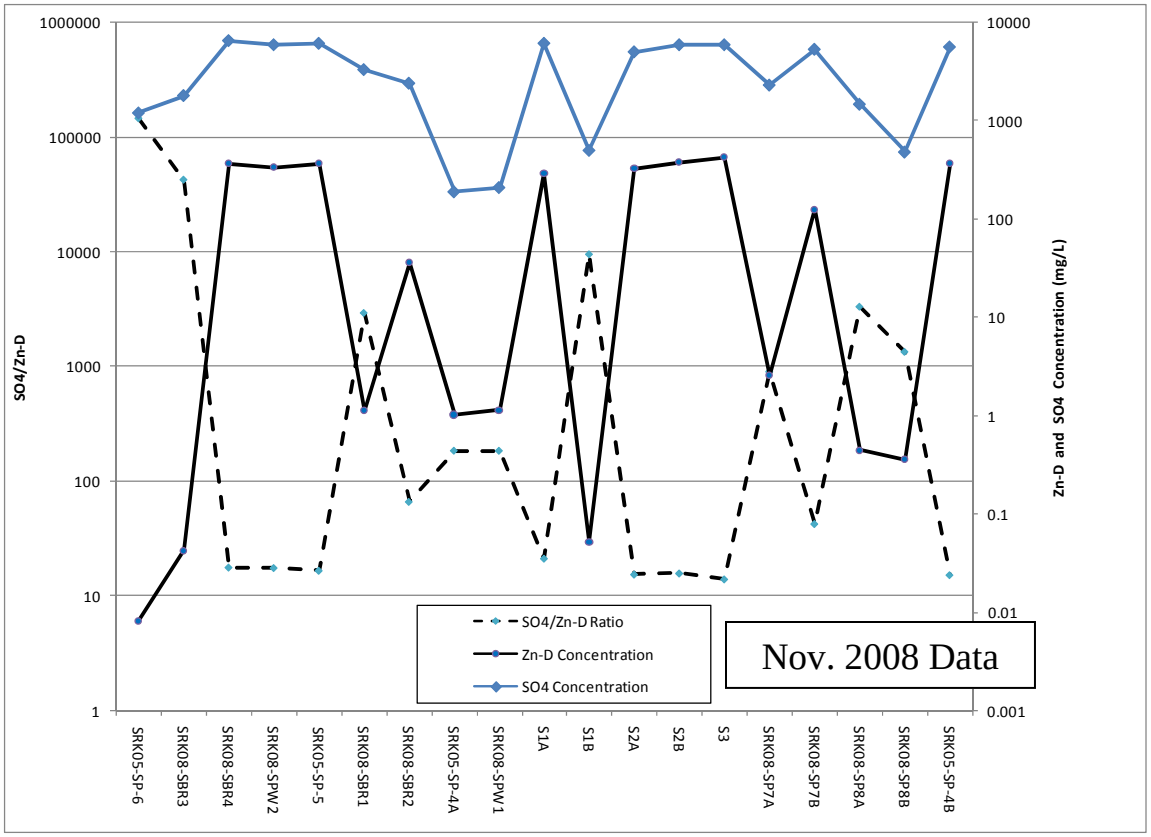
Deloitte & Touche

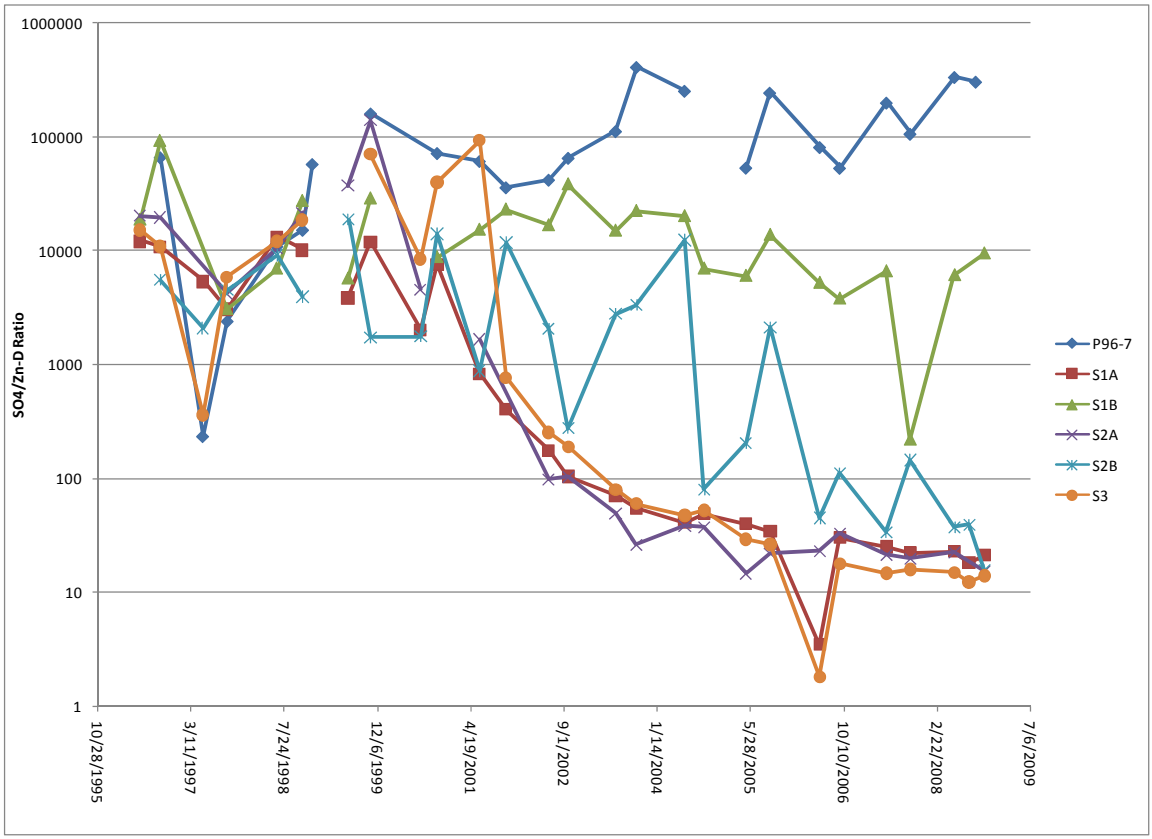
FARO MINE COMPLEX

2008 S-Cluster Groundwater Investigation

Cross Section With Zinc Concentration Distribution

DATE:	APPROVED:	FIGURE:
Jan. 2009	DM	14





SRK Consulting Engineers and Scientists VANCOUVER	Deloitte & Touche	S-Well Shallow Aquifer Groundwater Collection
		S-Cluster Sulphate/Zinc Ratio Comparison
Job No: 1CD003.112 Filename: Fig 6-7-9-15_test results_20090211. ppt	FARO MINE COMPLEX	Date: January 2009 / Approved: DM / Figure: **15**

N

584600 E

584650 E

1110

1100

1098

1096

1094

1092

1090

1088

Outline for approx. cut slope

TP08-6

TP-04-02

Temporary Sump Location, Option 2

E

1 17

2 17

SRK08-DPI

TP08-7

Upper Road

3 17

Temporary Sump Location, Option 1

D

TP08-5

SPW2

SRK05-SP5

A

TP08-8

B

Permanent sump

SRK08-SBR1

6912950 N

TP-04-01

TP08-9

SRK08-SBR2

Approx. outline of base of proposed SIS trench

S2A-B

TP08-2

TP08-1

C

3 17

1 17

SRK05-SP4A&B

SRK08-SPW4

SPW1

25.0m

2 17

TP08-3

TP08-4

Road

Marsh

SRK05-SP3A&B

0 4 8 12 16 20 Metres

LEGEND

- 2005 Groundwater Monitoring Well
- Other Groundwater Monitoring Well
- Shallow Drivepoint
- NFRC Monitoring Station
- S-Cluster Monitoring Well
- Test Pit (2004)
- Test Pit (2008)

SRK CONSULTING
Faro Mine, Yukon

Contour Interval: 2m
Date of Photography: 03/07/25
Scale of Photography: 1:20,000
Survey control derived from existing 1:20,000 photography
Survey control based on: UTM Projection, NAD27, Zone 8
Compiled by The ORTHOSHOP, Calgary, September 2003
WO 8856

Trench and Sump Coordinates		
Points	Easting	Northing
A	584,601.08	6,912,953.79
B	584,608.42	6,912,949.85
C	584,623.11	6,912,941.97
D	584,611.63	6,912,955.83
E	584,616.65	6,912,965.19

SRK Consulting
Engineers and Scientists
Vancouver B.C.

SRK JOB NO.: 1CD003.112

FILE NAME: S-Aquifer_Location and profiles.dwg

Deloitte & Touche

FARO MINE COMPLEX

2008 S-Cluster Groundwater Investigation

Location Map for Conceptual Shallow Aquifer Interceptor Sump

DATE:	APPROVED:	FIGURE:
Jan. 2009	DM	16

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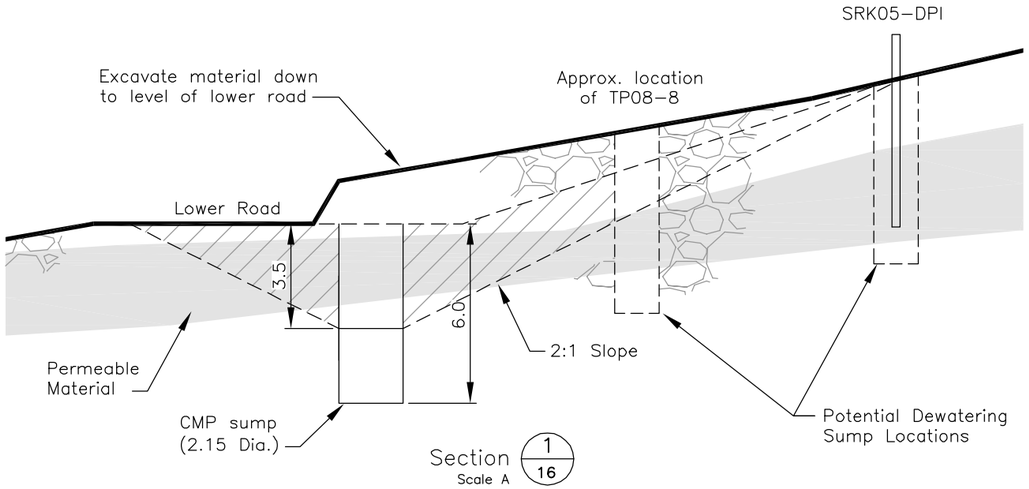
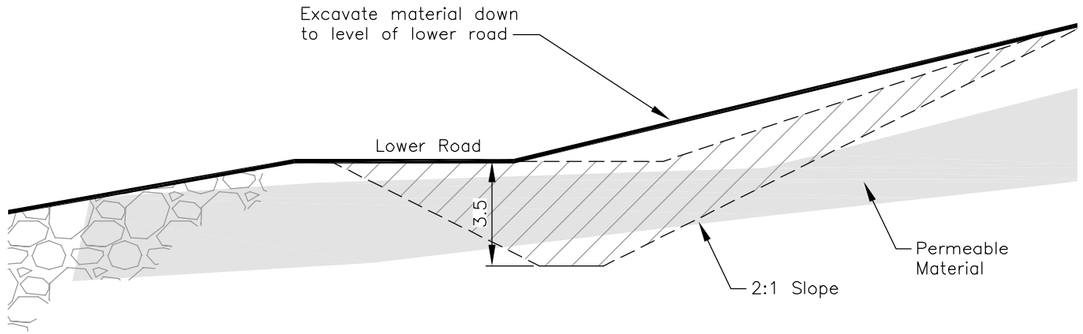
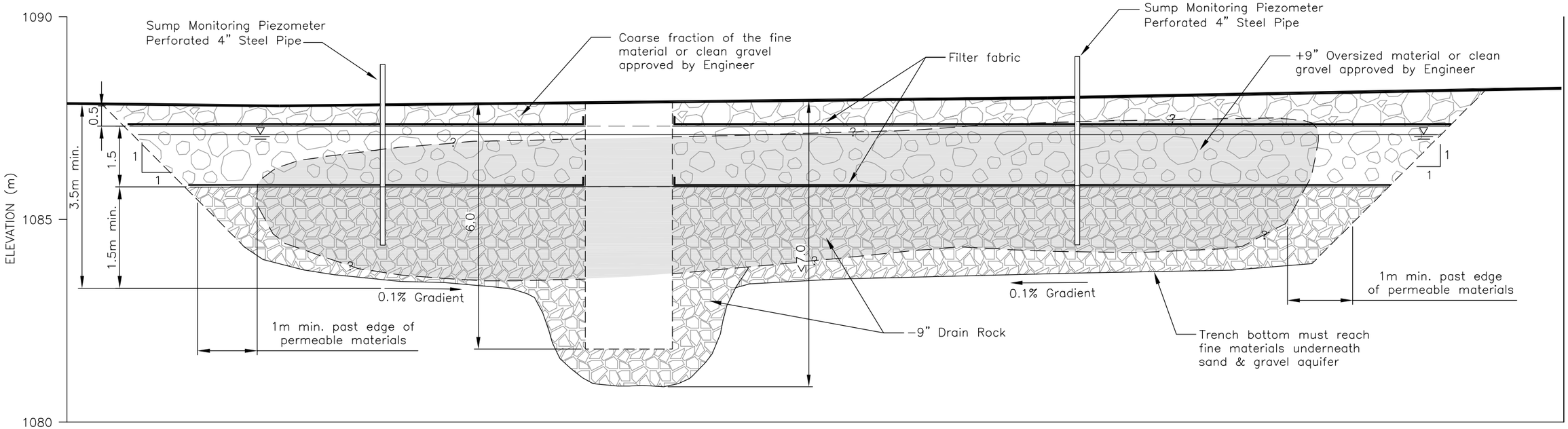


Section 1/16
Scale A



Section 2/16
Scale A



Section 3/16 – Trench and Pipes detail

(Front View looking up slope)

Scale B

Scale A 0 2 4 6 8 10 Metres

Scale B 0 1 2 3 4 5 Metres

SRK Consulting
Engineers and Scientists
Vancouver B.C.

SRK JOB NO.: 1CD003.112

FILE NAME: S–Aquifer_Location and profiles.dwg

Deloitte & Touche

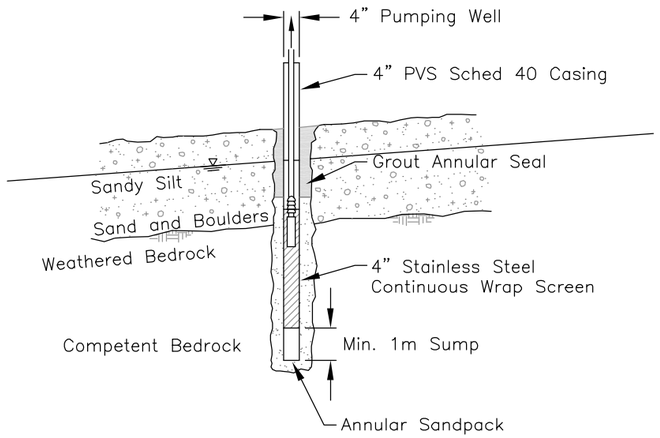
FARO MINE COMPLEX

S-Wells Shallow Aquifer Groundwater Collection

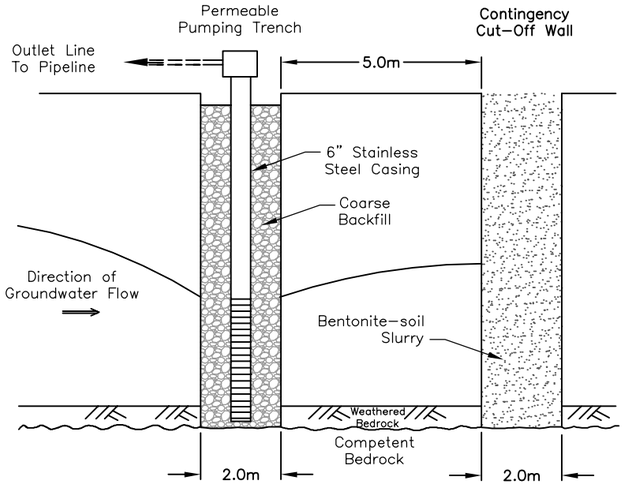
Conceptual Cross Sections Through Shallow Aquifer Interceptor Sump

DATE:	APPROVED:	FIGURE:
Jan. 2009	DM	17

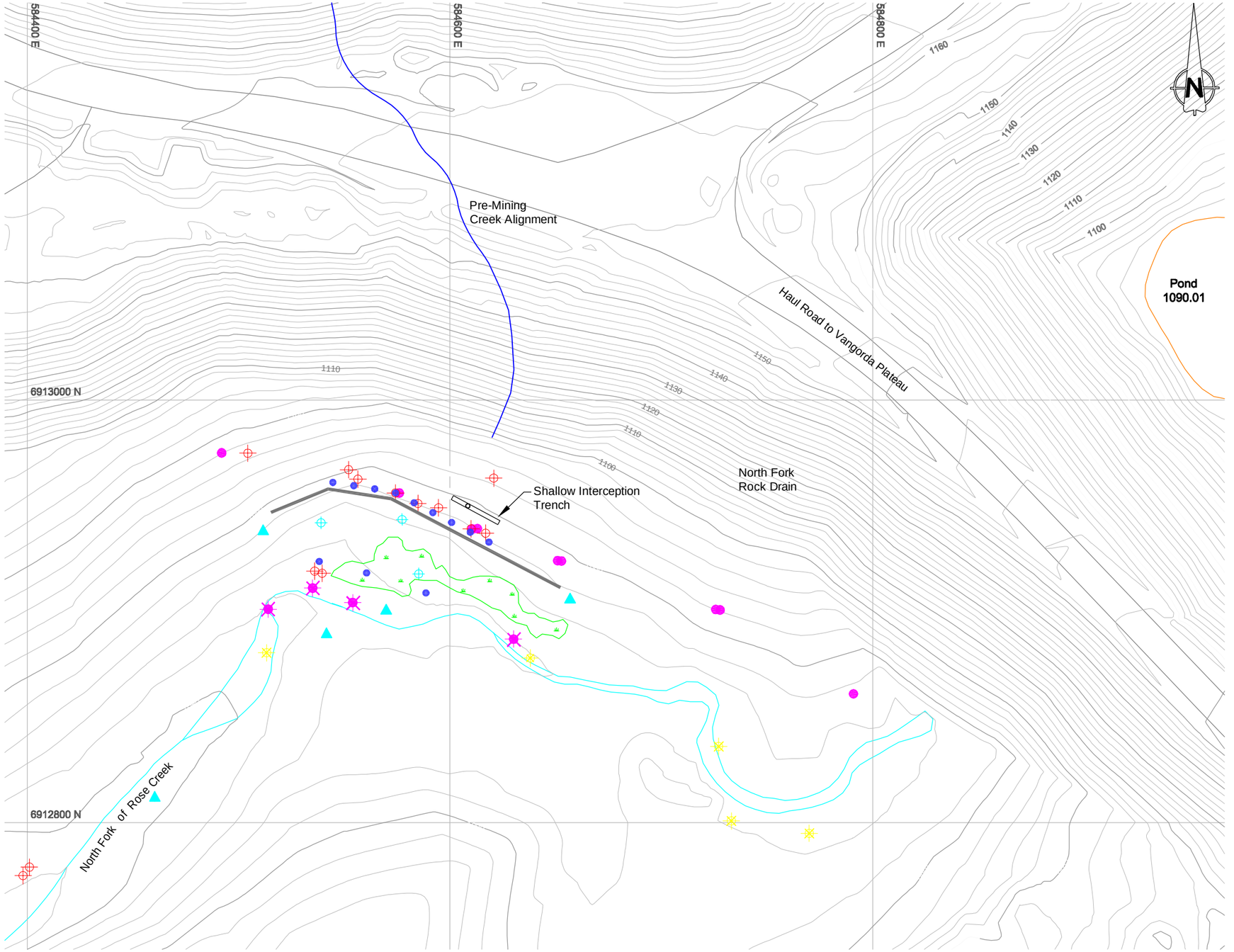
J:\01_SITES\FARO\1000_Deloitte_from GE_Projects\Acad-Faro\2008 Acad Dwgs\S-Aquifer_Location and profiles.dwg



Permeable Collector Trench with Cut–off Wall
(NTS)



Pumping Well for Bedrock
(NTS)



LEGEND

- 2005 Groundwater Monitoring Well
- Other Groundwater Monitoring Well
- Shallow Drivepoint
- NFRC Monitoring Station (NFRC_SC–4 = FLOW/SAMPLING) (SCS_1 = SURFACE SEEP)
- S–Cluster Monitoring Well
- SRK06–SPBA 2008 Well Location
- Pumping Well
- Monitoring Well

SRK CONSULTING
Faro Mine, Yukon

Contour Interval: 2m
Date of Photography: 03/07/25
Scale of Photography: 1:20,000
Survey control derived from existing 1:20,000 photography
Survey control based on: UTM Projection, NAD27, Zone 8
Compiled by The ORTHOSHOP, Calgary, September 2003 WO 8856

Notes:

1. All dimensions and elevations are in Metres.

1:2,000 0 50 100 Metres

SRK Consulting Engineers and Scientists
Vancouver B.C.

SRK JOB NO.: 1CD003.112
FILE NAME: Conceptual Layout.dwg

Deloitte & Touche

FARO MINE COMPLEX

2008 S-Cluster Groundwater Investigation

Map Showing Conceptual Layout of Deep Aquifer Interception System

DATE:	APPROVED:	FIGURE:
Jan. 2009	DM	18

J:\01_SITES\FARO\1000_Deloitte_from GE_Projects\Acad–Faro\2008 Acad Dwgs\Conceptual Layout.dwg

Appendix A-1
Drill Logs

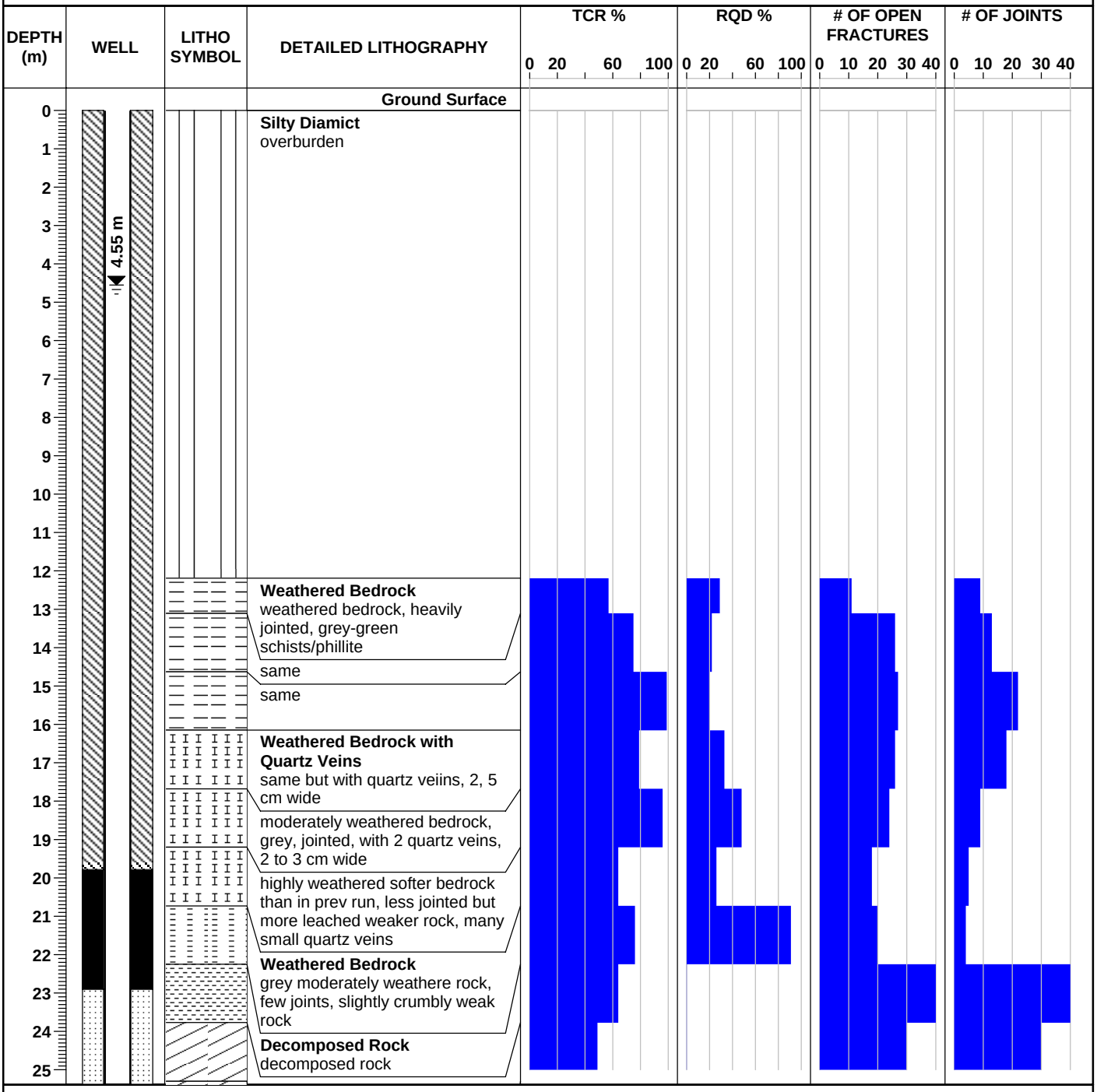
SRK Consulting
Engineers and Scientists

MONITORING WELL LOG

PROJECT No: 1CD003.112
SITE: FARO
CLIENT: Deloitte & Touche

DATE: Sept. 2, 2008
LOGGED BY: J. Scibek
DRILL HOLE: SRK08-SBR1

EASTING: 584477.8
NORTHING: 6913127.8
ELEVATION: 1086.5 masl



NOTES:
70 degree inclination, 270 azimuth
Stickup 0.80 m
Elevation in header is ground elevation

HQ core (96.6 mm drill core)
2" PVC monitoring well
Grout annular seal

	Reviewed By: DM	FILE

SRK Consulting
Engineers and Scientists

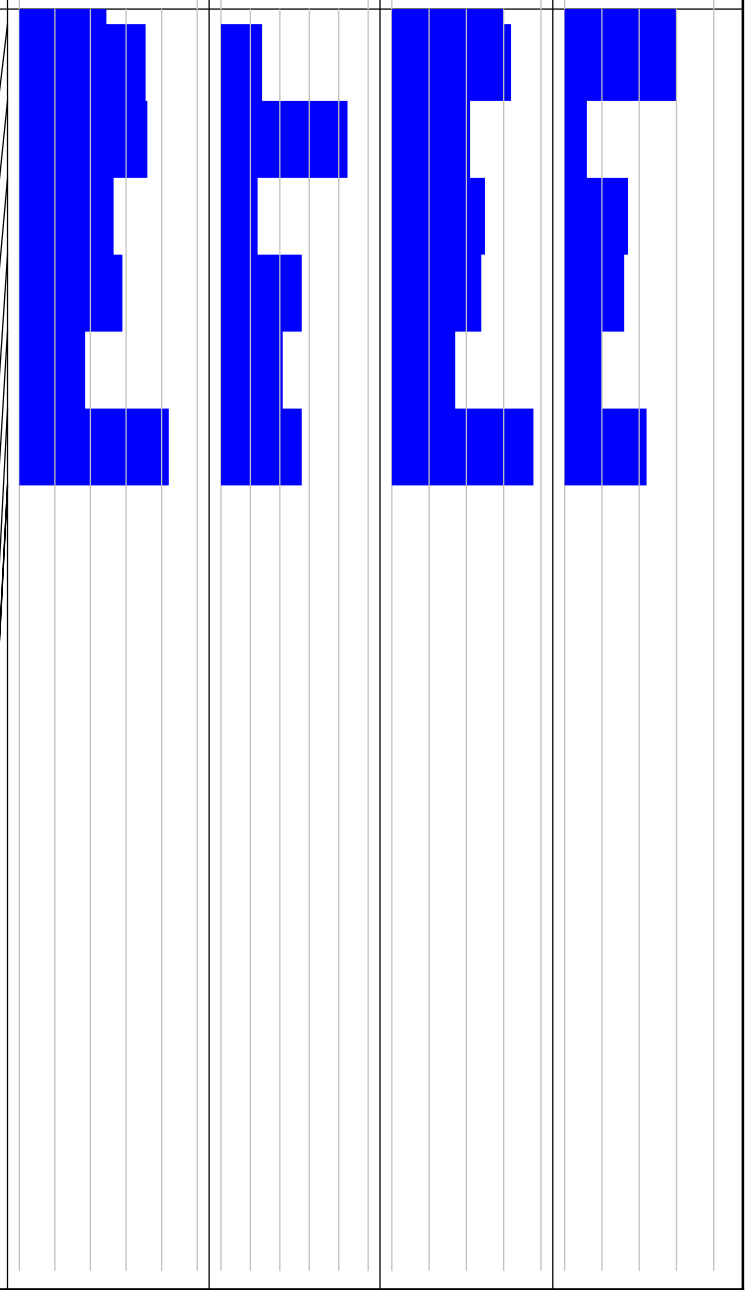
MONITORING WELL LOG

PROJECT No: 1CD003.112
SITE: FARO
CLIENT: Deloitte & Touche

DATE: Sept. 2, 2008
LOGGED BY: J. Scibek
DRILL HOLE: SRK08-SBR1

EASTING: 584477.8
NORTHING: 6913127.8
ELEVATION: 1086.5 masl

DEPTH (m)	WELL	LITHO SYMBOL	DETAILED LITHOGRAPHY
26			**Weathered Rock with Clay** grey highly weathered rock with clay (3 to 5 cm), separating hard rock pieces, therefore, this looks like fault gauge zone, remnants of weathered rock structures in clay in some places
27			
28			
29			same as above, but crumbly highly weathered rock instead of clay, at end of run change to jointed weathered rock
30			
31			**Weathered Rock with Quartz Veins** grey slightly weathered rock with one 25 cm Qz vein
32			
33			grey highly weathered rock with Qz veins, some leached sections (highly weath rock), many breaks along foliation, which is not 70 degrees alpha (change below "fault" zone)
34			
35			highly weathered bedrock, rock peels along foliation (has talc alteration along foliation) - this makes rock weak
36			
37			**Weathered Rock with Quartz Veins and Garnet** less weathering than in prev run, Qz vein 4 cm wide at bottom of run, garnet minerals present
38			
39			highly weathered rock with many small Qz veins, variable alteration of rock
40			
41			
42			
43			
44			
45			
46			
47			
48			
49			
50			



NOTES:

	Reviewed By: DM	FILE

SRK Consulting
Engineers and Scientists

MONITORING WELL LOG

PROJECT No: 1CD003.112
SITE: FARO
CLIENT: Deloitte & Touche

DATE: Sept. 10, 2008
LOGGED BY: J. Scibek
DRILL HOLE: SRK08-SBR2

EASTING: 584487.6
NORTHING: 6913125
ELEVATION: 1087.3 masl

DEPTH (m)	WELL	LITHO SYMBOL	DETAILED LITHOGRAPHY	TCR % (0 20 60 100)	RQD % (0 20 60 100)	# OF OPEN FRACTURES (0 10 20 30 40)	# OF JOINTS (0 10 20 30 40)
0			**Ground Surface**				
0–10	5.09 m		**Silt** silty diamict				
10–13			**Weathered Bedrock** weathered bedrock (boulder?), crumbly red-grey weath rock				
13–25			**Gravel and Boulders** rounded gravel and boulders (probably silt matrix)				
25–26							

NOTES:

Hole terminated in overburden due to casing breaks

60 degree inclination, 135 azimuth
Stickup 0.50 m
Elevation in header is ground elevation

HQ core (96.6 mm drill core)
2" PVC monitoring well
Grout annular seal

	Reviewed By: DM	FILE

SRK Consulting
Engineers and Scientists

MONITORING WELL LOG

PROJECT No: 1CD003.112
SITE: FARO
CLIENT: Deloitte & Touche

DATE: Sept. 12, 2008
LOGGED BY: J. Scibek
DRILL HOLE: SRK08-SBR3

EASTING: 584397.35
NORTHING: 6913150.8
ELEVATION: 1096.3 masl

DEPTH (m)	WELL	LITHO SYMBOL	DETAILED LITHOGRAPHY	TCR % (0 20 60 100)	RQD % (0 20 60 100)	# OF OPEN FRACTURES (0 10 20 30 40)	# OF JOINTS (0 10 20 30 40)
0			**Ground Surface**				
0			**Sand with Gravel** diamict: fine-coarse sub round-ang. sand with fine gravel (ang.-sub round), variable litho of gravel, silt 30 to 40% of matrix, slightly clayey, grey				
3			same as above but more gravel				
4			change of colour to brown				
5			**Weathered Bedrock** weathered bedrock, broken				
7			weathered bedrock, broken				
8	9.9 m						
26							

NOTES: No core recorded despite numerous attempts

90 degree inclination
Stickup 0.60 m
Elevation in header is ground elevation

HQ core (96.6 mm drill core)
2" PVC monitoring well
Grout annular seal

	Reviewed By: DM	FILE

SRK Consulting
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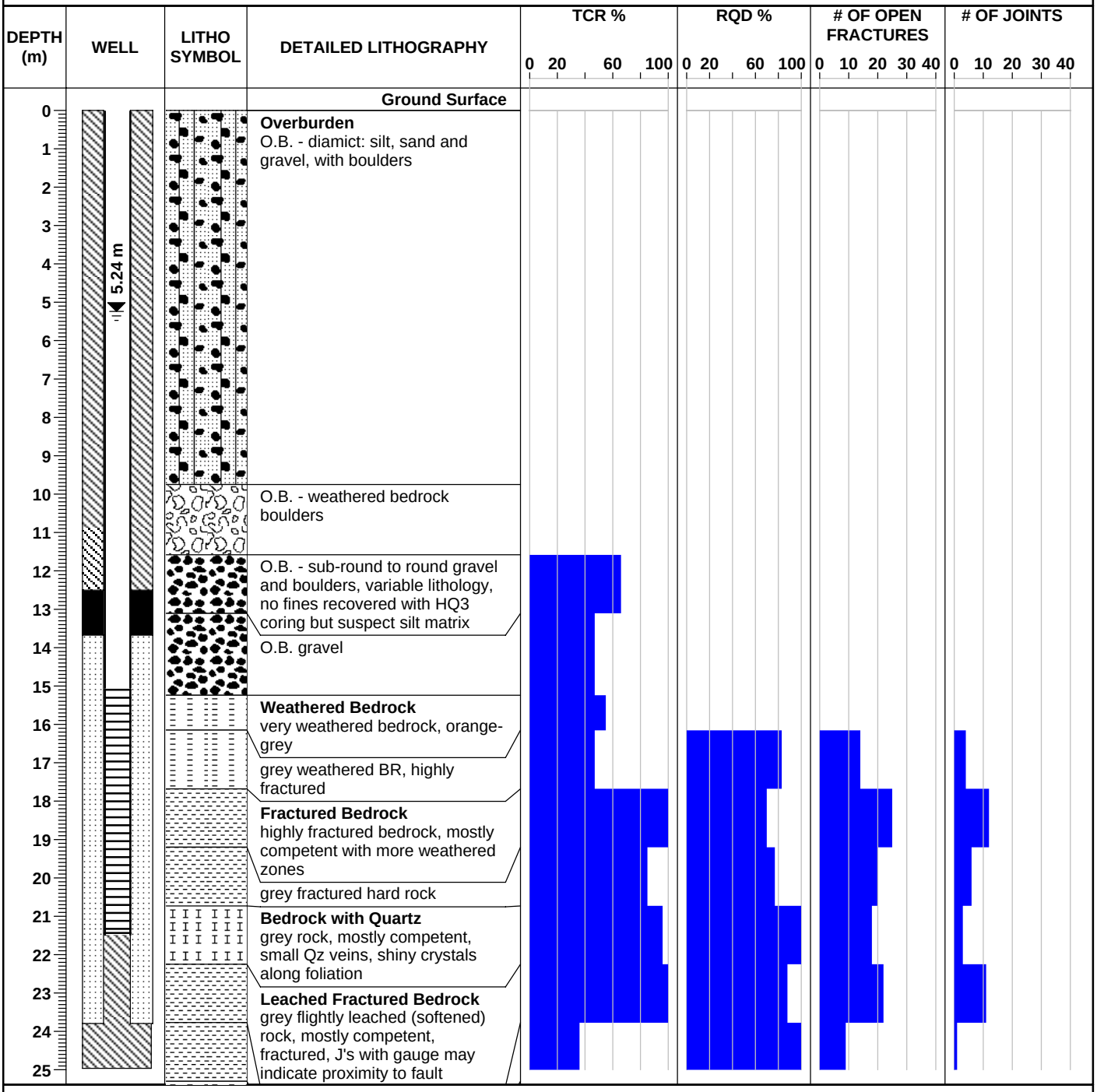
MONITORING WELL LOG

PROJECT No: 1CD003.112
SITE: FARO
CLIENT: Deloitte & Touche

DATE: Sept. 14, 2008
LOGGED BY: J. Scibek
DRILL HOLE: SRK08-SBR4

EASTING: 584449.45
NORTHING: 6913138.5
ELEVATION: 1087.3 masl



NOTES:
90 degree inclination
Stickup 0.70 m
Elevation in header is ground elevation

HQ core (96.6 mm drill core)
2" PVC monitoring well
Grout annular seal

	Reviewed By: DM	FILE

SRK Consulting
Engineers and Scientists

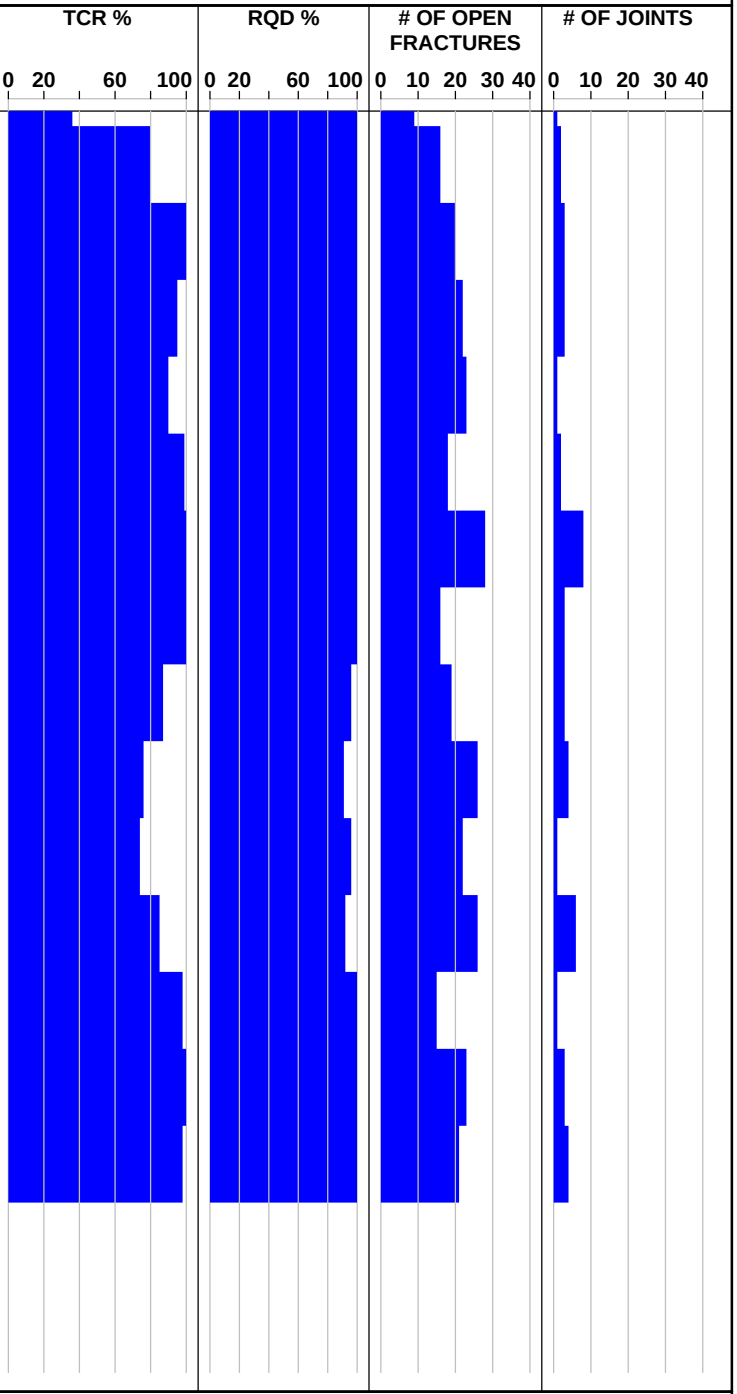
MONITORING WELL LOG

PROJECT No: 1CD003.112
SITE: FARO
CLIENT: Deloitte & Touche

DATE: Sept. 14, 2008
LOGGED BY: J. Scibek
DRILL HOLE: SRK08-SBR4

EASTING: 584449.45
NORTHING: 6913138.5
ELEVATION: 1087.3 masl

DEPTH (m)	WELL	LITHO SYMBOL	DETAILED LITHOGRAPHY
26			same rock as above
27			**Weathered Bedrock** grey slightly weathered rock, less jointing than above, competent between joints
28			same rock as above
29			**Leached Rock with Quartz Veins** grey rock, slightly leached to competent, small Qz veins, not much jointing
30			
31			grey rock with many Qz veins (3 - 10 cm wide)
32			grey slightly leached rock, Qz vein near 103 ft
33			grey slightly leache rock, Qz vein (10 cm), weaker and more jointed and more leached rock than above
34			
35			same as above but change in alteration along foliation to talc filling (between foliation/bedding - very prominent)
36			
37			same as above run
38			same as above run + small Qz veins along foliation
39			more leached rock than above, change in colour to purple-grey (harder rock) between more leached grey rock + Qz veins
40			
41			same as above
42			harder rock, few Qz veins, mostly purple-grey competent rock (no more leached rock below 143 FT)
43			
44			same as above, mostly competent rock but much mechanical damage by drilling (breaks in core parallel to core axis)
45			
46			**Fractured Bedrock** grey-purple rock, competent but fractured
47			
48			
49			
50			



NOTES:

	Reviewed By: DM	FILE

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PUMPING WELL LOG

PROJECT No: 1CD003.112 | **DATE: Sept. 5, 2008** | **EASTING: 584510**

SITE: FARO | **LOGGED BY: J. Scibek** | **NORTHING: 6913113**

CLIENT: Deloitte & Touche | **DRILL HOLE: SRK08-SPW1** | **ELEVATION: 1086.5 masl**

DEPTH (m)	WELL	LITHO SYMBOL	DETAILED LITHOGRAPHY	HYDROSTRATIGRAPHY	K (m/s)	COMMENTS
0			**Ground Surface**			
0			**Silty Sand and Gravel** Silty sand and gravel	**SHALLOW AQUIFER**		**0.95 m stickup**
1						
2	3.21 m				**N/A**	
3			**Diamict** silty diamict	**AQUITARD**		
4						
5						
6						
7						
8						**4" schedule 40 PVC casing**
9			**Sand and Gravel** grey, coarse sand and fine gravel, with silty fine sand (sub-round to sub-ang gravel, grey green)			
10						**Grout annular seal**
11			**Silty Sand and Gravel** diamict: grey-green, silt to silty fine sand, coarse sand, fine gravel (sub round-sub ang) with cobbles			
12			silty fine sand to med sand, with fine sub-round to sub ang gravel, with cobbles		**N/A**	
13			diamict: silt, grey coarse sand and fine-crs gravel (v angular to sub-angular)			
14			diamict: grey silty fine sand, coarse sand, with sub-round-angular fine gravel			
15			**Silt with Gravel** silt with gravel/cobbles			
16			**Silty Sand** slightly silty fine to coarse sand with fine gravel			
17						**1 m bentonite chips on sandpack**
18						

NOTES: NAD 83 (hand-held Garman GPS)

Reviewed By: DM | FILE

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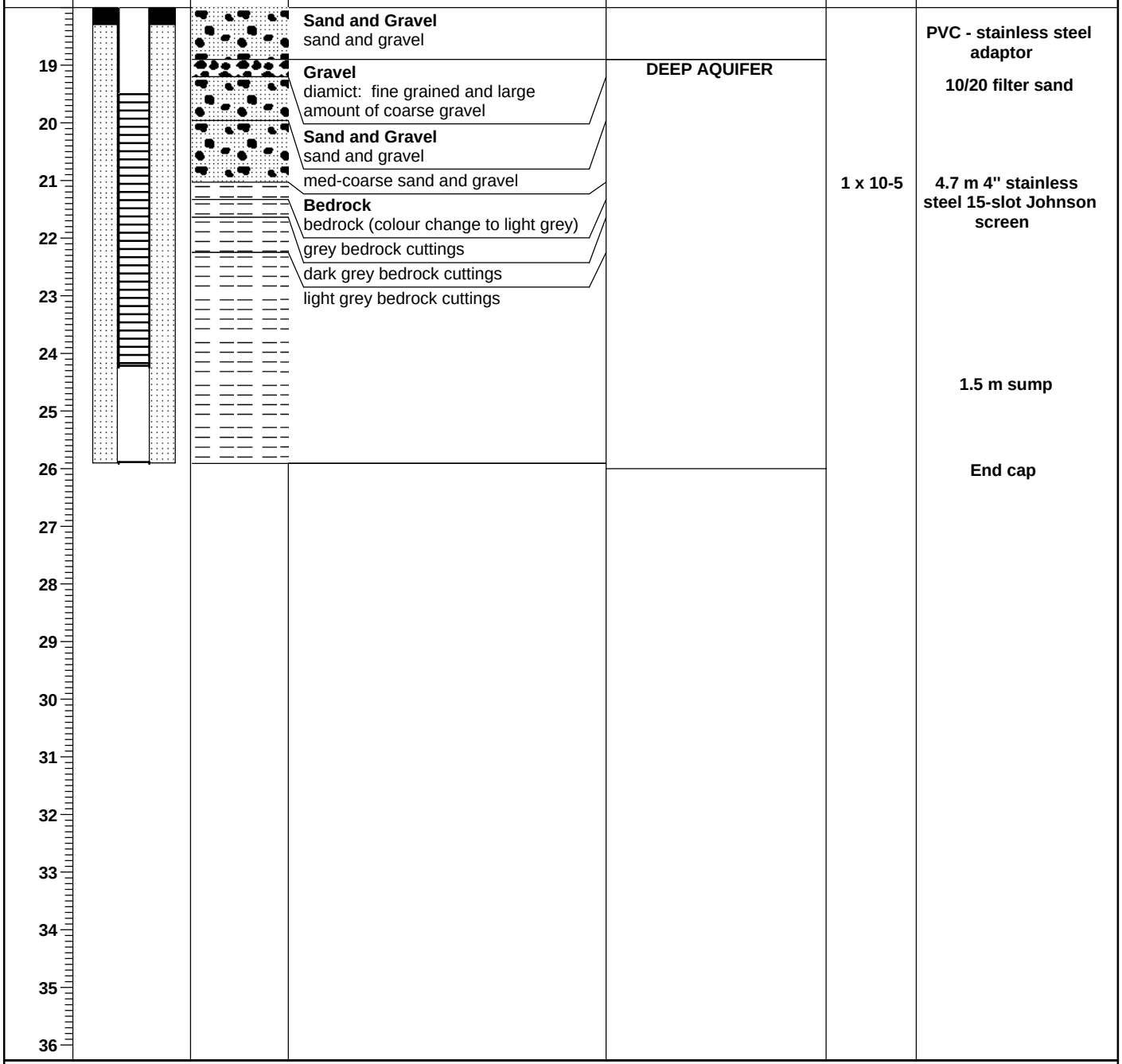
Engineers and Scientists

PUMPING WELL LOG

PROJECT No: 1CD003.112 | **DATE: Sept. 5, 2008** | **EASTING: 584510**

SITE: FARO | **LOGGED BY: J. Scibek** | **NORTHING: 6913113**

CLIENT: Deloitte & Touche | **DRILL HOLE: SRK08-SPW1** | **ELEVATION: 1086.5 masl**



NOTES: NAD 83 (hand-held Garman GPS)

	Reviewed By: DM	FILE

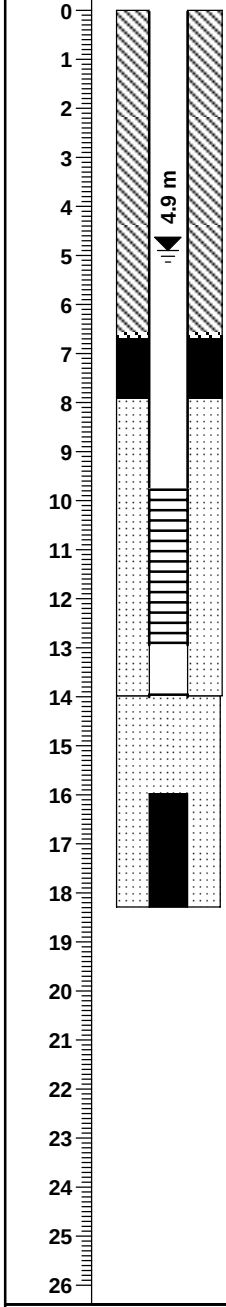
SRK Consulting
Engineers and Scientists

PUMPING WELL LOG

PROJECT No: 1CD003.112 | **DATE: Sept. 15, 2008** | **EASTING: 584467.2**

SITE: FARO | **LOGGED BY: J. Scibek** | **NORTHING: 6913132**

CLIENT: Deloitte & Touche | **DRILL HOLE: SRK08-SPW2** | **ELEVATION: 1086.53 masl**



DEPTH (m)	LITHO SYMBOL	DETAILED LITHOGRAPHY	HYDROSTRATIGRAPHY	K (m/s)	COMMENTS
0		**Ground Surface**			**1.0 m PVC stickup**
1		**Soil Fill** soil fill / silty-clayey diamict	**AQUITARD**		
2		**Sand and Gravel** diamict: grey-olive green silty (20% silt) fine-med sand, coarse sand and gravel (sub-round to angular), with cobbles; variable gravel litho			**4" schedule 40 PVC casing**
3					
4					**Grout to ground surface**
5					
6		diamict: same composition as above but change colour to grey (10 to 15% silt content)			
7			**DEEP AQUIFER**		**1.2 m bentonite chips on sandpack**
8		**Boulder** boulder/gravel (part of diamict)			
9		diamict: grey (same as above units)			**PVC - stainless steel adaptor**
10					
11		**Weathered Bedrock** weathered bedrock (orange-grey bedrock cuttings)			**3.2 m 4" stainless steel 15-slot Johnson screen**
12					
13		weathered bedrock (orange-grey bedrock cuttings)		**5 x 10-5**	**10/20 filter sand**
14		weathered bedrock/possibly some gravel near top of bedrock (orange-grey bedrock cuttings of BR and some fine rounded gravel))			**0.9 m sump** **End cap**
15					
16					**EOH 18.3 m, downhole hammer lost in drill hole, backfilled with sand ~ 13.7 to 18.3 m**
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

NOTES: NAD 83 (hand-held Garman GPS)

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PUMPING WELL LOG

PROJECT No: 1CD003.112 | **DATE: Sept. 5, 2008** | **EASTING: 584503**

SITE: FARO | **LOGGED BY: J. Scibek** | **NORTHING: 6913115**

CLIENT: Deloitte & Touche | **DRILL HOLE: SRK08-SPW4** | **ELEVATION: 1086.4 masl**

DEPTH (m)	WELL	LITHO SYMBOL	DETAILED LITHOGRAPHY	HYDROSTRATIGRAPHY	K (m/s)	COMMENTS
0	0.58 m		Ground Surface			
			Silt/Sand silt/fine sand	SHALLOW AQUIFER		0.76 m PVC stickup
1			**Silt and Gravel** diamict: silt and gravel			4" schedule 40 PVC casing Bentonite chips to surface
2			**Sand and Gravel** grey medium-coarse sand and fine gravel, silt < 10%, sub round-angular gravel)			10/20 filter sand
3			**Silty Gravel** grey gravel, silty		6 x 10-6	1.5 m 4" stainless steel 15-slot Johnson screen
4						
5			**Silty Sand** grey silty sand, high silt content			1.5 m sump End cap
6						
7						
8						
9						
10						

NOTES: NAD 83 (hand-held Garman GPS)

Reviewed By: DM | FILE

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PUMPING WELL LOG

PROJECT No: 1CD003.112 | **DATE: Sept. 5, 2008** | **EASTING: 584503**

SITE: FARO | **LOGGED BY: J. Scibek** | **NORTHING: 6913115**

CLIENT: Deloitte & Touche | **DRILL HOLE: SRK08-SPW4** | **ELEVATION: 1086.4 masl**

DEPTH (m)	WELL	LITHO SYMBOL	DETAILED LITHOGRAPHY	HYDROSTRATIGRAPHY	K (m/s)	COMMENTS
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

NOTES: NAD 83 (hand-held Garman GPS)

Reviewed By: DM | FILE

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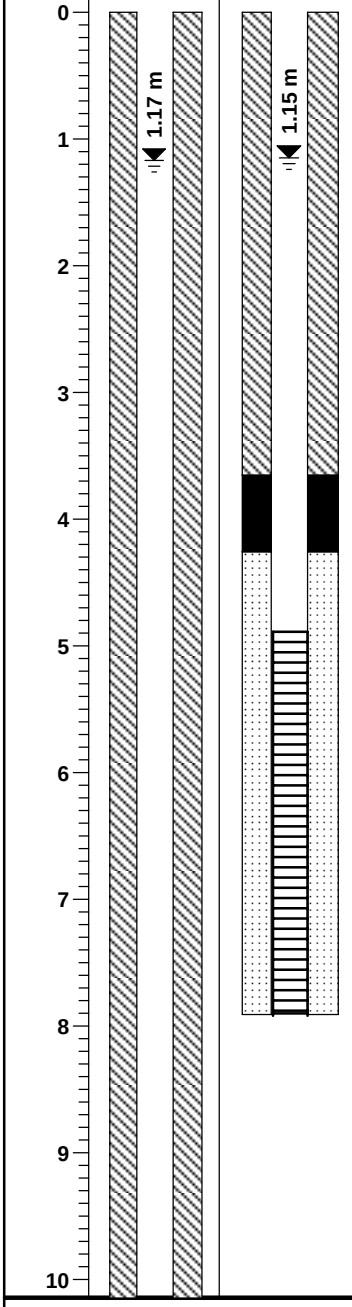
MONITORING WELL LOG

PROJECT No: 1CD003.112 | **DATE:** Aug. 21, 2008 | **EASTING:** See
SITE: FARO | **LOGGED BY:** J. Scibek | **NORTHING:** Notes
CLIENT: Deloitte & Touche | **DRILL HOLE:** SRK08-SP7 A & B | **ELEVATION:** 1081 masl



DETAILED LITHOGRAPHY	HYDROSTRATIGRAPHY	K (m/s)	COMMENTS
Ground Surface			
Silty Sand silty fine sand, coarse sand, cobbles, organics	AQUIFER		7a - 0.74 m stickup 7b - 0.73 m stickup 2" schedule 40 PVC riser pipe
Boulder boulder			
Sand with Gravel coarse sand and gravel, trace silt			
Silty Sand grey fine sand to silt with coarse gravel			
Sand and Gravel coarse sand and gravel with cobbles (yellow)			7b - 0.6 m bentonite chip seal on sand. Grout to surface
Sandy Silt grey silt with fine sand			
Sand orange coarse sand			10/20 filter sand
Silty Sand and Gravel grey coarse sand and gravel with silt and cobbles; washed gravel and crs sand at end of run		8 x 10-7	
Sand with Gravel brown-orange-rusty coarse sand and gravel with few cobbles (sub-rounded to sub angular crs sand and f grav but rounded crs gravel + cobbles)			20-slot 2" PVC screen Geo-sock
Sand and Gravel rusty-orange coarse sand and gravel with cobbles (includes 0.1 m thick silt+gravel layer)			
Sand rusty medium sand with cobbles	AQUITARD		
Silt grey silt and fine sand with some clay			

NOTES: NAD 83 (hand-held Garman GPS)

7a 584429, 6913095, ground elev = 1081 masl
7b 584433, 6913094, ground elev = 1081 masl

Monitoring wells about 3 m apart

	Reviewed By: DM	FILE

SRK Consulting
Engineers and Scientists

MONITORING WELL LOG

PROJECT No: 1CD003.112 | **DATE:** Aug. 21, 2008 | **EASTING:** See
SITE: FARO | **LOGGED BY:** J. Scibek | **NORTHING:** Notes
CLIENT: Deloitte & Touche | **DRILL HOLE:** SRK08-SP7 A & B | **ELEVATION:** 1081 masl

DEPTH (m)	WELL A	WELL B	LITHO SYMBOL	DETAILED LITHOGRAPHY	HYDROSTRATIGRAPHY	K (m/s)	COMMENTS
11				**Sandy Silt** grey silty med-crs sand with gravel	AQUIFER		
				Silty sand grey silty fine sand with cobbles, compacted			
12				**Silty Sand with Gravel** grey silty med-crs sand with gravel			
				grey v silty fine sand with fine gravel (compacted)			
13				**Silty Sand** dark grey silty fine sand, soft			7a - 1.2 m bentonite chip seal on sand. Grout to surface
				Silty Sand with Gravel grey silty fine sand with gravel and cobbles, compacted			10/20 filter sand
14				**Weathered Bedrock** grey-brown weathered bedrock	AQUIFER	4 x 10-7	
15							20-slot 2" PVC screen
				Competent Bedrock competent bedrock			Geo-sock
16							
17							
18							
19							
20							

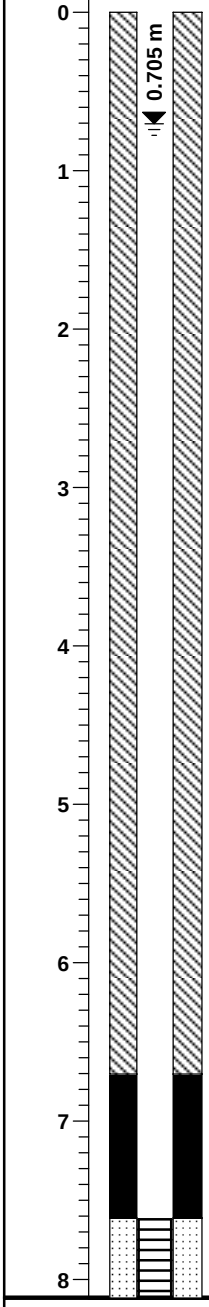
NOTES: NAD 83 (hand-held Garman GPS)

Reviewed By: DM | FILE

SRK Consulting
Engineers and Scientists

MONITORING WELL LOG

PROJECT No: 1CD003.112 | **DATE:** Aug. 22, 2008 | **EASTING:** See
SITE: FARO | **LOGGED BY:** J. Scibek | **NORTHING:** Notes
CLIENT: Deloitte & Touche | **DRILL HOLE:** SRK08-SP8 A & B | **ELEVATION:** 1077 masl



DEPTH (m)	DETAILED LITHOGRAPHY	HYDROSTRATIGRAPHY	K (m/s)	COMMENTS
	Ground Surface			
0	**Sand** grey-brown med sand	AQUIFER UNIT		8a - 0.7 m stickup
	Organic Soil silty organic soil, brown			8b - 0.78 m stickup
1	**Silty Sand** dark grey silty fine sand with wood debris (20%), silt with sand is compacted			2" schedule 40 PVC riser pipe
	Gravel sub-angular gravel with angular boulder pieces			8b - 1.5 m bentonite chip seal on sand. Grout to surface
2	**Boulder** boulder pieces, coarse grey rock			
	Gravel and Silt orange-brown fine gravel with cobbles and silt			
3	**Boulder** boulder (angular frag, shattered by sonic drill)			
	Gravel and Silt orange fine-crs gravel and silt (50% silt)			10/20 filter sand
4	**Boulder** boulder	MINOR AQUITARD	8 x 10-6	20-slot 2" PVC screen
	Silt, Sand, Gravel diamict: silt and grey crs-med sand with fine gravel (> 50% silt); washed rounded gravel at end of run due to drilling process	AQUIFER UNIT		Geo-sock
5	**Sand with Gravel** orange-brown med-crs sand with gravel, trace silt			
	Silty Sand and Greavel grey-orange fine silty sand and gravel			8b - BR cuttings
6	**Sand with Gravel** orange coarse sand with gravel			
	Silty Sand grey fine-med silty sand with 10 cm silt and fine sand layers)			8a - 1.0 m bentonite chip seal on sand. Grout to surface
7				
8				

NOTES: NAD 83 (hand-held Garman GPS)

8a 584294, 6912955, ground elev = 1077 masl
8b 584291, 6912951, ground elev = 1077 masl

Monitoring wells about 4 m apart

SRK Consulting
Engineers and Scientists

MONITORING WELL LOG

PROJECT No: 1CD003.112 | **DATE: Aug. 22, 2008** | **EASTING: See**

SITE: FARO | **LOGGED BY: J. Scibek** | **NORTHING: Notes**

CLIENT: Deloitte & Touche | **DRILL HOLE: SRK08-SP8 A & B** | **ELEVATION: 1077 masl**

DEPTH (m)	WELL A	WELL B	LITHO SYMBOL	DETAILED LITHOGRAPHY	HYDROSTRATIGRAPHY	K (m/s)	COMMENTS
				Weathered Rock grey-orange weathered rock, ang frags, shattered by drilling			**10/20 filter sand**
9				**Bedrock** light grey rock (powder, ang frags from drilling)			**20-slot 2" PVC screen**
				bedrock		**1 x 10-6**	**Geo-sock**
10							
11							**8a - BR cuttings to 12.2 m EOH**
12							
13							
14							
15							
16							

NOTES: NAD 83 (hand-held Garman GPS)

Reviewed By: DM | FILE

Appendix A-2
Test Pit Logs

FIELD TEST PIT LOG

BORING NO. TP08-1
SHEET 1 of 1
DATE: START Aug. 7, 2008
END Aug. 7, 2008
ELEV. ~ 1086 masl (GPS)

PROJECT NAME: FARO 1CD003.112 **STATION #:** TP08-1

INSPECTOR (SIGNED): D. Mackie

EQUPMENT USED: John Deere 345

PIT DIMENSIONS: **LENGTH:** 3 m **WIDTH:** 1.5 m **DEPTH:** ~ 5 m

WATER LEVEL DEPTH:

CHECKED BY: DM **DATE:** Jan. 29, 2009

DEPTH (m)	DESCRIPTION	Litho Symbol
0	Ground Surface	
	Silty Sand and Gravel Interbedded sand and gravel with clay and silt. Humic horizons. Damp	
2	**Sand and Gravel** Sand and Gravel with cobbles. Wet. Inflowing water	
	Sand and Gravel Sand and Gravel. Wet. Sloughing. Difficult to define base	
4		
	Clay Silty clay w/ fine sand	
6		
8		
10		
12		
14		
16		
18		
20		

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FIELD TEST PIT LOG

BORING NO. TP08-2
SHEET 1 of 1
DATE: START Aug. 7, 2008
END Aug. 7, 2008
ELEV. ~ 1086 masl (GPS)

PROJECT NAME: FARO 1CD003.112 **STATION #:** TP08-2

INSPECTOR (SIGNED): D. Mackie

EQUPMENT USED: John Deere 345

PIT DIMENSIONS: **LENGTH:** 3 m **WIDTH:** 1.5 m **DEPTH:** ~ 6 m

WATER LEVEL DEPTH:

CHECKED BY: DM **DATE:** Jan. 29, 2009

DEPTH (m)	DESCRIPTION	Litho Symbol
0	Ground Surface	
	Organics Interbedded silts and black humic horizons. White ash horizon at 1m.	
2	**Clay** Dense, plastic silt to sandy clay w/ cobbles and boulders. Dry	
	Clay Silty to sandy clay w/cobbles. Damp. Little inflow. Max. depth 6m. Not sloughing.	
4		
6		
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10		
12		
14		
16		
18		
20		

FIELD TEST PIT LOG

BORING NO. TP08-3
SHEET 1 of 1
DATE: START Aug. 7, 2008
END Aug. 7, 2008
ELEV. ~ 1087 masl (GPS)

PROJECT NAME: FARO 1CD003.112 **STATION #:** TP08-3

INSPECTOR (SIGNED): D. Mackie

EQUPMENT USED: John Deere 345

PIT DIMENSIONS: **LENGTH:** 3 m **WIDTH:** 2 m **DEPTH:** ~ 5 m

WATER LEVEL DEPTH: ~ 2 m

CHECKED BY: DM **DATE:** Jan. 29, 2009

DEPTH (m)	DESCRIPTION	Litho Symbol
0	Ground Surface	
	Silt Silt and oganics	
2	**Sand and Gravel** Sand and gravel on west side with significant inflow. Dry silt to sandy clay on east side. West side sloughing.	
4		
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16		
18		
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FIELD TEST PIT LOG

BORING NO. TP08-4
SHEET 1 of 1
DATE: START Aug. 7, 2008
END Aug. 7, 2008
ELEV. ~ 1087 masl (GPS)

PROJECT NAME: FARO 1CD003.112 **STATION #:** TP08-4

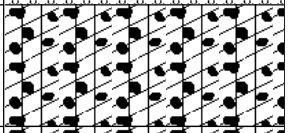
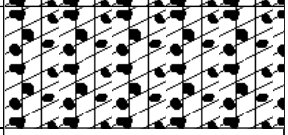
INSPECTOR (SIGNED): D. Mackie

EQUPMENT USED: John Deere 345

PIT DIMENSIONS: **LENGTH:** 3 m **WIDTH:** 1.5 m **DEPTH:** ~ 5 m

WATER LEVEL DEPTH:

CHECKED BY: DM **DATE:** Jan. 29, 2009

DEPTH (m)	DESCRIPTION	Litho Symbol
0	Ground Surface	
	Organics Organics. Silty. Some sand. Dry	
2	**Silty Clay** Sandy silty clay w/ boulders and cobbles. Dry.	
4	**Silty Clay** Dense Sandy silty clay w/ boulders and cobbles. Dry.	
6		
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FIELD TEST PIT LOG

BORING NO. TP08-5
SHEET 1 of 1
DATE: START Aug. 7, 2008
END Aug. 7, 2008
ELEV. ~ 1091 masl (GPS)

PROJECT NAME: FARO 1CD003.112 **STATION #:** TP08-5

INSPECTOR (SIGNED): D. Mackie

EQUPMENT USED: John Deere 345

PIT DIMENSIONS: **LENGTH:** 3 m **WIDTH:** 1.5 m **DEPTH:** ~ 7 m

WATER LEVEL DEPTH: ~ 2.5 m

CHECKED BY: DM **DATE:** Jan. 29, 2009

DEPTH (m)	DESCRIPTION	Litho Symbol
0	Ground Surface	
	Organics Organics and sandy silt. Dry	
2	**Silty Sand** Dense silty sand and gravel w/ clay and boulders. Minor seepage from 0.25m sandy lense. Black humic horizon at 3m. Minor inflow from below.	
4	**Clayey Silt** Dense clayey silt to silty sand w/ boulders and cobbles. Gravel lenses. Minor seepage 2.5 to 5m. Not significant.	
6		
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12		
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16		
18		
20		

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FIELD TEST PIT LOG

BORING NO. TP08-6
SHEET 1 of 1
DATE: START Aug. 7, 2008
END Aug. 7, 2008
ELEV. ~ 1091 masl (GPS)

PROJECT NAME: FARO 1CD003.112 **STATION #:** TP08-6

INSPECTOR (SIGNED): D. Mackie

EQUPMENT USED: John Deere 345

PIT DIMENSIONS: **LENGTH:** 3 m **WIDTH:** 1.5 m **DEPTH:** ~ 6 m

WATER LEVEL DEPTH:

CHECKED BY: DM **DATE:** Jan. 29, 2009

DEPTH (m)	DESCRIPTION	Litho Symbol
0	Ground Surface	
	Organics Organics sand and silt; some clay. Permafrost at 1.5m on west side. Dry to slightly damp.	
2	**Silt** Sandy, clayey silt with cobbles and boulders	
	Sandy Silt Sandy silt with gravel becoming more clayey with depth.	
4		
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FIELD TEST PIT LOG

BORING NO. TP08-7
SHEET 1 of 1
DATE: START Aug. 7, 2008
END Aug. 7, 2008
ELEV. ~ 1089 masl (GPS)

PROJECT NAME: FARO 1CD003.112 **STATION #:** TP08-7

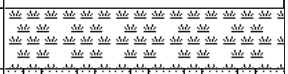
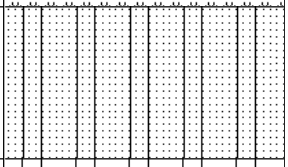
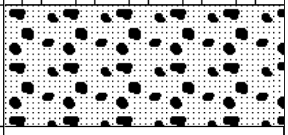
INSPECTOR (SIGNED): D. Mackie

EQUPMENT USED: John Deere 345

PIT DIMENSIONS: **LENGTH:** 3 m **WIDTH:** 2 m **DEPTH:** ~ 6 m

WATER LEVEL DEPTH: ~ 3.5 m

CHECKED BY: DM **DATE:** Jan. 29, 2009

DEPTH (m)	DESCRIPTION	Litho Symbol
0	Ground Surface	
	Organics Organics	
2	**Sandy Silt** Sandy clayey silt with cobbles and boulders	
4	**Silt** Silt with Increasing sand and gravel. Minor seepage below 3.5. Black humic horizons with water inflow below. Becoming easier to dig.	
6	**Sand and Gravel** Wet Sand and gravel. More water from west side of pit. Inflow to ~7m (max extent of hoe). Field EC 4.5 mS but silty, muddy water grabbed from pit bottom	
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FIELD TEST PIT LOG

BORING NO. TP08-8
SHEET 1 of 1
DATE: START Aug. 7, 2008
END Aug. 7, 2008
ELEV. ~ 1089 masl (GPS)

PROJECT NAME: FARO 1CD003.112 **STATION #:** TP08-8

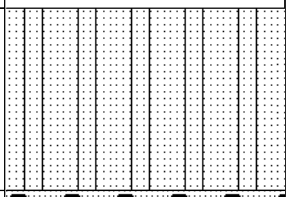
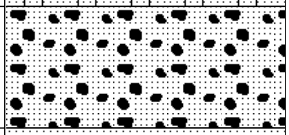
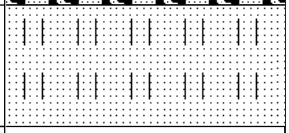
INSPECTOR (SIGNED): D. Mackie

EQUPMENT USED: John Deere 345

PIT DIMENSIONS: **LENGTH:** 3 m **WIDTH:** 2 m **DEPTH:** ~ 6 m

WATER LEVEL DEPTH: ~ 1 m

CHECKED BY: DM **DATE:** Jan. 29, 2009

DEPTH (m)	DESCRIPTION	Litho Symbol
0	Ground Surface	
	Sandy Silt Dry sandy silt	
2		
	Sand and Gravel Wet sand and gravel with Black humic horizon 0. 1 to 1.5 m thick. Inflow zone below black horizon.	
4		
	Silty Sand Siltier, Possibly becoming more competent, harder to dig	
6		
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12		
14		
16		
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20		

FIELD TEST PIT LOG

BORING NO. TP08-9
SHEET 1 of 1
DATE: START Aug. 7, 2008
END Aug. 7, 2008
ELEV. ~ 1091 masl (GPS)

PROJECT NAME: FARO 1CD003.112 **STATION #:** TP08-9

INSPECTOR (SIGNED): D. Mackie

EQUPMENT USED: John Deere 345

PIT DIMENSIONS: **LENGTH:** 3 m **WIDTH:** 1.5 m **DEPTH:** ~ 7 m

WATER LEVEL DEPTH:

CHECKED BY: DM **DATE:** Jan. 29, 2009

DEPTH (m)	DESCRIPTION	Litho Symbol
0	Ground Surface	
	Organics Organics and Silt	
2	**Clayey Silt** Clayey silt w/ sand, gravel and boulders. Silty clay lenses. Slightly damp. No signfiicant inflow. Pit remains open to maximum depth.	
4		
6		
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16		
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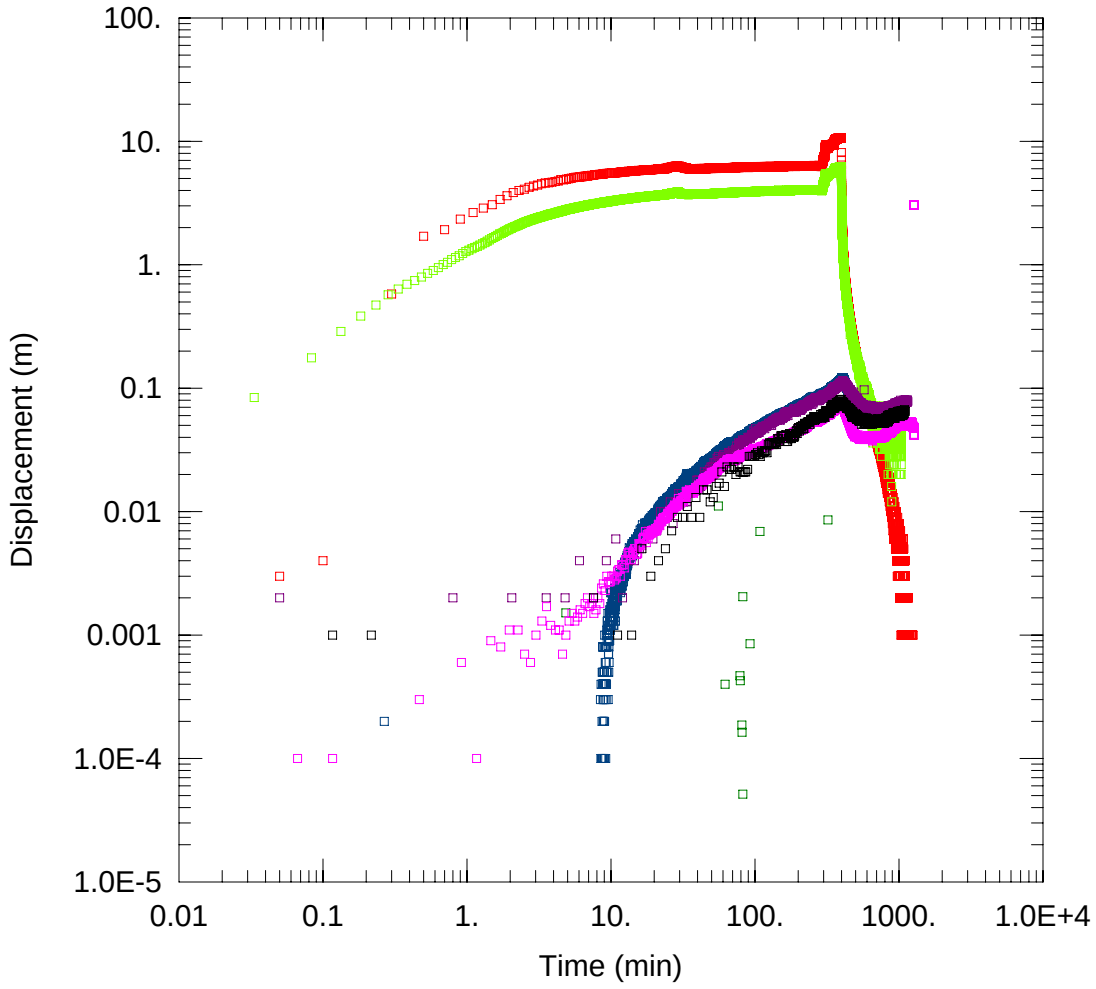
Appendix B
Hydraulic Testing Data Sheets

Pumping Tests



PW1 CONSTANT RATE TEST

Data Set: I:\...\PW1CR.rev4.aqt
Date: 01/29/09 Time: 11:53:57

PROJECT INFORMATION

Company: SRK
Client: D&T
Project: 1CD003.112
Location: Faro S-Cluster
Test Well: PW1
Test Date: Sept 20, 2008

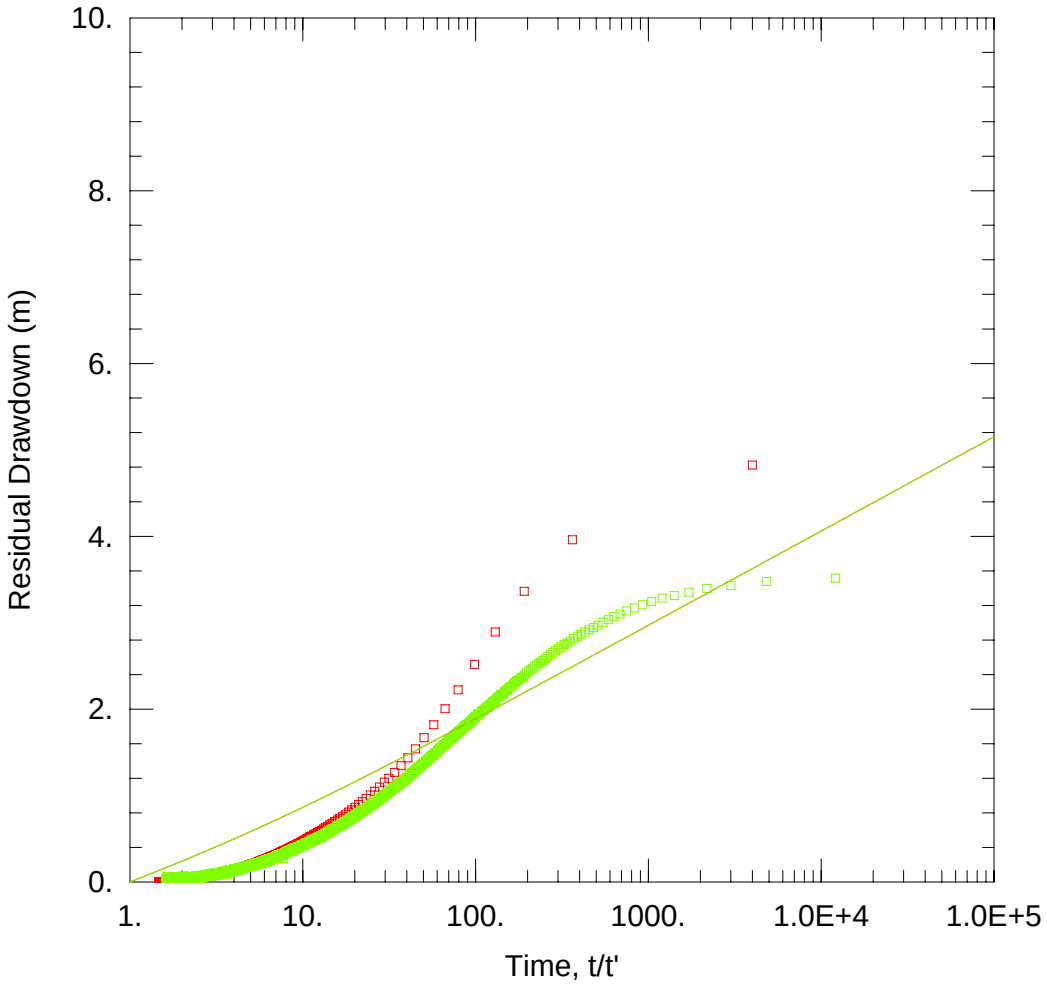
WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
PW1	584507.7	6913114.4

Observation Wells

Well Name	X (m)	Y (m)
PW1	584507.7	6913114.4
SP4a	584505	6913115
SP4b	584503.2	6913116
BR1	584465.4	6913130
SP5	584468	6913132
S3	584478	6913094
SP7a	584429	6913095



PW1 CONSTANT RATE TEST

Data Set: I:\...\PW1CR_recoverymatch.aqt
Date: 01/29/09 Time: 11:51:36

PROJECT INFORMATION

Company: SRK
Client: D&T
Project: 1CD003.112
Location: Faro S-Cluster
Test Well: PW1
Test Date: Sept 20, 2008

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
PW1	584507.7	6913114.4

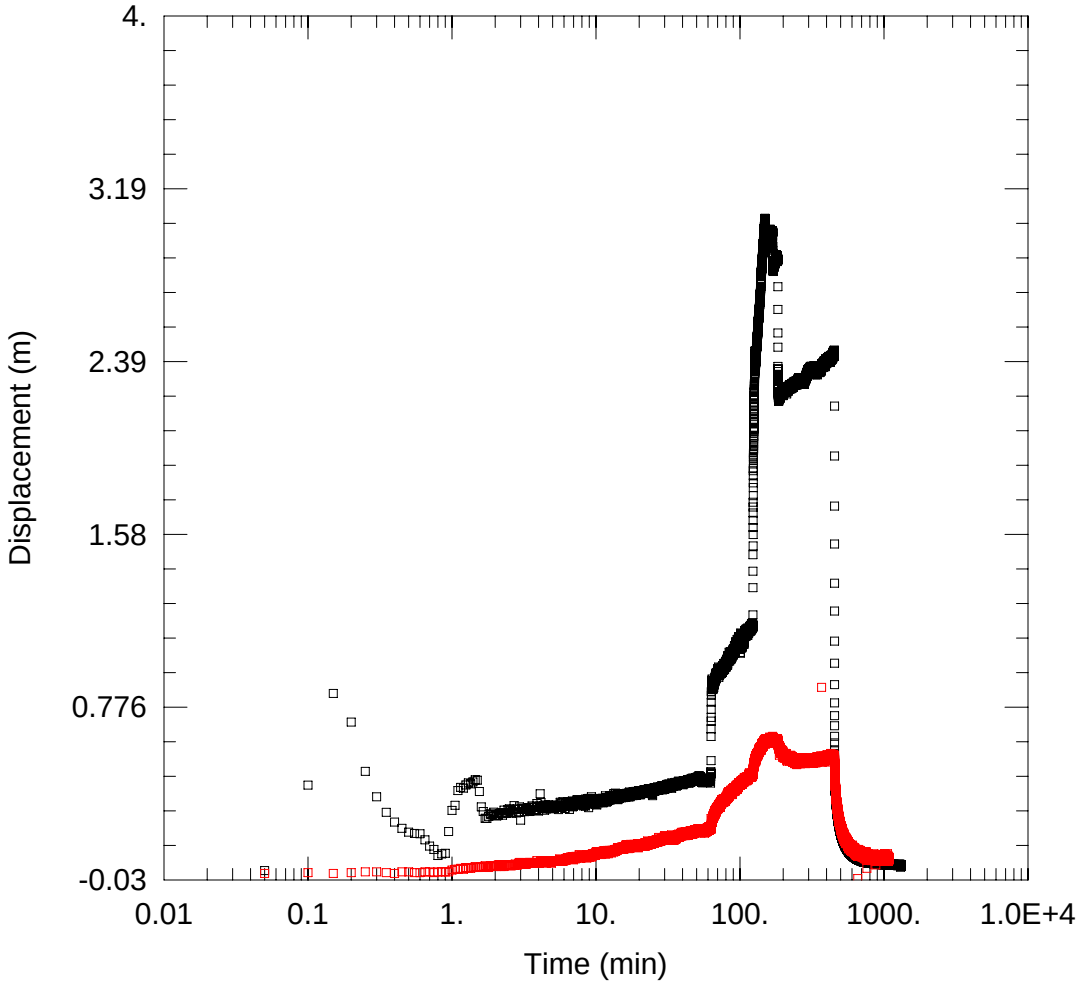
Observation Wells

Well Name	X (m)	Y (m)
PW1	584507.7	6913114.4
SP4a	584505	6913115

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 0.0002219 m^2/sec
S = 1.634E-30
Kz/Kr = 1.
b = 35. m



WELL TEST ANALYSIS

Data Set: I:\...\PW2 Recovery.aqt
Date: 01/29/09 Time: 11:58:41

PROJECT INFORMATION

Company: SRK
Client: D&T
Project: 1CD003.112
Location: Faro S-Cluster
Test Well: PW2
Test Date: Sept 17, 2008

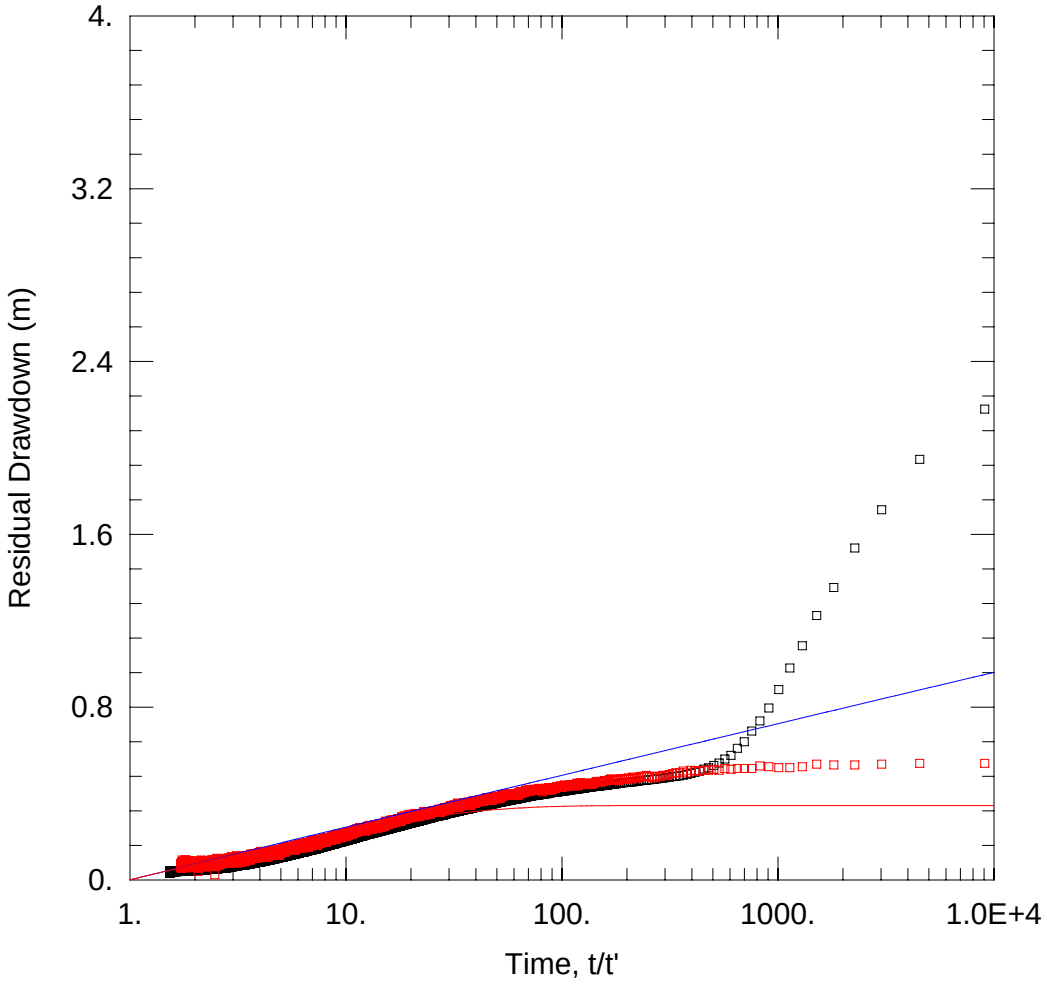
WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
PW2	0	0

Observation Wells

Well Name	X (m)	Y (m)
PW2	0	0
SP5	3	0



WELL TEST ANALYSIS

Data Set: I:\...\PW2 stop to CR.rev1.aqt
Date: 01/29/09 Time: 11:55:48

PROJECT INFORMATION

Company: SRK
Client: D&T
Project: 1CD003.112
Location: Faro S-Cluster
Test Well: PW2
Test Date: Sept 17, 2008

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
PW2	0	0

Observation Wells

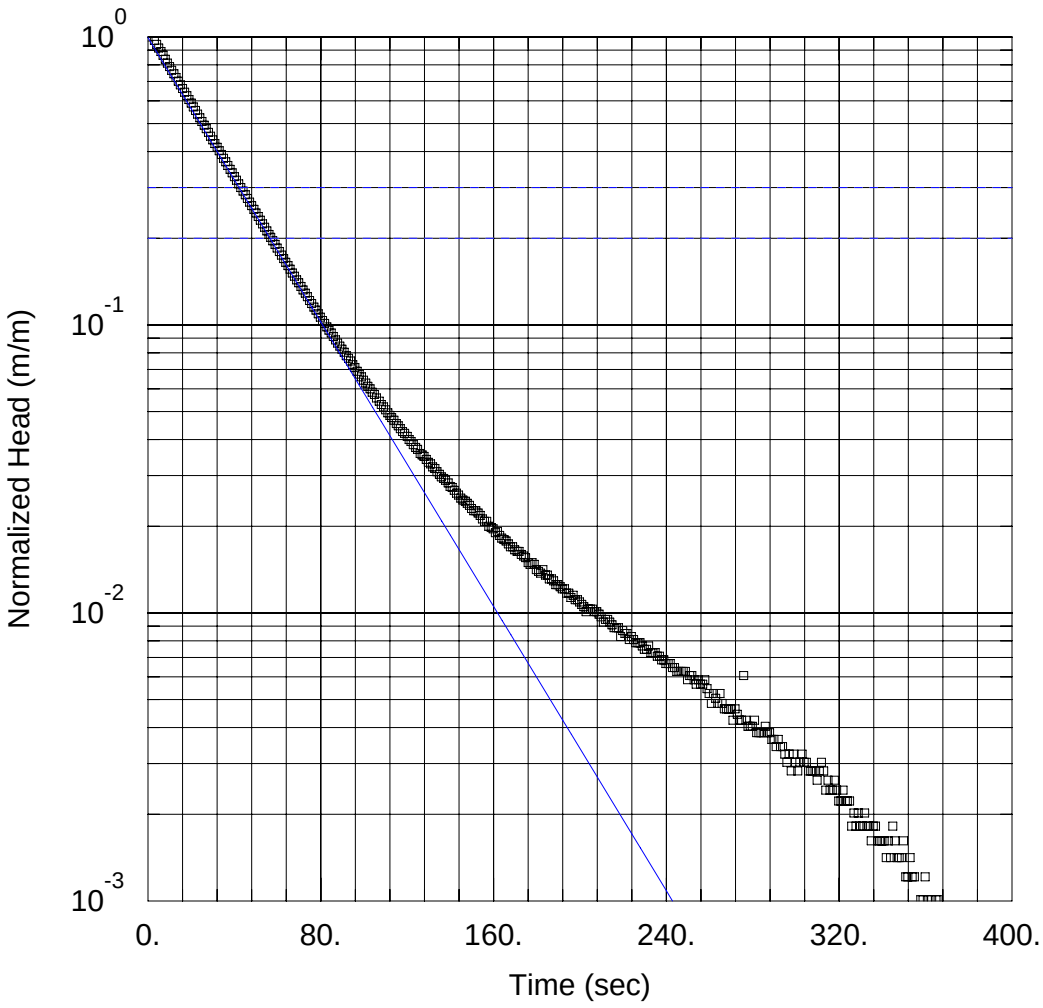
Well Name	X (m)	Y (m)
PW2	0	0
SP5	3	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 0.0004545 m^2/sec
S = 0.1221
Kz/Kr = 1.
b = 10. m

Packer-Isolated Falling Head Tests



WELL TEST ANALYSIS

Data Set: P:\...\BR1_FHTest_44-58.aqt
Date: 01/27/09 Time: 11:08:01

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: BR4 Falling Head

AQUIFER DATA

Saturated Thickness: 17.6 m Anisotropy Ratio (Kz/Kr): 1.

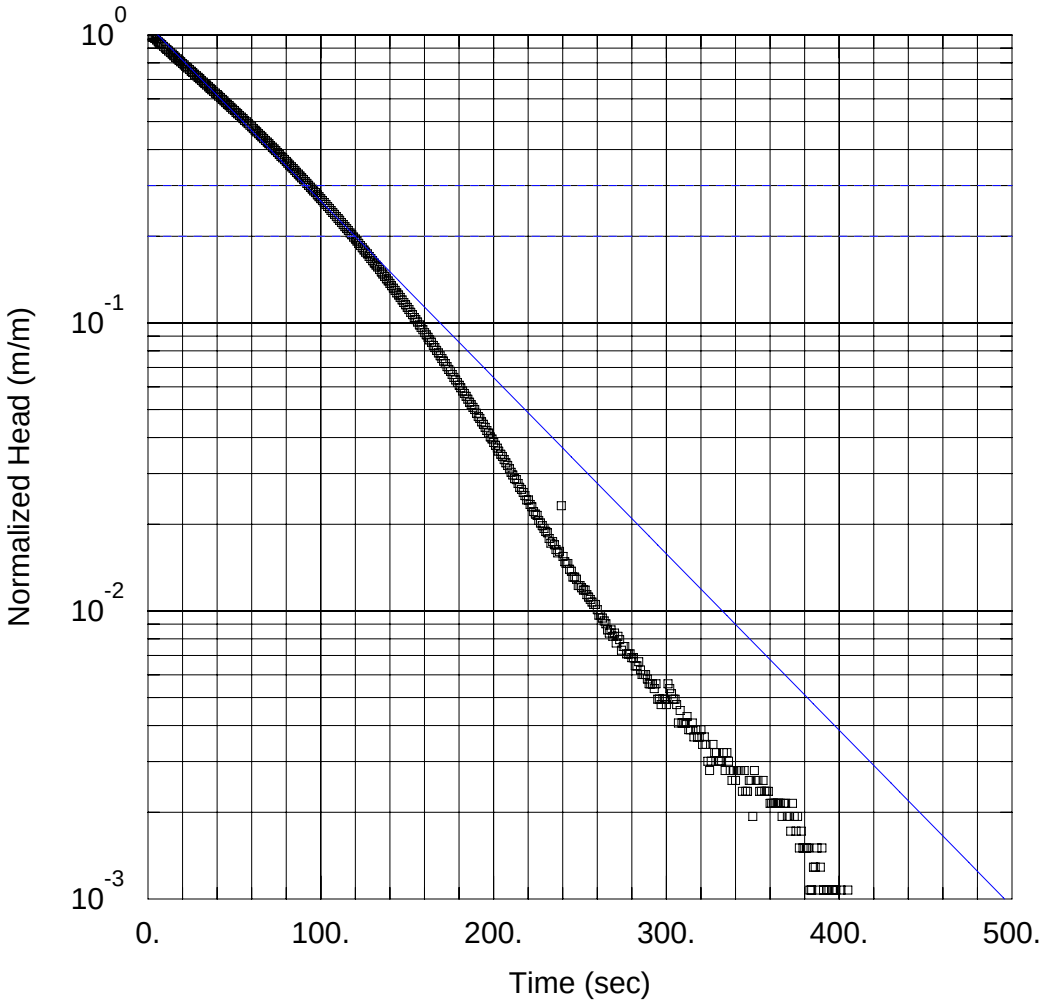
WELL DATA (BR1_44-58_FH)

Initial Displacement: 4.95 m
Total Well Penetration Depth: 12.25 m
Casing Radius: 0.0257 m
Static Water Column Height: 17.6 m
Screen Length: 4.2 m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 9.107E-6 m/sec
y0 = 4.921 m



WELL TEST ANALYSIS

Data Set: P:\...\BR1_FHTest_61-78.aqt
Date: 01/27/09 Time: 11:07:46

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: BR4 Falling Head

AQUIFER DATA

Saturated Thickness: 23.7 m Anisotropy Ratio (Kz/Kr): 1.

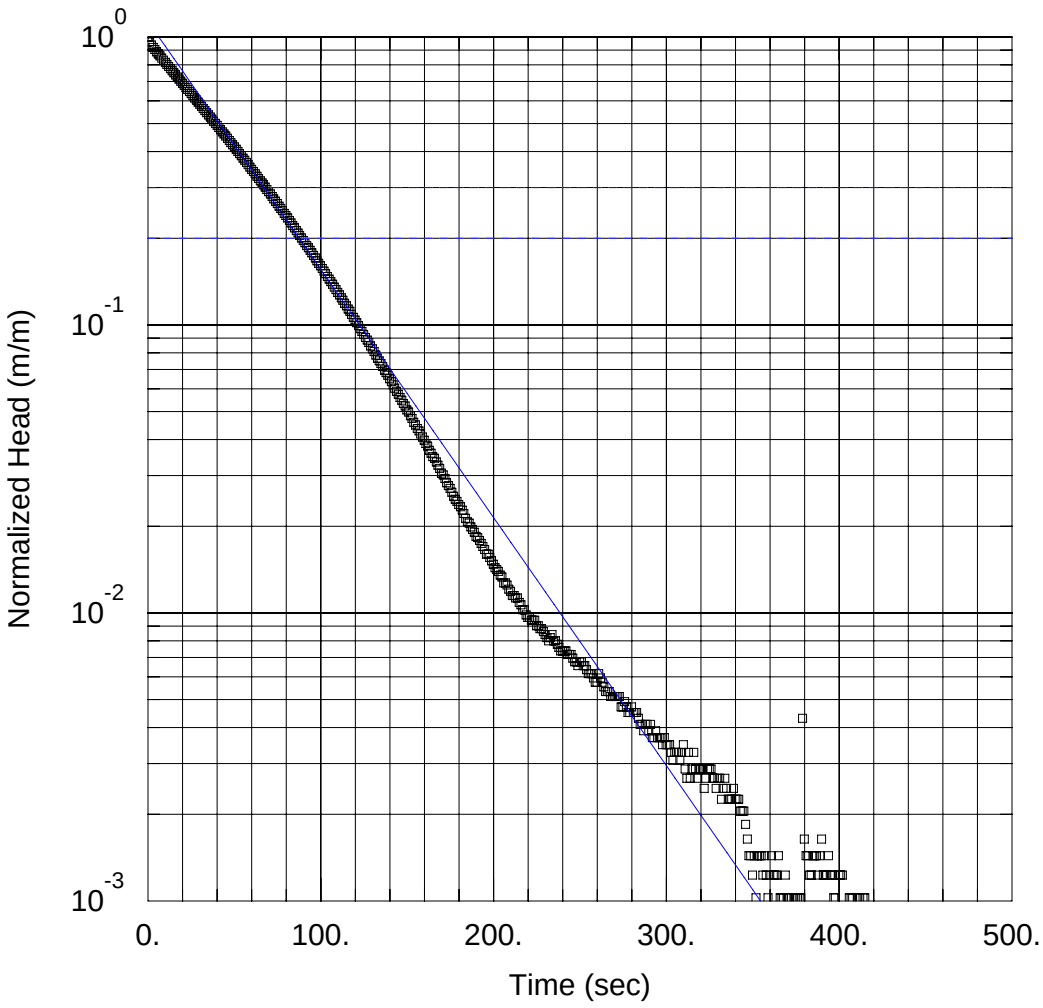
WELL DATA (BR1_61-78_FH)

Initial Displacement: 4.655 m
Total Well Penetration Depth: 18.45 m
Casing Radius: 0.0257 m
Static Water Column Height: 23.7 m
Screen Length: 5.2 m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 3.923E-6 m/sec
y0 = 5.047 m



WELL TEST ANALYSIS

Data Set: P:\...\BR1_FHTest_61-113.aqt
Date: 01/27/09 Time: 11:07:28

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: BR4 Falling Head

AQUIFER DATA

Saturated Thickness: 34.4 m Anisotropy Ratio (Kz/Kr): 1.

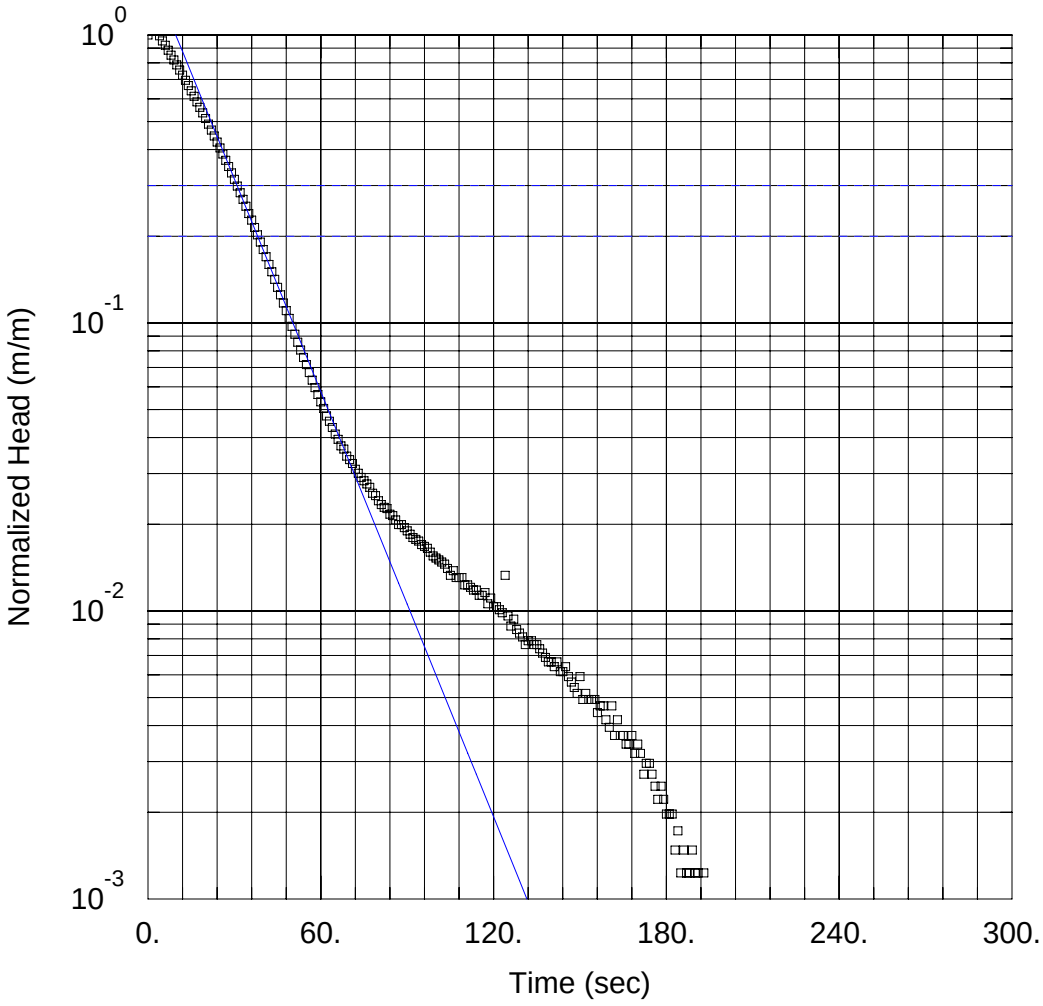
WELL DATA (BR1_44-58_FH)

Initial Displacement: 4.877 m
Total Well Penetration Depth: 29.09 m
Casing Radius: 0.0257 m
Static Water Column Height: 34.4 m
Screen Length: 15.84 m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 2.171E-6 m/sec
y0 = 5.526 m



WELL TEST ANALYSIS

Data Set: P:\...\BR1_FHTest_78-113.aqt
Date: 01/27/09 Time: 11:06:53

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: BR1 Falling Head
Test Date: September 2008

AQUIFER DATA

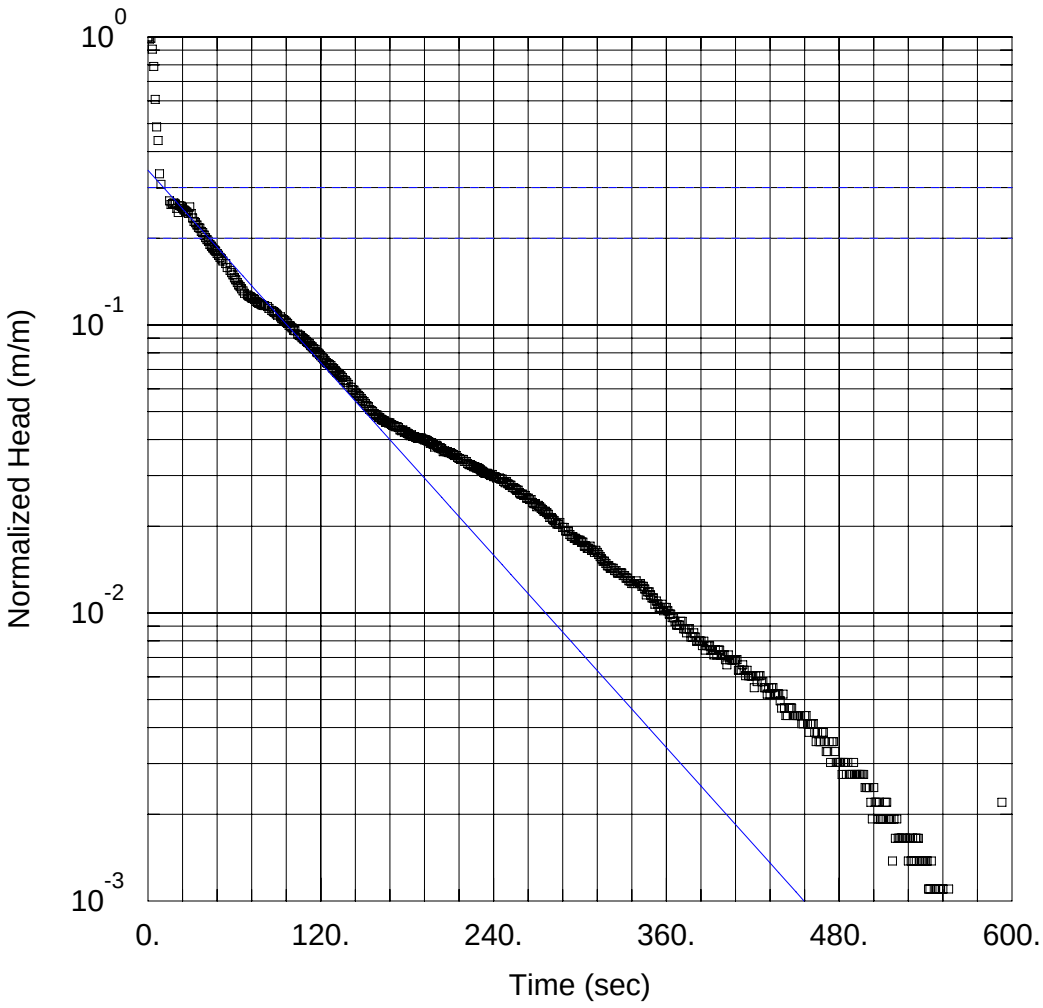
Saturated Thickness: 34.4 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BR1_44-58_FH)

Initial Displacement: 4.06 m
Total Well Penetration Depth: 29.01 m
Casing Radius: 0.0257 m
Static Water Column Height: 34.4 m
Screen Length: 10.66 m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 8.795E-6 m/sec
y0 = 7.019 m



WELL TEST ANALYSIS

Data Set: P:\...\BR3_FHTest.aqt
Date: 01/27/09 Time: 11:08:46

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: BR3 Falling Head

AQUIFER DATA

Saturated Thickness: 1.5 m Anisotropy Ratio (Kz/Kr): 1.

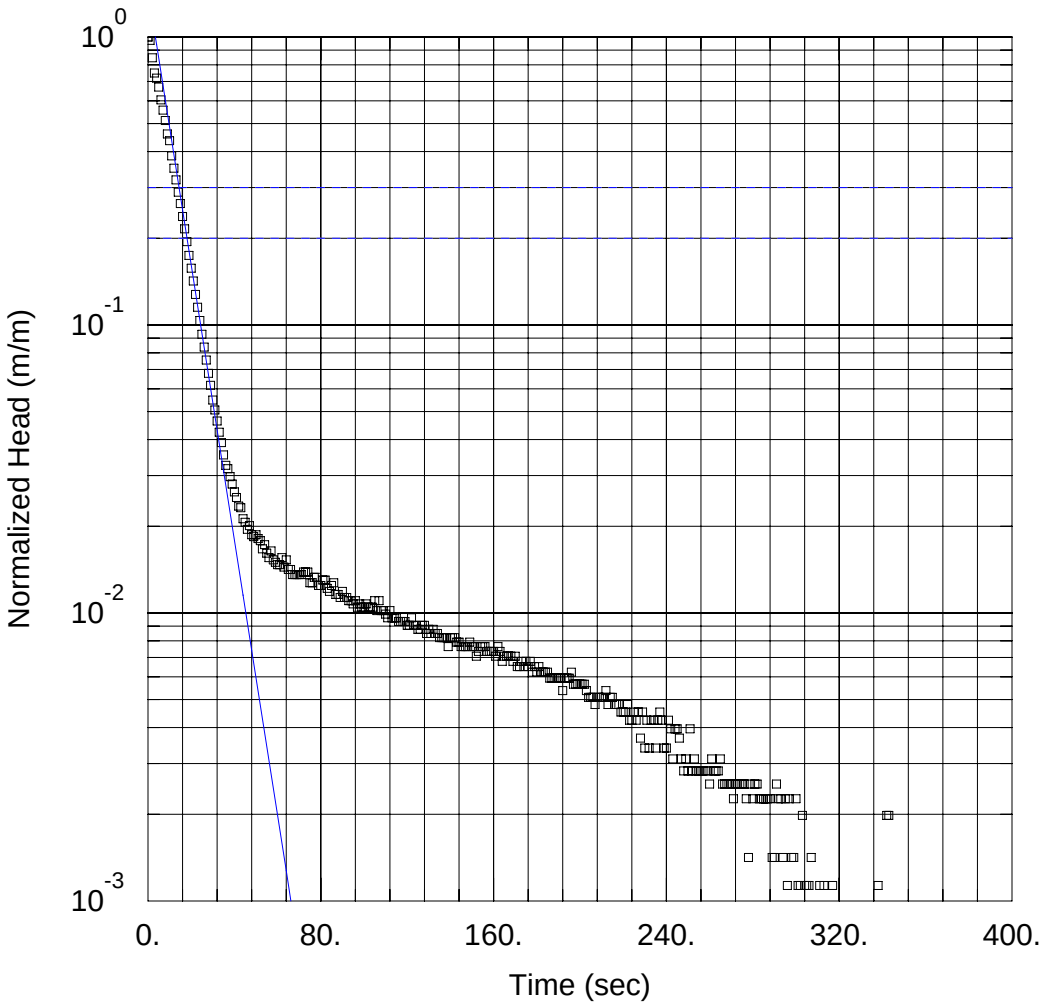
WELL DATA (BR3 FHT)

Initial Displacement: 3.636 m
Total Well Penetration Depth: 6. m
Casing Radius: 0.0257 m
Static Water Column Height: 1.5 m
Screen Length: 6. m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 3.015E-6 m/sec
y0 = 1.252 m



WELL TEST ANALYSIS

Data Set: P:\...\BR4_FHTest_53-73.aqt
Date: 01/27/09 Time: 11:09:36

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: BR4 Falling Head

AQUIFER DATA

Saturated Thickness: 22.25 m Anisotropy Ratio (Kz/Kr): 1.

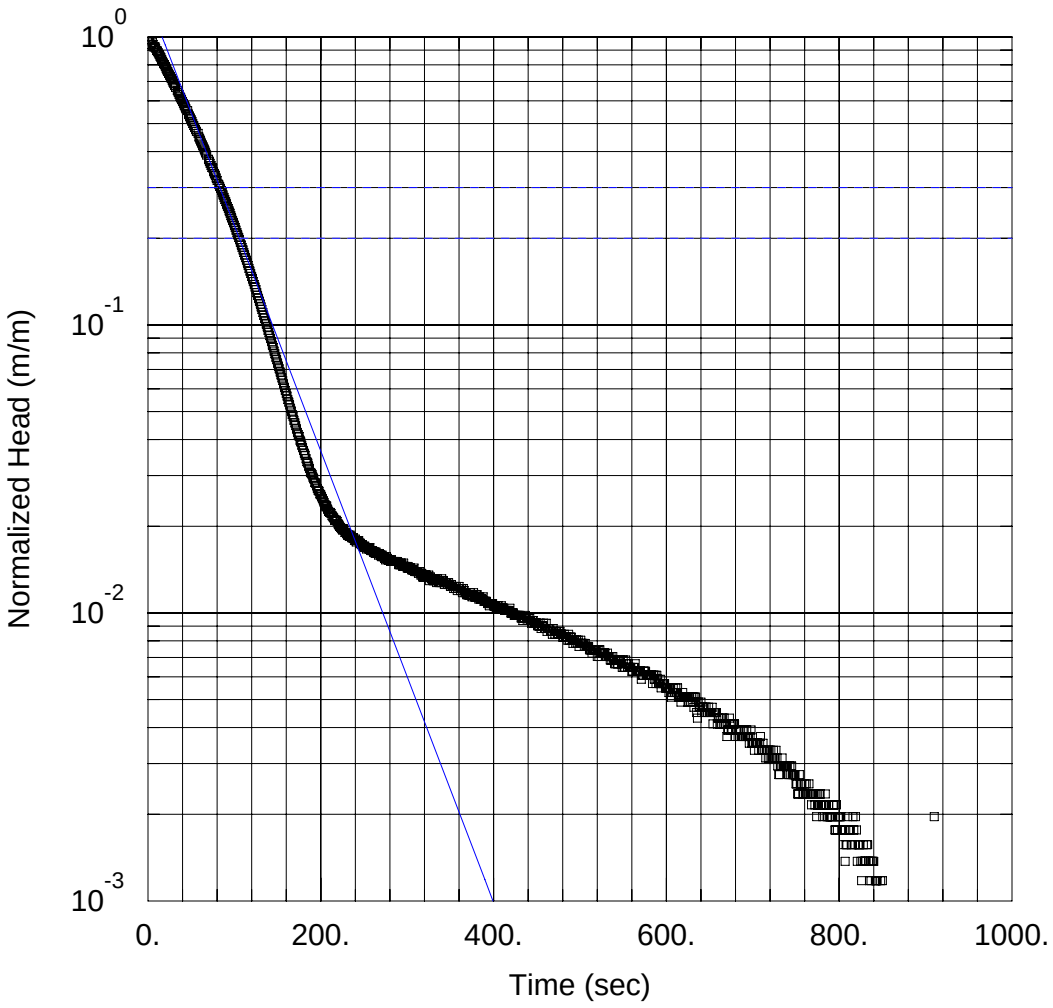
WELL DATA (BR4 53-73)

Initial Displacement: 3.535 m
Total Well Penetration Depth: 16.3 m
Casing Radius: 0.0257 m
Static Water Column Height: 22.25 m
Screen Length: 6.09 m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 2.617E-5 m/sec
y0 = 5.158 m



WELL TEST ANALYSIS

Data Set: P:\...\BR4_FHTest_73-93.aqt
Date: 01/27/09 Time: 11:09:46

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: BR4 Falling Head

AQUIFER DATA

Saturated Thickness: 28.34 m Anisotropy Ratio (Kz/Kr): 1.

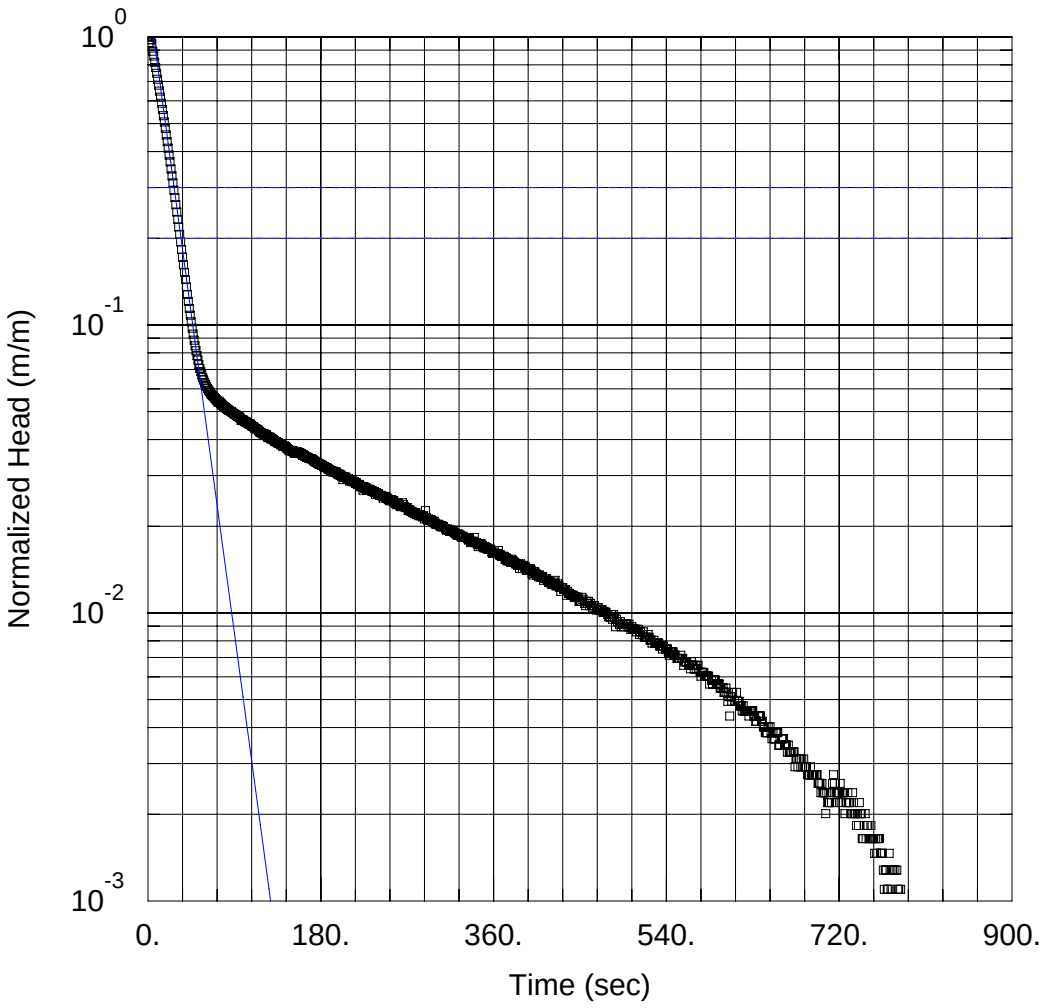
WELL DATA (BR4 73-93)

Initial Displacement: 5.101 m
Total Well Penetration Depth: 28.49 m
Casing Radius: 0.0257 m
Static Water Column Height: 28.34 m
Screen Length: 6.09 m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 5.175E-6 m/sec
y0 = 6.86 m



WELL TEST ANALYSIS

Data Set: P:\...\BR4_FHTest_101-123.aqt
Date: 01/27/09 Time: 11:09:56

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: BR4 Falling Head

AQUIFER DATA

Saturated Thickness: 37.5 m Anisotropy Ratio (Kz/Kr): 1.

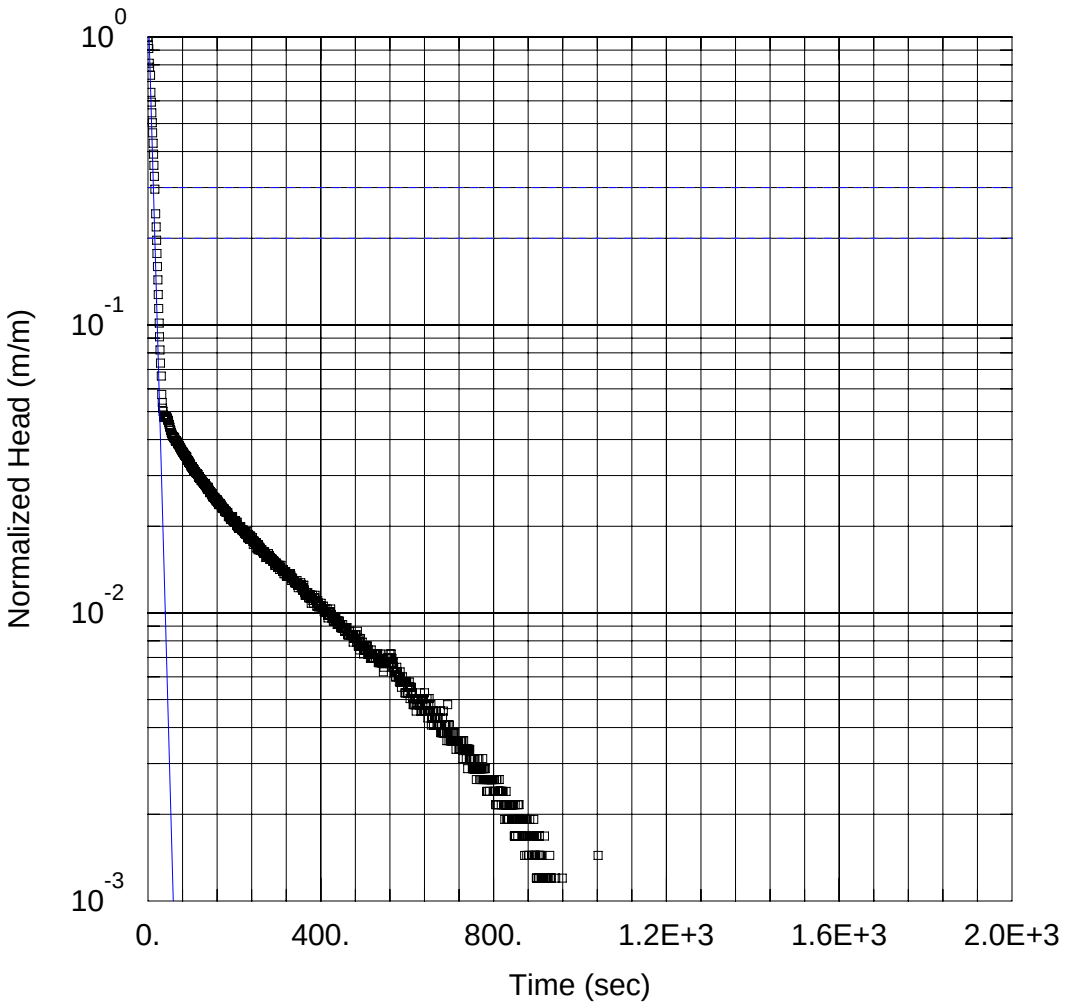
WELL DATA (BR4 101-123)

Initial Displacement: 5.471 m
Total Well Penetration Depth: 31.54 m
Casing Radius: 0.0257 m
Static Water Column Height: 37.5 m
Screen Length: 6.7 m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 1.334E-5 m/sec
y0 = 7.698 m



WELL TEST ANALYSIS

Data Set: P:\...\BR4_FHTest_126-153.aqt
Date: 01/27/09 Time: 11:10:07

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: BR4 Falling Head

AQUIFER DATA

Saturated Thickness: 46.6 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BR4 126-153)

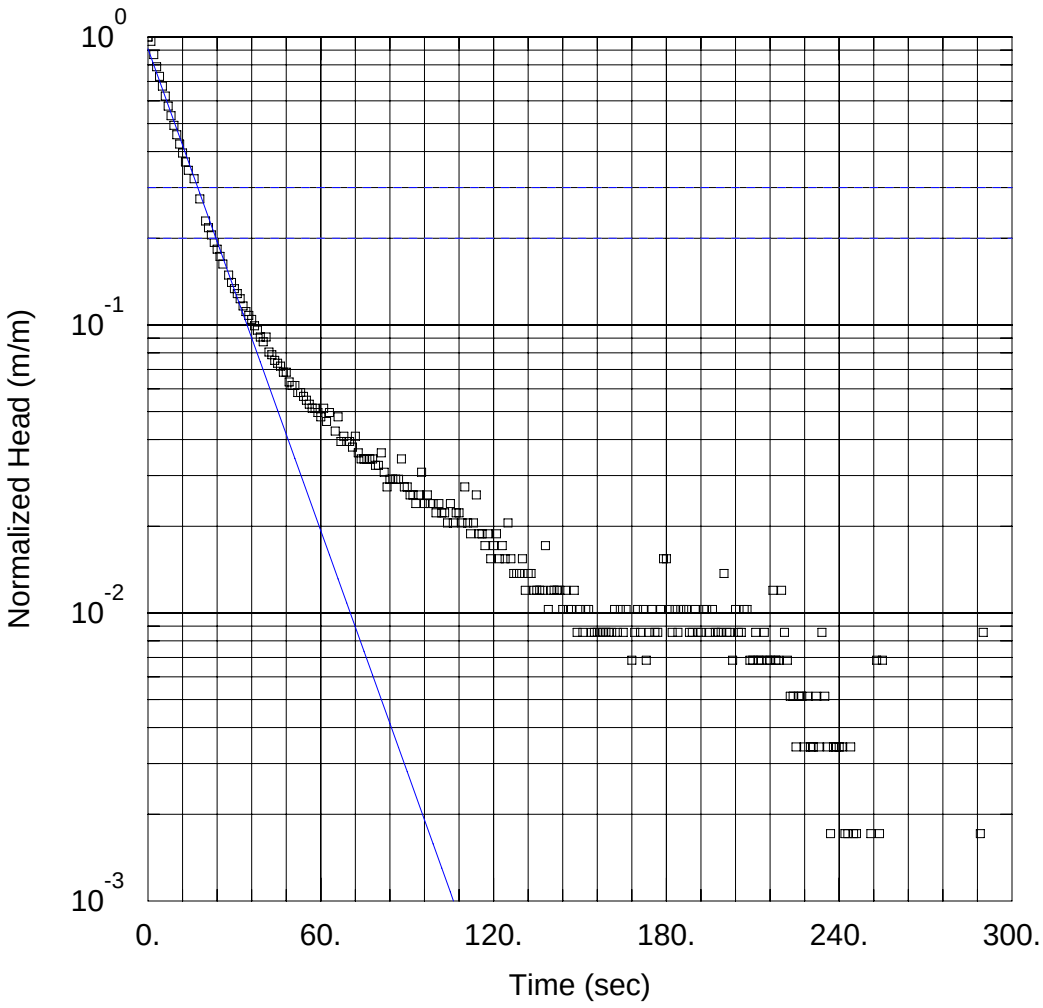
Initial Displacement: 4.167 m
Total Well Penetration Depth: 36.69 m
Casing Radius: 0.0257 m
Static Water Column Height: 46.4 m
Screen Length: 8.23 m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 2.439E-5 m/sec
y0 = 5.963 m

Slug Tests



WELL TEST ANALYSIS

Data Set: P:\...\BR1_test1.aqt
Date: 01/27/09 Time: 11:11:41

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: BR1- Slug Tests
Test Date: September 2008

AQUIFER DATA

Saturated Thickness: 26.73 m Anisotropy Ratio (Kz/Kr): 1.

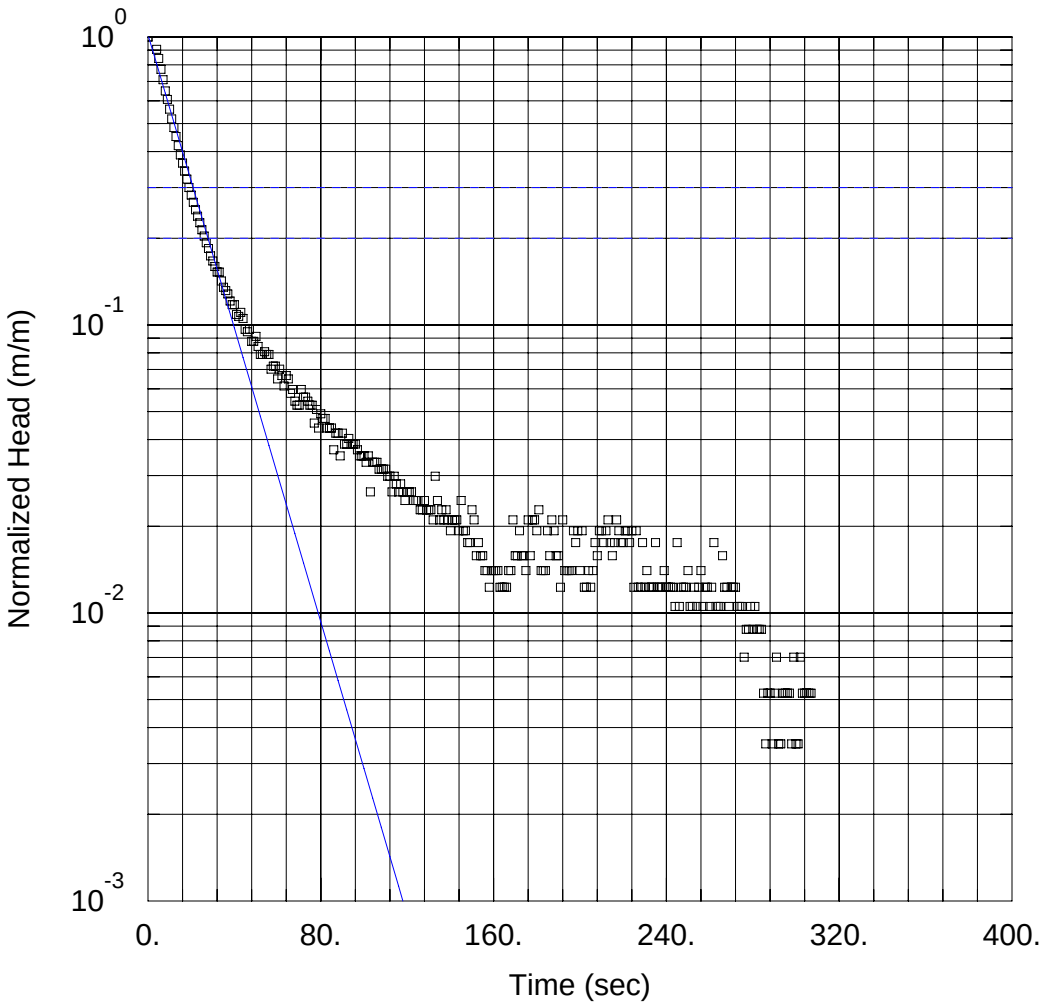
WELL DATA (Test 1)

Initial Displacement: 0.584 m
Total Well Penetration Depth: 26.73 m
Casing Radius: 0.0257 m
Static Water Column Height: 26.73 m
Screen Length: 5.73 m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 1.934E-5 m/sec y0 = 0.5311 m



WELL TEST ANALYSIS

Data Set: P:\...\BR1_test2.aqt
Date: 01/27/09 Time: 11:11:56

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: Test 3

AQUIFER DATA

Saturated Thickness: 26.73 m Anisotropy Ratio (Kz/Kr): 1.

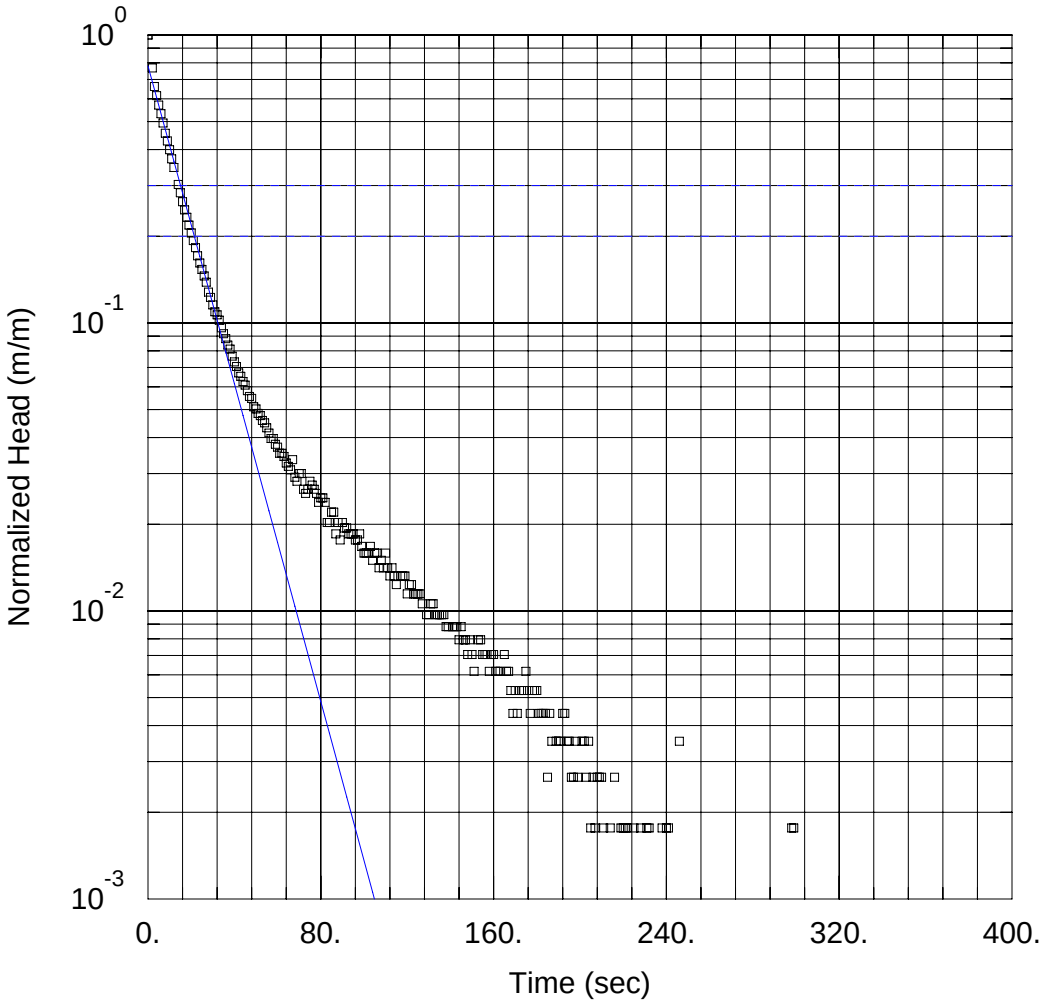
WELL DATA (Test 2)

Initial Displacement: 0.57 m
Total Well Penetration Depth: 26.73 m
Casing Radius: 0.0257 m
Static Water Column Height: 26.73 m
Screen Length: 5.73 m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 1.768E-5 m/sec
y0 = 0.5817 m



WELL TEST ANALYSIS

Data Set: P:\...\BR1_test3.aqt
Date: 01/27/09 Time: 11:12:07

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: Test 3

AQUIFER DATA

Saturated Thickness: 26.73 m Anisotropy Ratio (Kz/Kr): 1.

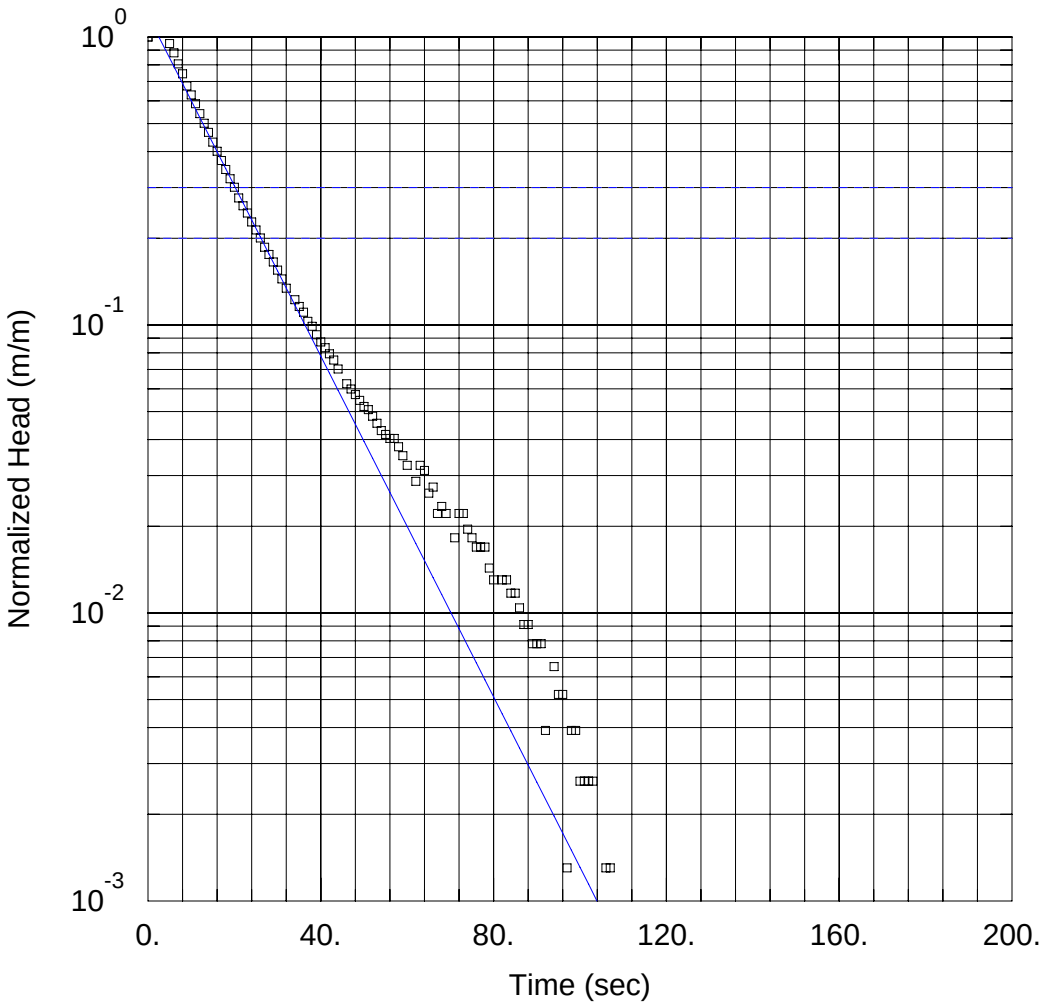
WELL DATA (Test 3)

Initial Displacement: 1.134 m
Total Well Penetration Depth: 26.73 m
Casing Radius: 0.0257 m
Static Water Column Height: 26.73 m
Screen Length: 5.73 m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 1.914E-5 m/sec
y0 = 0.8857 m



WELL TEST ANALYSIS

Data Set: P:\...\BR1_test4.aqt
Date: 01/27/09 Time: 11:12:22

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: Test 3

AQUIFER DATA

Saturated Thickness: 26.73 m Anisotropy Ratio (Kz/Kr): 1.

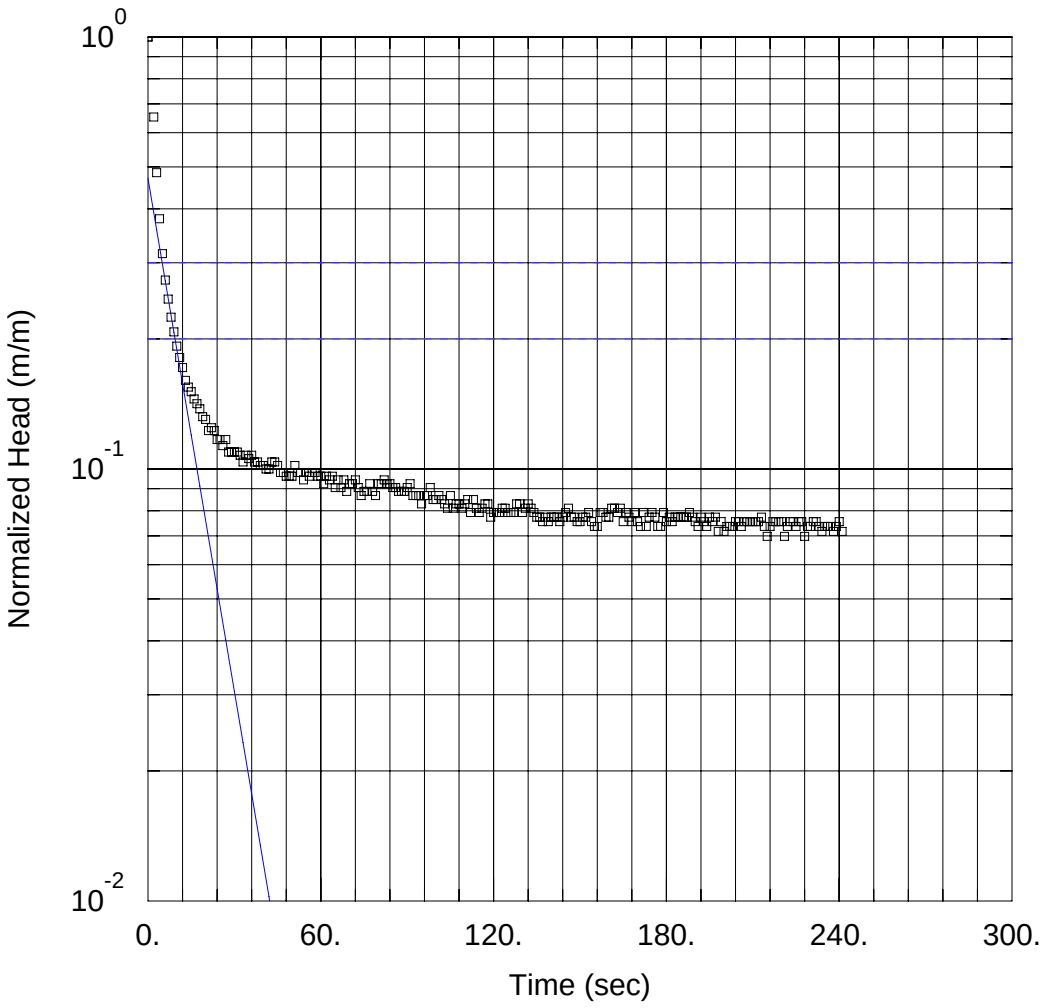
WELL DATA (Test 4)

Initial Displacement: 0.768 m
Total Well Penetration Depth: 26.73 m
Casing Radius: 0.0257 m
Static Water Column Height: 26.73 m
Screen Length: 5.73 m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 2.051E-5 m/sec
y0 = 0.9121 m



WELL TEST ANALYSIS

Data Set: P:\...\BR2_test1.aqt
Date: 01/27/09 Time: 11:13:28

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: BR2 Slug tests
Test Date: September 2008

AQUIFER DATA

Saturated Thickness: 18.33 m Anisotropy Ratio (Kz/Kr): 1.

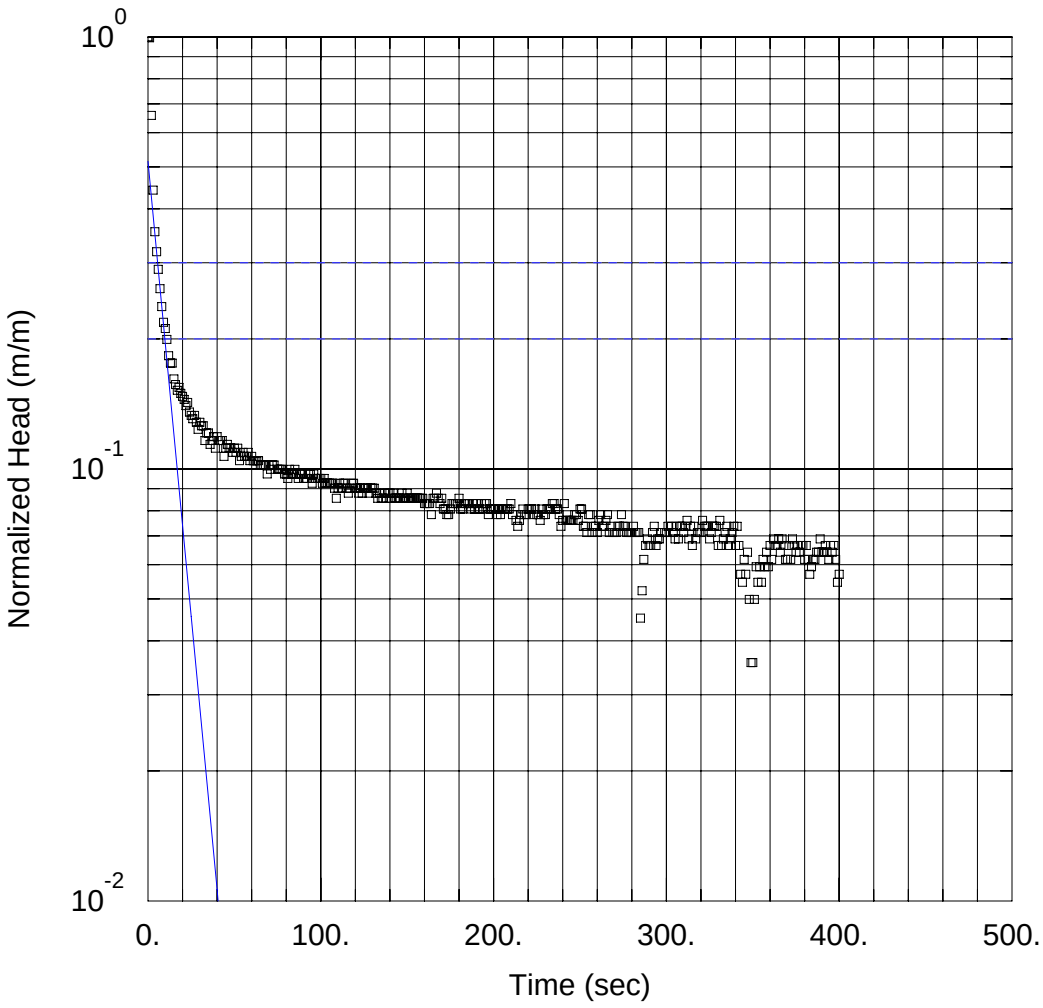
WELL DATA (Test 1)

Initial Displacement: 0.53 m
Total Well Penetration Depth: 13.24 m
Casing Radius: 0.0257 m
Static Water Column Height: 13.33 m
Screen Length: 6. m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 2.151E-5 m/sec y0 = 0.2493 m



WELL TEST ANALYSIS

Data Set: P:\...\BR2_test2.aqt
Date: 01/27/09 Time: 11:13:41

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: Test 3

AQUIFER DATA

Saturated Thickness: 18.33 m Anisotropy Ratio (Kz/Kr): 1.

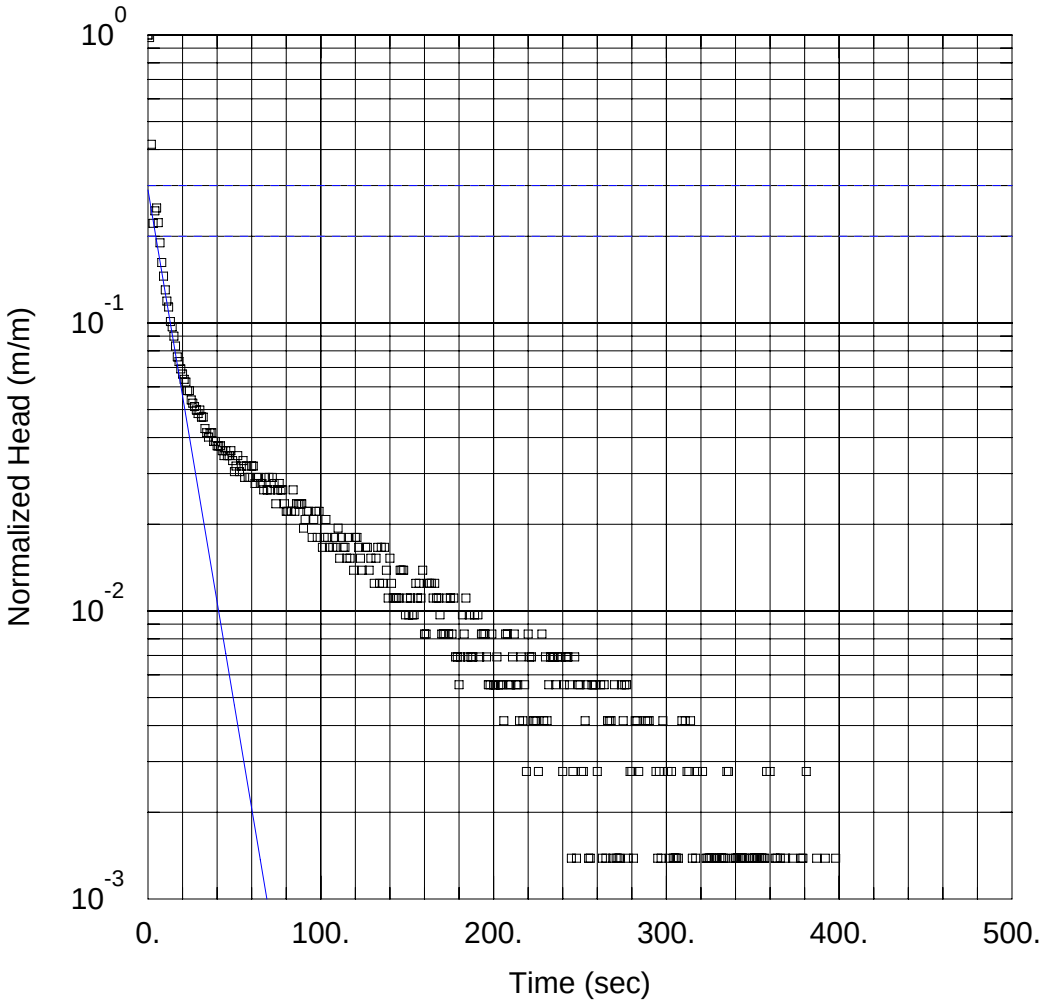
WELL DATA (Test 2)

Initial Displacement: 0.421 m
Total Well Penetration Depth: 13.24 m
Casing Radius: 0.0257 m
Static Water Column Height: 13.33 m
Screen Length: 6. m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 2.29E-5 m/sec
y0 = 0.2169 m



WELL TEST ANALYSIS

Data Set: P:\...\BR2_test3.aqt
Date: 01/27/09 Time: 11:13:51

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: Test 3

AQUIFER DATA

Saturated Thickness: 18.33 m Anisotropy Ratio (Kz/Kr): 1.

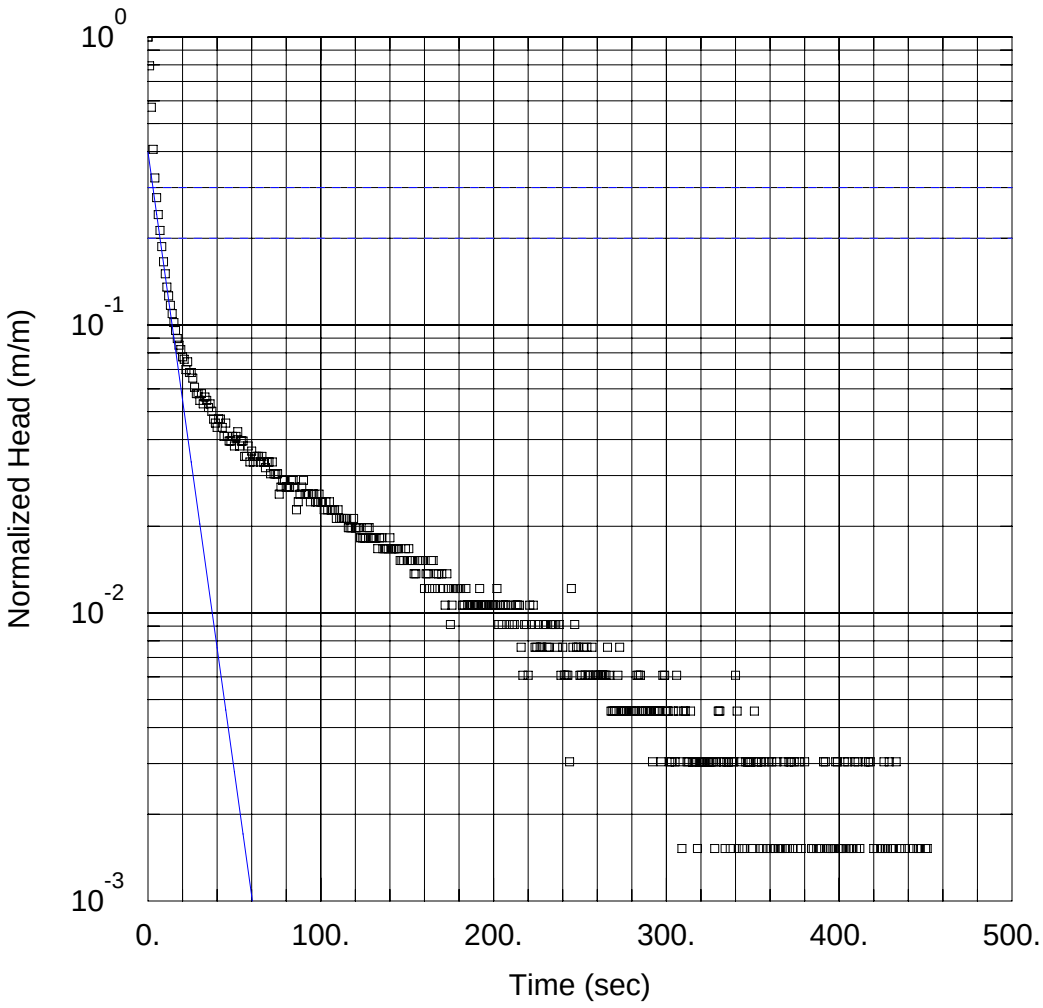
WELL DATA (Test 3)

Initial Displacement: 0.722 m
Total Well Penetration Depth: 13.24 m
Casing Radius: 0.0257 m
Static Water Column Height: 13.33 m
Screen Length: 6. m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 1.945E-5 m/sec
y0 = 0.2093 m



WELL TEST ANALYSIS

Data Set: P:\...\BR2_test4.aqt
Date: 01/27/09 Time: 11:14:01

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: Test 3

AQUIFER DATA

Saturated Thickness: 18.33 m Anisotropy Ratio (Kz/Kr): 1.

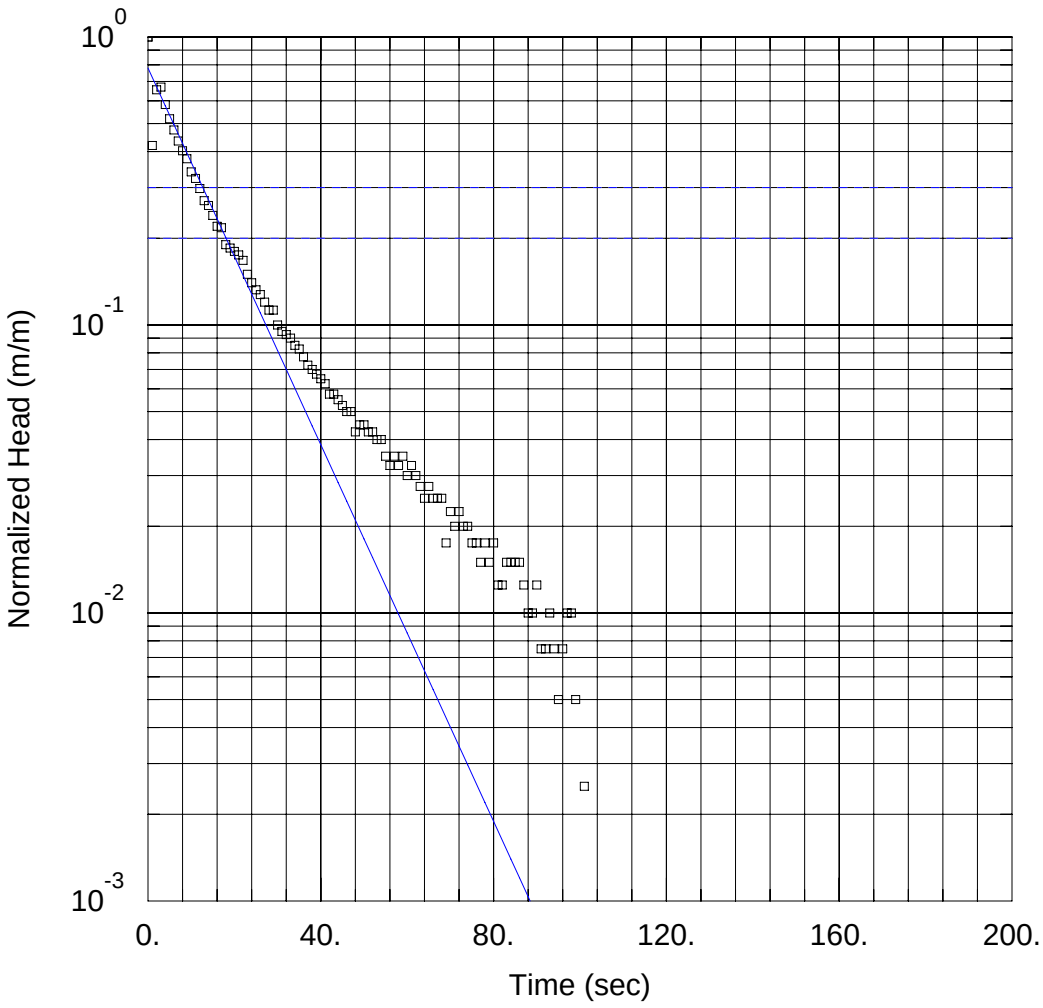
WELL DATA (Tes 4)

Initial Displacement: 0.658 m
Total Well Penetration Depth: 13.24 m
Casing Radius: 0.0257 m
Static Water Column Height: 13.33 m
Screen Length: 6. m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 2.34E-5 m/sec
y0 = 0.2621 m



SP4B TEST 1

Data Set: P:\...\2008 Test1.aqt
Date: 01/27/09 Time: 11:15:44

PROJECT INFORMATION

Company: SRK
Client: D&T
Project: 1CD003.112
Location: Faro S-Cluster
Test Well: SP4b
Test Date: Sep 3, 2008

AQUIFER DATA

Saturated Thickness: 2.9 m Anisotropy Ratio (Kz/Kr): 1.

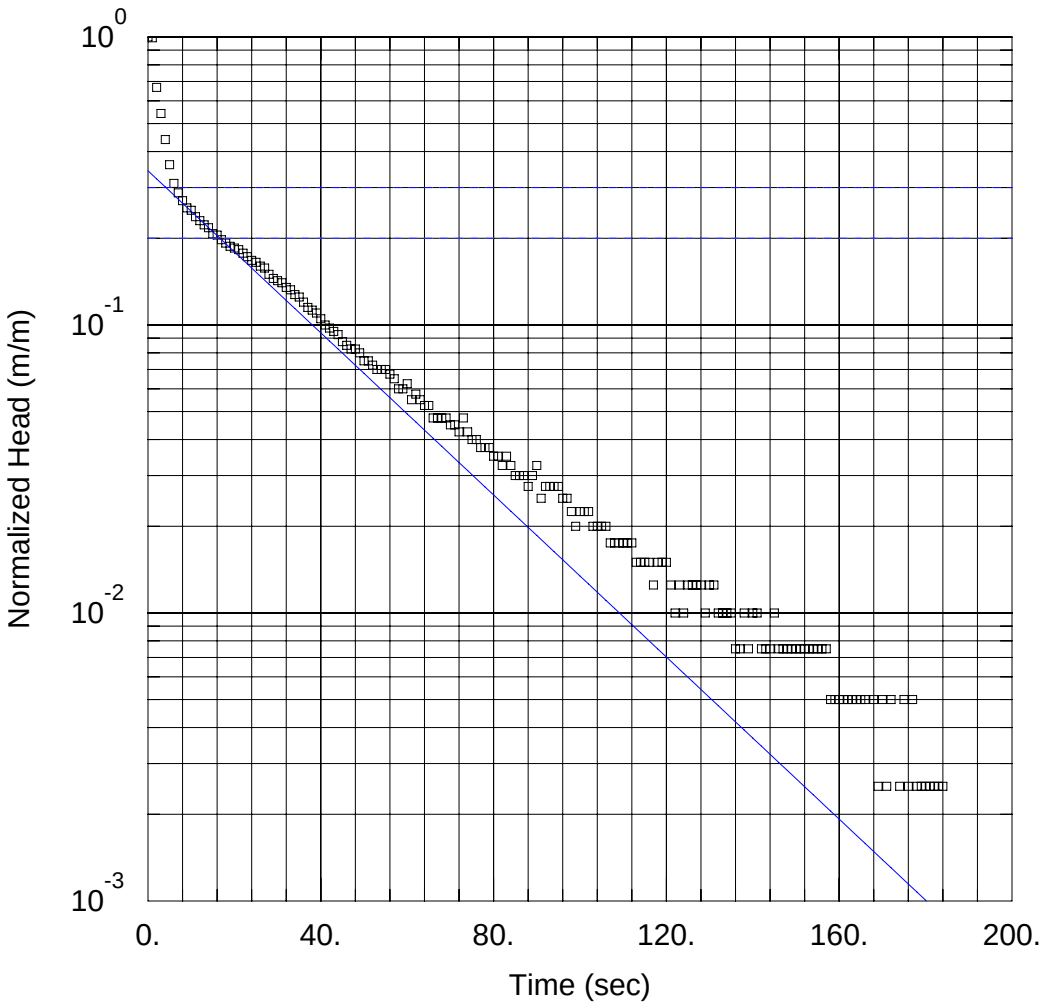
WELL DATA (SP4b)

Initial Displacement: 0.4 m
Total Well Penetration Depth: 2.9 m
Casing Radius: 0.025 m
Static Water Column Height: 3.5 m
Screen Length: 2.9 m
Well Radius: 0.05 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 2.525E-5 m/sec
y0 = 0.3118 m



SP4B TEST 1

Data Set: P:\...\2008 Test2.aqt
Date: 01/27/09 Time: 11:15:53

PROJECT INFORMATION

Company: SRK
Client: D&T
Project: 1CD003.112
Location: Faro S-Cluster
Test Well: SP4b
Test Date: Sep 3, 2008

AQUIFER DATA

Saturated Thickness: 2.9 m Anisotropy Ratio (Kz/Kr): 1.

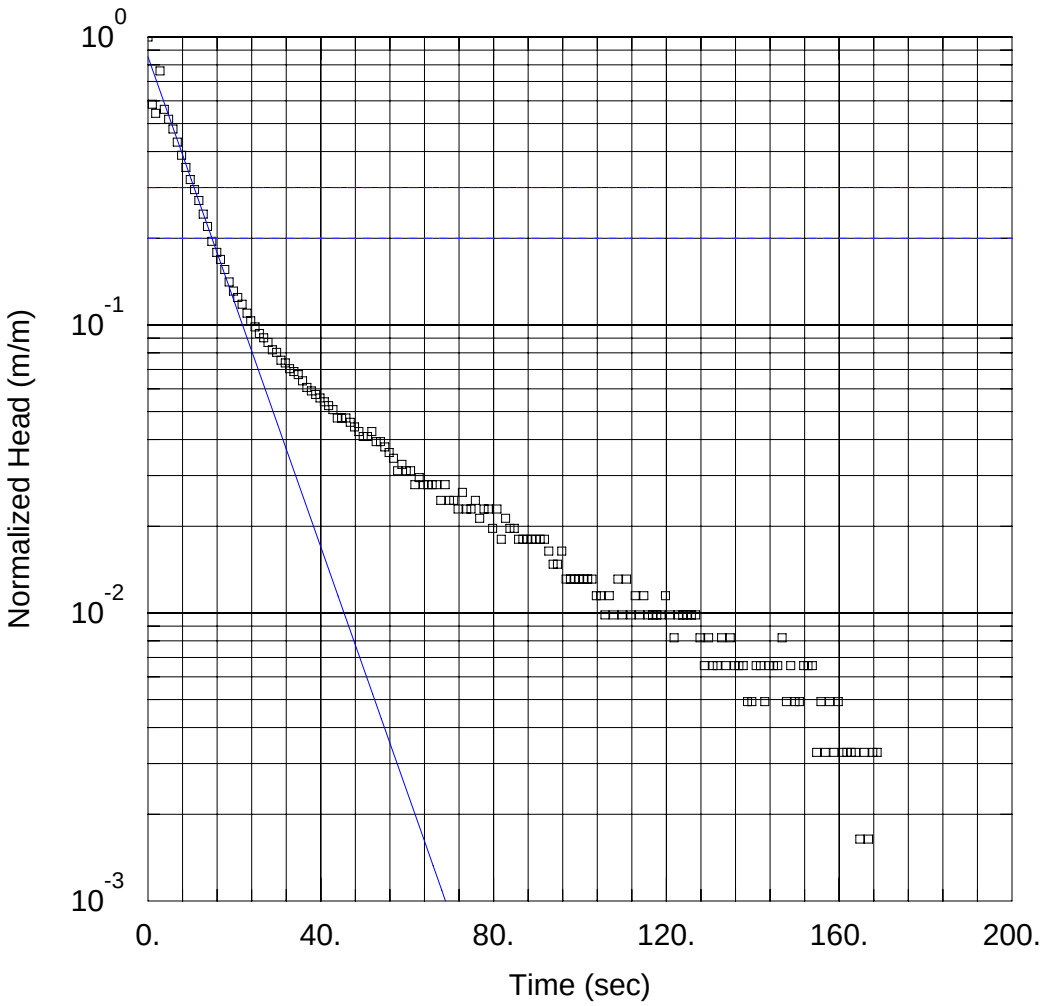
WELL DATA (SP4b)

Initial Displacement: 0.4 m
Total Well Penetration Depth: 2.9 m
Casing Radius: 0.025 m
Static Water Column Height: 3.5 m
Screen Length: 2.9 m
Well Radius: 0.05 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 1.087E-5 m/sec
y0 = 0.1372 m



SP4B TEST 1

Data Set: P:\...\2008 Test3.aqt
Date: 01/27/09 Time: 11:16:04

PROJECT INFORMATION

Company: SRK
Client: D&T
Project: 1CD003.112
Location: Faro S-Cluster
Test Well: SP4b
Test Date: September 2008

AQUIFER DATA

Saturated Thickness: 2.9 m Anisotropy Ratio (Kz/Kr): 1.

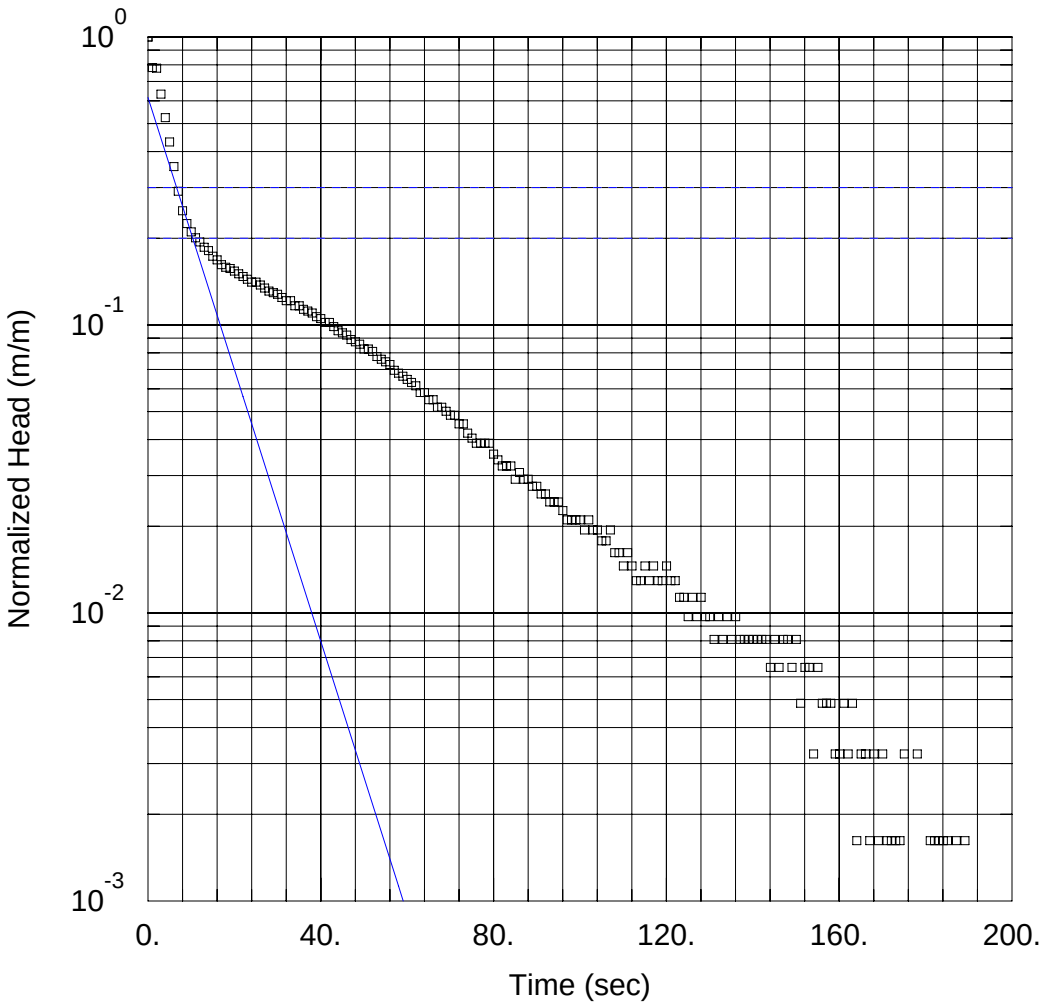
WELL DATA (SP4b)

Initial Displacement: 0.61 m
Total Well Penetration Depth: 2.9 m
Casing Radius: 0.025 m
Static Water Column Height: 3.5 m
Screen Length: 2.9 m
Well Radius: 0.05 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 3.286E-5 m/sec
y0 = 0.5203 m



SP4B TEST 1

Data Set: P:\...\2008 Test4.aqt
Date: 01/27/09 Time: 11:15:33

PROJECT INFORMATION

Company: SRK
Client: D&T
Project: 1CD003.112
Location: Faro S-Cluster
Test Well: SP4b
Test Date: Sep 3, 2008

AQUIFER DATA

Saturated Thickness: 2.9 m Anisotropy Ratio (Kz/Kr): 1.

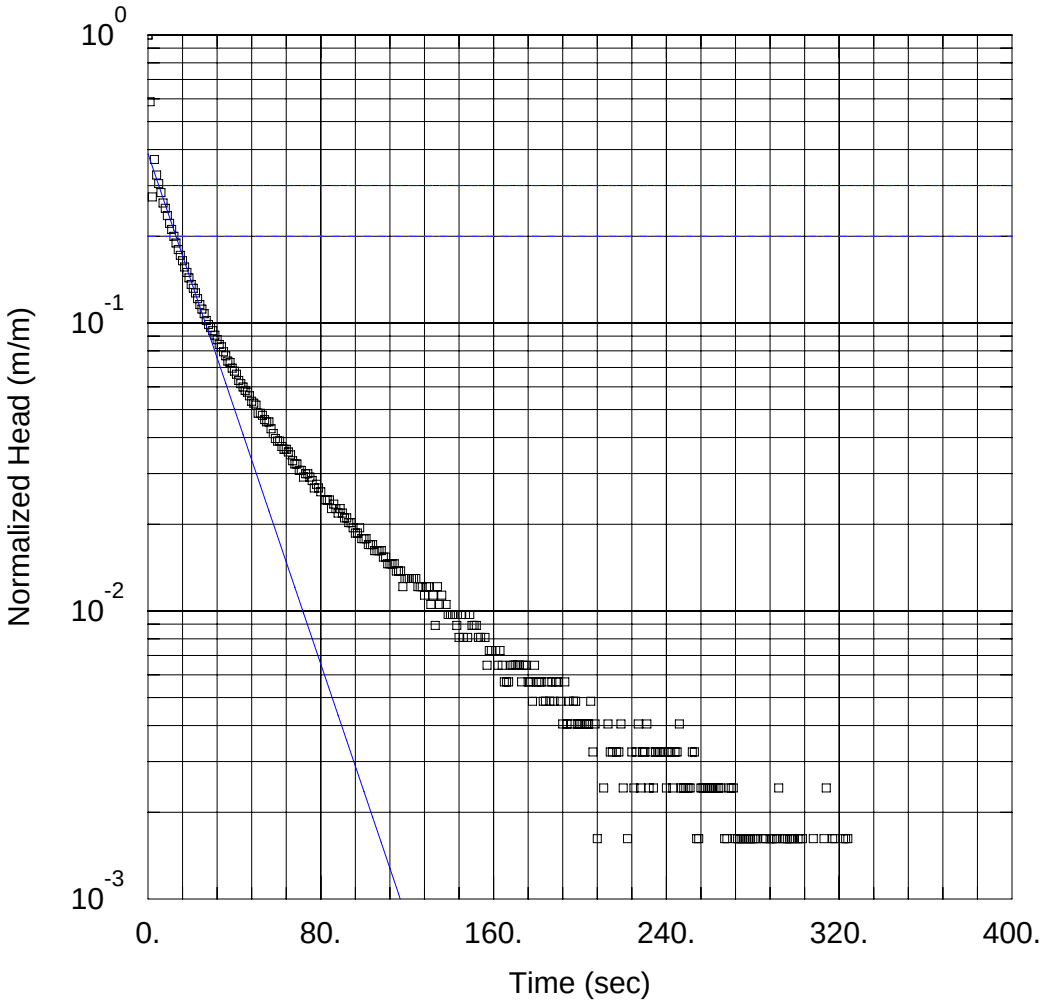
WELL DATA (SP4b)

Initial Displacement: 0.618 m
Total Well Penetration Depth: 2.9 m
Casing Radius: 0.025 m
Static Water Column Height: 3.5 m
Screen Length: 2.9 m
Well Radius: 0.05 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 3.647E-5 m/sec
y0 = 0.381 m



WELL TEST ANALYSIS

Data Set: P:\...\SP7a_Test1.aqt
Date: 01/27/09 Time: 11:18:07

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: SP7a

AQUIFER DATA

Saturated Thickness: 15.1 m Anisotropy Ratio (Kz/Kr): 1.

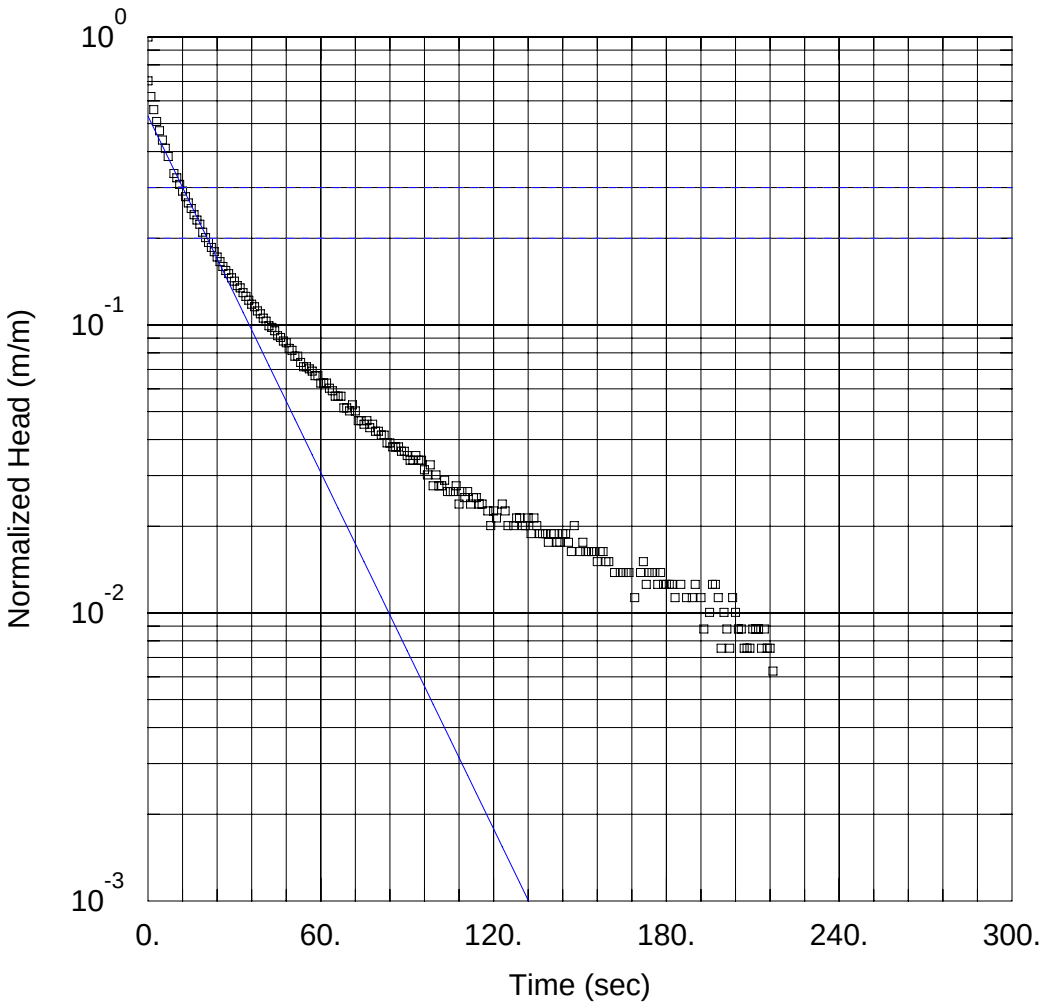
WELL DATA (test 1)

Initial Displacement: 1.235 m
Total Well Penetration Depth: 15.1 m
Casing Radius: 0.0257 m
Static Water Column Height: 15.1 m
Screen Length: 3. m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 2.624E-5 m/sec
y0 = 0.4778 m



WELL TEST ANALYSIS

Data Set: P:\...\SP7a_Test2.aqt
Date: 01/27/09 Time: 11:18:19

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: Test 2

AQUIFER DATA

Saturated Thickness: 15.1 m Anisotropy Ratio (Kz/Kr): 1.

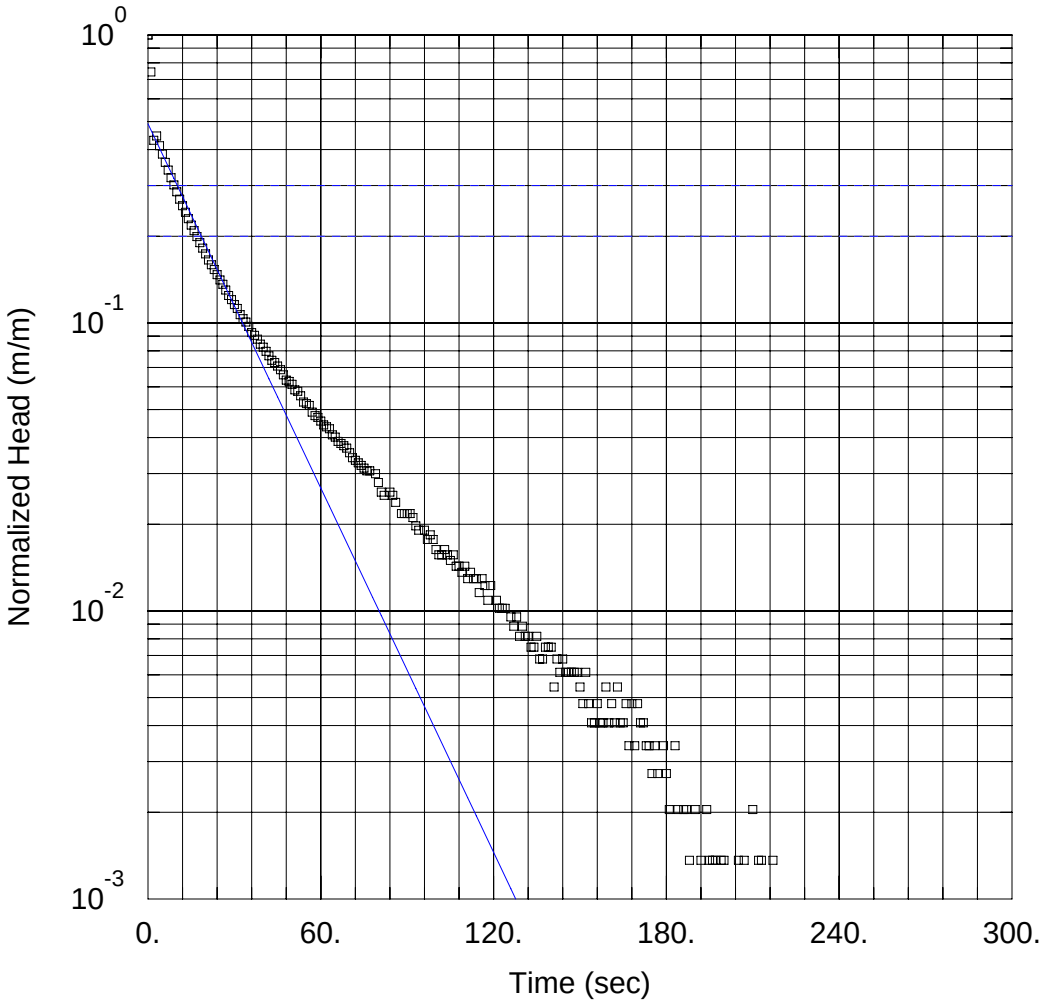
WELL DATA (test 2)

Initial Displacement: 0.796 m
Total Well Penetration Depth: 15.1 m
Casing Radius: 0.0257 m
Static Water Column Height: 15.1 m
Screen Length: 3. m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 2.443E-5 m/sec
y0 = 0.4226 m



WELL TEST ANALYSIS

Data Set: P:\...\SP7a_Test3.aqt
Date: 01/27/09 Time: 11:18:32

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: Test 2

AQUIFER DATA

Saturated Thickness: 15.1 m Anisotropy Ratio (Kz/Kr): 1.

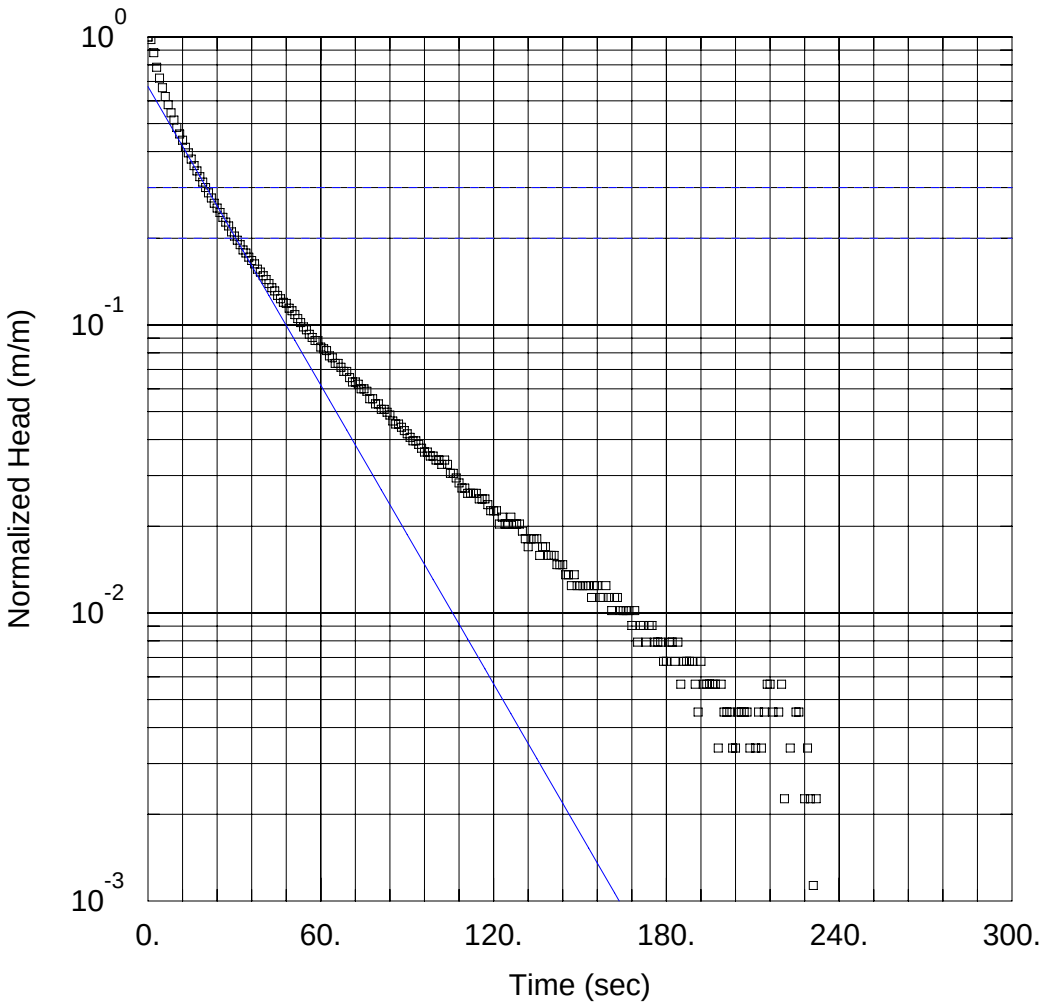
WELL DATA (test 3)

Initial Displacement: 1.469 m
Total Well Penetration Depth: 15.1 m
Casing Radius: 0.0257 m
Static Water Column Height: 15.1 m
Screen Length: 3. m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 2.497E-5 m/sec
y0 = 0.7216 m



WELL TEST ANALYSIS

Data Set: P:\...\SP7a_Test4.aqt
Date: 01/27/09 Time: 11:18:41

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: Test 2

AQUIFER DATA

Saturated Thickness: 15.1 m Anisotropy Ratio (Kz/Kr): 1.

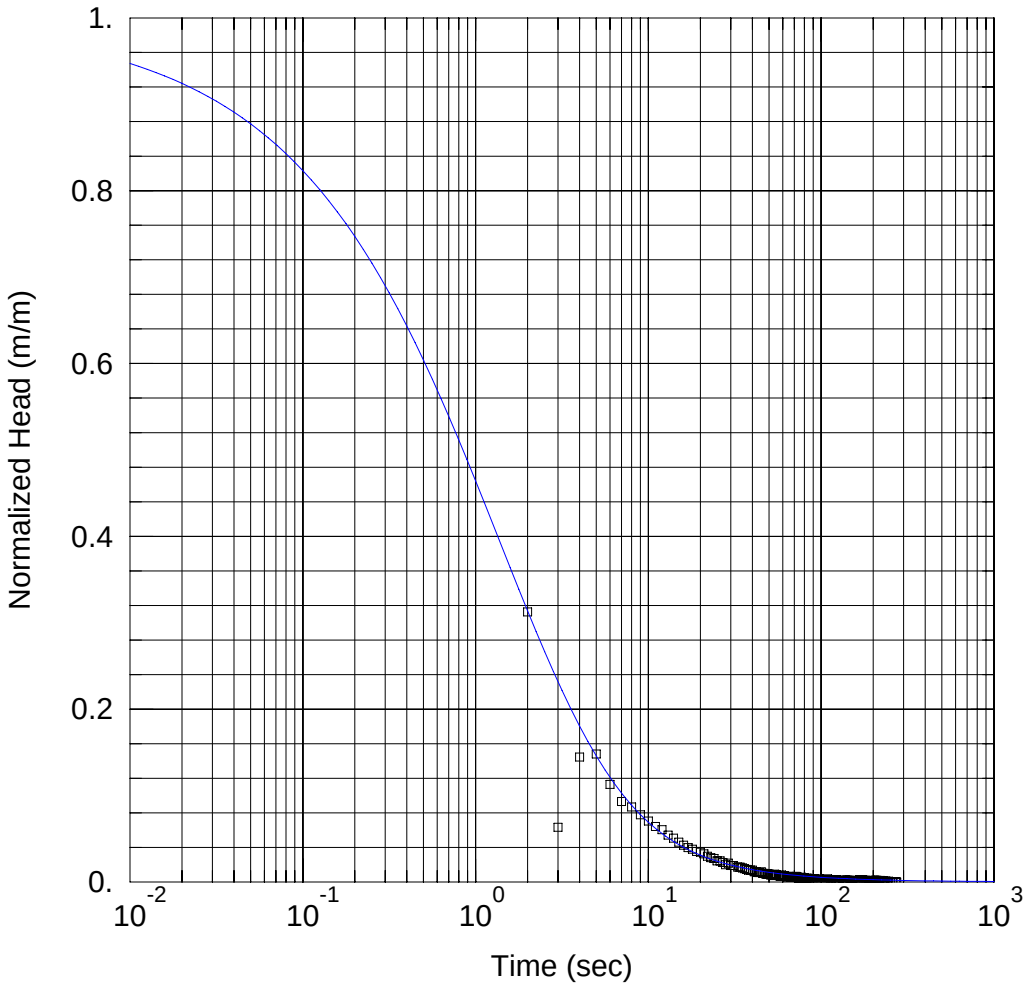
WELL DATA (test 4)

Initial Displacement: 0.884 m
Total Well Penetration Depth: 15.1 m
Casing Radius: 0.0257 m
Static Water Column Height: 15.1 m
Screen Length: 3. m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 2.047E-5 m/sec
y0 = 0.5944 m



WELL TEST ANALYSIS

Data Set: P:\...\SP7b_Test1.aqt
Date: 01/27/09 Time: 11:18:52

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: SP7b Slug

AQUIFER DATA

Saturated Thickness: 6.12 m Anisotropy Ratio (Kz/Kr): 1.

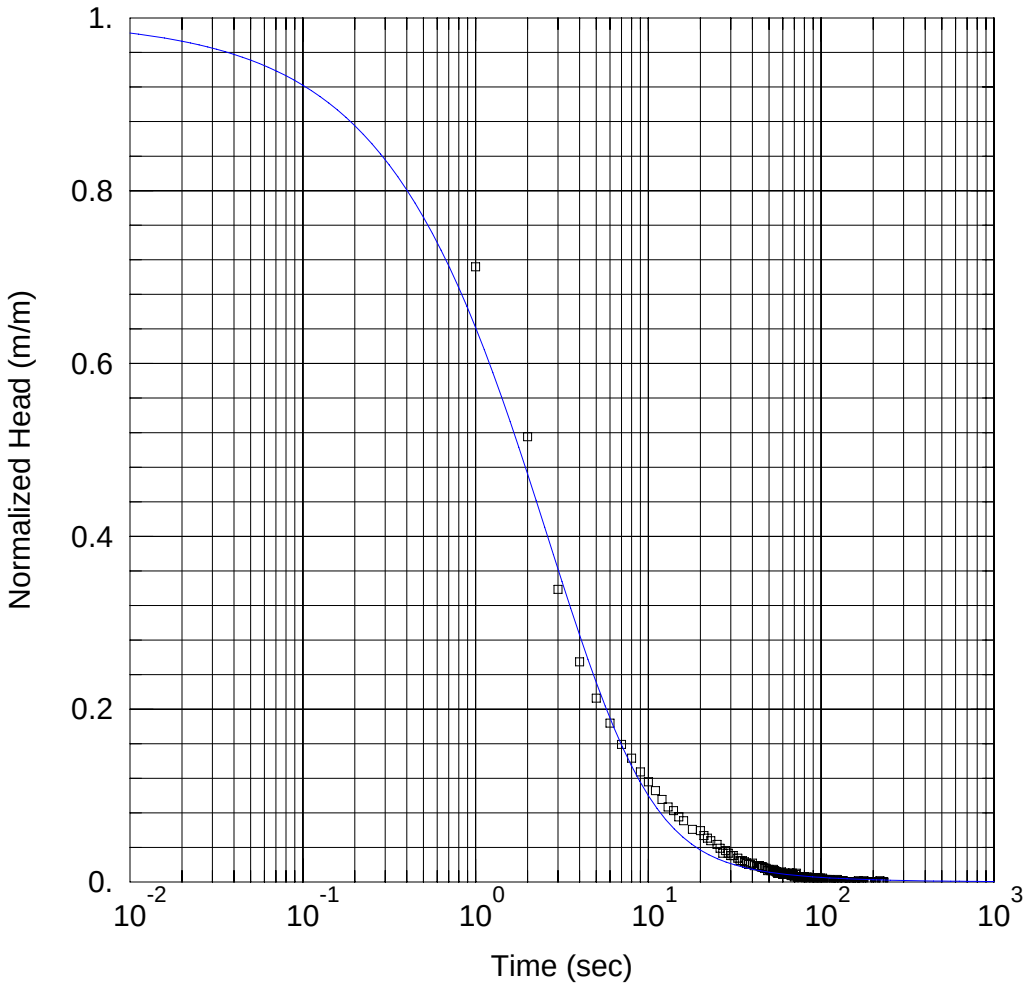
WELL DATA (SP7b_Test1)

Initial Displacement: 1.107 m
Total Well Penetration Depth: 6.12 m
Casing Radius: 0.0257 m
Static Water Column Height: 1. m
Screen Length: 3. m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 0.0003273 m^2/sec
S = 0.1



WELL TEST ANALYSIS

Data Set: P:\...\SP7b_Test2.aqt
Date: 01/27/09 Time: 11:19:04

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: SP7b Slug

AQUIFER DATA

Saturated Thickness: 6.12 m Anisotropy Ratio (Kz/Kr): 1.

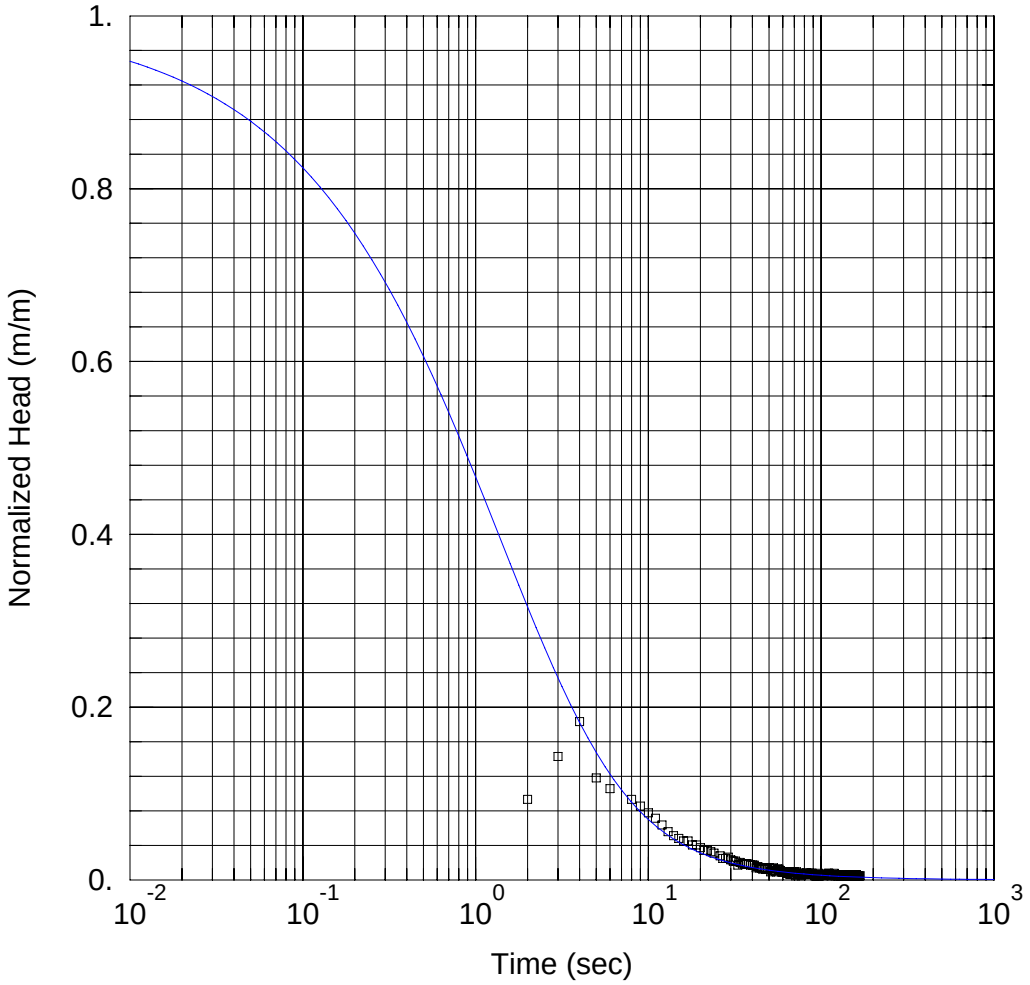
WELL DATA (SP7b_Test2)

Initial Displacement: 0.691 m
Total Well Penetration Depth: 6.12 m
Casing Radius: 0.0257 m
Static Water Column Height: 1. m
Screen Length: 3. m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

$T = 0.0003458\ m^2/sec$
$S = 0.006438$



WELL TEST ANALYSIS

Data Set: P:\...\SP7b_Test3.aqt
Date: 01/27/09 Time: 11:19:13

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: SP7b Slug
Test Date: September 2008

AQUIFER DATA

Saturated Thickness: 6.12 m Anisotropy Ratio (Kz/Kr): 1.

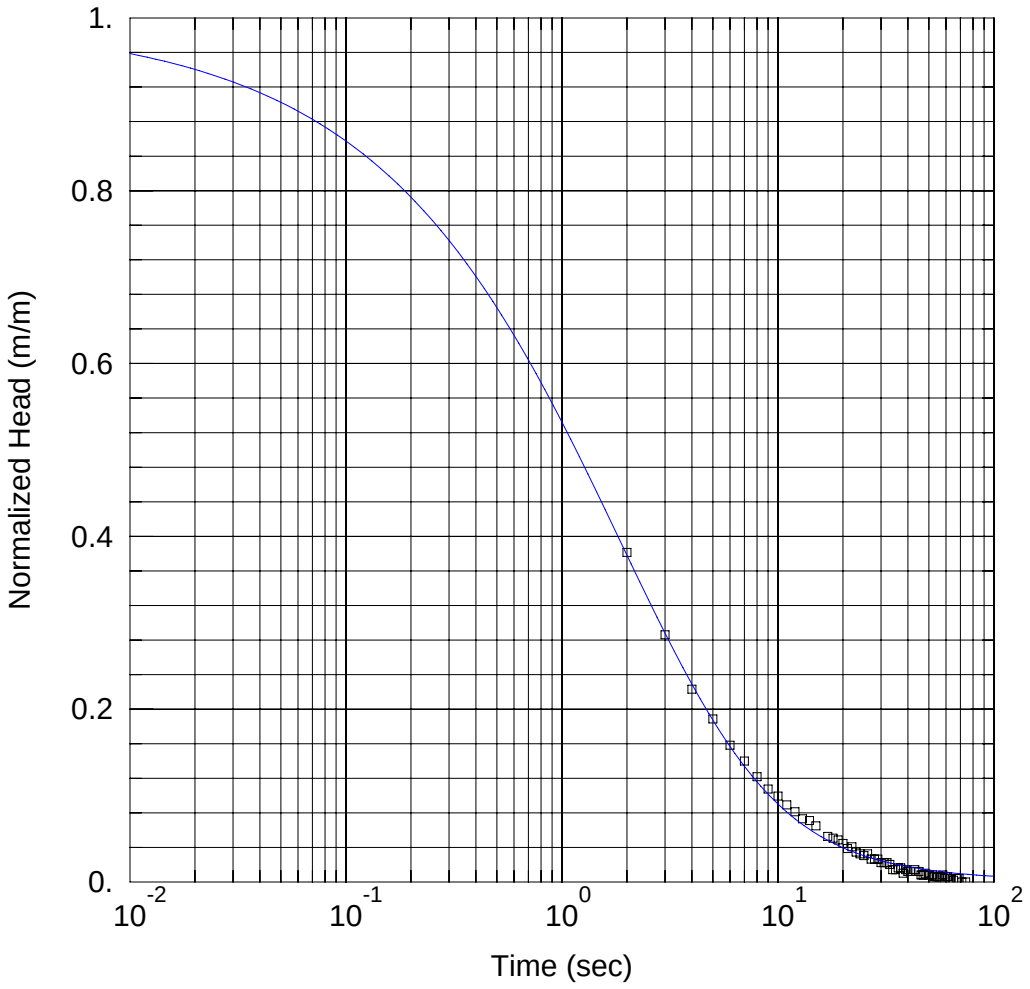
WELL DATA (SP7b_Test3)

Initial Displacement: 0.644 m
Total Well Penetration Depth: 6.12 m
Casing Radius: 0.0257 m
Static Water Column Height: 1. m
Screen Length: 3. m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

$T = 0.0003237\ m^2/sec$
$S = 0.1$



WELL TEST ANALYSIS

Data Set: P:\...\SP7b_Test4.aqt
Date: 01/27/09 Time: 11:17:58

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: SP7b Slug

AQUIFER DATA

Saturated Thickness: 6.12 m Anisotropy Ratio (Kz/Kr): 1.

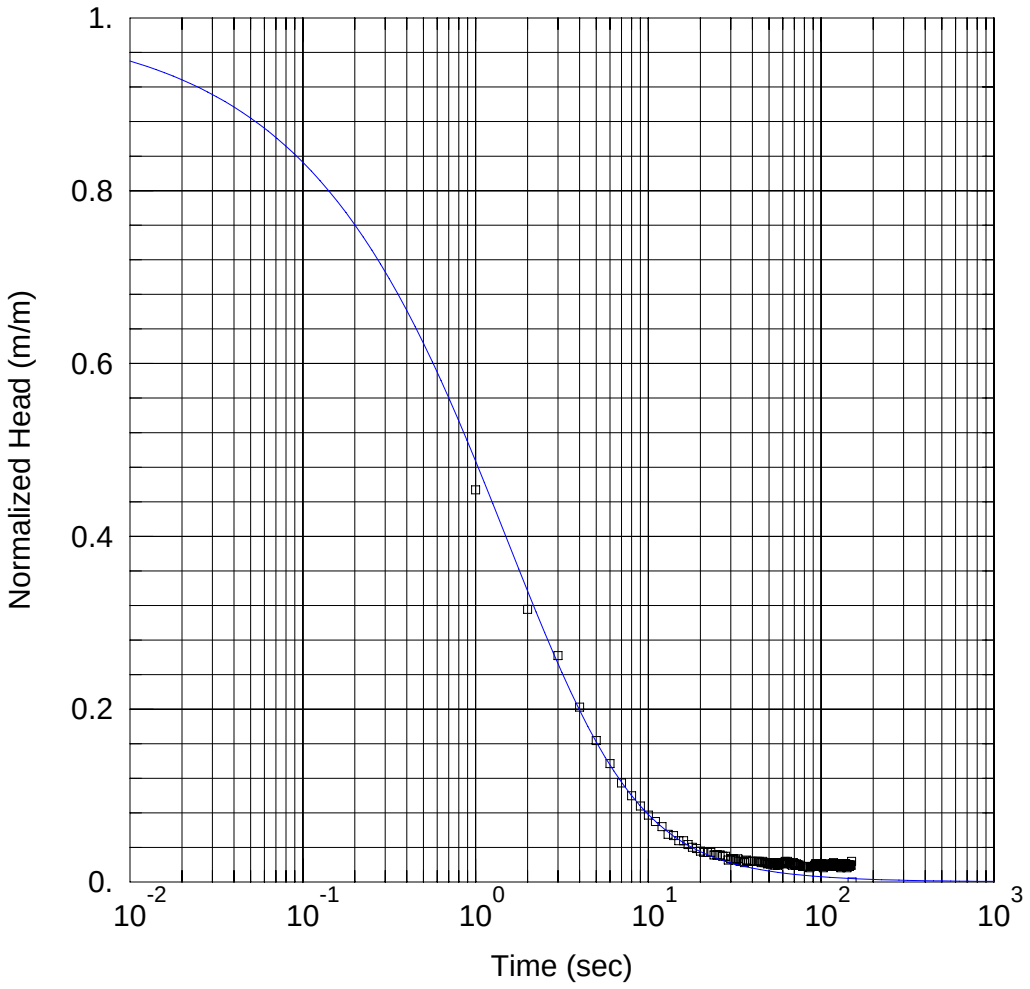
WELL DATA (SP7b_Test4)

Initial Displacement: 0.493 m
Total Well Penetration Depth: 6.12 m
Casing Radius: 0.0257 m
Static Water Column Height: 1. m
Screen Length: 3. m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

$T = 0.0002728\ m^2/sec$
$S = 0.07108$



WELL TEST ANALYSIS

Data Set: P:\...\SP8a_Test 1.aqt
Date: 01/27/09 Time: 11:22:13

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: SP8a Slug

AQUIFER DATA

Saturated Thickness: 10.76 m Anisotropy Ratio (Kz/Kr): 1.

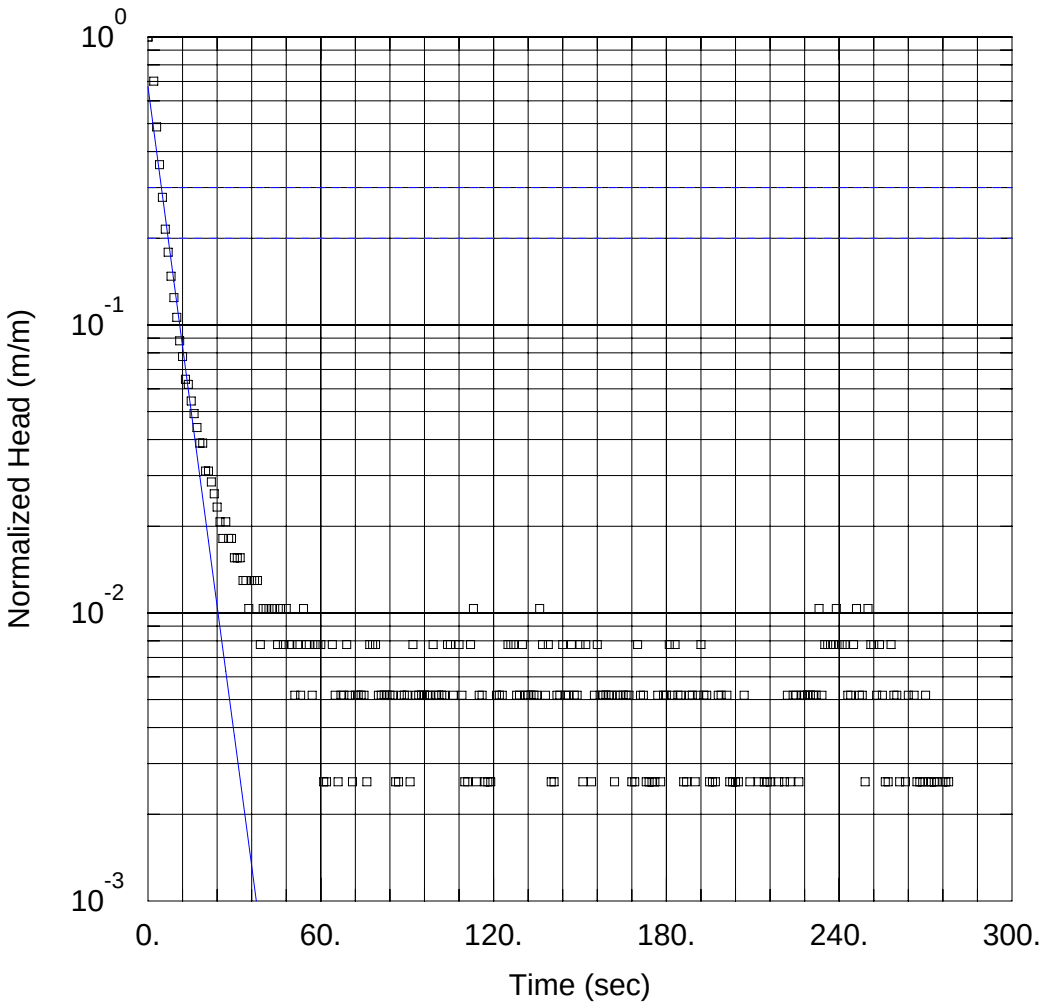
WELL DATA (SP8a-Test1)

Initial Displacement: 0.672 m
Total Well Penetration Depth: 10.76 m
Casing Radius: 0.0257 m
Static Water Column Height: 10.76 m
Screen Length: 3. m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 0.0002939 m^2/sec
S = 0.1



WELL TEST ANALYSIS

Data Set: P:\...\SP8a_Test 2.aqt
Date: 01/27/09 Time: 11:22:27

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: SP8a Slug

AQUIFER DATA

Saturated Thickness: 10.76 m Anisotropy Ratio (Kz/Kr): 1.

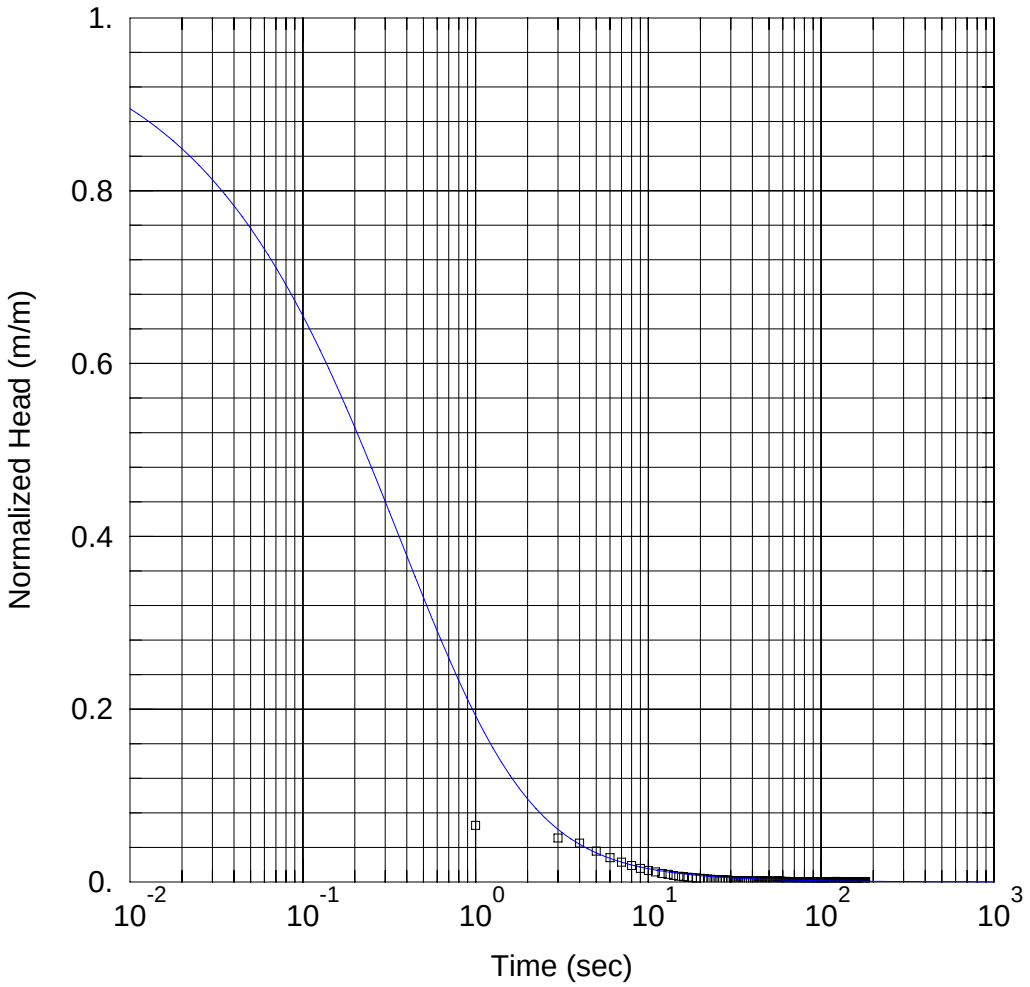
WELL DATA (SP8a-Test2)

Initial Displacement: 0.386 m
Total Well Penetration Depth: 10.76 m
Casing Radius: 0.0257 m
Static Water Column Height: 10.76 m
Screen Length: 3. m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 8.515E-5 m/sec
y0 = 0.259 m



WELL TEST ANALYSIS

Data Set: P:\...\SP8a_Test 3.aqt
Date: 01/27/09 Time: 11:22:46

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: SP8a Slug

AQUIFER DATA

Saturated Thickness: 10.76 m Anisotropy Ratio (Kz/Kr): 1.

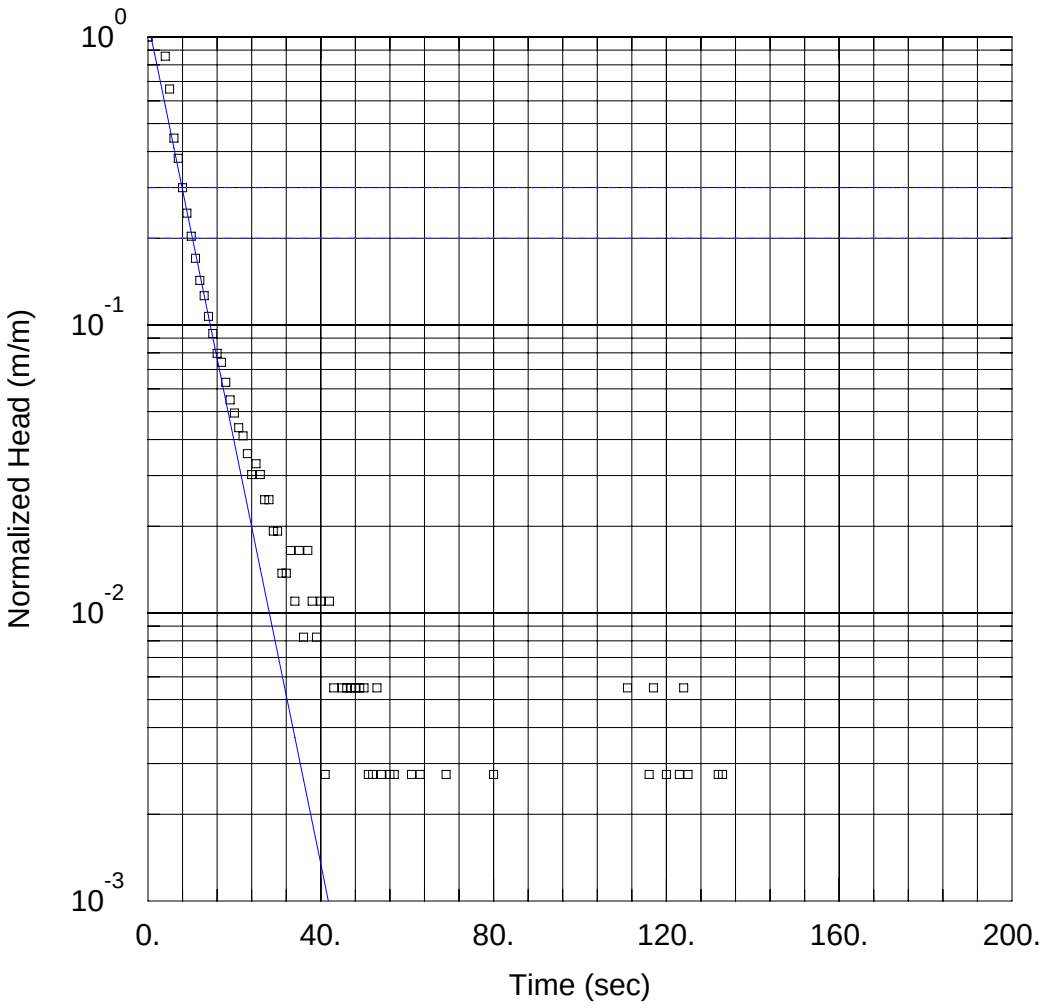
WELL DATA (SP8a-Test3)

Initial Displacement: 6.131 m
Total Well Penetration Depth: 10.76 m
Casing Radius: 0.0257 m
Static Water Column Height: 10.76 m
Screen Length: 3. m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 0.001219 m^2/sec
S = 0.1



WELL TEST ANALYSIS

Data Set: P:\...\SP8a_Test 4.aqt
Date: 01/27/09 Time: 11:22:58

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: SP8a Slug

AQUIFER DATA

Saturated Thickness: 10.76 m Anisotropy Ratio (Kz/Kr): 1.

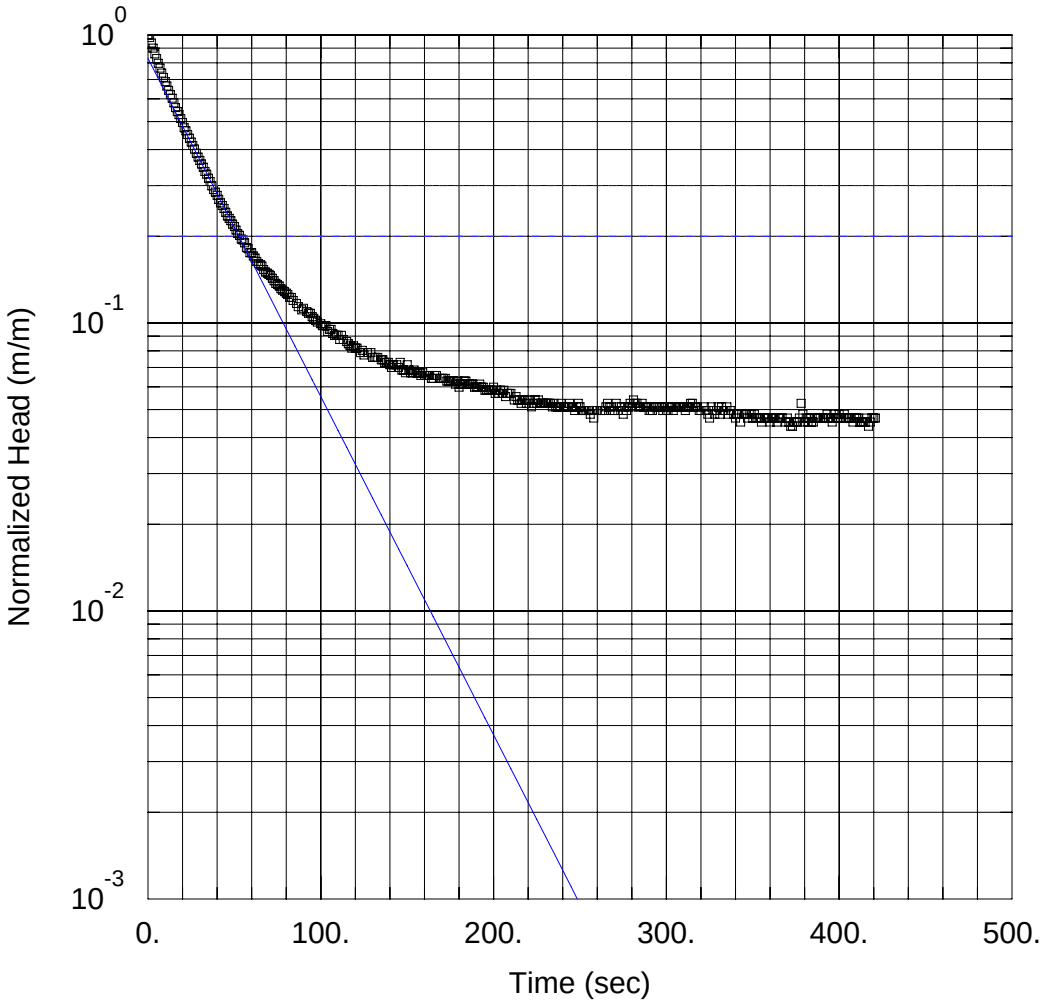
WELL DATA (SP8a-Test4)

Initial Displacement: 0.364 m
Total Well Penetration Depth: 10.76 m
Casing Radius: 0.0257 m
Static Water Column Height: 10.76 m
Screen Length: 3. m
Well Radius: 0.0257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 8.286E-5 m/sec
y0 = 0.4119 m



WELL TEST ANALYSIS

Data Set: P:\...\SP8b_Test1.aqt
Date: 01/27/09 Time: 11:23:20

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: SP8b Slug

AQUIFER DATA

Saturated Thickness: 8.27 m Anisotropy Ratio (Kz/Kr): 1.

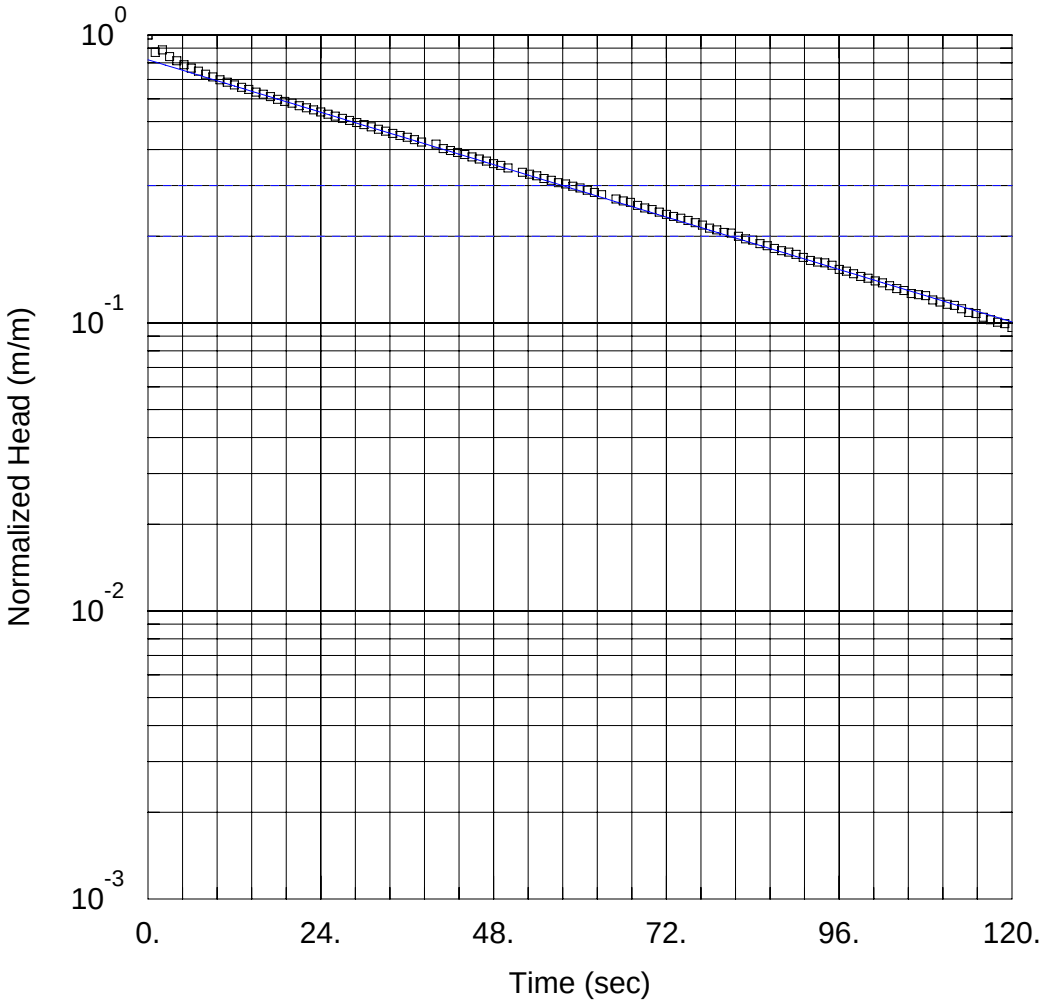
WELL DATA (SP8b_Test1)

Initial Displacement: 0.685 m
Total Well Penetration Depth: 4.27 m
Casing Radius: 0.257 m
Static Water Column Height: 4.27 m
Screen Length: 3. m
Well Radius: 0.257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.0004783 m/sec
y0 = 0.5676 m



WELL TEST ANALYSIS

Data Set: P:\...\SP8b_Test2.aqt
Date: 01/27/09 Time: 11:23:33

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: SP8b Slug

AQUIFER DATA

Saturated Thickness: 8.27 m Anisotropy Ratio (Kz/Kr): 1.

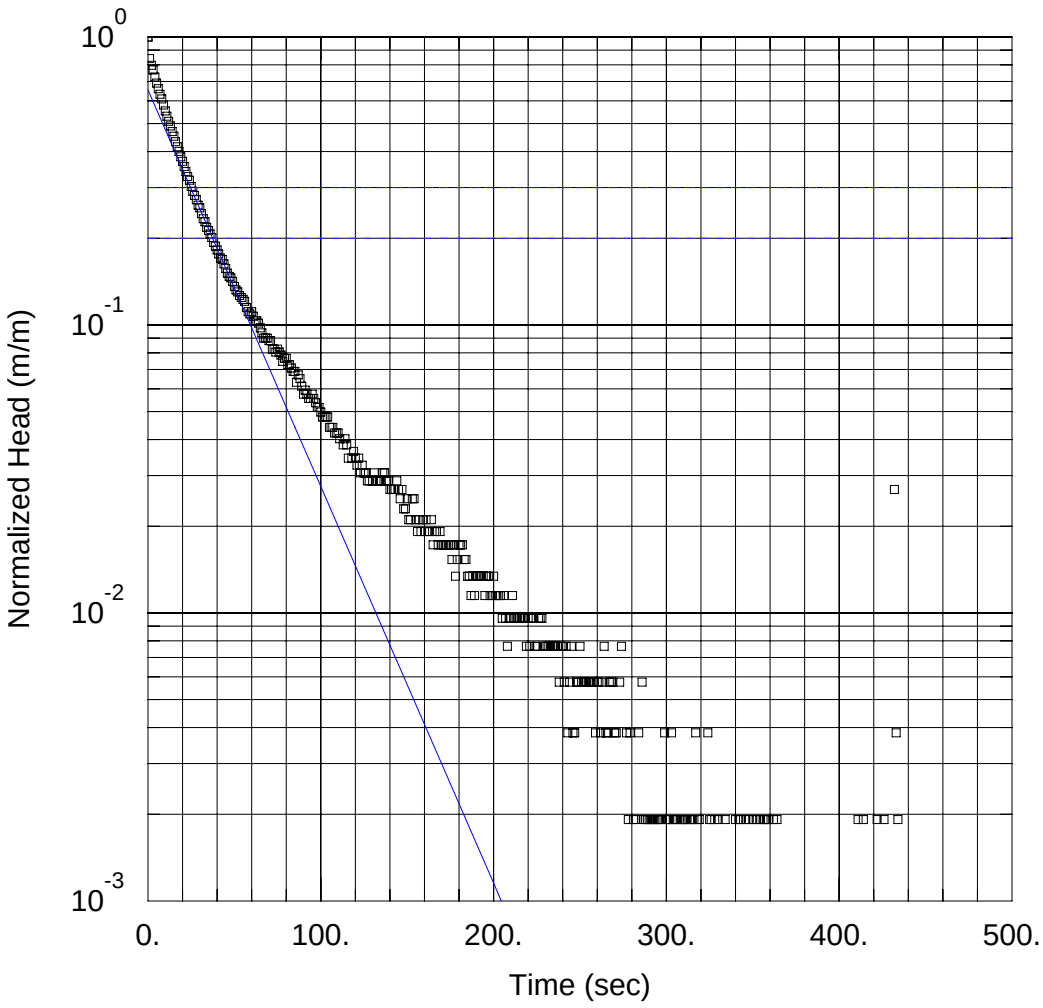
WELL DATA (SP8b_Test2)

Initial Displacement: 0.965 m
Total Well Penetration Depth: 4.27 m
Casing Radius: 0.257 m
Static Water Column Height: 4.27 m
Screen Length: 3. m
Well Radius: 0.257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.0003089 m/sec
y0 = 0.791 m



WELL TEST ANALYSIS

Data Set: P:\...\SP8b_Test3.aqt
Date: 01/27/09 Time: 11:23:42

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: SP8b Slug

AQUIFER DATA

Saturated Thickness: 8.27 m Anisotropy Ratio (Kz/Kr): 1.

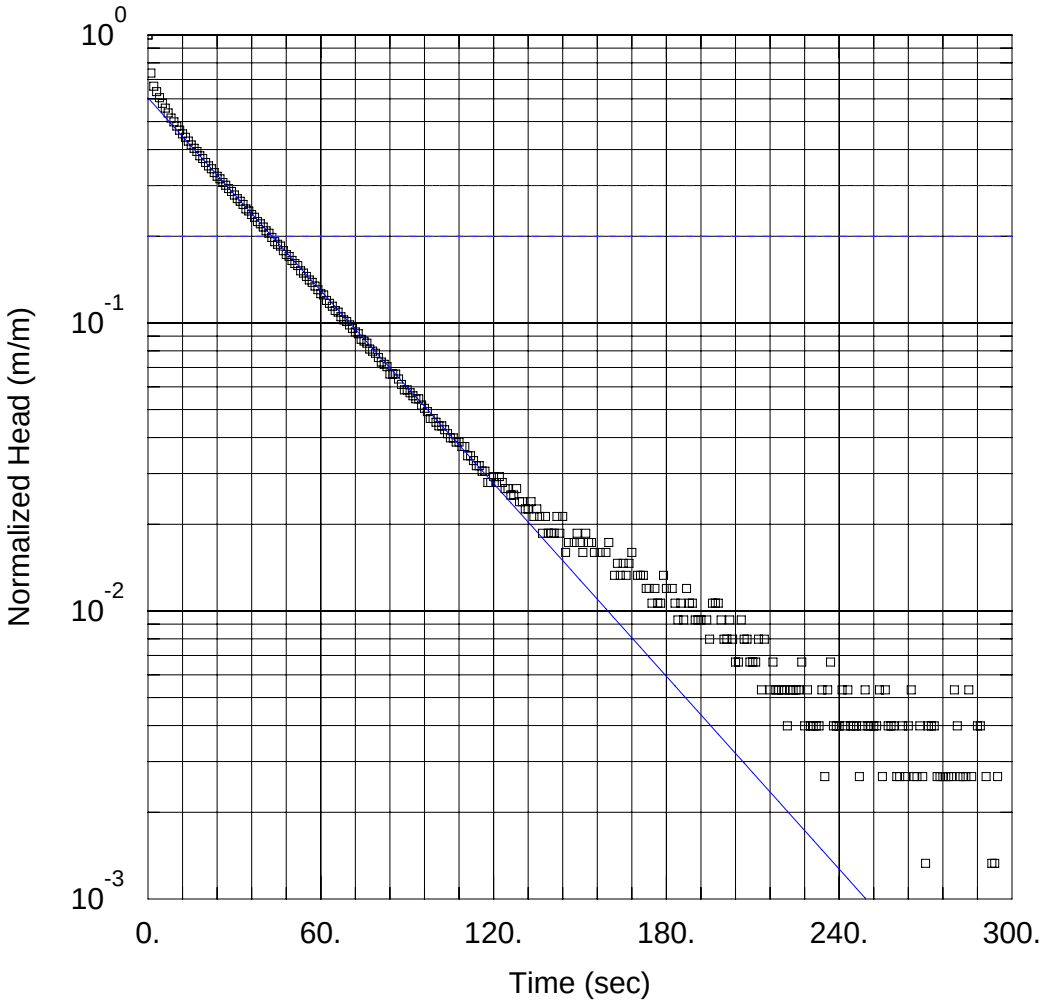
WELL DATA (SP8b_Test3)

Initial Displacement: 0.522 m
Total Well Penetration Depth: 4.27 m
Casing Radius: 0.257 m
Static Water Column Height: 4.27 m
Screen Length: 3. m
Well Radius: 0.257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.0005607 m/sec
y0 = 0.3416 m



WELL TEST ANALYSIS

Data Set: P:\...\SP8b_Test4.aqt
Date: 01/27/09 Time: 11:22:02

PROJECT INFORMATION

Company: SRK Consulting
Client: Faro
Location: Faro Mine
Test Well: SP8b Slug
Test Date: September 2008

AQUIFER DATA

Saturated Thickness: 8.27 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (SP8b_Test4)

Initial Displacement: 0.752 m
Total Well Penetration Depth: 4.27 m
Casing Radius: 0.257 m
Static Water Column Height: 4.27 m
Screen Length: 3. m
Well Radius: 0.257 m

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.0004544 m/sec
y0 = 0.4544 m

Appendix C
Field Program Water Quality Data

Certificate of Analysis

SRK CONSULTING (CANADA) INC.

ATTN: DAN MACKIE

SUITE 2200
1066 WEST HASTINGS ST.
VANCOUVER BC V6E 3X2

Reported On: 06-OCT-08 11:32 AM

Lab Work Order #: L686337 **Date Received:** 23-SEP-08

Project P.O. #:
Job Reference: FARO S-CLUSTER
Legal Site Desc:
CofC Numbers: 47805

Other Information:

Comments: Some of the metals detection limits were increased due to high levels of metals in these samples.

LINDSAY JONES
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L686337-1	L686337-2			
	Description					
	Sampled Date	19-SEP-08	18-SEP-08			
	Sampled Time	14:00	15:00			
	Client ID	SRK08-SPW1	SRK08-SPW2			
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	92.5				
	Conductivity (uS/cm)	946				
	Hardness (as CaCO3) (mg/L)	496	5270			
	pH (pH)	6.85				
	Total Suspended Solids (mg/L)	<3.0				
	Total Dissolved Solids (mg/L)	682				
	Turbidity (NTU)	16.3				
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	276				
	Ammonia as N (mg/L)	0.0624				
	Bromide (Br) (mg/L)	0.069				
	Chloride (Cl) (mg/L)	30.1				
	Fluoride (F) (mg/L)	0.030				
	Nitrate (as N) (mg/L)	<0.0050				
	Nitrite (as N) (mg/L)	<0.0010				
	Sulfate (SO4) (mg/L)	4.01				
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.0463	<0.10			
	Antimony (Sb)-Dissolved (mg/L)	0.00023	<0.010			
	Arsenic (As)-Dissolved (mg/L)	0.00593	<0.010			
	Barium (Ba)-Dissolved (mg/L)	0.0315	0.0224			
	Beryllium (Be)-Dissolved (mg/L)	0.0011	<0.050			
	Bismuth (Bi)-Dissolved (mg/L)	<0.0010	<0.050			
	Boron (B)-Dissolved (mg/L)	<0.020	<1.0			
	Cadmium (Cd)-Dissolved (mg/L)	0.00017	0.0333			
	Calcium (Ca)-Dissolved (mg/L)	123	485			
	Chromium (Cr)-Dissolved (mg/L)	<0.0060	<0.050			
	Cobalt (Co)-Dissolved (mg/L)	0.0128	0.036			
	Copper (Cu)-Dissolved (mg/L)	0.00082	<0.010			
	Iron (Fe)-Dissolved (mg/L)	20.7	0.093			
	Lead (Pb)-Dissolved (mg/L)	0.00130	<0.0050			
	Lithium (Li)-Dissolved (mg/L)	0.070	<0.50			
	Magnesium (Mg)-Dissolved (mg/L)	46.0	986			
	Manganese (Mn)-Dissolved (mg/L)	1.53	71.8			
	Molybdenum (Mo)-Dissolved (mg/L)	0.00048	<0.0050			
	Nickel (Ni)-Dissolved (mg/L)	0.0289	2.12			
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.60			
	Potassium (K)-Dissolved (mg/L)	5.5	11.7			
	Selenium (Se)-Dissolved (mg/L)	<0.0020	<0.10			
	Silicon (Si)-Dissolved (mg/L)	15.9	11.5			

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L686337-1	L686337-2			
	Description					
	Sampled Date	19-SEP-08	18-SEP-08			
	Sampled Time	14:00	15:00			
	Client ID	SRK08-SPW1	SRK08-SPW2			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Silver (Ag)-Dissolved (mg/L)	<0.000020	<0.0010			
	Sodium (Na)-Dissolved (mg/L)	17.0	37.6			
	Strontium (Sr)-Dissolved (mg/L)	0.667	2.22			
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.010			
	Tin (Sn)-Dissolved (mg/L)	<0.00020	<0.010			
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.020			
	Uranium (U)-Dissolved (mg/L)	0.000750	0.0068			
	Vanadium (V)-Dissolved (mg/L)	<0.0020	<0.10			
	Zinc (Zn)-Dissolved (mg/L)	1.35	330			

Reference Information

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comments

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	APHA 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.

ANIONS-BR-IC-VA	Water	Bromide by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-F-IC-VA	Water	Fluoride by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-NO2-IC-VA	Water	Nitrite by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-NO3-IC-VA	Water	Nitrate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

COLOUR-TRUE-VA	Water	Color (True) by Spectrometer	APHA 2120 "Color"

This analysis is carried out using procedures adapted from APHA Method 2120 "Color". Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Aparent Colour is determined without prior sample filtration. Colour is pH dependent. Unless otherwise indicated, reported colour results pertain to the pH of the sample as received, to within +/- 1 pH unit.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.

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

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
		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-DIS-LOW-MS-VA	Water	Dissolved Metals in Water by ICPMS(Low)	EPA SW-846 3005A/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 involves preliminary sample treatment by filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).	
NH3-COL-VA	Water	Ammonia by Color	APHA 4500-NH3 "Nitrogen (Ammonia)"
		This analysis is carried out, on unpreserved samples, using procedures adapted from APHA Method 4500-NH3 "Nitrogen (Ammonia)". Ammonia is determined using the phenate colourimetric method.	
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	
TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC
		This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.	
TSS-VA	Water	Solids by Gravimetric	APHA 2540 D - GRAVIMETRIC
		This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.	
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.	

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.
The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA		

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)

GLOSSARY OF REPORT TERMS
Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.
The reported surrogate recovery value provides a measure of method efficiency.
mg/kg (units) - unit of concentration based on mass, parts per million
mg/L (units) - unit of concentration based on volume, parts per million
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.
Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

47805

ALS Environmental (ALS) www.alsenviro.com
excellence in analytical testing

Vancouver, BC 1988 Triumph Street V5L 1K5 Tel: 604-253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-6700
Fort St. John, BC #2 - 8820 100th Street V1J 3W9 Tel: 250-785-8281 Fax: 250-785-8286
Calgary, AB #2 - 21 Highfield Circle SE T2G 5N6 Tel: 403-214-5431 Toll Free: 1-866-722-6231 Fax: 403-214-5430
Burlington, ON 5420 Mainway Drive, Unit 5 L7L 6A4 Tel: 905-331-3111 Toll Free: 1-888-257-3684 Fax: 905-331-4567

CHAIN OF CUSTODY FORM

PAGE _____ OF _____

SEND REPORT TO:

CLIENT: SRK CONSULTING ATTN.: DAN MACKIE

ADDRESS: 2200 1096 WEST HASTING ST

CITY: VANCOUVER PROV.: BC POSTAL CODE: V6E3X2

TELEPHONE: 604 681 4196 FAX: _____ SAMPLER: B Green

PROJECT NAME & NO.: FARO SCLUSTER QUOTE NO.: _____

PO NO.: _____ ALS CONTACT: _____

REPORT FORMAT: ☐ HARDCOPY ☒ EMAIL - ADDRESS: dmackie@srk.com

U681337 ☐ FAX ☐ EXCEL ☐ PDF ☐ OTHER: _____

FOR LAB USE ONLY

	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	ANALYSIS REQUESTED: GENERAL	DISS METALS	NOTES (sample specific comments, due dates, etc.)
	SRK08_SPW1	2008/09/19	1400	GW	1		
	SRK08-SPW1	2008/09/19	1400	GW		1	
	SRK08-SPW2	2008/09/18	1500	GW		1	

TURN AROUND REQUIRED: ☑ ROUTINE ☐ **RUSH - SPECIFY DATE:** _____ (surcharge may apply)

SEND INVOICE TO: ☑ SAME AS REPORT **INVOICE FORMAT:** ☐ HARDCOPY ☐ PDF ☐ FAX
☐ DIFFERENT FROM REPORT (provide details below)

SPECIAL INSTRUCTIONS:

RELINQUISHED BY:	DATE / TIME	RECEIVED BY:	DATE / TIME
Ben Green	DATE 20 sept 08 TIME 1500 hrs	[illegible]	DATE 9/23/08 TIME 2:28 PM
RELINQUISHED BY:	DATE / TIME	RECEIVED BY:	DATE / TIME

FOR LAB USE ONLY

COOLER SEAL INTACT? ☑ YES ☐ NO ☐ N/A

SAMPLE TEMPERATURE: 10 °C FROZEN? ☐ YES ☑ NO

COOLING METHOD? ☐ ICEPACKS ☑ ICE ☐ NONE

ALS COPY

SEE WHITEPAPER FOR SOURCE VERSIONR_08

Certificate of Analysis

SRK CONSULTING (CANADA) INC.

ATTN: DAN MACKIE

SUITE 2200
1066 WEST HASTINGS ST.
VANCOUVER BC V6E 3X2

Reported On: 19-SEP-08 05:13 PM
Revision: 1

Lab Work Order #: **L678707** **Date Received:** **05-SEP-08**

Project P.O. #: 1CD003.112
Job Reference: FARO GROUNDWATER 2008
Legal Site Desc:
CofC Numbers: C064218

Other Information:

Comments:
Some of the metals detection limits were increased due to high levels of metals in these samples.

LINDSAY JONES
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678707-1	L678707-2	L678707-3	L678707-4	L678707-5
	Description					
	Sampled Date	31-AUG-08	31-AUG-08	30-AUG-08	30-AUG-08	02-SEP-08
	Sampled Time					
	Client ID	SRK08-SP7A	SRK08-SP7B	SRK08-SP8A	SRK08-SP8B	SRK08-P9
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	141	151	147	73.9	<5.0
	Conductivity (uS/cm)	3260	6610	2740	1300	1290
	Hardness (as CaCO3) (mg/L)	2000	5160	1140	745	762
	pH (pH)	6.31	6.41	6.39	6.78	7.90
	Total Suspended Solids (mg/L)	215	108	349	315	104
	Total Dissolved Solids (mg/L)	3420	8430	2610	1020	1010
	Turbidity (NTU)	658	539	662	595	84.5
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	225	61.9	427	284	269
	Ammonia as N (mg/L)	0.203	0.458	0.293	0.266	0.0232
	Bromide (Br) (mg/L)	<5.0	<5.0	<5.0	<0.050	<0.050
	Chloride (Cl) (mg/L)	<50	<50	<50	1.38	1.77
	Fluoride (F) (mg/L)	<2.0	<2.0	<2.0	0.260	0.133
	Sulfate (SO4) (mg/L)	2140	5680	1470	481	487
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	6.85	18.4	7.44	3.01	3.64
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.0313	0.063	0.0273	0.0393	<0.0020
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.0020	<0.00050	<0.00020	<0.00020
	Arsenic (As)-Dissolved (mg/L)	0.00523	0.0028	0.00586	0.00076	0.00029
	Barium (Ba)-Dissolved (mg/L)	0.0298	0.0346	0.0212	0.0466	0.111
	Beryllium (Be)-Dissolved (mg/L)	<0.0025	<0.010	<0.0025	<0.0010	<0.0010
	Bismuth (Bi)-Dissolved (mg/L)	<0.0025	<0.010	<0.0025	<0.0010	<0.0010
	Boron (B)-Dissolved (mg/L)	<0.050	<0.20	<0.050	<0.020	<0.020
	Cadmium (Cd)-Dissolved (mg/L)	<0.00025	<0.0010	<0.00025	<0.00010	<0.00010
	Calcium (Ca)-Dissolved (mg/L)	485	489	287	192	243
	Chromium (Cr)-Dissolved (mg/L)	<0.0025	<0.010	<0.0025	<0.0010	<0.0010
	Cobalt (Co)-Dissolved (mg/L)	0.0223	0.0430	0.00654	0.00770	0.00128
	Copper (Cu)-Dissolved (mg/L)	0.00065	<0.0020	0.00064	0.00043	0.00178
	Iron (Fe)-Dissolved (mg/L)	50.8	76.5	29.2	20.7	<0.030
	Lead (Pb)-Dissolved (mg/L)	<0.00025	<0.0010	<0.00025	<0.00010	0.00011
	Lithium (Li)-Dissolved (mg/L)	0.072	0.16	0.079	0.048	0.012
	Magnesium (Mg)-Dissolved (mg/L)	191	956	102	64.6	37.7
	Manganese (Mn)-Dissolved (mg/L)	4.22	75.8	1.68	1.50	0.133
	Molybdenum (Mo)-Dissolved (mg/L)	0.00075	0.0015	0.00035	0.00089	0.00549
	Nickel (Ni)-Dissolved (mg/L)	0.0536	0.329	0.0154	0.0105	0.0101
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.60	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	8.9	11.5	5.1	5.3	6.1
	Selenium (Se)-Dissolved (mg/L)	<0.0050	<0.020	<0.0050	<0.0020	<0.0020
	Silicon (Si)-Dissolved (mg/L)	15.7	13.4	14.4	13.1	6.00
	Silver (Ag)-Dissolved (mg/L)	<0.000050	<0.00020	<0.000050	<0.000020	<0.000020

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID	L678707-6	L678707-7	L678707-8	L678707-9	L678707-10
		Description					
		Sampled Date	26-AUG-08	26-AUG-08	27-AUG-08	27-AUG-08	29-AUG-08
		Sampled Time					
		Client ID	SRK08-P11A	SRK08-P11B	SRK08-P12A	SRK08-P12B	SRK05-SP6
WATER							
Physical Tests	Colour, True (CU)		10.4	<5.0	124	9.1	7.2
	Conductivity (uS/cm)		707	879	1240	819	2070
	Hardness (as CaCO3) (mg/L)		391	492	647	402	1270
	pH (pH)		7.92	7.74	6.25	6.38	7.72
	Total Suspended Solids (mg/L)		699	63.6	431	711	1010
	Total Dissolved Solids (mg/L)		504	665	597	685	1860
	Turbidity (NTU)		1290	80.9	534	1300	1320
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)		273	175	154	380	147
	Ammonia as N (mg/L)		0.0293	0.0498	0.0831	0.0378	0.0219
	Bromide (Br) (mg/L)		<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)		<0.50	<0.50	0.67	<0.50	0.57
	Fluoride (F) (mg/L)		0.210	0.134	0.222	0.217	0.138
	Sulfate (SO4) (mg/L)		210	330	154	86.9	1160
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)		3.97	3.08	3.89	3.70	8.79
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)		0.0034	0.0026	0.0956	0.0704	0.0458
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00020	0.00031	<0.00020	<0.00050
	Arsenic (As)-Dissolved (mg/L)		0.00011	<0.00020	0.00112	<0.00020	<0.00050
	Barium (Ba)-Dissolved (mg/L)		0.0562	0.0407	0.0574	0.0965	0.0633
	Beryllium (Be)-Dissolved (mg/L)		<0.00050	<0.0010	<0.0010	<0.0010	<0.0025
	Bismuth (Bi)-Dissolved (mg/L)		<0.00050	<0.0010	<0.0010	<0.0010	<0.0025
	Boron (B)-Dissolved (mg/L)		<0.010	<0.020	<0.020	<0.020	<0.050
	Cadmium (Cd)-Dissolved (mg/L)		<0.000050	0.00043	<0.00010	0.00011	<0.00025
	Calcium (Ca)-Dissolved (mg/L)		127	151	177	115	347
	Chromium (Cr)-Dissolved (mg/L)		<0.00050	<0.0010	0.0087	0.0032	<0.0025
	Cobalt (Co)-Dissolved (mg/L)		0.00126	0.00159	0.00982	0.0109	<0.00050
	Copper (Cu)-Dissolved (mg/L)		0.00081	0.00089	0.00051	0.00061	0.00244
	Iron (Fe)-Dissolved (mg/L)		0.178	0.073	17.9	3.83	<0.030
	Lead (Pb)-Dissolved (mg/L)		0.000088	0.00010	0.00013	<0.00010	<0.00025
	Lithium (Li)-Dissolved (mg/L)		0.0085	<0.010	0.102	0.084	<0.025
	Magnesium (Mg)-Dissolved (mg/L)		17.9	27.8	49.6	28.2	97.5
	Manganese (Mn)-Dissolved (mg/L)		0.0854	1.30	0.991	0.784	0.0837
	Molybdenum (Mo)-Dissolved (mg/L)		0.00141	0.00171	0.00154	0.00026	<0.00025
	Nickel (Ni)-Dissolved (mg/L)		0.00143	0.0149	0.0127	0.0066	<0.0025
	Phosphorus (P)-Dissolved (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)		3.6	3.7	3.9	3.8	4.7
	Selenium (Se)-Dissolved (mg/L)		<0.0010	<0.0020	<0.0020	<0.0020	<0.0050
	Silicon (Si)-Dissolved (mg/L)		6.55	6.94	10.8	9.48	5.31
	Silver (Ag)-Dissolved (mg/L)		<0.000010	<0.000020	<0.000020	<0.000020	<0.000050

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678707-11				
	Description					
	Sampled Date	29-AUG-08				
	Sampled Time					
	Client ID	SRK08-DP5				
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	14.7				
	Conductivity (uS/cm)	7240				
	Hardness (as CaCO3) (mg/L)	6000				
	pH (pH)	6.83				
	Total Suspended Solids (mg/L)	689				
	Total Dissolved Solids (mg/L)	10200				
	Turbidity (NTU)	860				
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	111				
	Ammonia as N (mg/L)	0.164				
	Bromide (Br) (mg/L)	<25				
	Chloride (Cl) (mg/L)	<250				
	Fluoride (F) (mg/L)	<10				
	Sulfate (SO4) (mg/L)	6230				
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	29.8				
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.13				
	Antimony (Sb)-Dissolved (mg/L)	<0.010				
	Arsenic (As)-Dissolved (mg/L)	<0.010				
	Barium (Ba)-Dissolved (mg/L)	0.0322				
	Beryllium (Be)-Dissolved (mg/L)	<0.050				
	Bismuth (Bi)-Dissolved (mg/L)	<0.050				
	Boron (B)-Dissolved (mg/L)	<1.0				
	Cadmium (Cd)-Dissolved (mg/L)	0.0753				
	Calcium (Ca)-Dissolved (mg/L)	407				
	Chromium (Cr)-Dissolved (mg/L)	<0.050				
	Cobalt (Co)-Dissolved (mg/L)	0.967				
	Copper (Cu)-Dissolved (mg/L)	0.015				
	Iron (Fe)-Dissolved (mg/L)	13.9				
	Lead (Pb)-Dissolved (mg/L)	<0.0050				
	Lithium (Li)-Dissolved (mg/L)	<0.50				
	Magnesium (Mg)-Dissolved (mg/L)	1210				
	Manganese (Mn)-Dissolved (mg/L)	69.0				
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0050				
	Nickel (Ni)-Dissolved (mg/L)	2.37				
	Phosphorus (P)-Dissolved (mg/L)	<0.90				
	Potassium (K)-Dissolved (mg/L)	15.3				
	Selenium (Se)-Dissolved (mg/L)	<0.10				
	Silicon (Si)-Dissolved (mg/L)	8.54				
	Silver (Ag)-Dissolved (mg/L)	<0.0010				

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678707-1	L678707-2	L678707-3	L678707-4	L678707-5
	Description					
	Sampled Date	31-AUG-08	31-AUG-08	30-AUG-08	30-AUG-08	02-SEP-08
	Sampled Time					
	Client ID	SRK08-SP7A	SRK08-SP7B	SRK08-SP8A	SRK08-SP8B	SRK08-P9
Grouping	**Analyte**					
WATER						
Dissolved Metals	Sodium (Na)-Dissolved (mg/L)	21.3	32.8	17.0	14.0	14.8
	Strontium (Sr)-Dissolved (mg/L)	1.40	1.96	1.12	0.687	1.62
	Thallium (Tl)-Dissolved (mg/L)	<0.00050	<0.0020	<0.00050	<0.00020	<0.00020
	Tin (Sn)-Dissolved (mg/L)	<0.00050	<0.0020	<0.00050	<0.00020	<0.00020
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.020	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.00295	0.00167	0.00153	0.00250	0.00779
	Vanadium (V)-Dissolved (mg/L)	<0.0050	<0.020	<0.0050	<0.0020	<0.0020
	Zinc (Zn)-Dissolved (mg/L)	1.64	96.8	0.444	0.359	0.0100

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678707-6	L678707-7	L678707-8	L678707-9	L678707-10
	Description					
	Sampled Date	26-AUG-08	26-AUG-08	27-AUG-08	27-AUG-08	29-AUG-08
	Sampled Time					
	Client ID	SRK08-P11A	SRK08-P11B	SRK08-P12A	SRK08-P12B	SRK05-SP6
Grouping	**Analyte**					
WATER						
Dissolved Metals	Sodium (Na)-Dissolved (mg/L)	6.9	8.3	29.7	15.7	46.0
	Strontium (Sr)-Dissolved (mg/L)	0.399	0.407	1.06	0.705	0.834
	Thallium (Tl)-Dissolved (mg/L)	<0.00010	<0.00020	<0.00020	<0.00020	<0.00050
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00020	<0.00020	<0.00020	<0.00050
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.00163	0.00125	0.00197	0.00128	0.00320
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0020	<0.0020	<0.0020	<0.0050
	Zinc (Zn)-Dissolved (mg/L)	0.0028	0.0058	0.978	0.207	0.0726

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L678707-11				
	Description					
	Sampled Date	29-AUG-08				
	Sampled Time					
	Client ID	SRK08-DP5				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Sodium (Na)-Dissolved (mg/L)	67.5				
	Strontium (Sr)-Dissolved (mg/L)	1.83				
	Thallium (Tl)-Dissolved (mg/L)	<0.010				
	Tin (Sn)-Dissolved (mg/L)	<0.010				
	Titanium (Ti)-Dissolved (mg/L)	<0.030				
	Uranium (U)-Dissolved (mg/L)	0.0025				
	Vanadium (V)-Dissolved (mg/L)	<0.10				
	Zinc (Zn)-Dissolved (mg/L)	376				

Reference Information

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comments

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	APHA 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.

ALK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 "Alkalinity"

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

ANIONS-BR-IC-VA	Water	Bromide by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-F-IC-VA	Water	Fluoride by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

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)".

COLOUR-TRUE-VA	Water	Color (True) by Spectrometer	APHA 2120 "Color"

This analysis is carried out using procedures adapted from APHA Method 2120 "Color". Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Aparent Colour is determined without prior sample filtration. Colour is pH dependent. Unless otherwise indicated, reported colour results pertain to the pH of the sample as received, to within +/- 1 pH unit.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.

MET-DIS-ICP-VA	Water	Dissolved Metals 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 procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma -

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
		optical emission spectrophotometry (EPA Method 6010B).	
MET-DIS-LOW-MS-VA	Water	Dissolved Metals in Water by ICPMS(Low)	EPA SW-846 3005A/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 involves preliminary sample treatment by filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).	
NH3-COL-VA	Water	Ammonia by Color	APHA 4500-NH3 "Nitrogen (Ammonia)"
		This analysis is carried out, on unpreserved samples, using procedures adapted from APHA Method 4500-NH3 "Nitrogen (Ammonia)". Ammonia is determined using the phenate colourimetric method.	
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	
TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC
		This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.	
TSS-VA	Water	Solids by Gravimetric	APHA 2540 D - GRAVIMETRIC
		This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.	
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.	

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.
The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA		

GLOSSARY OF REPORT TERMS
Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.
The reported surrogate recovery value provides a measure of method efficiency.
mg/kg (units) - unit of concentration based on mass, parts per million
mg/L (units) - unit of concentration based on volume, parts per million
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.
Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

ALS ENVIRONMENTAL
ATTN ANDRE LANGLAIS
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#2 -21 Highfield Circle SE, **Calgary**, AB Canada T2G 5N6 Tel. 403-214-5431 Toll Free: 1-866-722-6231 Fax: 403-214-5430
#2 - 8820 100th Street, **Fort St. John**, BC Canada V1J 3W9 Tel: 250-785-8281 Fax: 250-785-8286
www.alsenviro.com

excellence in analytical testing

L678707

CHAIN OF CUSTODY FORM

SEND REPORT TO:

COMPANY:	SRK Consulting				
ADDRESS:	2200-1066 West Hastings St.				
CITY:	Vancouver	PROV:	BC	POSTAL CODE:	V6E3X2
TEL:		FAX:		CONTACT:	Dan Mackie
PROJECT NAME AND NO.:		Faro Groundwater 2008		SAMPLER:	DM/JS
QUOTE NO.:		PO NO.:	1CD003.112	ALS CONTACT:	Andre Langlais
REPORT FORMAT:	PDF, Excel, CC: reports to gfagerlund@srk.com and dmackie@srk.com				

ANALYSIS REQUESTED:

		SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	See attached parameter list	Diss. Metals (filter/preserved)	Routine	NOTES (sample specific comments, due dates, etc.)
		SRK08-SP7a	31-Aug-08		water	X	X	X	possible high zinc and sulphates
		SRK08-SP7b	31-Aug-08		water	X	X	X	possible high zinc and sulphates
		SRK08-SP8a	30-Aug-08		water	X	X	X	possible high zinc and sulphates
		SRK08-SP8b	30-Aug-08		water	X	X	X	possible high zinc and sulphates
		SRK08-P9	2-Sept-08		water	X	X	X	possible high zinc and sulphates
		SRK08-P11a	26-Aug-08		water	X	X	X	possible high zinc and sulphates
		SRK08-P11b	26-Aug-08		water	X	X	X	possible high zinc and sulphates
		SRK08-P12a	27-Aug-08		water	X	X	X	possible high zinc and sulphates
		SRK08-P12b	27-Aug-08		water	X	X	X	possible high zinc and sulphates
		SRK05-SP6	29-Aug-08		water	X	X	X	possible high zinc and sulphates
		SRK08-DP5	29-Aug-08		water	X	X	X	possible high zinc and sulphates

TURN AROUND REQUIRED:	Routine	SPECIFY DATE:	(surcharge may apply)	RELINQUISHED BY:	DATE: 4-Sept-08	RECEIVED BY:	DATE:
				Dan Mackie	TIME:		TIME:
SEND INVOICE TO:	SRK			RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
INVOICE FORMAT:					TIME:		TIME:

SPECIAL INSTRUCTIONS:

Samples preserved as per ALS requirements

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature: ____°C	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

Certificate of Analysis

SRK CONSULTING (CANADA) INC.

ATTN: DAN MACKIE

SUITE 2200
1066 WEST HASTINGS ST.
VANCOUVER BC V6E 3X2

Reported On: 24-SEP-08 05:09 PM

Lab Work Order #: **L684850** **Date Received:** **19-SEP-08**

Project P.O. #:
Job Reference: 1CD003.112
Legal Site Desc: FARO MINE-S-CLUSTER
CofC Numbers: C064219

Other Information:

Comments: Please note that some of the detection limits were increased due to high levels of metals in these samples.

LINDSAY JONES
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L684850-1	L684850-2	L684850-3	L684850-4	L684850-5
	Description					
	Sampled Date	15-SEP-08	12-SEP-08	15-SEP-08	17-SEP-08	11-SEP-08
	Sampled Time					
	Client ID	SRK 08- SPW2	SRK 08- SBR3	SRK 08- SBR4	SRK 08- P14	SRK 08- SBR2
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	29.5	<5.0	7.1	<5.0	19.3
	Conductivity (uS/cm)	6400	2150	4260	921	3450
	Hardness (as CaCO3) (mg/L)	5230	1230	3190	570	2430
	pH (pH)	7.39	7.95	7.34	8.14	7.48
	Total Suspended Solids (mg/L)	206	<3.0	176	397	80.8
	Total Dissolved Solids (mg/L)	7790	1830	4870	660	3500
	Turbidity (NTU)	69.8	4.09	77.7	410	72.6
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	190	371	155	211	232
	Ammonia as N (mg/L)	0.0630	0.0068	0.101	0.0236	0.225
	Bromide (Br) (mg/L)	<5.0	<0.50	<5.0	<0.050	<5.0
	Chloride (Cl) (mg/L)	<50	<5.0	<50	<0.50	<50
	Fluoride (F) (mg/L)	<2.0	<0.20	<2.0	0.061	<2.0
	Sulfate (SO4) (mg/L)	5340	1060	3130	294	2320
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	<0.050	0.0057	0.381	<0.0020	0.021
	Antimony (Sb)-Dissolved (mg/L)	<0.0050	<0.00050	<0.0050	0.00022	<0.0010
	Arsenic (As)-Dissolved (mg/L)	<0.0050	0.00055	<0.0050	0.00033	0.0011
	Barium (Ba)-Dissolved (mg/L)	0.0236	0.0438	0.0738	0.0890	0.0685
	Beryllium (Be)-Dissolved (mg/L)	<0.025	<0.0025	<0.025	<0.0010	<0.0050
	Bismuth (Bi)-Dissolved (mg/L)	<0.025	<0.0025	<0.025	<0.0010	<0.0050
	Boron (B)-Dissolved (mg/L)	<0.50	<0.050	<0.50	<0.020	<0.10
	Cadmium (Cd)-Dissolved (mg/L)	0.0269	<0.00025	0.0162	<0.00010	0.00470
	Calcium (Ca)-Dissolved (mg/L)	517	270	343	173	396
	Chromium (Cr)-Dissolved (mg/L)	<0.025	<0.0025	<0.025	<0.0010	<0.0050
	Cobalt (Co)-Dissolved (mg/L)	0.0363	0.00144	0.102	0.00034	0.0412
	Copper (Cu)-Dissolved (mg/L)	0.0108	0.00241	<0.0050	0.00360	0.0030
	Iron (Fe)-Dissolved (mg/L)	<0.15	<0.030	2.12	<0.030	7.97
	Lead (Pb)-Dissolved (mg/L)	<0.0025	0.00048	<0.0025	0.00021	0.00502
	Lithium (Li)-Dissolved (mg/L)	<0.25	0.048	<0.25	<0.010	0.107
	Magnesium (Mg)-Dissolved (mg/L)	956	135	566	33.5	349
	Manganese (Mn)-Dissolved (mg/L)	66.5	0.118	37.7	0.0393	20.9
	Molybdenum (Mo)-Dissolved (mg/L)	<0.0025	0.00031	0.0051	0.00187	0.00577
	Nickel (Ni)-Dissolved (mg/L)	1.88	0.0107	1.11	0.0021	0.228
	Phosphorus (P)-Dissolved (mg/L)	<1.5	<0.30	<1.5	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	14	5.4	13	<2.0	9.6
	Selenium (Se)-Dissolved (mg/L)	<0.050	<0.0050	<0.050	<0.0020	<0.010
	Silicon (Si)-Dissolved (mg/L)	12.3	4.53	10.2	4.94	10.7
	Silver (Ag)-Dissolved (mg/L)	<0.00050	<0.000050	<0.00050	<0.000020	<0.00010
	Sodium (Na)-Dissolved (mg/L)	42	35.9	29	3.6	31.8

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L684850-6	L684850-7	L684850-8	L684850-9	
	Description					
	Sampled Date	08-SEP-08	17-SEP-08	18-SEP-08	09-SEP-08	
	Sampled Time					
	Client ID	SRK 08- SBR1	SRK 08- P15	SRK 08- P16	SRK 08- SPW4	
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	39.1	<5.0	<5.0	12.4	
	Conductivity (uS/cm)	2880	1600	1050	6780	
	Hardness (as CaCO3) (mg/L)	2000	1030	654	5160	
	pH (pH)	7.27	8.04	8.08	7.18	
	Total Suspended Solids (mg/L)	121	909	1080	1210	
	Total Dissolved Solids (mg/L)	2890	1280	752	8640	
	Turbidity (NTU)	126	1070	1340	1580	
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	256	365	284	171	
	Ammonia as N (mg/L)	0.108	0.0174	0.179	0.0533	
	Bromide (Br) (mg/L)	<2.5	<0.050	<0.050	<5.0	
	Chloride (Cl) (mg/L)	<25	1.10	0.81	<50	
	Fluoride (F) (mg/L)	<1.0	0.085	0.060	<2.0	
	Sulfate (SO4) (mg/L)	1840	578	331	5780	
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.022	<0.0050	0.0031	<0.10	
	Antimony (Sb)-Dissolved (mg/L)	<0.0010	0.00056	0.00028	<0.010	
	Arsenic (As)-Dissolved (mg/L)	0.0081	0.00055	0.00043	<0.010	
	Barium (Ba)-Dissolved (mg/L)	0.0337	0.0858	0.136	0.0307	
	Beryllium (Be)-Dissolved (mg/L)	<0.0050	<0.0025	<0.0010	<0.050	
	Bismuth (Bi)-Dissolved (mg/L)	<0.0050	<0.0025	<0.0010	<0.050	
	Boron (B)-Dissolved (mg/L)	<0.10	<0.050	<0.020	<1.0	
	Cadmium (Cd)-Dissolved (mg/L)	<0.00050	<0.00025	<0.00010	0.101	
	Calcium (Ca)-Dissolved (mg/L)	485	267	189	411	
	Chromium (Cr)-Dissolved (mg/L)	<0.0050	<0.0025	<0.0010	<0.050	
	Cobalt (Co)-Dissolved (mg/L)	0.0091	0.00072	0.00058	<0.010	
	Copper (Cu)-Dissolved (mg/L)	0.0039	0.00216	0.00072	0.028	
	Iron (Fe)-Dissolved (mg/L)	24.4	0.062	<0.030	<0.060	
	Lead (Pb)-Dissolved (mg/L)	0.0402	<0.00025	<0.00010	<0.0050	
	Lithium (Li)-Dissolved (mg/L)	0.078	<0.025	<0.010	<0.50	
	Magnesium (Mg)-Dissolved (mg/L)	192	88.3	44.4	1000	
	Manganese (Mn)-Dissolved (mg/L)	3.25	0.0618	0.0617	91.8	
	Molybdenum (Mo)-Dissolved (mg/L)	0.00091	0.00148	0.00252	<0.0050	
	Nickel (Ni)-Dissolved (mg/L)	0.0647	0.0221	0.0033	2.58	
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.60	
	Potassium (K)-Dissolved (mg/L)	9.2	<2.0	2.6	13.5	
	Selenium (Se)-Dissolved (mg/L)	<0.010	<0.0050	<0.0020	<0.10	
	Silicon (Si)-Dissolved (mg/L)	11.3	5.23	4.15	12.7	
	Silver (Ag)-Dissolved (mg/L)	<0.00010	<0.000050	<0.000020	<0.0010	
	Sodium (Na)-Dissolved (mg/L)	20.6	4.3	7.1	33.5	

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L684850-1	L684850-2	L684850-3	L684850-4	L684850-5
	Description					
	Sampled Date	15-SEP-08	12-SEP-08	15-SEP-08	17-SEP-08	11-SEP-08
	Sampled Time					
	Client ID	SRK 08- SPW2	SRK 08- SBR3	SRK 08- SBR4	SRK 08- P14	SRK 08- SBR2
Grouping	**Analyte**					
WATER						
Dissolved Metals	Strontium (Sr)-Dissolved (mg/L)	2.02	0.730	1.38	0.710	1.52
	Thallium (Tl)-Dissolved (mg/L)	<0.0050	<0.00050	<0.0050	<0.00020	<0.0010
	Tin (Sn)-Dissolved (mg/L)	<0.0050	<0.00050	<0.0050	<0.00020	<0.0010
	Titanium (Ti)-Dissolved (mg/L)	<0.050	0.010	<0.050	<0.010	0.010
	Uranium (U)-Dissolved (mg/L)	0.00720	0.0177	0.00376	0.00324	0.0112
	Vanadium (V)-Dissolved (mg/L)	<0.050	<0.0050	<0.050	<0.0020	<0.010
	Zinc (Zn)-Dissolved (mg/L)	233	0.0232	119	0.0317	28.6

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L684850-6	L684850-7	L684850-8	L684850-9	
	Description					
	Sampled Date	08-SEP-08	17-SEP-08	18-SEP-08	09-SEP-08	
	Sampled Time					
	Client ID	SRK 08- SBR1	SRK 08- P15	SRK 08- P16	SRK 08- SPW4	
Grouping	**Analyte**					
WATER						
Dissolved Metals	Strontium (Sr)-Dissolved (mg/L)	1.93	0.942	0.746	1.87	
	Thallium (Tl)-Dissolved (mg/L)	<0.0010	<0.00050	<0.00020	<0.010	
	Tin (Sn)-Dissolved (mg/L)	<0.0010	<0.00050	<0.00020	<0.010	
	Titanium (Ti)-Dissolved (mg/L)	<0.010	0.010	0.010	<0.020	
	Uranium (U)-Dissolved (mg/L)	0.00230	0.0179	0.0116	0.0037	
	Vanadium (V)-Dissolved (mg/L)	<0.010	<0.0050	<0.0020	<0.10	
	Zinc (Zn)-Dissolved (mg/L)	1.13	0.0076	0.0060	355	

Reference Information

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comments

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	APHA 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.

ANIONS-BR-IC-VA	Water	Bromide by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-F-IC-VA	Water	Fluoride by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

COLOUR-TRUE-VA	Water	Color (True) by Spectrometer	APHA 2120 "Color"

This analysis is carried out using procedures adapted from APHA Method 2120 "Color". Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Aparent Colour is determined without prior sample filtration. Colour is pH dependent. Unless otherwise indicated, reported colour results pertain to the pH of the sample as received, to within +/- 1 pH unit.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.

MET-DIS-ICP-VA	Water	Dissolved Metals 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 procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-DIS-LOW-MS-VA	Water	Dissolved Metals in Water by ICPMS(Low)	EPA SW-846 3005A/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 involves preliminary sample treatment by filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

		Ammonia by Color	APHA 4500-NH3 "Nitrogen (Ammonia)"

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
NH3-COL-VA	Water		

This analysis is carried out, on unpreserved samples, using procedures adapted from APHA Method 4500-NH3 "Nitrogen (Ammonia)". Ammonia is determined using the phenate colourimetric method.

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

TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TSS-VA	Water	Solids by Gravimetric	APHA 2540 D - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

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.

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.
The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA		

GLOSSARY OF REPORT TERMS
Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.
The reported surrogate recovery value provides a measure of method efficiency.
mg/kg (units) - unit of concentration based on mass, parts per million
mg/L (units) - unit of concentration based on volume, parts per million
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.
Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

RUSH
Requires priority proces

REQUEST FORM
68-9878

COC # C064219

Page 1 of 1

REPORT TO:	REPORT FORMAT / DISTRIBUTION	SERVICE REQUESTED
COMPANY: SRK Consulting	STANDARD ✓ OTHER	REGULAR SERVICE (DEFAULT)
CONTACT: Dan Mackie	PDF EXCEL ✓ CUSTOM FAX	RUSH SERVICE (2-3 DAYS) ✓
ADDRESS: 2200-1066 W Hastings St.	EMAIL 1: dmackie@srk.com	PRIORITY SERVICE (1 DAY or ASAP)
	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: 604 601 8415 FAX:		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? (YES) / NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY:	CLIENT / PROJECT INFORMATION:	
CONTACT:	JOB #: ICD003.112	
ADDRESS:	PO /AFE:	
	Legal Site Description: Faro Mine - S-cluster	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only): L684850	SAMPLER (Initials):	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Routine 1000 mL	Metals 250 mL	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
1	SRK 08-SPW2	SEP 15 '08		~~Routine~~ Water	✓	✓			2
2	SRK 08-SBR3	SEP 12 '08		Water	✓	✓			2
3	SRK 08-SBR4	SEP 15 '08		Water	✓	✓			2
4	SRK 08-P14	SEP 17 '08		"	✓	✓			2
5	SRK 08-SBR2	SEP 11 '08		"	✓	✓			2
6	SRK 08-SBR1	SEP 8 '08		"	✓	✓			2
7	SRK 08-P15	SEP 17 '08		"	✓	✓			2
8	SRK 08-P16	SEP 18 '08		"	✓	✓			2
9	SRK 08-SPW4	SEP 9 '08		"	✓	✓			2

GUIDELINES / REGULATIONS

SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

Failure to complete all portions of this form may delay analysis. Please fill in this form *LEGIBLY*.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the reverse page of the white report copy.

RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:
Jacek Scibek	SEP 19 10:40		09/09/19 16:40
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:

SAMPLE CONDITION (lab use only)

TEMPERATURE	SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (if no provide details)
7°C	

Your Project #: 80632-6
Site#: FARO
Site: FARO
Your C.O.C. #: 38471-03, 38471-01

Attention: Kai Woloshyn
GARTNER LEE
2251 - 2nd AVENUE
WHITEHORSE, YT
CANADA Y1A 5W1

Report Date: 2008/11/17

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A861389
Received: 2008/11/07, 16:25

Sample Matrix: Water
Samples Received: 14

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	14	2008/11/13	2008/11/13	BRN SOP-00264 R2.0	Based on SM2320B
Chloride by Automated Colourimetry	14	N/A	2008/11/13	BRN-SOP 00234 R1.0	Based on EPA 325.2
Conductance - water	14	N/A	2008/11/13	BRN SOP-00264 R2.0	Based on SM-2510B
Hardness (calculated as CaCO3)	14	N/A	2008/11/14		
Ion Balance	14	N/A	2008/11/14		
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	14	N/A	2008/11/14	BRN SOP-00206	Based on EPA 200.8
Elements by ICPMS Low Level (dissolved) (1)	14	N/A	2008/11/14	BRN SOP-00206	Based on EPA 200.8
Filter and HNO3 Preserve for Metals	14	N/A	2008/11/13	BRN WI-00006 R1.0	Based on EPA 200.2
pH Water	14	N/A	2008/11/13	BRN SOP-00264 R2.0	Based on SM-4500H+B
Sulphate by Automated Colourimetry	14	N/A	2008/11/13	BRN-SOP 00243 R1.0	Based on EPA 375.4

* Results relate only to the items tested.

(1) SCC/CAEAL

Encryption Key

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

ROB MACARTHUR, BBY Customer Service
Email: rob.macarthur@maxxamanalytics.com
Phone# (604) 444-4808 Ext:253

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

Total cover pages: 1

Maxxam Job #: A861389
Report Date: 2008/11/17

GARTNER LEE
Client Project #: 80632-6
Site Reference: FARO

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		M67633		M67634		M67635		M67636	M67637		M67638		
Sampling Date		2008/11/05		2008/11/05		2008/11/05		2008/11/05	2008/11/05		2008/11/03		
	Units	**SRK08-P10A**	**RDL**	**SRK08-P12A**	**QC Batch**	**SRK08-P12B**	**QC Batch**	**SRK08-P14**	**SRK08-P16**	**RDL**	**SRK08-SBR1**	**RDL**	**QC Batch**
Preparation													
Filter and HNO3 Preservation	N/A	FIELD	N/A	FIELD	ONSITE	FIELD	ONSITE	FIELD	FIELD	N/A	FIELD	N/A	ONSITE
Calculated Parameters													
Ion Balance	N/A	0.92	0.01	0.97	2728988	1.1	2728988	0.97	0.95	0.01	0.91	0.01	2728988
Misc. Inorganics													
Alkalinity (Total as CaCO3)	mg/L	430	0.5	580	2730144	330	2730144	210	320	0.5	240	0.5	2730144
Anions													
Dissolved Sulphate (SO4)	mg/L	2000	50	170	2732564	76	2738484	490	400	5	3300	50	2732564
Dissolved Chloride (Cl)	mg/L	59	5	1.2	2732547	1.9	2732547	1.7	1.4	0.5	5.3	0.5	2732547
Physical Properties													
Conductivity	uS/cm	3400	1	1200	2730143	730	2730143	1200	1200	1	4200	1	2730143
pH	pH Units	7.6		6.6	2730138	6.6	2730138	7.8	8.0		7.1		2730138

Maxxam ID		M67639	M67640		M67641		M67642		
Sampling Date		2008/11/03	2008/11/03		2008/11/03		2008/11/03		
	Units	**SRK08-SBR2**	**SRK08-SBR3**	**QC Batch**	**SRK08-SBR4**	**QC Batch**	**SRK08-SP7A**	**RDL**	**QC Batch**
Preparation									
Filter and HNO3 Preservation	N/A	FIELD	FIELD	ONSITE	FIELD	ONSITE	FIELD	N/A	ONSITE
Calculated Parameters									
Ion Balance	N/A	0.89	1.0	2728988	0.92	2728988	0.99	0.01	2728988
Misc. Inorganics									
Alkalinity (Total as CaCO3)	mg/L	330	460	2730144	140	2730144	210	0.5	2730144
Anions									
Dissolved Sulphate (SO4)	mg/L	2400	1800	2738484	6500	2732564	2300	50	2738484
Dissolved Chloride (Cl)	mg/L	4.9	1.8	2732547	5.4	2732547	4.6	0.5	2732547
Physical Properties									
Conductivity	uS/cm	3600	3400	2730143	7100	2730143	3500	1	2730143
pH	pH Units	7.3	7.8	2730138	7.2	2730138	7.1		2730138

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: A861389
Report Date: 2008/11/17

GARTNER LEE
Client Project #: 80632-6
Site Reference: FARO

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		M67643	M67644		M67645		M67646		
Sampling Date		2008/11/03	2008/11/03		2008/11/03		2008/11/03		
	Units	**SRK08-SP7B**	**SRK08-SP7C**	**RDL**	**SRK08-SPW1**	**RDL**	**SRK08-SPW2**	**RDL**	**QC Batch**
Preparation									
Filter and HNO3 Preservation	N/A	FIELD	FIELD	N/A	FIELD	N/A	FIELD	N/A	ONSITE
Calculated Parameters									
Ion Balance	N/A	0.90	0.99	0.01	0.98	0.01	0.96	0.01	2728988
Misc. Inorganics									
Alkalinity (Total as CaCO3)	mg/L	57	52	0.5	290	0.5	210	0.5	2730144
Anions									
Dissolved Sulphate (SO4)	mg/L	5800	5300	50	210	5	5900	50	2732564
Dissolved Chloride (Cl)	mg/L	6.8	6.7	0.5	1.5	0.5	6.7	0.5	2732547
Physical Properties									
Conductivity	uS/cm	6400	6300	1	880	1	6700	1	2730143
pH	pH Units	6.7	6.7		6.8		7.1		2730138

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: A861389
Report Date: 2008/11/17

GARTNER LEE
Client Project #: 80632-6
Site Reference: FARO

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		M67633	M67634		M67635	M67636	M67637		M67638		
Sampling Date		2008/11/05	2008/11/05		2008/11/05	2008/11/05	2008/11/05		2008/11/03		
	Units	**SRK08-P10A**	**SRK08-P12A**	**RDL**	**SRK08-P12B**	**SRK08-P14**	**SRK08-P16**	**RDL**	**SRK08-SBR1**	**RDL**	**QC Batch**
Misc. Inorganics											
Dissolved Hardness (CaCO3)	mg/L	2140	650	0.5	419	685	681	0.5	3160	0.5	2727773

RDL = Reportable Detection Limit

Maxxam Job #: A861389
Report Date: 2008/11/17

GARTNER LEE
Client Project #: 80632-6
Site Reference: FARO

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		M67633	M67634		M67635	M67636	M67637		M67638		
Sampling Date		2008/11/05	2008/11/05		2008/11/05	2008/11/05	2008/11/05		2008/11/03		
	Units	**SRK08-P10A**	**SRK08-P12A**	**RDL**	**SRK08-P12B**	**SRK08-P14**	**SRK08-P16**	**RDL**	**SRK08-SBR1**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS											
Dissolved Aluminum (Al)	mg/L	0.021	0.063	0.001	0.0551	0.0041	0.0050	0.0002	0.019	0.001	2730132
Dissolved Antimony (Sb)	mg/L	0.0003	0.0002	0.0001	0.00003	0.00022	0.00014	0.00002	0.0002	0.0001	2730132
Dissolved Arsenic (As)	mg/L	0.0004	0.0006	0.0001	0.00008	0.00025	0.00034	0.00002	0.0029	0.0001	2730132
Dissolved Barium (Ba)	mg/L	0.0342	0.0352	0.0001	0.0845	0.0971	0.156	0.00002	0.0241	0.0001	2730132
Dissolved Beryllium (Be)	mg/L	<0.00005	0.00071	0.00005	0.00039	<0.00001	<0.00001	0.00001	0.00085	0.00005	2730132
Dissolved Bismuth (Bi)	mg/L	<0.00003	<0.00003	0.00003	<0.000005	<0.000005	<0.000005	0.000005	<0.00003	0.00003	2730132
Dissolved Boron (B)	mg/L	<0.3	<0.3	0.3	<0.05	<0.05	<0.05	0.05	<0.3	0.3	2730132
Dissolved Cadmium (Cd)	mg/L	0.00041	<0.00003	0.00003	0.000054	0.000040	0.000044	0.000005	<0.00003	0.00003	2730132
Dissolved Chromium (Cr)	mg/L	<0.0005	0.0008	0.0005	0.0002	0.0002	0.0001	0.0001	0.0006	0.0005	2730132
Dissolved Cobalt (Co)	mg/L	0.00813	0.00806	0.00003	0.00397	0.000390	0.000221	0.000005	0.0126	0.00003	2730132
Dissolved Copper (Cu)	mg/L	0.0012	<0.0003	0.0003	0.00017	0.00283	0.00033	0.00005	0.0008	0.0003	2730132
Dissolved Iron (Fe)	mg/L	0.011	14.8	0.005	5.99	0.009	0.003	0.001	37.5	0.005	2730132
Dissolved Lead (Pb)	mg/L	0.00020	0.00017	0.00003	0.000020	0.000088	0.000032	0.000005	0.00026	0.00003	2730132
Dissolved Lithium (Li)	mg/L	0.009	0.100	0.003	0.0867	0.0070	0.0059	0.0005	0.088	0.003	2730132
Dissolved Manganese (Mn)	mg/L	0.395	0.840	0.0003	0.586	0.0386	0.0135	0.00005	5.12	0.0003	2730132
Dissolved Mercury (Hg)	mg/L	<0.00005	<0.00005	0.00005	<0.00001	0.00001	0.00001	0.00001	0.00006	0.00005	2730132
Dissolved Molybdenum (Mo)	mg/L	0.0021	0.0003	0.0003	0.00014	0.00150	0.00170	0.00005	0.0006	0.0003	2730132
Dissolved Nickel (Ni)	mg/L	0.0164	0.0165	0.0001	0.00544	0.00131	0.00176	0.00002	0.0785	0.0001	2730132
Dissolved Phosphorus (P)	mg/L	<0.01	0.02	0.01	<0.002	<0.002	<0.002	0.002	<0.01	0.01	2730132
Dissolved Selenium (Se)	mg/L	0.0003	<0.0002	0.0002	<0.00004	0.00215	0.00228	0.00004	<0.0002	0.0002	2730132
Dissolved Silicon (Si)	mg/L	7.4	9.7	0.5	9.1	4.8	3.5	0.1	9.0	0.5	2730132
Dissolved Silver (Ag)	mg/L	<0.00003	<0.00003	0.00003	0.000010	0.000006	<0.000005	0.000005	<0.00003	0.00003	2730132
Dissolved Strontium (Sr)	mg/L	1.29	1.04	0.0003	0.734	0.956	0.931	0.00005	2.89	0.0003	2730132
Dissolved Thallium (Tl)	mg/L	0.00003	0.00004	0.00001	0.000052	0.000005	0.000012	0.000002	<0.00001	0.00001	2730132
Dissolved Tin (Sn)	mg/L	0.00005	<0.00005	0.00005	0.00002	0.00004	0.00006	0.00001	<0.00005	0.00005	2730132
Dissolved Titanium (Ti)	mg/L	0.004	0.015	0.003	0.0014	0.0006	0.0006	0.0005	0.005	0.003	2730132
Dissolved Uranium (U)	mg/L	0.0315	0.00064	0.00001	0.00103	0.00376	0.0144	0.000002	0.00150	0.00001	2730132
Dissolved Vanadium (V)	mg/L	<0.001	<0.001	0.001	<0.0002	<0.0002	<0.0002	0.0002	<0.001	0.001	2730132
Dissolved Zinc (Zn)	mg/L	0.0819	1.00	0.0005	0.229	0.0078	0.0092	0.0001	1.13	0.0005	2730132
Dissolved Zirconium (Zr)	mg/L	0.0007	0.0008	0.0005	0.0027	<0.0001	0.0002	0.0001	<0.0005	0.0005	2730132
Dissolved Calcium (Ca)	mg/L	730	178	0.05	119	206	193	0.05	754	0.05	2734256
Dissolved Magnesium (Mg)	mg/L	76.2	50.2	0.05	29.4	41.6	48.4	0.05	309	0.05	2734256
Dissolved Potassium (K)	mg/L	13.9	3.16	0.05	3.66	0.97	2.11	0.05	9.81	0.05	2734256
Dissolved Sodium (Na)	mg/L	97.5	24.9	0.05	15.8	3.79	8.03	0.05	25.6	0.05	2734256
Dissolved Sulphur (S)	mg/L	661	54	3	31	166	133	3	1060	3	2734256

RDL = Reportable Detection Limit

Maxxam Job #: A861389
Report Date: 2008/11/17

GARTNER LEE
Client Project #: 80632-6
Site Reference: FARO

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		M67639	M67640		M67641		M67642		
Sampling Date		2008/11/03	2008/11/03		2008/11/03		2008/11/03		
	Units	**SRK08-SBR2**	**SRK08-SBR3**	**RDL**	**SRK08-SBR4**	**RDL**	**SRK08-SP7A**	**RDL**	**QC Batch**
Misc. Inorganics									
Dissolved Hardness (CaCO3)	mg/L	2330	2190	0.5	5530	0.5	2440	0.5	2727773

RDL = Reportable Detection Limit

Maxxam Job #: A861389
Report Date: 2008/11/17

GARTNER LEE
Client Project #: 80632-6
Site Reference: FARO

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		M67639	M67640		M67641		M67642		
Sampling Date		2008/11/03	2008/11/03		2008/11/03		2008/11/03		
	Units	**SRK08-SBR2**	**SRK08-SBR3**	**RDL**	**SRK08-SBR4**	**RDL**	**SRK08-SP7A**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS									
Dissolved Aluminum (Al)	mg/L	0.023	0.013	0.001	0.06	0.01	0.026	0.001	2730132
Dissolved Antimony (Sb)	mg/L	0.0004	<0.0001	0.0001	<0.001	0.001	<0.0001	0.0001	2730132
Dissolved Arsenic (As)	mg/L	0.0014	0.0004	0.0001	0.002	0.001	0.0047	0.0001	2730132
Dissolved Barium (Ba)	mg/L	0.0353	0.0207	0.0001	0.023	0.001	0.0258	0.0001	2730132
Dissolved Beryllium (Be)	mg/L	0.00011	<0.00005	0.00005	<0.0005	0.0005	0.00056	0.00005	2730132
Dissolved Bismuth (Bi)	mg/L	<0.00003	<0.00003	0.00003	<0.0003	0.0003	<0.00003	0.00003	2730132
Dissolved Boron (B)	mg/L	<0.3	<0.3	0.3	<3	3	<0.3	0.3	2730132
Dissolved Cadmium (Cd)	mg/L	0.00428	<0.00003	0.00003	0.0559	0.0003	0.00014	0.00003	2730132
Dissolved Chromium (Cr)	mg/L	<0.0005	<0.0005	0.0005	0.005	0.005	<0.0005	0.0005	2730132
Dissolved Cobalt (Co)	mg/L	0.0274	0.00289	0.00003	0.171	0.0003	0.0264	0.00003	2730132
Dissolved Copper (Cu)	mg/L	0.0004	0.0014	0.0003	0.004	0.003	<0.0003	0.0003	2730132
Dissolved Iron (Fe)	mg/L	14.3	0.099	0.005	1.51	0.05	54.8	0.005	2730132
Dissolved Lead (Pb)	mg/L	0.00761	0.00005	0.00003	<0.0003	0.0003	0.00027	0.00003	2730132
Dissolved Lithium (Li)	mg/L	0.071	0.077	0.003	0.18	0.03	0.080	0.003	2730132
Dissolved Manganese (Mn)	mg/L	20.1	0.104	0.0003	74.9	0.003	6.31	0.0003	2730132
Dissolved Mercury (Hg)	mg/L	0.00005	<0.00005	0.00005	<0.0005	0.0005	<0.00005	0.00005	2730132
Dissolved Molybdenum (Mo)	mg/L	0.0029	0.0003	0.0003	0.003	0.003	<0.0003	0.0003	2730132
Dissolved Nickel (Ni)	mg/L	0.296	0.0180	0.0001	2.42	0.001	0.0739	0.0001	2730132
Dissolved Phosphorus (P)	mg/L	<0.01	<0.01	0.01	<0.1	0.1	<0.01	0.01	2730132
Dissolved Selenium (Se)	mg/L	0.0003	0.0006	0.0002	<0.002	0.002	<0.0002	0.0002	2730132
Dissolved Silicon (Si)	mg/L	10.7	5.8	0.5	11	5	13.1	0.5	2730132
Dissolved Silver (Ag)	mg/L	<0.00003	<0.00003	0.00003	<0.0003	0.0003	<0.00003	0.00003	2730132
Dissolved Strontium (Sr)	mg/L	1.57	1.23	0.0003	2.06	0.003	1.74	0.0003	2730132
Dissolved Thallium (Tl)	mg/L	0.00002	0.00004	0.00001	<0.0001	0.0001	<0.00001	0.00001	2730132
Dissolved Tin (Sn)	mg/L	<0.00005	<0.00005	0.00005	<0.0005	0.0005	<0.00005	0.00005	2730132
Dissolved Titanium (Ti)	mg/L	0.004	0.005	0.003	<0.03	0.03	0.005	0.003	2730132
Dissolved Uranium (U)	mg/L	0.0144	0.0310	0.00001	0.0049	0.0001	0.00323	0.00001	2730132
Dissolved Vanadium (V)	mg/L	<0.001	<0.001	0.001	<0.01	0.01	<0.001	0.001	2730132
Dissolved Zinc (Zn)	mg/L	36.3	0.0426	0.0005	367	0.005	2.56	0.0005	2730132
Dissolved Zirconium (Zr)	mg/L	<0.0005	<0.0005	0.0005	<0.005	0.005	<0.0005	0.0005	2730132
Dissolved Calcium (Ca)	mg/L	435	464	0.05	457	0.5	577	0.05	2734256
Dissolved Magnesium (Mg)	mg/L	302	251	0.05	1070	0.5	242	0.05	2734256
Dissolved Potassium (K)	mg/L	7.23	7.06	0.05	13.2	0.5	8.29	0.05	2734256
Dissolved Sodium (Na)	mg/L	21.7	62.4	0.05	54.1	0.5	21.2	0.05	2734256
Dissolved Sulphur (S)	mg/L	759	673	3	2110	30	847	3	2734256

RDL = Reportable Detection Limit

Maxxam Job #: A861389
Report Date: 2008/11/17

GARTNER LEE
Client Project #: 80632-6
Site Reference: FARO

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		M67643	M67644		M67645		M67646		
Sampling Date		2008/11/03	2008/11/03		2008/11/03		2008/11/03		
	Units	**SRK08-SP7B**	**SRK08-SP7C**	**RDL**	**SRK08-SPW1**	**RDL**	**SRK08-SPW2**	**RDL**	**QC Batch**
Misc. Inorganics									
Dissolved Hardness (CaCO3)	mg/L	4970	5010	0.5	428	0.5	5310	0.5	2727773

RDL = Reportable Detection Limit

Maxxam Job #: A861389
Report Date: 2008/11/17

GARTNER LEE
Client Project #: 80632-6
Site Reference: FARO

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		M67643	M67644		M67645		M67646		
Sampling Date		2008/11/03	2008/11/03		2008/11/03		2008/11/03		
	Units	SRK08-SP7B	SRK08-SP7C	RDL	SRK08-SPW1	RDL	SRK08-SPW2	RDL	QC Batch
Dissolved Metals by ICPMS									
Dissolved Aluminum (Al)	mg/L	0.077	0.104	0.004	0.052	0.001	0.05	0.01	2730132
Dissolved Antimony (Sb)	mg/L	<0.0004	<0.0004	0.0004	0.0001	0.0001	<0.001	0.001	2730132
Dissolved Arsenic (As)	mg/L	0.0130	0.0130	0.0004	0.0036	0.0001	0.002	0.001	2730132
Dissolved Barium (Ba)	mg/L	0.0337	0.0346	0.0004	0.0260	0.0001	0.018	0.001	2730132
Dissolved Beryllium (Be)	mg/L	0.0004	0.0003	0.0002	0.00117	0.00005	<0.0005	0.0005	2730132
Dissolved Bismuth (Bi)	mg/L	<0.0001	<0.0001	0.0001	<0.00003	0.00003	<0.0003	0.0003	2730132
Dissolved Boron (B)	mg/L	<1	<1	1	<0.3	0.3	<3	3	2730132
Dissolved Cadmium (Cd)	mg/L	0.0001	<0.0001	0.0001	0.00004	0.00003	0.0382	0.0003	2730132
Dissolved Chromium (Cr)	mg/L	<0.002	<0.002	0.002	<0.0005	0.0005	<0.005	0.005	2730132
Dissolved Cobalt (Co)	mg/L	0.0473	0.0471	0.0001	0.00996	0.00003	0.0306	0.0003	2730132
Dissolved Copper (Cu)	mg/L	<0.001	<0.001	0.001	<0.0003	0.0003	0.006	0.003	2730132
Dissolved Iron (Fe)	mg/L	75.2	76.0	0.02	22.3	0.005	0.07	0.05	2730132
Dissolved Lead (Pb)	mg/L	0.0002	0.0008	0.0001	0.00015	0.00003	0.0006	0.0003	2730132
Dissolved Lithium (Li)	mg/L	0.19	0.19	0.01	0.065	0.003	0.16	0.03	2730132
Dissolved Manganese (Mn)	mg/L	78.7	79.6	0.001	1.16	0.0003	80.5	0.003	2730132
Dissolved Mercury (Hg)	mg/L	<0.0002	<0.0002	0.0002	<0.00005	0.00005	<0.0005	0.0005	2730132
Dissolved Molybdenum (Mo)	mg/L	<0.001	<0.001	0.001	<0.0003	0.0003	<0.003	0.003	2730132
Dissolved Nickel (Ni)	mg/L	0.310	0.313	0.0004	0.0273	0.0001	2.16	0.001	2730132
Dissolved Phosphorus (P)	mg/L	<0.04	<0.04	0.04	<0.01	0.01	<0.1	0.1	2730132
Dissolved Selenium (Se)	mg/L	0.0009	<0.0008	0.0008	<0.0002	0.0002	0.002	0.002	2730132
Dissolved Silicon (Si)	mg/L	15	14	2	15.0	0.5	13	5	2730132
Dissolved Silver (Ag)	mg/L	<0.0001	<0.0001	0.0001	<0.00003	0.00003	<0.0003	0.0003	2730132
Dissolved Strontium (Sr)	mg/L	2.04	2.07	0.001	0.529	0.0003	2.07	0.003	2730132
Dissolved Thallium (Tl)	mg/L	<0.00004	<0.00004	0.00004	<0.00001	0.00001	<0.0001	0.0001	2730132
Dissolved Tin (Sn)	mg/L	<0.0002	<0.0002	0.0002	<0.00005	0.00005	<0.0005	0.0005	2730132
Dissolved Titanium (Ti)	mg/L	0.01	0.01	0.01	0.006	0.003	0.04	0.03	2730132
Dissolved Uranium (U)	mg/L	0.00091	0.00094	0.00004	0.00056	0.00001	0.0068	0.0001	2730132
Dissolved Vanadium (V)	mg/L	<0.004	<0.004	0.004	<0.001	0.001	<0.01	0.01	2730132
Dissolved Zinc (Zn)	mg/L	123	125	0.002	1.14	0.0005	336	0.005	2730132
Dissolved Zirconium (Zr)	mg/L	<0.002	<0.002	0.002	<0.0005	0.0005	<0.005	0.005	2730132
Dissolved Calcium (Ca)	mg/L	468	469	0.2	106	0.05	492	0.5	2734256
Dissolved Magnesium (Mg)	mg/L	923	933	0.2	39.9	0.05	990	0.5	2734256
Dissolved Potassium (K)	mg/L	12.0	12.0	0.2	4.19	0.05	12.4	0.5	2734256
Dissolved Sodium (Na)	mg/L	32.1	33.3	0.2	9.45	0.05	40.7	0.5	2734256
Dissolved Sulphur (S)	mg/L	1920	1960	10	75	3	2040	30	2734256

RDL = Reportable Detection Limit

Maxxam Job #: A861389
Report Date: 2008/11/17

GARTNER LEE
Client Project #: 80632-6
Site Reference: FARO

LOW LEVEL DISSOLVED METALS - WATER (WATER) Comments

Sample	M67633-01 Elements by ICPMS Low Level (dissolved): Detection limits raised due to sample matrix.
Sample	M67634-01 Elements by ICPMS Low Level (dissolved): Detection limits raised due to sample matrix.
Sample	M67638-01 Elements by ICPMS Low Level (dissolved): Detection limits raised due to sample matrix.
Sample	M67639-01 Elements by ICPMS Low Level (dissolved): Detection limits raised due to sample matrix.
Sample	M67640-01 Elements by ICPMS Low Level (dissolved): Detection limits raised due to sample matrix.
Sample	M67641-01 Elements by ICPMS Low Level (dissolved): Detection limits raised due to sample matrix.
Sample	M67642-01 Elements by ICPMS Low Level (dissolved): Detection limits raised due to sample matrix.
Sample	M67643-01 Elements by ICPMS Low Level (dissolved): Detection limits raised due to sample matrix.
Sample	M67644-01 Elements by ICPMS Low Level (dissolved): Detection limits raised due to sample matrix.
Sample	M67645-01 Elements by ICPMS Low Level (dissolved): Detection limits raised due to sample matrix.
Sample	M67646-01 Elements by ICPMS Low Level (dissolved): Detection limits raised due to sample matrix.
Sample	M67641-01 Na, K, Ca, Mg, S by CRC ICPMS (diss.): Detection limits raised due to sample matrix.
Sample	M67643-01 Na, K, Ca, Mg, S by CRC ICPMS (diss.): Detection limits raised due to sample matrix.
Sample	M67644-01 Na, K, Ca, Mg, S by CRC ICPMS (diss.): Detection limits raised due to sample matrix.
Sample	M67646-01 Na, K, Ca, Mg, S by CRC ICPMS (diss.): Detection limits raised due to sample matrix.

Maxxam Job #: A861389
Report Date: 2008/11/17

GARTNER LEE
Client Project #: 80632-6
Site Reference: FARO

QUALITY ASSURANCE REPORT

			Matrix Spike		Spike		Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
2730132	Dissolved Arsenic (As)	2008/11/14	101	75 - 125	95	75 - 125	<0.00002	mg/L	NC	25
2730132	Dissolved Beryllium (Be)	2008/11/14	105	75 - 125	99	75 - 125	<0.00001	mg/L	5.5	25
2730132	Dissolved Cadmium (Cd)	2008/11/14	100	75 - 125	98	75 - 125	<0.000005	mg/L	8.2	25
2730132	Dissolved Chromium (Cr)	2008/11/14	102	75 - 125	97	75 - 125	<0.0001	mg/L	NC	25
2730132	Dissolved Cobalt (Co)	2008/11/14	100	75 - 125	96	75 - 125	<0.000005	mg/L	0.4	25
2730132	Dissolved Copper (Cu)	2008/11/14	NC	75 - 125	102	75 - 125	<0.00005	mg/L	NC	25
2730132	Dissolved Lead (Pb)	2008/11/14	104	75 - 125	101	75 - 125	<0.000005	mg/L	NC	25
2730132	Dissolved Lithium (Li)	2008/11/14	110	75 - 125	100	75 - 125	<0.0005	mg/L	1.9	25
2730132	Dissolved Nickel (Ni)	2008/11/14	100	75 - 125	97	75 - 125	<0.00002	mg/L	1.6	25
2730132	Dissolved Selenium (Se)	2008/11/14	NC	75 - 125	100	75 - 125	<0.00004	mg/L	NC	25
2730132	Dissolved Uranium (U)	2008/11/14	111	75 - 125	102	75 - 125	<0.000002	mg/L	3.9	25
2730132	Dissolved Vanadium (V)	2008/11/14	102	75 - 125	92	75 - 125	<0.0002	mg/L	NC	25
2730132	Dissolved Zinc (Zn)	2008/11/14	NC	75 - 125	100	75 - 125	<0.0001	mg/L	0.6	25
2730132	Dissolved Aluminum (Al)	2008/11/14					<0.0002	mg/L	5.9	25
2730132	Dissolved Antimony (Sb)	2008/11/14					<0.00002	mg/L	NC	25
2730132	Dissolved Barium (Ba)	2008/11/14					<0.00002	mg/L	4.8	25
2730132	Dissolved Bismuth (Bi)	2008/11/14					<0.000005	mg/L	NC	25
2730132	Dissolved Boron (B)	2008/11/14					<0.05	mg/L	NC	25
2730132	Dissolved Iron (Fe)	2008/11/14					<0.001	mg/L	1.1	25
2730132	Dissolved Manganese (Mn)	2008/11/14					<0.00005	mg/L	0.7	25
2730132	Dissolved Mercury (Hg)	2008/11/14					0.00002, RDL=0.00001	mg/L	NC	25
2730132	Dissolved Molybdenum (Mo)	2008/11/14					<0.00005	mg/L	NC	25
2730132	Dissolved Phosphorus (P)	2008/11/14					<0.002	mg/L	NC	25
2730132	Dissolved Silicon (Si)	2008/11/14					<0.1	mg/L	4.9	25
2730132	Dissolved Silver (Ag)	2008/11/14					<0.000005	mg/L	NC	25
2730132	Dissolved Strontium (Sr)	2008/11/14					<0.00005	mg/L	4.4	25
2730132	Dissolved Thallium (Tl)	2008/11/14					<0.000002	mg/L	11.8	25
2730132	Dissolved Tin (Sn)	2008/11/14					<0.00001	mg/L	NC	25
2730132	Dissolved Titanium (Ti)	2008/11/14					<0.0005	mg/L	NC	25
2730132	Dissolved Zirconium (Zr)	2008/11/14					<0.0001	mg/L	15.0	25
2730143	Conductivity	2008/11/13			98	80 - 120	<1	uS/cm	0.4	25
2730144	Alkalinity (Total as CaCO3)	2008/11/13	100	80 - 120	98	80 - 120	<0.5	mg/L	0.7	25
2732547	Dissolved Chloride (Cl)	2008/11/13	109	80 - 120	99	80 - 120	<0.5	mg/L	NC	20
2732564	Dissolved Sulphate (SO4)	2008/11/13	NC	75 - 125	89	80 - 120	<0.5	mg/L	11.2	20
2734256	Dissolved Calcium (Ca)	2008/11/14					<0.05	mg/L	4.1	25
2734256	Dissolved Magnesium (Mg)	2008/11/14					<0.05	mg/L	2.0	25
2734256	Dissolved Potassium (K)	2008/11/14					<0.05	mg/L	0.6	25
2734256	Dissolved Sodium (Na)	2008/11/14					<0.05	mg/L	2.3	25

Maxxam Job #: A861389
Report Date: 2008/11/17

GARTNER LEE
Client Project #: 80632-6
Site Reference: FARO

QUALITY ASSURANCE REPORT

			Matrix Spike		Spike		Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
2734256	Dissolved Sulphur (S)	2008/11/14					<3	mg/L	0.4	25
2738484	Dissolved Sulphate (SO4)	2008/11/15	108	75 - 125	94	80 - 120	0.9, RDL=0.5	mg/L	6.1	20

N/A = Not Applicable
NC = Non-calculable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference

Maxxam Analytics

Maxxam Analytics International Corporation o/a Maxxam Analytics
8577 Commerce Court, Burnaby, British Columbia Canada V5A 4N5 Tel:(604) 444-4808 Toll-free:(800) 440-4808 Fax:(604) 444-4511 www.maxxamanalytics.com

CHAIN OF CUSTODY RECORD

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#2448 AECOM	Company Name:		Quotation #:	A80323	MAXXAM JOB #:	BOTTLE ORDER #:
Contact Name:	Kai Woloshyn	Contact Name:		P.O. #:		A861389	38471
Address:	2251 - 2nd AVENUE WHITEHORSE YT Y1A 5W1	Address:		Project #:	40632-6	CHAIN OF CUSTODY #:	PROJECT MANAGER:
Phone:	(867)633-6474 Fax: (867)633-6321	Phone:	Fax:	Project Name:		C#38471-03-01	ROB MACARTHUR
Email:	kai.woloshyn@aecom.com	Email:		Site Location:	FARO		
				Sampled By:			

REGULATORY CRITERIA: CCME

SPECIAL INSTRUCTIONS: ultra low level metals

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

TURNAROUND TIME (TAT) REQUIRED:

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Regular (Standard) TAT: ☒
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission) ☐
Date Required: _____ Time Required: _____
Rush Confirmation Number: _____ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Matrix	Regulated Drinking Water? (Y/N)	Metals Field Filtered? (Y/N)	Dissolved Metals	General chemistry	pH, conductivity	chloride, sulphate	hardness (as calcium)	alkalinity	# of Bottles	Comments
1		SRK08-P10A	Nov 5 '08	water	N	Y	X	X					2	
2		SRK08-P12A												
3		SRK08-P12B												
4		SRK08-P14												
5		SRK08-P16												
6		SRK08-SBR1	Nov 3 '08											
7		SRK08-SBR2												
8		SRK08-SBR3												
9		SRK08-SBR4												
10		SRK08-SP7A												

*RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	Laboratory Use Only: Time Sensitive	Temperature (°C) on Receipt	Condition of Sample on Receipt	Custody Seal Intact on Cooler?
Kai Woloshyn	08/11/06	10:30				☐			
			AS	Nov 7/08	10:25		4.8.7	☐ OK ☐ SIF	☐ Yes ☐ No

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

Maxxam Analytics

Maxxam Analytics International Corporation o/a Maxxam Analytics
8577 Commerce Court, Burnaby, British Columbia Canada V5A 4N5 Tel:(604) 444-4808 Toll-free:(800) 440-4808 Fax:(604) 444-4511 www.maxxamanalytics.com

CHAIN OF CUSTODY RECORD

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#2448 AECOM	Company Name:		Quotation #:	A80323	MAXXAM JOB #:	BOTTLE ORDER #: 38471
Contact Name:	Kai Woloshyn	Contact Name:		P.O. #:			
Address:	2251 - 2nd AVENUE WHITEHORSE YT Y1A 5W1	Address:		Project #:	80632-6	CHAIN OF CUSTODY #:	PROJECT MANAGER:
Phone:	(867)633-6474 Fax: (867)633-6321	Phone:	Fax:	Project Name:		C#38471-01-01	ROB MACARTHUR
Email:	kai.woloshyn@aecom.com	Email:		Site Location:	FARO		
				Sampled By:			

REGULATORY CRITERIA: CCME

SPECIAL INSTRUCTIONS: ultra low level metals

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (Please be specific):

TURNAROUND TIME (TAT) REQUIRED:

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Regular (Standard) TAT: ☒
(will be applied if Rush TAT is not specified)
Standard TAT = 5-7 Working days for most tests
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission) ☐
Date Required: _____ Time Required: _____
Rush Confirmation Number: _____ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Matrix	Regulated Drinking Water? (Y/N)	Metals Field Filtered? (Y/N)	Dissolved Metals	General Chemistry (pH, conductivity, alkalinity, chloride, sulphate, hardness, ion balance)							# of Bottles	Comments
1		SRK04 - SP7B	Nov 3, 08	Water	N	Y									2	
2		SRK04 - SP7C	↓	↓	↓	↓	↓	↓							↓	
3		SRK04 - SPW1														
4		SRK04 - SPW2														
5																
6																
7																
8																
9																
10																

*RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	Laboratory Use Only: Time Sensitive	Temperature (°C) on Receipt	Condition of Sample on Receipt	Custody Seal Intact on Cooler?
Kai Woloshyn	08/11/06	10:30				☐		☐ OK ☐ SIF	☐ Yes ☐ No

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

Appendix D
Drilling and Site Photographs (on attached CD)