Anvil Range Mine Complex
2005 Annual Environmental Report
Water Licence QZ03-059

prepared for:

Deloitte & Touche Inc.
(acting as Court Appointed Interim Receiver for Anvil Range Mining Corporation)

prepared by:

Gartner Lee Limited

reference: **GLL 40433**

Date: **February 2006**

distribution:

6 Yukon Water Board (plus electronic)
10 Deloitte & Touche Inc.
2 Gartner Lee Limited

February 28, 2006

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

Dear Board:

Re: Water Licence QZ03-059, Annual Environmental Report

We are pleased to submit five bound copies and one unbound original of the report Anvil Range Mine Complex, 2005 Annual Environmental Report, Water Licence QZ03-059. Gartner Lee Limited 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 three accompanying reports that fulfill the reporting requirements for 2005:

1. 2005 Annual Geotechnical Evaluation Instrument Review, Various Facilities, Faro Mine, Yukon as prepared by BGC Engineering Inc.;
2. 2005 Annual Inspection, Waste and Water Management Facilities, Vangorda Mine, Yukon Territory as prepared by SRK Consulting (Canada) Inc.; and
3. Town of Faro Water Wells Investigation as prepared by Gartner Lee Limited.

We draw your attention also to the report, Anvil Range Mine Adaptive Management Plan - Annual Review for 2005, which is appended. That report, prepared by Gartner Lee Limited, provides several recommended numerical refinements to the triggers and thresholds. The Interim Receiver plans to implement these recommendations unless directed otherwise by the Board.

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

Yours very truly,
GARTNER LEE LIMITED

Eric Denholm
Senior Mining Consultant

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8. Biological and Sediment Monitoring Program at Vangorda Creek, Faro, YT, 2005, Laberge Environmental Services, November 2005.
9. 2005 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 Licence QZ03-059, Conducted: During August, 2005, White Mountain Environmental Consulting, December 2005.
10. Anvil Range Mine Adaptive Management Plan - Annual Review for 2005, Gartner Lee Limited, February 2006.
11. Risk Classification Matrix for Elements on the Anvil Range Mine Site for the 2004-05 Review, Interim Receiver
12. CLC July 2005 Meeting Summary
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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 has an expiry date of February 28, 2009.

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 2005 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 2005. 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, the Vangorda pit and the Intermediate Pond was successfully treated with lime through the three on-site water treatment systems and released to the environment according to the terms of the water licence.

The water treatment program at the Vangorda pit successfully lowered the in-pit water level to the point where treatment is not planned for 2006. The water level in the pit and natural runoff levels will be closely monitored to ensure that it remains safe to postpone further treatment until 2007.

The summary highlights of the 2005 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, the Intermediate Pond and the Vangorda pit, with the Vangorda pit being lowered to the extent where it is anticipated that treatment in 2006 will not be necessary;

- Compliance of effluent with the maximum allowable discharge criteria was excellent; there were isolated, minor exceedances for TSS and ammonia that had no effect in the receiving environment;
- Special investigations into methods for cyanide analysis resolved this issue such that all parties agreed on the most appropriate method for all laboratories to use going forward and no apparent exceedances were noted in 2005;
- 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;
- The benthic invertebrate community remains healthy in Vangorda Creek;
- Fish populations remain healthy in both Vangorda and Rose Creeks with no increasing trends in fish metal concentrations;
- Salmon were again observed in Rose Creek in the vicinity of the mine site, which represents a fisheries return to the creek after a long period of non-use;
- 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;
- The Adaptive Management Plan was successfully implemented and appropriate refinements were developed.

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 (Rose Creek Tailings 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 Territory 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; and

?? Major refurbishments to primary water diversions including the Rose Creek Diversion Canal, the Vangorda Creek Diversion Flume and the Faro Creek Diversion Channel.

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 combines 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"). The Water Licence has an expiry date of February 28, 2009.

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 standalone report.

The Water Licence requirements for 2005 are summarized in Table 1-1. The requirements for 2005 include several reports and special projects.

Table 1-1. Summary of Water Licence Requirements for 2004

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

Item	Licence Clause	Dates
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
Town of Faro Water Wells Study	50	2005 Annual Env. Report
Routine Reporting (from submitted plans and studies)		
Fish Monitoring	53	Annual
Adaptive Management Plan	54	Annual

1.3 Organization of the Report

This annual environmental report for the year 2005 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 Gartner Lee Limited ("Gartner Lee") based on information provided by the Interim Receiver, BGC Engineering Inc., SRK, Laberge Environmental Services and White Mountain.

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;
- Fish, White Mountain;
- Physical Stability, Faro Mine Site, BGC Engineering Inc.;
- Physical Stability, Vangorda Plateau Mine Site, SRK Consulting;
- Adaptive Management Plan, 2005 Annual Review, Gartner Lee Limited;
- Comprehensive Risk Assessment, Interim Receiver;
- Town of Faro Water Wells Study, Gartner Lee Limited; and
- Terrestrial Effects Study, Gartner Lee Limited.

Figures 1-1, 1-2 and 1-3 illustrate the general layout of the mine property and facilities.

Figure 1-1. Anvil Range Mine Property General Layout

Figure 1-2. Faro Mine Site General Layout

Figure 1-3. Vangorda Plateau Mine Site General Layout

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 2005 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 Direct Water Use from Rose Creek

Water Use	Maximum Rate (m^3/day)	2005 Total (million m^3)
Zone II Pit Pumping	2,074	0.1
Main Pit Pumping	13,098	1.6
Intermediate Pond	7,982	0.7
Total Estimated Water Use	**23,154**	**2.4**
Total Allowable	**65,465**	**4.1**[1]

1. As suggested in the Water Licence Application Report.

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 2005. The precipitation measured in 2005 was 121% of the 27-year record at 374 mm. New information is being developed regarding site-specific climate data 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.

Table 2-2. Monthly Precipitation at Faro Airport to 2005

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
Max	35.7	25.8	45	19.5	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	**15.4**	**11.7**	**11.6**	**7.3**	**24.4**	**35.7**	**57.4**	**46.2**	**38.2**	**24.2**	**17.6**	**15.6**	**308.3**
Min	0.4	2	trace	0.4	7.6	11.1	13.5	13.8	trace	8.6	3.5	3.9	
Year	1978	2000	1978	2003	2003	1980	2004	1979	1997	2000	1996	1983	
St.Dev	9.2	7.9	10.7	5.0	16.6	15.2	26.6	24.2	19.0	11.5	9.9	10.6	

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

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.

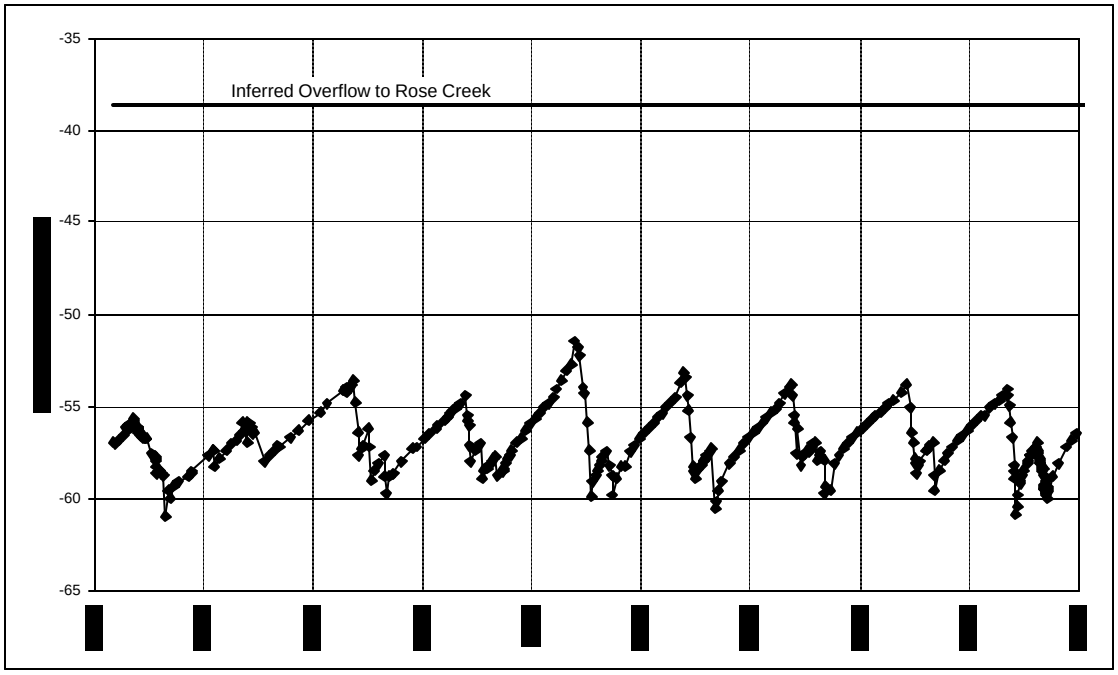
An open riser pipe was installed in the pumping well in March 1997 that allowed direct water level measurements. The measured water levels are illustrated on Figure 2-1. The total volume pumped during 2005 is estimated at 101,500 m^3 based on the measured water levels and an estimated pumping rate of 0.024 m^3/s (380 USgpm). 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

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 2005.

Figure 2-1. Faro Zone II Pit Water Elevation, 1997 to 2005



2.1.3 Main Pit

The recycle water system which provides water from the Faro Main pit to the mill was installed during the summer of 1997 and was utilized 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. 3 electric pumps mounted on a floating barge in the pit rated at providing 5,000 USgpm each to the mill (only one or occasionally two pumps are operated at one time);
2. 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 2005 (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.

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 2005.

Figure 2-2. Faro Main Pit Filling Curve, 1992 to 2005

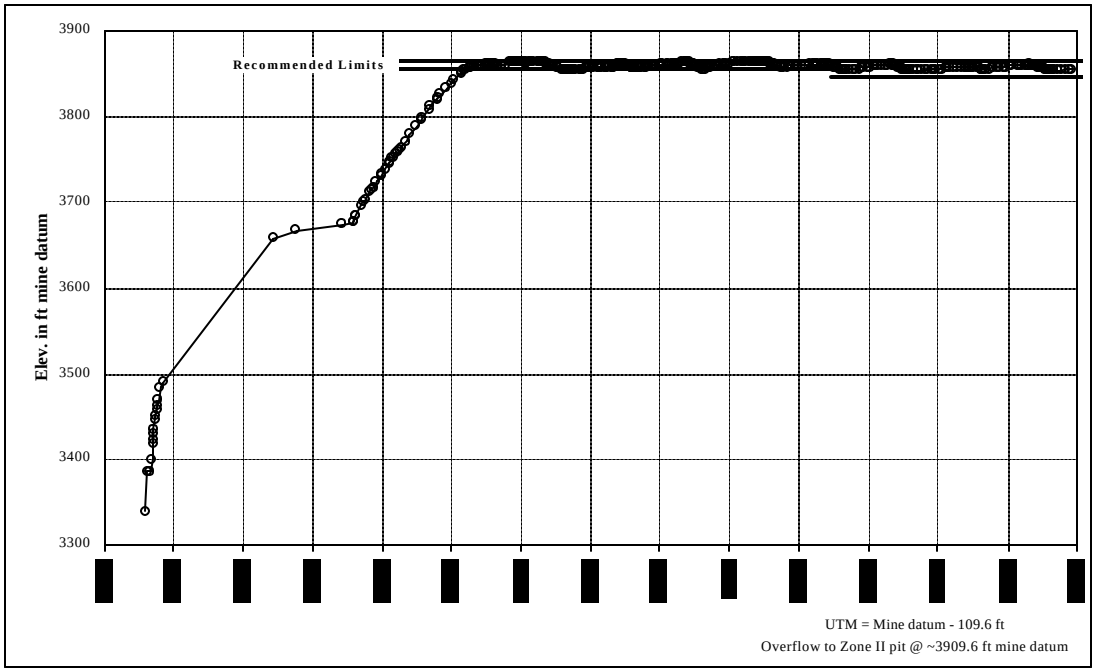
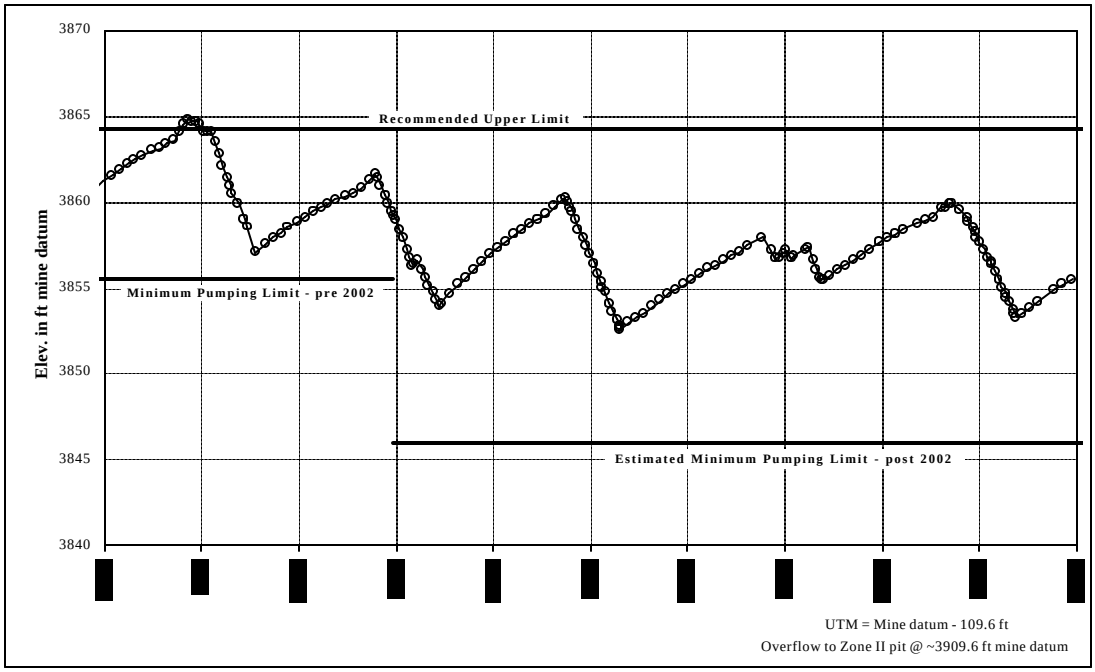


Figure 2-3. Faro Main Pit Water Level, 2001 to 2005



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 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:

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

Therefore, the 2005 water balance for the Faro Main pit can be expressed as:

$$0.10 + 1.18 - 1.62 = -0.35 \quad (\text{in millions } m^3)$$

Notes (also see Table 2-3):

1. The quantity of water pumped from the Zone II pit into the Main pit in 2005 is estimated to be 101,500 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 1.18 million m^3 for 2005 (avg. 37 L/s). This estimate was developed from direct measurements of the pond water level during periods in 2005 where the only inflows/outflows were the uncontrolled water and inflow pumped from the Zone II pit. Periods during which there was pumping were estimated from the preceding and subsequent periods. This may provide for a slight underestimate since the pumping periods may coincide with periods of peak inflows. The estimate of net uncontrolled water inflows for 2005 is within the range of calculated values from 1995 to 2004 (1.0 to 2.0 million m^3).

3. The quantity of water pumped out is calculated for each pumping period from the know volumes derived from the measured changes in pond level plus the net uncontrolled inflow and water pumped from the Zone II pit. The estimated volume pumped in 2005 is 1.62 million m^3. This provides an estimated average flow rate of 13,098 m^3/day (2,402 USgpm average) over the operating period, which would be inclusive of operating variations. This method of estimating the pumping rate continues to be somewhat inconsistent with the rated pump capacity of 5,000 USgpm, as has been observed in recent years. It is noted that there was substantially ore down-time in 2005 for sludge removal related to excess algae in the influent water (Section 5.2) which leads to a lower average pumping rate. The apparent discrepancy is the subject of additional investigation and recommendations (Section 5.2).

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 2005, there was a net decrease in the pond level of 2.1 m representing a net volume of 0.35 million m^3.

Table 2-3. Faro Main Pit Water Balance, 2005

Period (days)	Elevation Change (ft mine datum)	Net Volume Change	ZoneII Inflow	Net Uncontrolled Inflows	Water Pumped OUT
Jan01-May18 (138)	3857.62 - 3860.00 (+5 mm/day)	+396,803 m^3 (+2,875 m^3/day)	Nil	+396,803 m^3 (+2,875 m^3/day)	Nil
May19-Sep19 (124)	3860.00 – 3853.29 (-16 mm/day)	-1,118,718 m^3 (-9,022 m^3/day)	+101,500 m^3 (+2,074 m^3/day) (49 days)	+403,992 m^3 (+3,258 m^3/day) assumed	-1,624,210 m^3 (-13,098 m^3/day) calc.
Sep20-Dec31 (103)	3853.29 – 3855.54 (+7 mm/day)	+375,129 m^3 (+3,642 m^3/day)	Nil	+375,129 m^3 (+3,642 m^3/day)	Nil
Total 2005 (365)	3857.62 – 3855.54 (-2 mm/day)	-346,786 m^3 (-950 m^3/day)	+101,500 m^3 (+278 m^3/day)	1,175,924 m^3 (+3,222 m^3/day)	-1,624,210 m^3 (-4,450 m^3/day)

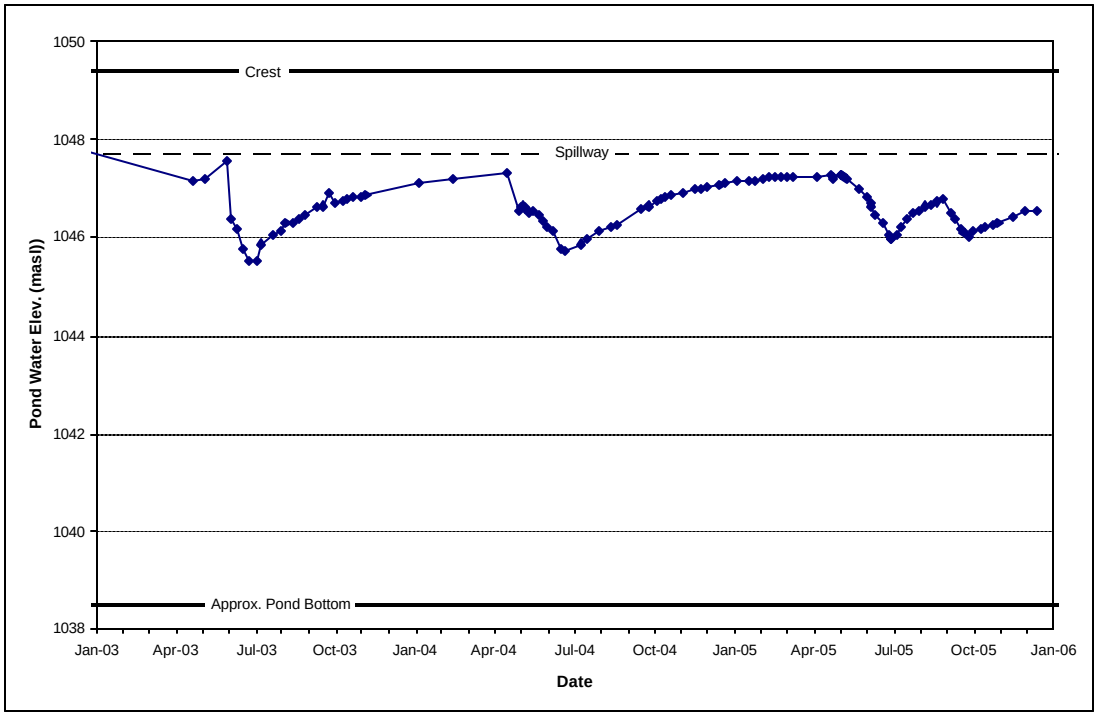
2.1.4 Intermediate Pond

The Intermediate Pond is managed by maintaining the water level below the spillway elevation by periodically syphoning water out into the Cross Valley Pond (with treatment). This practice reduces the environmental and physical stability risks associated with operating a retained water pond at full supply level and was 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 rates for the Intermediate Pond.

An estimated 686,500 m^3 was syphoned (and treated) from the Intermediate Pond in 2005. There were 86 days of syphon operation over three periods (April 22 to April 25, May 5 to June 29, August 29 to September 26) at an estimated average flow rate of 7,982 m^3/day (1,464 USgpm average over the operating period). As per the established operating practice, the system was operated in spring to restore storage for the upcoming freshet. The system was operated again in late summer to provide storage for the (low) winter inflows.

Figure 2-4 illustrates the water level measurements in the Intermediate Pond from 2003 to 2005. The pond level was 0.6 m lower at year end than at the beginning of the year.

Figure 2-4. Intermediate Pond Water Level, 2003-2005



A simple water balance can be described for the Intermediate Pond that is based on the measured pond water levels, the height-volume relationship and the dates of syphon outflow. In this case, the water balance parameters are the quantities of:

- "Net uncontrolled inflows" (groundwater seepage in/out, runoff, precipitation, net inflows from X23/Faro rock dumps, etc.) calculated from observed changes in the pit pond water elevation during strategic periods;
- "Water syphoned"; 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:

$$\textit{Net Uncontrolled Inflows}^{1} - \textit{Water Syphoned}^{2} = \textit{Net Inflow}^{3}$$

Therefore, the 2005 water balance for the Intermediate Pond pit can be expressed as:

$$+0.55^{1} - 0.69^{2} = -0.14^{3} \quad \textit{(in millions } m^{3}\textit{)}$$

Notes (also see Table 2-4):

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 0.55 million m^3 for 2005 (avg. 17 L/s). This estimate was developed from direct measurements of the pond water level during periods in 2005 where the only inflows/outflows were the uncontrolled water. Periods during which there was syphoned outflow were estimated from the preceding and subsequent periods. This may provide for a slight underestimate since the periods of siphoned outflow may coincide with periods of peak inflows.

2. The water syphoned out is calculated for each syphoning period from the know volumes derived from the measured changes in pond level plus the net uncontrolled inflow. The estimated volume syphoned in 2005 is 0.69 million m^3. The estimated average flow rate of 7,982 m^3/day (1,464 USgpm average over the operating period) is slightly less than previous estimate of 2,000 USgpm.

3. 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 syphoned out. In 2005, there was a net decrease in the pond level of 0.6 m representing a net volume of 0.14 million m^3.

Table 2-4. Intermediate Pond Water Balance, 2005

Period (days)	Elevation Change (m asl)	Net Volume Change	Net Uncontrolled Inflows	Water Syphoned OUT
Jan01-Apr21 (112)	1047.15 - 1047.27 (+1 mm/day)	+27,556 m^3 (+246 m^3/day)	+27,556 m^3 (+246 m^3/day)	Nil
Apr22-Apr25 (3)	1047.27 – 1047.20 (-23 mm/day)	-17,748 m^3 (-5,916 m^3/day)	+3,348 m^3 (+1,116 m^3/day) assumed	-21,096 m^3 (-7,032 m^3/day) calc.
Apr26-May 4 (10)	1047.20 – 1047.28 (+8 mm/day)	+19,850 m^3 (+1,985 m^3/day)	+19,850 m^3 (+1,985 m^3/day)	Nil
May 5-Jun29 (55)	1047.28 – 1045.98 (-24 mm/day)	-296,455 m^3 (-5,390 m^3/day)	+135,630 m^3 (+2,466 m^3/day) assumed	-432,085 m^3 (-7,856 m^3/day) calc.
Jun30-Aug28 (61)	1045.98 – 1046.78 (+13 mm/day)	+179,691 m^3 (+2,946 m^3/day)	+179,691 m^3 (+2,946 m^3/day)	Nil
Aug29-Sep26 (28)	1046.78 – 1046.00 (-28 mm/day)	-173,917 m^3 (-6,211 m^3/day)	+59,360 m^3 (+2,120 m^3/day) assumed	-233,277 m^3 (-8,331 m^3/day) calc.
Sep27-Dec31 (96)	1046.00 – 1046.56 (+6 mm/day)	+124,143 m^3 (+1,293 m^3/day)	+124,143 m^3 (+1,293 m^3/day)	Nil
Total 2005 (365)	1047.15 – 1046.56 (-2 mm/day)	-136,880 m^3 (-375 m^3/day)	549,578 m^3 (+1,506 m^3/day)	-686,458 m^3 (-1,881 m^3/day)

2.1.5 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 that is not released unless it meets the maximum allowable discharge limits specified in the Water Licence (Part C, Items 27 through 31).

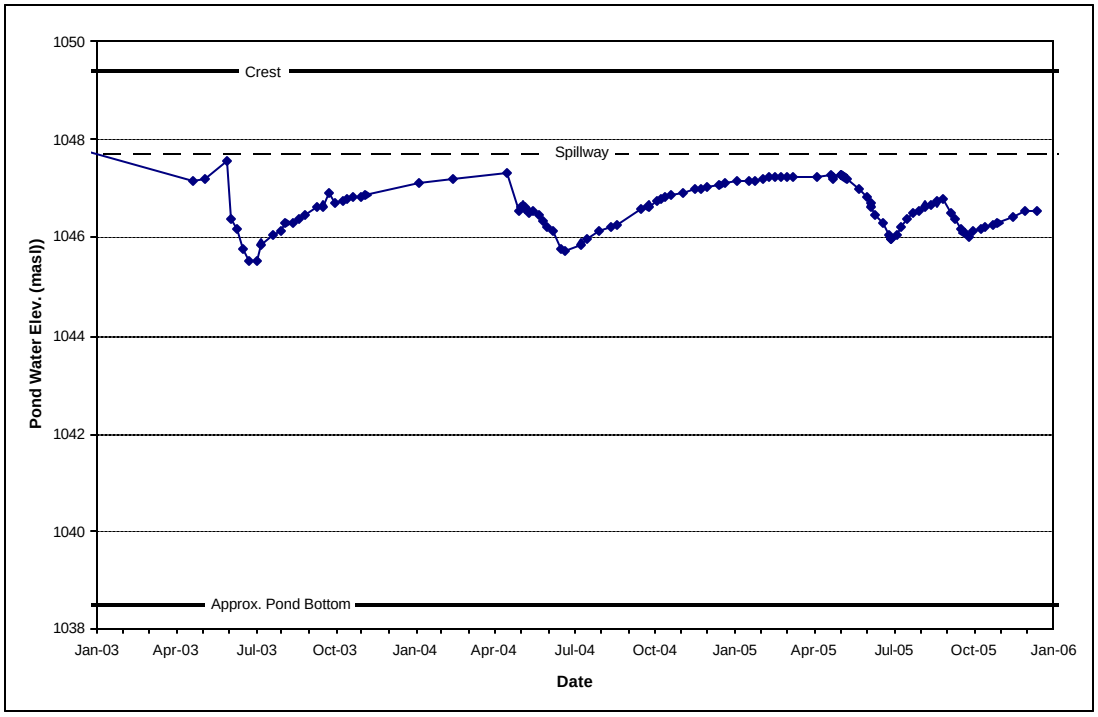
The sources of water entering the Cross Valley pond are:

- ?? surface inflow syphoned (and treated) from the Intermediate pond (Section 2.2);
- ?? water that is pumped (and treated) from the Faro Main pit and the mill treatment system;
- ?? groundwater that may possibly discharge into the pond from the underlying aquifer; and
- ?? precipitation and local runoff.

There were 178 days of syphon operation over three periods (February 22 to March 24, May 2 to May 16, May 25 to October 5) at an estimated average flow rate of 460 Lps (7,291 USgpm), as measured via staff gauge. As per the established operating practice, the system was operated in late winter/spring to restore storage for the upcoming freshet. The system was operated again through the summer to pass (treated) water inflows from the Intermediate Pond and the Main pit/mill treatment system.

Figure 2-5 illustrates the water level measurements in the Cross Valley Pond from 2003 to 2005. The pond level was 0.6 m lower at year end (2005) than at the beginning of the year.

Figure 2-5. Cross Valley Pond Water Level, 2003-2005



An estimated 7.1 million m^3 of (compliant) water was syphoned from the Cross Valley Pond in 2005, based on the number of days syphoned and the (assumed) average flow rate. This is inclusive of:

- ?? inflow from the Main Pit (1.6 million m^3);
- ?? inflow from the Intermediate Pond (0.7 million m^3);
- ?? net lowering of the pond level by 1.4 m over the course of the year even in light of higher than normal precipitation (122% of normal); and
- ?? any other inflows and outflows.

2.1.6 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. New information on this topic is being developed through the studies that are currently underway for development of the FCRP. However, the information is in a preliminary state and not available at this time.

The total volume of effluent that entered Rose Creek via location X13 in 2005 was estimated to be 0.9 million m^3 at a rate of flow that varied from 16 to 49 Lps, as compiled by BGC Engineering Inc.

2.1.7 Freshwater

No freshwater was drawn from Rose Creek for industrial purposes in 2005. Freshwater from Rose Creek was not used for reagent mixing in the water treatment systems, drinking water or wash water. A minor amount of water used for dust control and maintenance on the public mine access road is not reported here.

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 without major refurbishment and operation of the system is 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 (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;
   The building is largely empty. Pumps and motors have been previously removed for alternate use.
3. Freshwater Pipeline; and
   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.

2.1.8 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) excepting periods of malfunction or damage.

These flow records are currently the subject of technical review as part of the FCRP and, therefore, may be amended in future. As an example of the data under review, Figures 2-6 (R7) and 2-7 (X14) are preliminary graphs of 2005 flow rates provided by Laberge Environmental Services.

Figure 2-6. Preliminary 2005 Flow Record for Location R7, North Fork Rose Creek

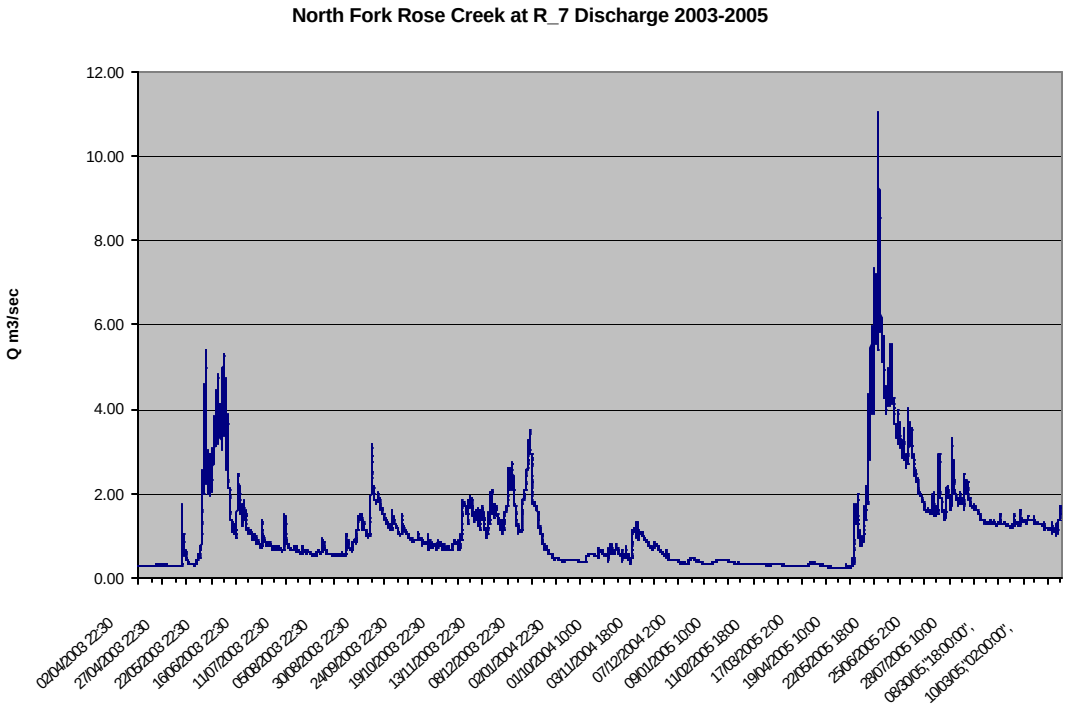
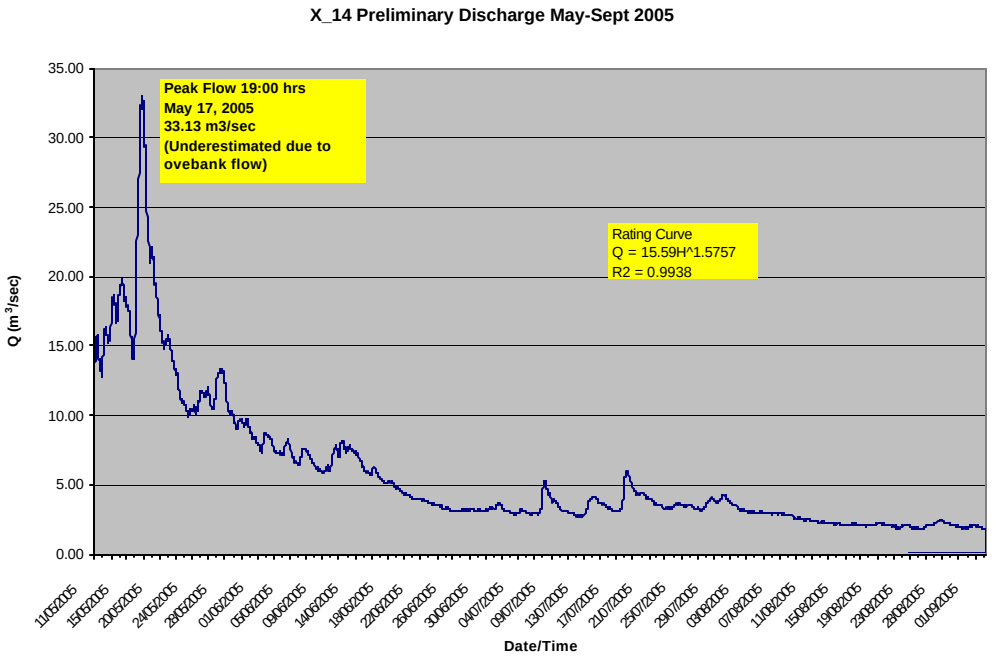


Figure 2-7. Preliminary 2005 Flow Record for Location X14, Rose Creek



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 2-5 summarizes the total water obtained from Vangorda Creek in 2005 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 2005. Therefore, these amounts are not included in the amounts listed in Table 2-5. There was no use of water for unauthorized purposes.

Table 2-5. Summary of Water Use from Vangorda Creek

Water Use	Maximum Rate (m^3/day)	2005 Total Quantity (m^3)
Pumping from Little Creek Dam Pond	1,690	49,000
Pumping from the Vangorda Pit	10,727	924,352
Pumping from Freshwater Supply Pond	30	2,585
Possible Future Pumping from the Grum Pit	Not required	Not required
Total Estimated Water Use	**12,447**	**975,937**
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 2-5 shows that the volume of water pumped (and treated) from the Vangorda Pit in 2005 was greater than the annual volume that was suggested in the Water Licence Application. In 2005, a management strategy was implemented to move a large volume of water from the Vangorda pit in 2005 so that the pumping program would not be required in 2006. This strategy provides operational and cost benefits, reduces environmental risks and provides for moving the average annual volumes of water on a multi-year basis. In this way, the overall annual volumes pumped will be as anticipated.

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 2005. The precipitation measured in 2005 was 121% of the 27-year record at 374 mm. New information is being developed regarding site-specific climate data 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.

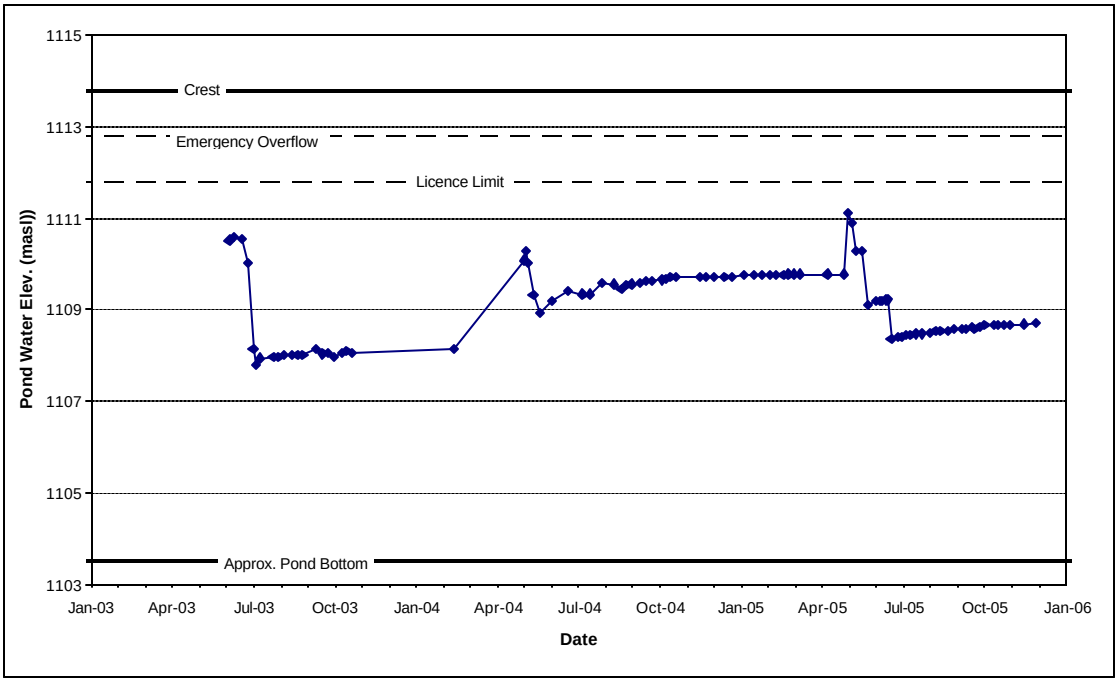
2.2.2 Little Creek Dam Pond

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.

An estimated 49,000 m^3 was pumped from Little Creek Dam Pond in 2005. This is estimated from the measured pond elevations and the height-capacity relationship. There were 29 days of pumping over two periods (April 27 to May 24, June 13 to June 20) at an estimated average flow rate of 1,690 m^3/day (310 USgpm average over the pumping period).

Figure 2-8 illustrates the water level measurements in Little Creek Dam Pond from 2003 to 2005. The pond level was approximately 0.9 m lower 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 2005.

Figure 2-8. Little Creek Dam Pond Water Levels, 2003 to 2005



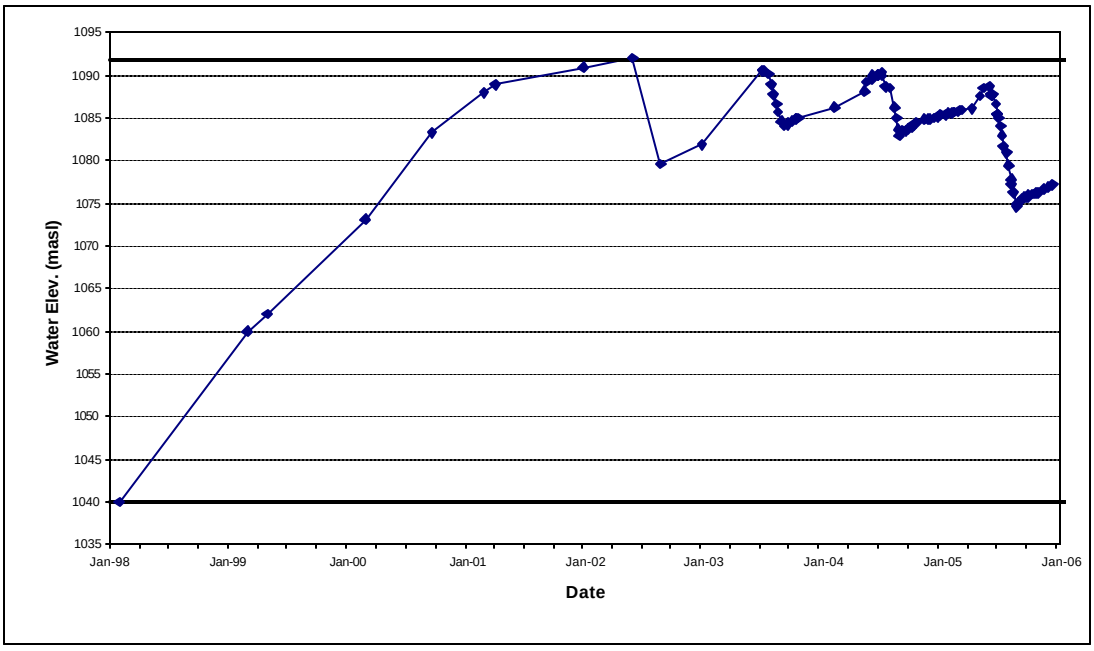
2.2.3 Vangorda Pit

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. Since 2002, an annual seasonal pumping program has been established to maintain the pit water level below the maximum recommended elevation. The filling curve for the Vangorda pit through 2005 is illustrated on Figure 2-9.

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 2005.

Figure 2-9. Filling Curve for Vangorda Pit, 1998 to 2005



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:

- "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:

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

Therefore, the 2005 water balance for the Vangorda pit can be expressed as:

$$0.05 + 0.45 - 0.92 = -0.43 \quad \textit{(in millions } m^3\textit{)}$$

Notes (also see Table 2-6):

1. The quantity of water pumped from Little Creek Dam into the Vangorda pit in 2005 is estimated to be 49,000 m^3 (Section 2.3).

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 0.45 million m^3 for 2005 (avg. 14 L/s). This estimate was developed from direct measurements of the pond water level during periods in 2005 where the only inflows/outflows were the uncontrolled water and inflow pumped from Little Creek Dam. Periods during which there was pumping were estimated from the preceding and subsequent periods. This may provide for a slight underestimate since the pumping periods may coincide with periods of peak inflows. The estimate of net uncontrolled water inflows for 2005 is within the range of calculated values from 1998 to 2004 (0.2 to 1.0 million m^3).

3. The quantity of water pumped out is calculated for each pumping period from the know volumes derived from the measured changes in pond level plus the net uncontrolled inflow and water pumped from Little Creek Dam. The estimated volume pumped in 2005 is 0.92 million m^3. This provides an estimated average flow rate of 10,727 m^3/day (1,968 USgpm average) over the operating period, which would be inclusive of operating variations. This method of estimating the pumping rate is consistent with the rated pump capacity of 2,000 USgpm.

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 2005, there was a net decrease in the pond level of 7.8 m representing a net volume of 0.43 million m^3.

Table 2-6: Vangorda Pit Water Balance, 2005

Period (Days)	Elevation Change (m)	Net Volume Change	Water Pumped from Little Creek Dam	Net Uncontrolled Inflows	Water Pumped Out
Jan01-May31 (151)	1085.27 – 1088.61 (+22 mm/day)	+220,908 m^3 (+1,463 m^3/day)	+39,000 m^3 (+1,773 m^3/day) (22 days)	+205,516 m^3 (+1,361 m^3/day) calc.	23,608 m^3 (-10,896 m^3/day) (52 hours)
Jun1-Aug23 (84)	1088.61 – 1074.58 (-167 mm/day)	-788,852 m^3 (-9,391 m^3/day)	+10,000 m^3 (+1,429 m^3/day) (7 days)	+101,892 m^3 (+1,213 m^3/day) assumed	-900,744 m^3 (-10,723 m^3/day) calc.
Aug24-Dec31 (130)	1074.58 – 1077.48 (+22 mm/day)	+138,398 m^3 (+1,065 m^3/day)	Nil	+138,398 m^3 (+1,065 m^3/day) *see note 1.*	Nil
2004 (365)	1085.27 – 1077.48 (-21 mm/day)	-429,546 m^3 (-1,177 m^3/day)	+49,000 m^3 (+134 m^3/day)	+445,806 m^3 (+1,221 m^3/day)	-924,352 m^3 (-2,532 m^3/day)

Note: 1. This includes end-of-season draining of the clarification pond.

2.2.4 Grum/Vangorda Freshwater Supply Pond

The only freshwater drawn from Vangorda Creek in 2004 was a relatively small amount used for mixing lime in the Grum/Vangorda water treatment plant. This water was 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 lime in 2005 is estimated to be 2,585 m^3 based on the assumed pumping rate (30 m^3/day) and the estimated operating days (84 days plus 52 hours initial filling of the Clarification Pond).

2.2.5 Grum Pit

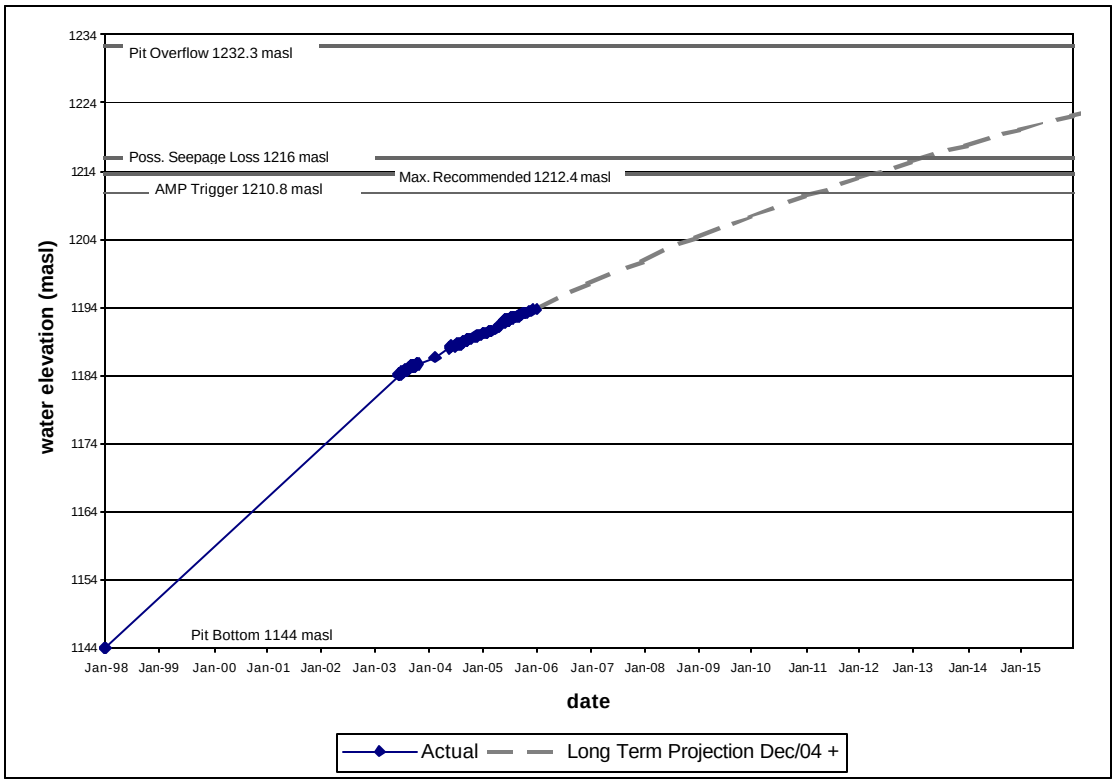
Since the cessation of mining activities in 1998, the Grum pit has been allowed to accumulate natural runoff water. The rate of filling has been slower than the Vangorda pit because of the relatively smaller

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 2005. 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 is during 2011. This is projected to be a minimum 2 years prior to the water level reaching the elevation at which subsurface seepage might occur. The projected rate of filling is one of the elements of the Adaptive Management Plan and is also discussed in Section 9.8.

The estimated net quantity of water that accumulated in the Grum pit in 2005, based on the measured elevations and the height-capacity curve, is 393,500 m^3.

Figure 2-10. Grum Pit Filling Curve



2.2.6 Effluent Discharge

The quantity of effluent discharged from the Grum/Vangorda water treatment plant in 2005 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 totaled 896,712 m^3 for 2005.

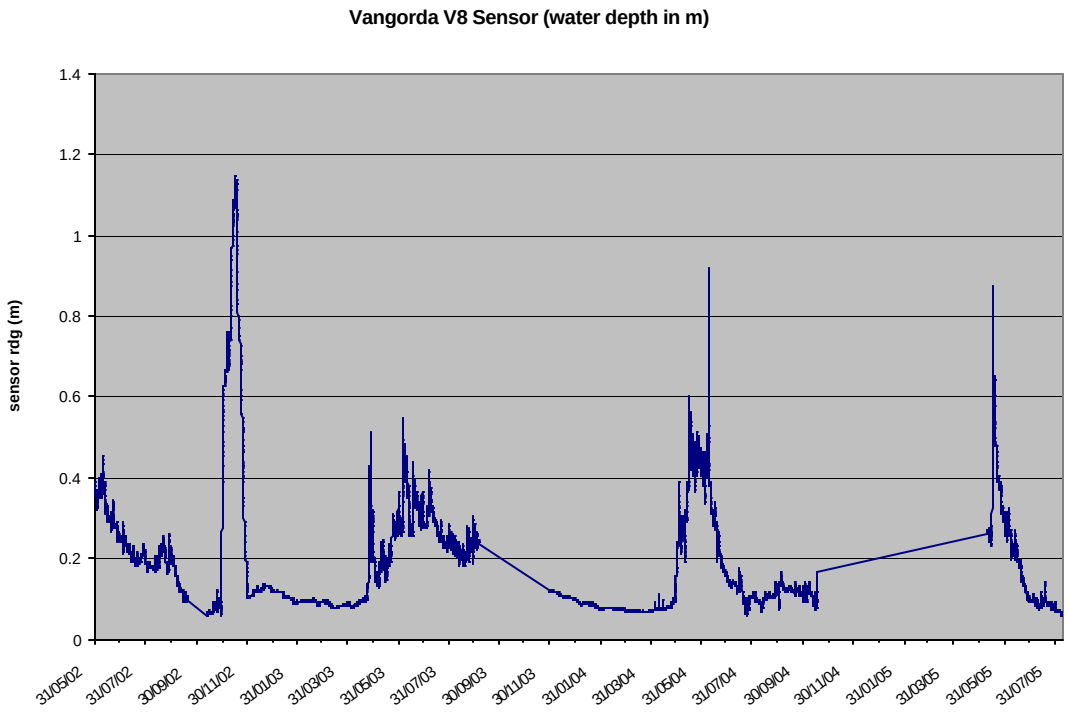
Further information on this topic is provided in Section 5.4.

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 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". The water level has been monitored on a continuous basis using a pressure transducer and datalogger since 1996 excepting periods of malfunction or damage.

The flow record is currently the subject of technical review as part of the FCRP and, therefore, may be amended in future. As an example of the data under review, Figure 2-11 illustrates 2005 sensor readings provided by Laberge Environmental Services.

Figure 2-11. Preliminary 2005 Flow Readings for Location V8, Lower Vangorda Creek



3. Water Quality Monitoring – Rose Creek Drainage

3.1 Overview of Water Quality Monitoring Program

Part G and Schedule A of the Water Licence describe the water quality monitoring program for the mine property. 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 2005, most of the water analyses were conducted by CanTest. The analytical data is managed through an electronic database that is managed by Gartner Lee Limited.

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 on either the Faro or Vangorda Plateau mine sites.

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 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 2005 is provided in Appendix 3 (surface water) and Appendix 4 (groundwater). Bioassay results are provided in Appendix 5. 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

Main Pit

Water chemistry in the near surface zone of the Faro Main Pit is monitored at location X22B. Twelve monthly samples were collected in 2005. Information at this location is important to the general understanding of conditions at the mine site and also to facilitate management of the annual Faro pit-pumping program.

Water quality at location X22B is generally indicative of buffered acid rock drainage with elevated 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 to February 1998) of lime treated tailings slurry. A generally progressive increase in zinc concentrations from 1998 to 2003 illustrates the anticipated trends related to the discontinuation of high pH water inflow from the tailings slurry.

In 2005, the concentration of sulphate (SO_4) at location X22B ranged from 533 mg/L to 689 mg/L with an average concentration of 616 mg/L for the year. The concentrations of total and dissolved Zinc (Zn) at location X22B in 2005 ranged from 12.1 mg/L to 15.1 mg/L and from 9.6 mg/L and 14.4 mg/L, respectively, with average concentrations of 13.5 mg/L and 12.1 mg/L, respectively. Both SO_4 and Zn concentrations recorded in 2005 are within ranges typically observed at this site in recent years (Figures 3-1 and 3-2).

The concentrations of total and dissolved Cadmium (Cd) ranged from 0.0017 mg/L to 0.0140 mg/L and from <0.0002 mg/L to 0.014 mg/L, respectively in 2005. The average concentrations were 0.0077 mg/L and 0.0069 mg/L, respectively. Annual maximum Cd concentrations at this location have continued to decrease progressively over the last three years (Figure 3-3).

Figure 3-1. Sulphate at X22B

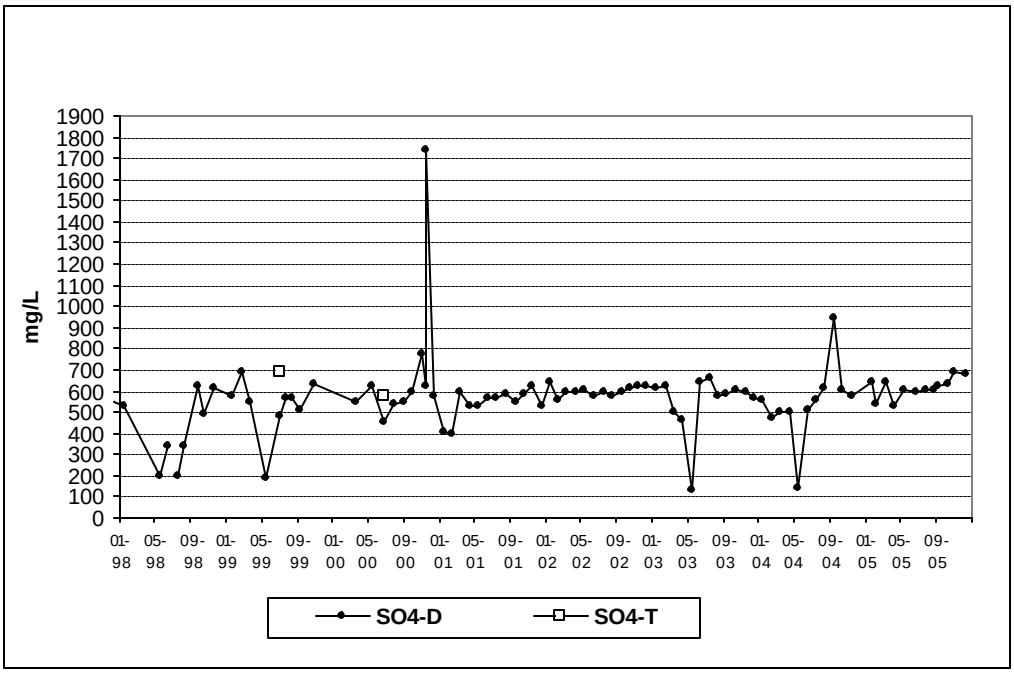


Figure 3-2. Zinc at X22B

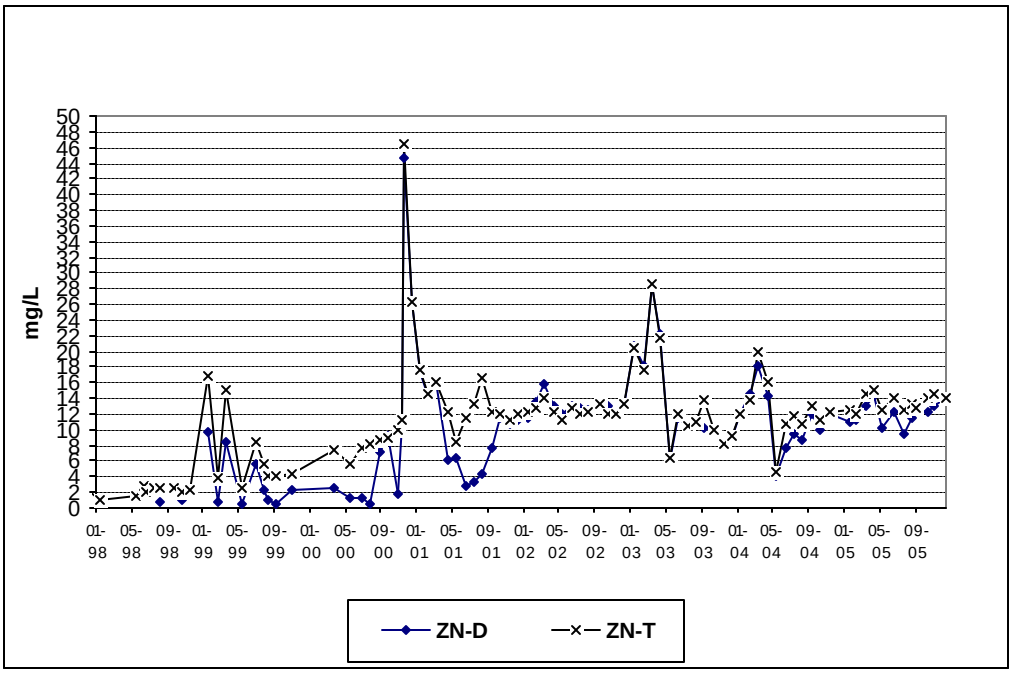
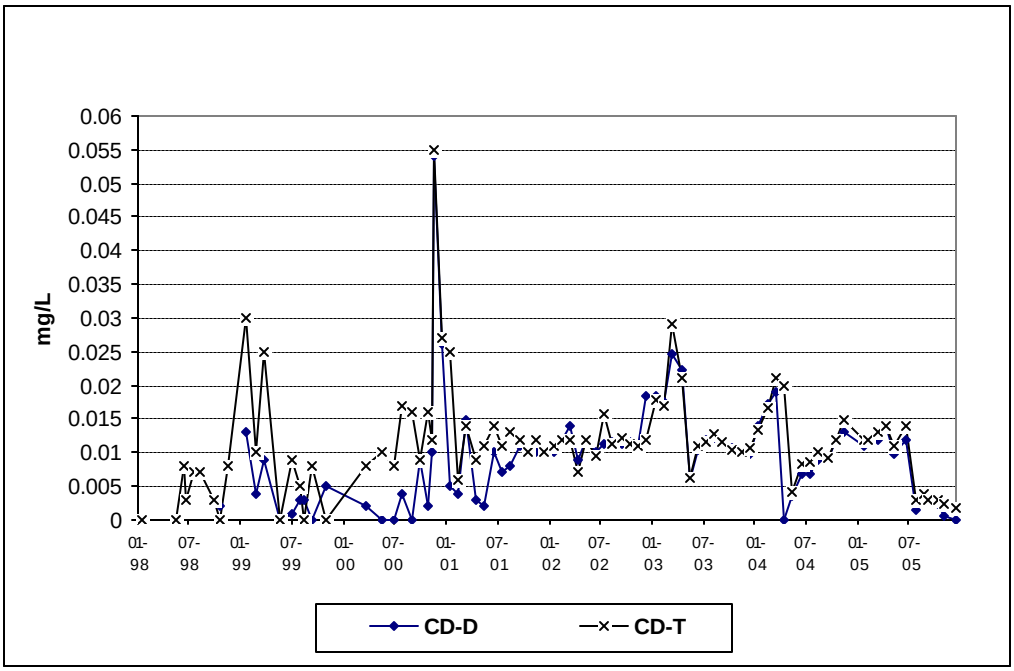


Figure 3-3. Cadmium at X22B



Miscellaneous Surface Seepages

Flow that collects in the Faro Creek channel above the Faro Valley rock dump (location FCO) was sampled in the June and September of 2005. This water flows along the base of the Faro Valley rock dump and into the Main pit. The water quality results for 2005 showed increased levels of Cd and SO_4 concentrations in comparison to previous years. The SO_4 concentration in June was the highest recorded at that site since sampling commenced in 1989. Concentrations for Cu and Zn were higher in June than in September.

Locations A30 and A25 are seeps into the Main Pit from the Faro pit walls. Location A30 is located immediately below the toe of the Faro Valley rock dump on the north pit wall. A30 was sampled twice in 2005, in June and September. Concentrations of Cd, Cu, Pb, SO_4 and Zn followed similar trends of the previous year (2004), with elevated concentrations observed in June, returning to normal levels by September. Sulphate concentrations at location A30 for 2005 ranged from 563 mg/L to 1,060 and total Zn concentrations ranged from 58.5 mg/L to 90.9 mg/L.

Sampling station A25, located in the Main Pit on the northwest wall, was sampled in June and September. Sulphate concentrations have remained consistent throughout 2004 and 2005, while total Zn concentration decreased in 2005 compared to the previous year. Sulphate and total Zn concentrations at location A25 ranged from 18.6 mg/L to 19.1 mg/L, and 0.007 mg/L and 0.01 mg/L, respectively, in 2005.

Concentrations of As, Cd, Cu, and Pb have remained below MDL's (minimum detection limits) since water quality monitoring at this site began in 2004.

Location SP5/6 is a surface ditch into the Main Pit from the North East Dumps and was sampled twice in 2005, in spring and fall. Contaminant concentrations were similar to previous years, with the exception of Zn and Cd, which displayed higher than normal values than those observed in recent years. Concentrations of SO_4 at SP5/6 continue to remain at elevated levels similar to those of 2004.

3.2.2 Zone II Pit

Water chemistry in the backfilled Zone II Pit is monitored at location X26, which is water pumped from the Zone II Pit into the Main Pit. Information at this location can identify significant 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.

Three samples were collected at location X26 in 2005, in July, August and September. No sample was collected in June due to a temporary shut down for maintenance of the pumping system. The concentration of SO_4 at location X26 in 2005 ranged from 2,700 mg/L to 3,410 mg/L with an average over the year of 3,120 mg/L. The concentration of SO_4 observed in June (3,410 mg/L) is the highest concentration recorded at this location, and is consistent with a progressively increasing trend in SO_4 levels since 1998 (Figure 3-4). Location X26 continues to have the highest SO_4 concentration of any of the monitored inflows into the Main Pit.

The concentrations of total and dissolved Zn at location X26 in 2005 ranged from 71.7 mg/L to 125 mg/L and 80.2 mg/L to 128 mg/L, respectively, with average concentrations of 114.6 and 103.7 mg/L, respectively. Zinc concentrations observed in 2005 are slightly higher than those observed in 2004, consistent will an overall increasing trend in Zn at location X26 since 2000 (Figure 3-5)

Total lead concentrations at this site in 2005 ranged from 0.052 mg/L to 0.086 mg/L, with an average concentration of 0.078 mg/L. Dissolved Pb concentrations were all below the MDL. Total Pb concentrations are similar to those recorded in 2004, with both years reporting elevated concentrations in comparison to previous years.

Cadmium concentrations were similar to those observed in recent years at location X26.

Figure 3-4. Sulphate at X26

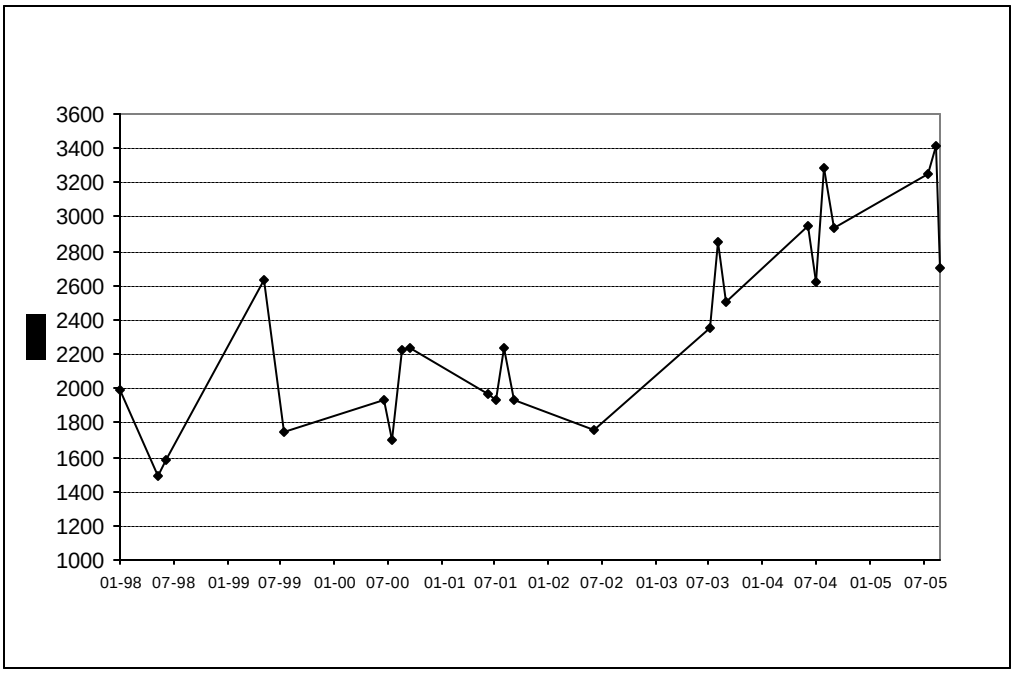
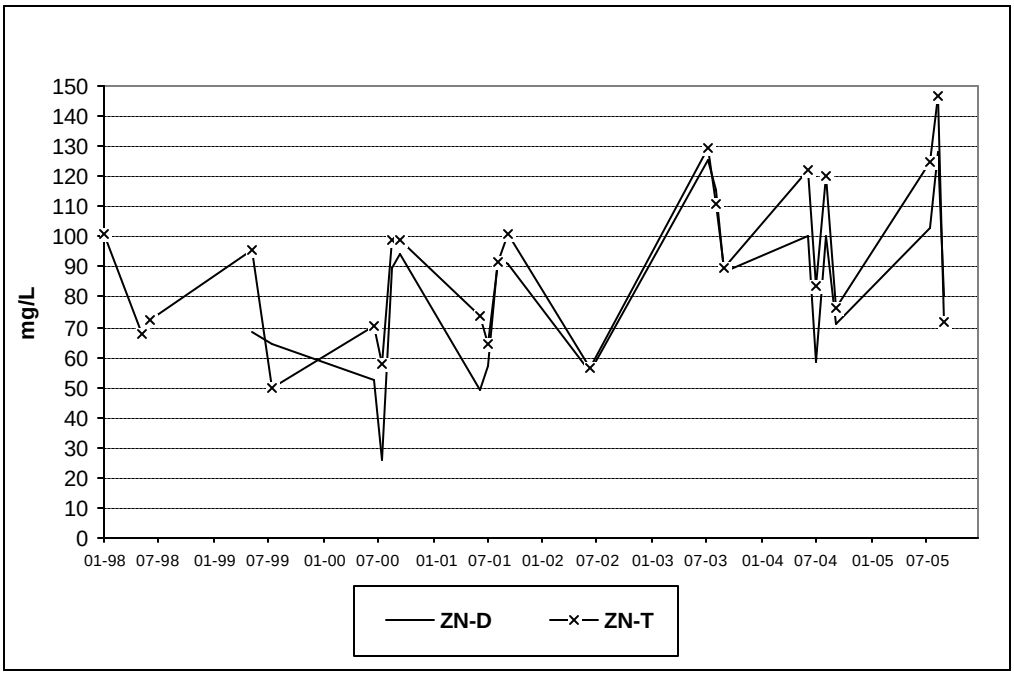


Figure 3-5. Zinc at X26



3.2.3 Rock Dumps

Old Faro Creek Channel

Surface seepage from the toe of the main rock dump area is sampled at location X23 located in the old Faro Creek channel where a large portion of the seepage from the Main and Intermediate rock dumps is assumed to collect. Water quality is typical of buffered acid rock drainage with elevated metals and sulphate at neutral pH. This water flows into the Intermediate Impoundment and receives treatment prior to discharge. New information regarding the possible loss of some portion of this water to the Rose Creek Valley Aquifer is being developed through studies that are currently underway for development of the FCRP. However, this information is in a preliminary state and not available for reporting at this time.

In 2005, twelve monthly samples were collected at location X23. The concentration of SO_4 in 2005 ranged from 4,730 mg/L to 6,820 mg/L with an average of 5,788 mg/L. Sulphate concentrations were generally higher in 2005 compared to recent years, continuing a generally increasing trend since around 1998 (Figure 3-6).

The concentrations of total and dissolved Zn at location X23 in 2005 ranged from 283 mg/L to 808 mg/L and 222 mg/L to 732 mg/L, respectively, with average concentrations of 463 mg/L and 414 mg/L, respectively. Zinc concentrations for 2005 are similar to those observed in 2004, with maximum annual concentrations observed during the spring for both years (Figure 3-7).

Maximum concentrations for Cd, Cu, and Pb at X23 peaked in May and returned to normal levels by June, suggesting a possible seasonal trend.

Figure 3-6. Sulphate at X23

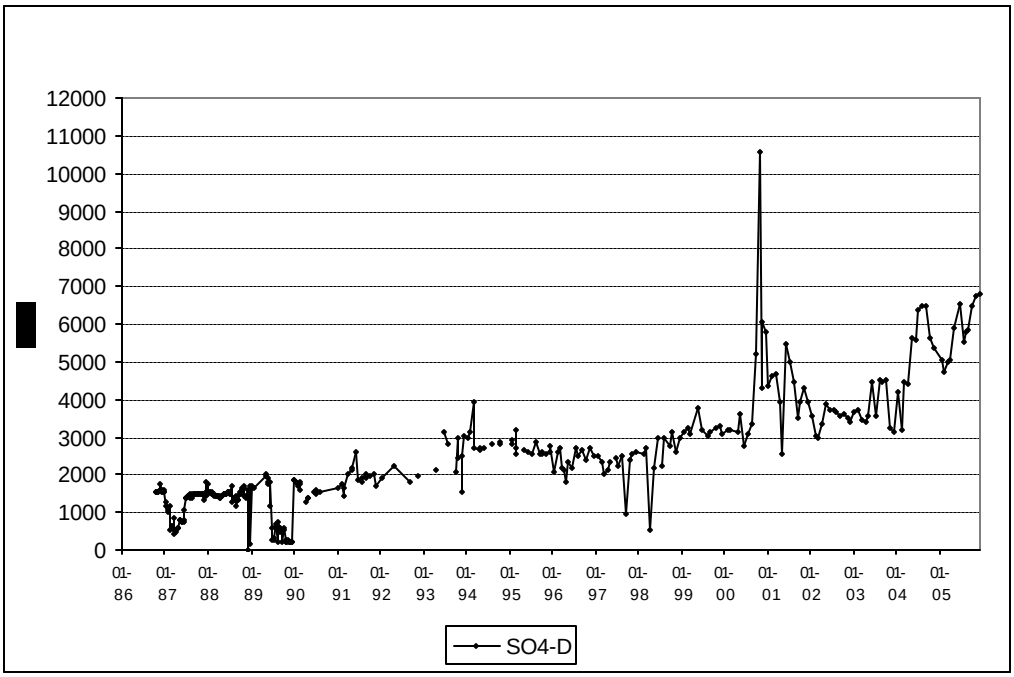
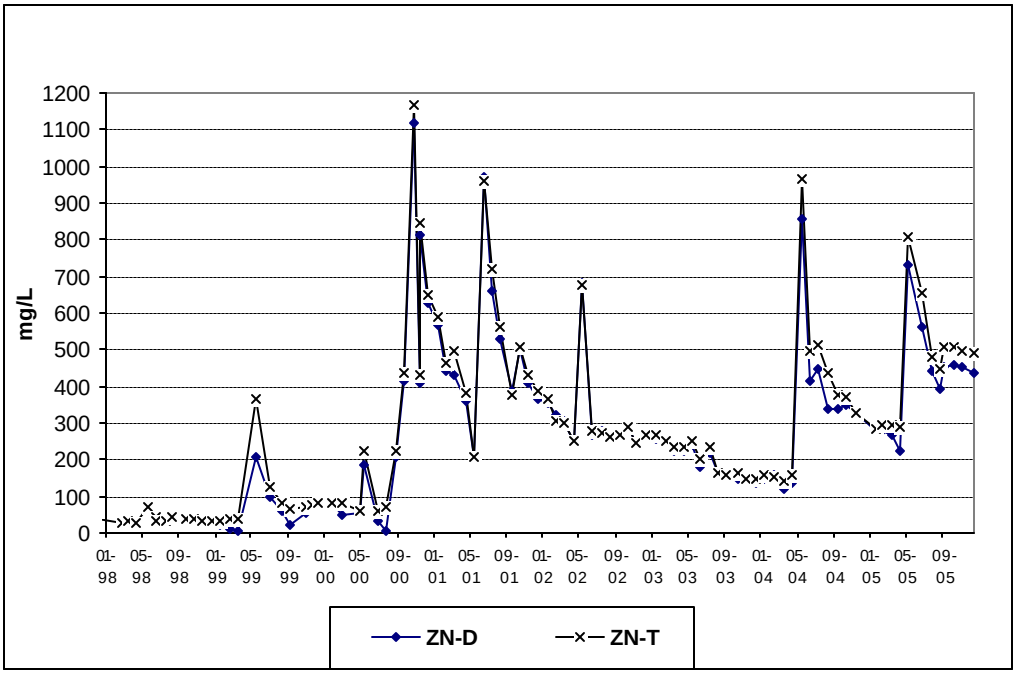


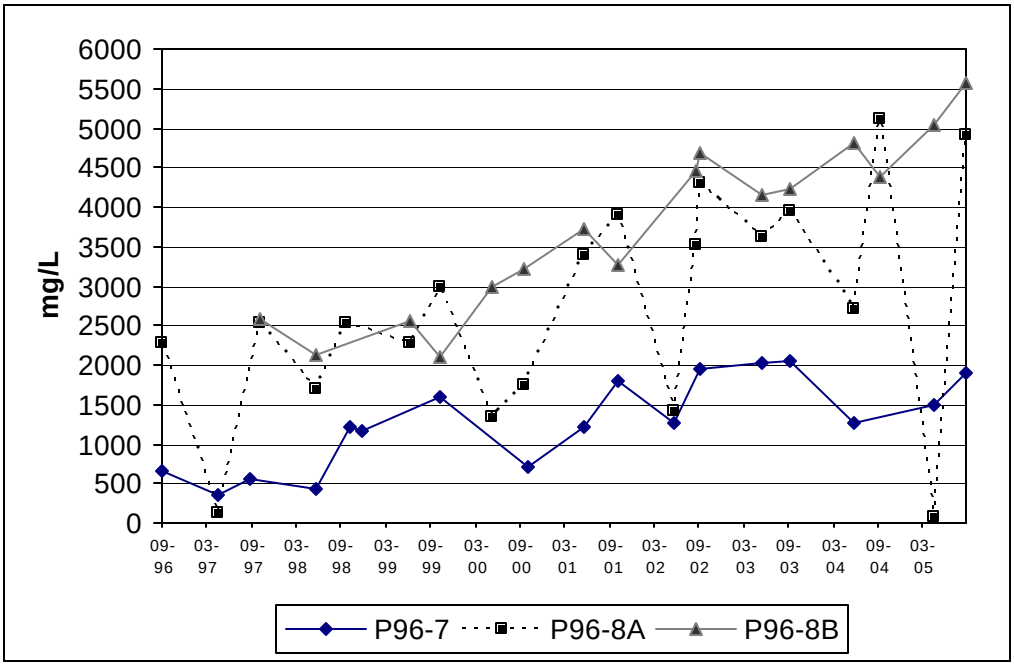
Figure 3-7. Zinc at X23



Groundwater: Main Rock Dumps

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 adjacent to surface monitoring location X23. These wells were sampled in the spring and fall of 2005. Sulphate concentrations ranged from 71.2 mg/L (P96-8A) to 4,980 mg/L at P96-8B. All three locations showed a general continuation of an increasing trend (Figure 3-8).

Figure 3-8. SO4 at P96-7, P96-8A and P96-8B



In 2005, Zn concentrations for location P96-7 ranged from 0.008 mg/L to 0.028 mg/L, comparable to recent years. At location P96-8A/B, Zn concentrations ranged from 1.67 mg/L to 618 mg/L, continuing an overall increasing trend in recent years.

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. All six sampling points were sampled twice in 2005, in May and September.

Sulphate concentrations in the shallower wells S1A, S2A and S3 ranged from 1,860 mg/L to 4,610 mg/L whereas SO_4 concentrations in deeper wells S1B and S2B ranged from 403 mg/L to 2,510 mg/L. In the shallower wells S1A, S2A, and S3, Zn concentrations ranged from 113 mg/L to 178 mg/L, whereas Zn

concentrations in deeper wells S1B and S2B ranged from 0.051 mg/L to 8.65 mg/L. Sulphate and Zn concentrations in shallower wells exhibit an overall increasing trend from about 2000 (Figures 3-9 and 3-10).

The concentrations of SO_4 and Zn at location P96-6 were 286 mg/L and 1,030 mg/L and were 0.73 mg/L to 0.56 mg/L, respectively, in 2005. There are no clear trends for SO_4 or Zn over the last several years of sampling at this location, although the SO_4 concentration recorded in 2005 is the highest on record.

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

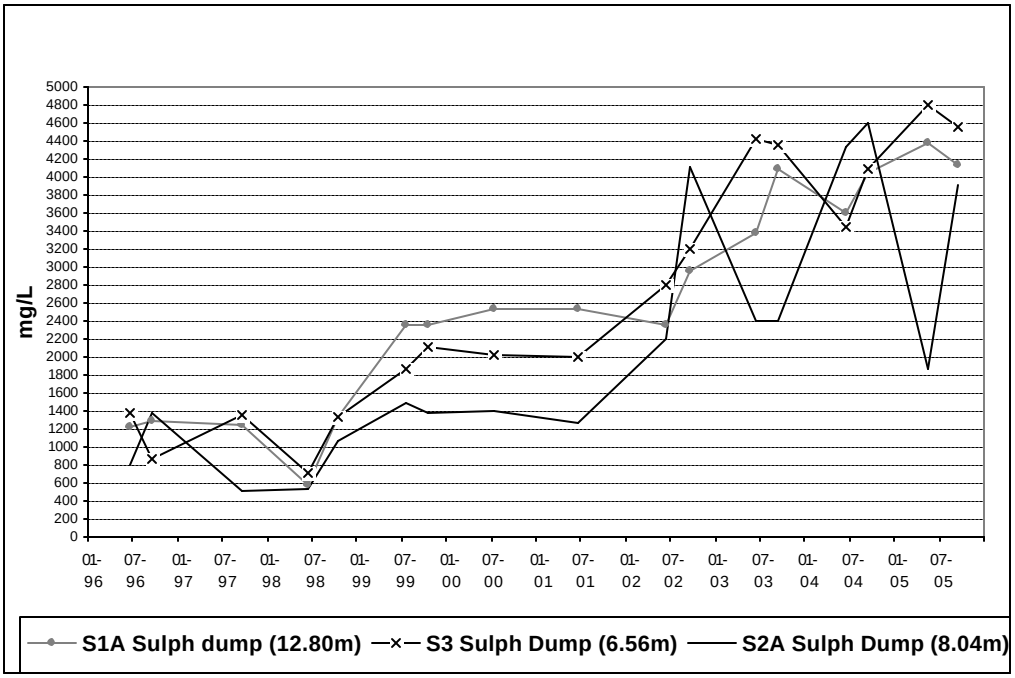
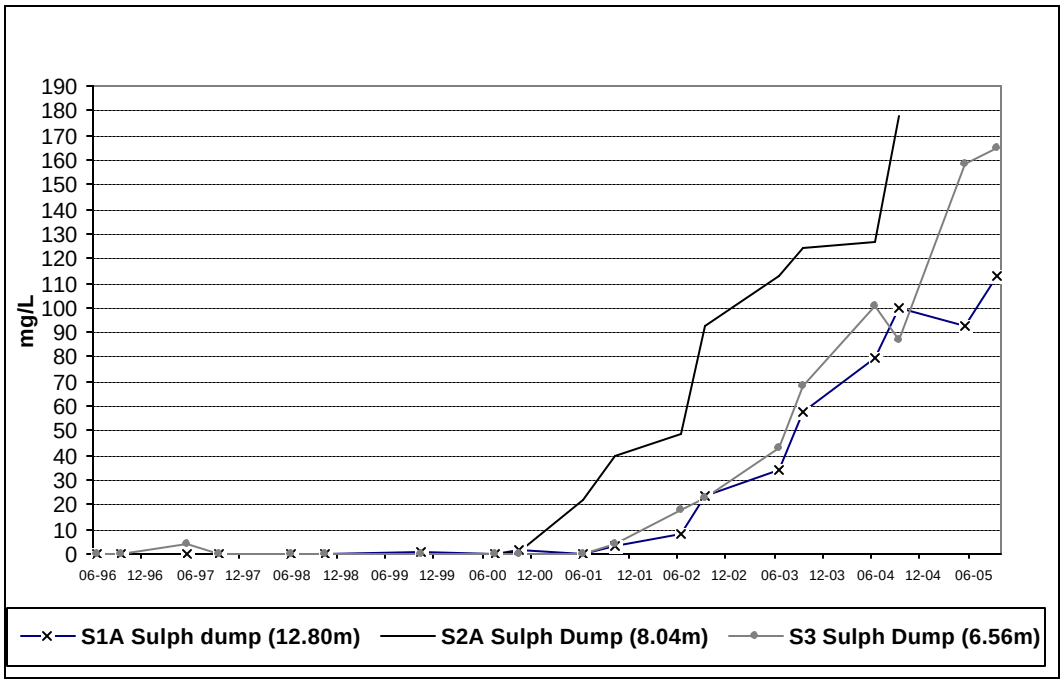


Figure 3-10. Zn in Groundwater Wells S1A, S2A and S3



Groundwater : Zone II Rock Dumps

The wells located at the base of the Zone II Rock Dumps are BH1, BH2 and BH4. All three locations were sampled in May and September of 2005. Sulphate concentrations at these sampling points ranged from 54.6 mg/L to 240 mg/L and Zn concentrations ranged from 0.62 mg/L to 17.3 mg/L. Both SO_4 and Zn concentrations remained consistent with previous years, with no apparent trends.

Groundwater: Northeast Rock Dumps

The wells located at the base of the Zone II Rock Dumps are BH12A/B, BH13A/B and BH14A/B. All locations were sampled in May and September, with the exception of BH13B, which could not be sampled during the May sampling event due to ice present in the well. Sulphate and Zn concentrations were consistent with previous years, ranging from 234 mg/L to 2,040 mg/L and from 0.008 mg/L to 0.20 mg/L, respectively.

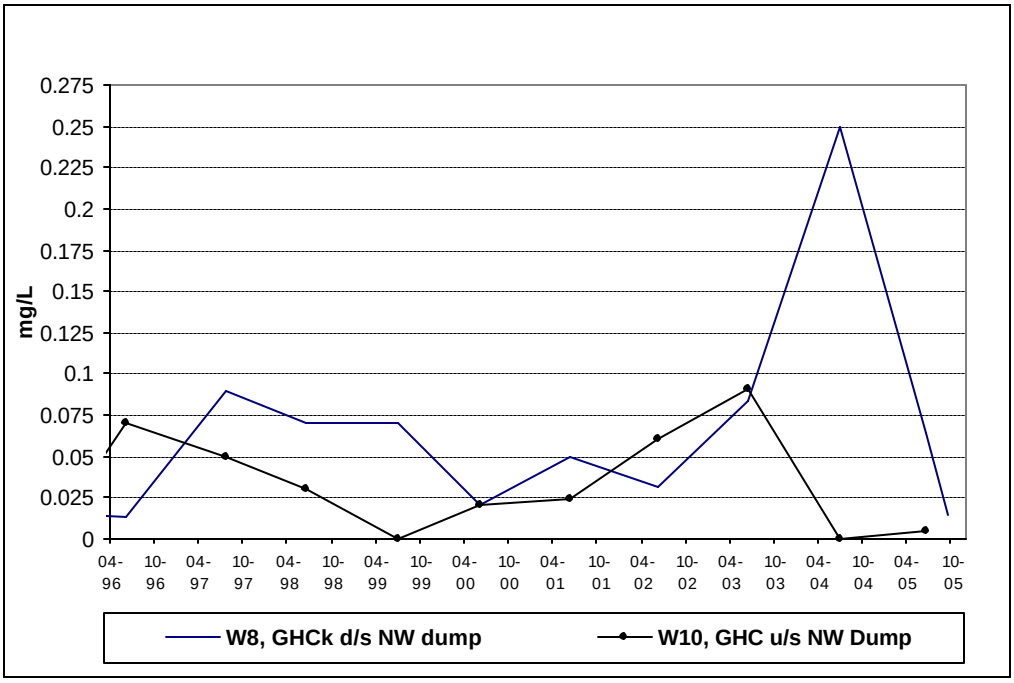
Miscellaneous Surface Seepages

Locations W10 and W8 are located in Upper Guardhouse Creek where it passes under the northwest corner of the Northwest Rock Dump. Location W10 is immediately upstream of the rock dump and location W8 is immediately downstream. Both seeps were sampled in June and September of 2005. In 2005, SO_4 concentrations at these locations remained at consistently low levels, ranging from 3.4 mg/L to

4.2 mg/L. Zinc concentrations at both locations were slightly lower in 2005 than 2004 ranging from the MDL (0.005 mg/L) to 0.064 mg/L in 2005, with slightly greater concentrations observed at W8 (Figure 3-11).

Location W5 is located at the toe of the Northeast Rock Dump. In 2005, location W5 was sampled for the second consecutive year since 1991. The location was sampled in June and September of 2005. Total Zn in June and September was 2.41 mg/L and 1.37 mg/L, respectively, and the SO_4 concentrations were 320 mg/L and 289 mg/L, respectively.

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. Both locations were sampled in June and September 2005. The June and September SO_4 concentrations were 136 mg/L and 266 mg/L for NE1, and 391 mg/L and 439 mg/L for NE2. Zinc concentrations were <0.005 mg/L and 0.011 mg/L for NE1, and 0.077 mg/L and 0.1 mg/L for NE2. In 2005, SO_4 and Zn concentrations at both NE1 and NE2 were slightly lower than those recorded in 2004.

3.2.4 Rose Creek Tailings Facility

Intermediate Pond

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

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

Water treatment in the Down Valley was started in 1992 in order to ensure that surface outflow from the Cross Valley Pond met the maximum allowable discharge limits and the practice of treating outflow from the Intermediate Pond for the removal of zinc continued, on an as-required basis, through 2005. 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; and
- inflow into the upstream end of the Intermediate pond of water pumped from the Faro Main pit that was pre-treated with lime at the mill.

From 1998 to 2000, the Intermediate Pond received inflow of treated water pumped from the Faro Main pit on a seasonal basis and this periodic inflow of a relatively high volume of high pH water resulted in a general improvement in pond water quality. The method for treatment of water pumped from the Faro Main pit was improved in 2001 by construction and activation of a new treatment system in the mill that utilizes certain fixed equipment for lime treatment and settlement of sediments. Compliant effluent from the mill was delivered into the Intermediate Pond spillway from 2001 through 2005 (i.e. bypassing the Intermediate Pond), which resulted in an apparent negative impact on water quality in the Intermediate Pond due to the removal of the periodic inflow of high pH (treated) water.

Water is syphoned from the Intermediate Pond at the outflow spillway. This maintains the pond water level below the overflow spillway and provides additional safety freeboard. The water is syphoned

directly into a mixing tank where lime slurry is added. In 2005, an outflow pipeline was installed which delivers water from the mixing box directly into the Cross Valley Pond at the base of the inflow spillway, where settlement of treatment sediments occurs. The "Down Valley" water treatment system is described in section 5.

Water quality in the Intermediate Pond is monitored at location X4, which is outflow from the pond at the outflow spillway. Outflow in 2005 was exclusively via syphon (i.e. no overflow). In 2005, twelve monthly samples were collected, representing Licence monitoring requirements during periods of outflow, as well as water quality monitoring when no outflow was occurring for site management purposes.

Sulphate concentrations ranged from 496 mg/L to 1,080 mg/L with an average over the year of 867 mg/L. Sulphate concentrations in 2005 continue to follow an established seasonal trend, with levels increasing through spring and summer followed by a decrease in the fall. Sulphate concentrations remained relatively consistent from 1998 to 2003, followed by an increasing trend through 2004 and 2005 (Figure 3-12).

The concentrations of total and dissolved Zn at location X4 ranged from 5.69 mg/L to 33.3 mg/L and from 5.13 mg/L to 30.5 mg/L, respectively, with average concentrations of 21.4 mg/L and 23.5 mg/L, respectively. Similar to SO_4, Zn concentrations display an increasing trend through 2004 and 2005 (Figure 3-13).

Since 2002, iron (Fe) concentrations in the Intermediate Pond have followed a seasonal trend with maximum concentrations observed during the winter months and minimum concentrations observed during the summer months. Additionally, Fe concentrations have been higher since 2002, with a possible increasing trend. Prior to 2002, Fe concentrations at X4 ranged from <0.01 to 5.48 mg/L. Total and dissolved Fe concentrations in 2005 ranged from 3.85 mg/L to 39.0 mg/L, and 1.75 mg/L to 12.90 mg/L, respectively (Figure 3-14).

PH at location X4 displayed some unusually (for this location) low values in 2005. PH was recorded between 4.4 and 4.6 from late July through early September. In response to the unusually low levels, soda ash and lime were added directly into the pond in September. By year end, pH had returned to 6.9, typical for the winter season (Figure 3-15). The pH did not hamper the lime treatment process but may have resulted in an increased use of lime (Section 5).

Figure 3-12. Sulphate at X4

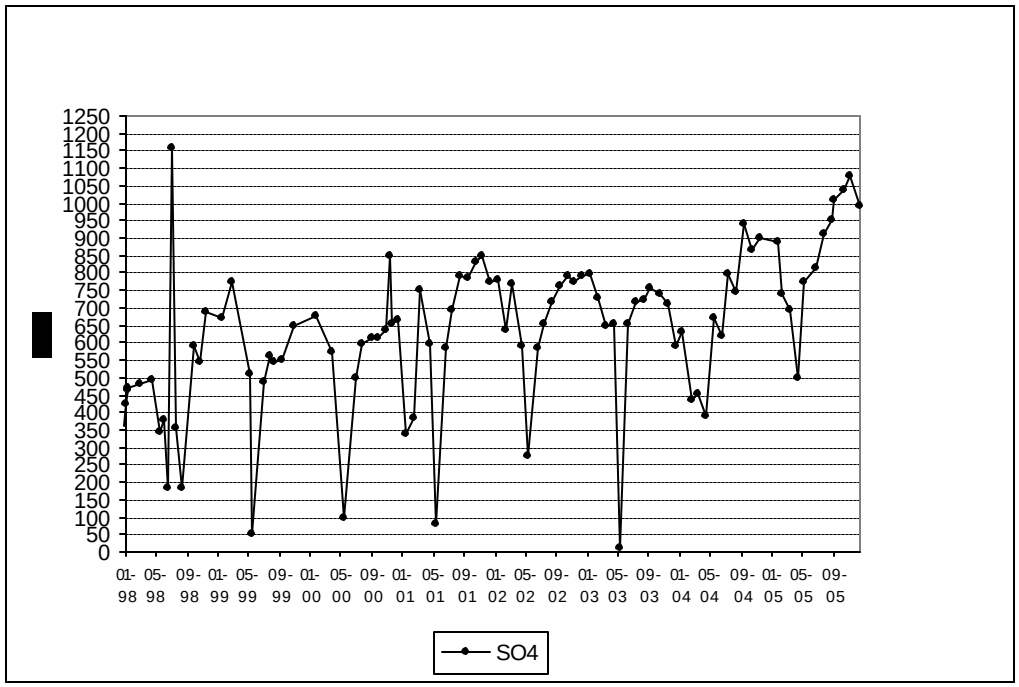


Figure 3-13. Zinc at X4

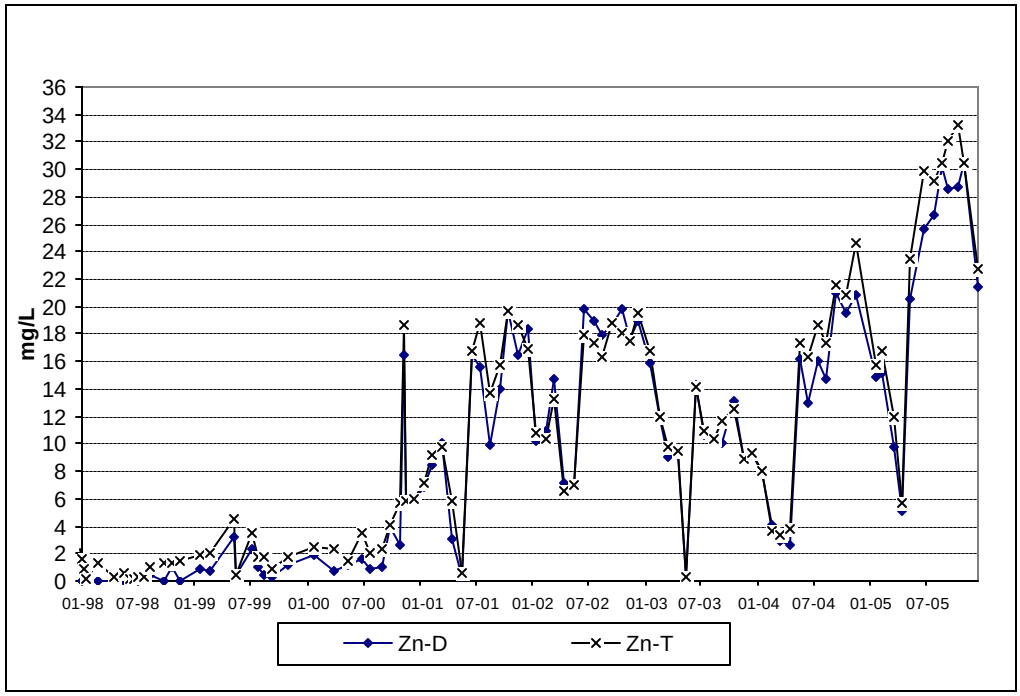


Figure 3-14. Iron at X4

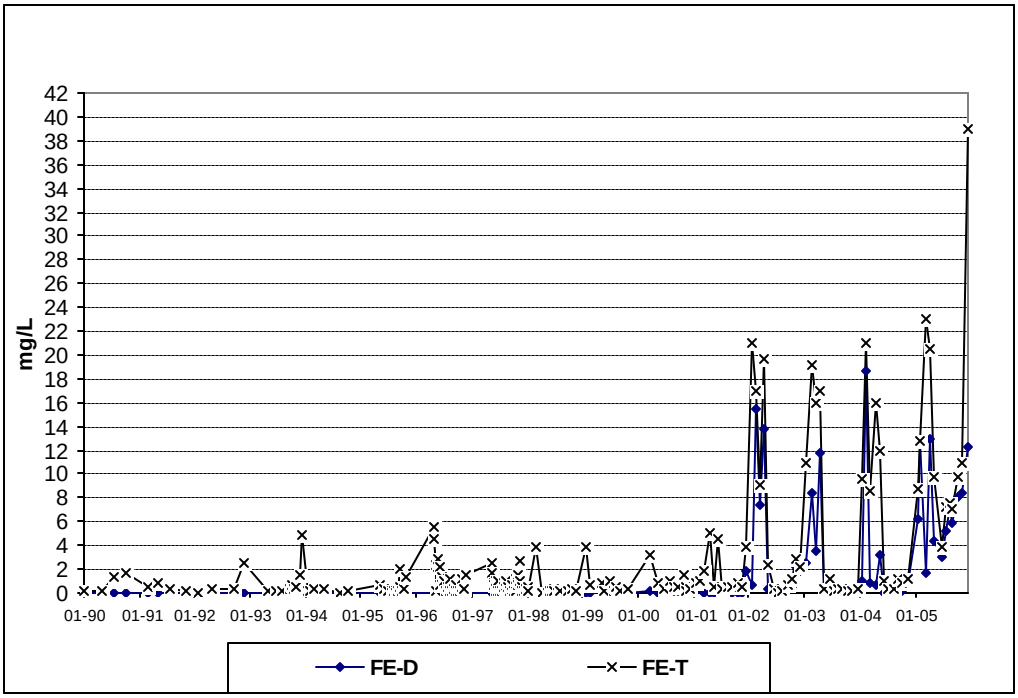
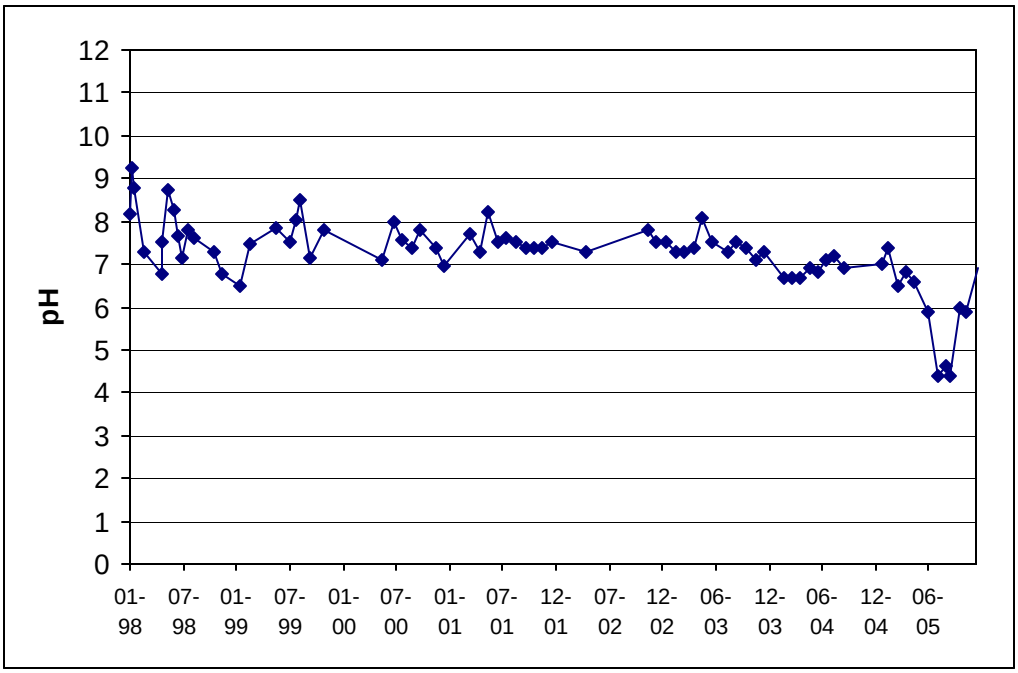


Figure 3-15. PH at X4



Groundwater

Groundwater wells in the Rose Creek Tailings Facility and the underlying native soils (i.e., the aquifer) were sampled twice in 2005, in June and September. Additional sampling of certain wells was conducted in July and August as part of the Adaptive Management Plan (Section 9.8). Several "P01" series groundwater wells (P01-05, P01-06, P01-07A/B/C/D, P01-09A/B/C/D and P01-10A/B) were decommissioned in 2005.

Comprehensive studies of groundwater quality within the aquifer underlying the tailings impoundments are underway for development of the FCRP. However, this information is not available for reporting at this time.

The groundwater monitoring wells located at the toe of the Intermediate Dam report generally lower SO_4 and Zn levels than those wells located upgradient, in and under the tailings facility. The SO_4 concentrations at the toe of the Intermediate Dam in 2005 ranged from 26 mg/L to 229 mg/L and Zn concentrations ranged from <0.005 mg/L to 0.06 mg/L. Sulphate concentrations on the north side of the valley continued to be higher than in the south and central areas of the valley.

Miscellaneous Surface Seepages

Location X7 is a subsurface seep that emerges to surface just below the mine access road in the old Faro Creek channel. X7 was sampled in June and September of 2005. X7 was sampled monthly between 1987 and 1989, twice in 1995 and once in 2000. Water quality in 2005 showed 7,480 mg/L and 8,910 mg/L SO_4 and 342 mg/L and 472 mg/L total Zn.

Lower Guardhouse Creek receives runoff from some areas of the plant site and flows into the Intermediate Impoundment. Lower Guard House Creek was sampled in two locations in 2005: at GHSCR1, located below the rock dump area, and GHSCR2, located upstream of the Intermediate Impoundment. Water chemistry results at GHSCR1 have remained consistent from 2001-2005. Sulphate and total Zn concentrations were 681 mg/L 4.59 mg/L.

Prior to 2005, GHSCR1 had not been sampled since 1998. Sulphate and total Zn concentrations in 2005 were 641 mg/L and 1.72 mg/L, consistent with previous data.

3.3 Water Quality Entering Rose Creek

3.3.1 Effluent Discharge

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

The Down Valley and Mill water treatment systems were successfully operated in 2005 as described in Sections 5.2 and 5.3. The treatment systems 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, with the exceptions noted below. The periods and volumes of effluent release are described in Section 2.

For the July 25, 2005 sampling event, total ammonia concentrations were reported to be 1.67 mg/L, which is greater than the licence limit of 1.30 mg/L. This was an isolated occurrence not considered to represent an impact on Rose Creek as the corresponding ammonia concentration at X14, located downstream of the mixing zone, was not elevated. The elevated ammonia concentration at X5 was a one-time event that was primarily due to the addition of fertilizer to the Faro Pit for the purpose of metals bio-remediation studies. The fertilization program was discontinued for the year upon receipt of the elevated ammonia concentration.

In 2005, the concentrations of total and dissolved Zn released to Rose Creek at location X5 ranged from 0.067 mg/L to 0.47 mg/L and from <0.005 to 0.380 mg/L, respectively (Figure 3-16). The average concentrations of total and dissolved zinc were 0.229 mg/L and 0.144 mg/L, respectively. Since 2001, zinc concentrations have remained below the allowable discharge limits, primarily due to the implementation the mill treatment system, which significantly increased treatment efficiency compared treatment methods employed prior to 2001.

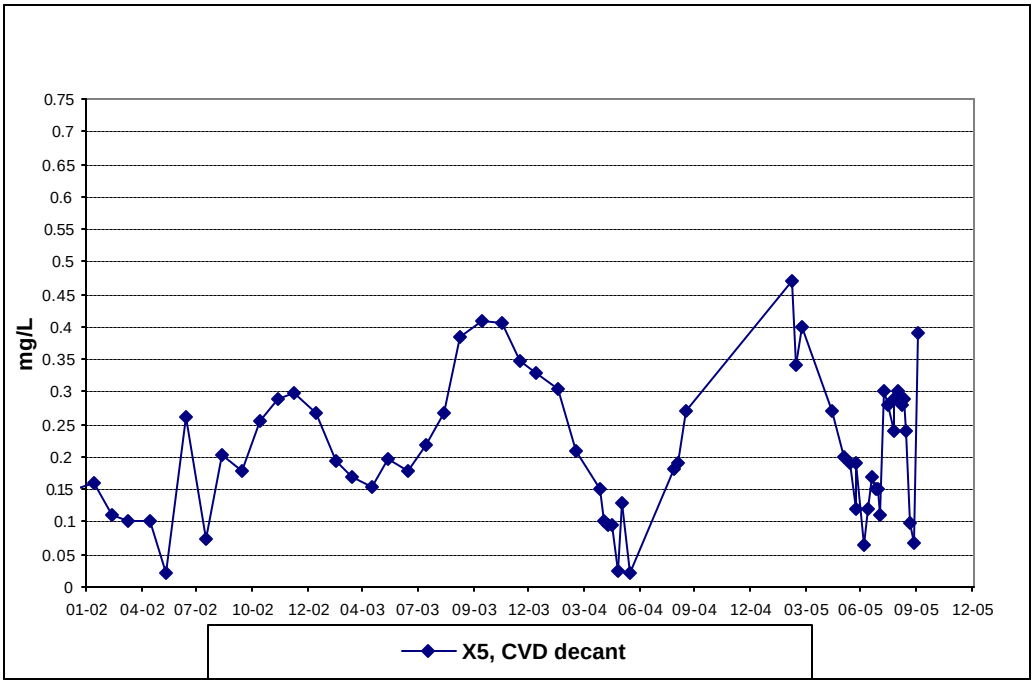
The concentration of cyanide reported for June 11 was 0.0525 mg/L, which was the highest result reported in 2005 by about two-times. This is the same as the licence limit of 0.05 mg/L when the effluent result is rounded to the same one significant figure. This isolated and unusual result is not considered an exceedance of the licence since the corresponding concentration of cyanide in the receiving environment at location X14 was less than the detection limit (<0.0050 mg/L) and the subsequent effluent result was 0.0128 mg/L. The inherent challenges and variability in laboratory methods for analysing cyanide concentration are well documented.

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 AA (atomic absorption)

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 2005. The individual results are available at the mine site and were available for review by Water Resources personnel during site visits.

In 2005, four quarterly samples were collected at X5/X5P for acute lethality testing using rainbow trout (96-hour LC_{50}). All tests passed (less than 50% mortality in 100% concentration over 96 hours), with no mortalities in three samples, and a 10% mortality for the sample collected in September. The December test was 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



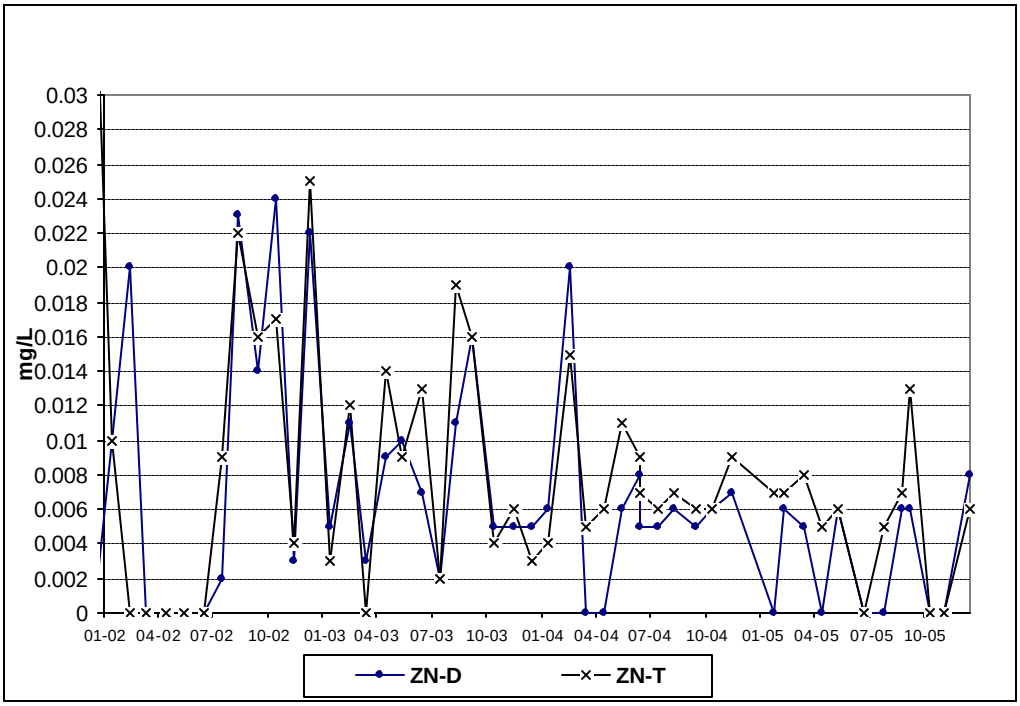
3.3.2 Cross Valley Dam Seepage

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, which are locations 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 2005. Water quality was within the maximum allowable discharge limits throughout 2005. Total Zn concentrations ranged from below the minimum detection limit to 0.013 mg/L (Figure 3-17).

Figure 3-17. Zn 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 2005 at location X13. Additionally, an "extra" bioassay sample was collected in January as the final sample of a suite of monthly samples that were initiated in 2004. All tests passed (less than 50% mortality in 100% concentration over 96 hours) and three of the tests had no mortalities.

Locations X11 and WEIR3 were sampled in March and August of 2005. Location X12 was sampled only in August of 2005, as only minimal flows were present during the month of March. At station X11, SO_4 concentrations were 996 mg/L and 1040 mg/L, slightly higher than those recorded in years prior to about 2004. Concentrations of Zn were 0.006 mg/L and 0.012 mg/L, typical for this location. At location X12,

SO_4 and Zn concentrations for 2005 were 345 mg/L and <0.005 mg/L, respectively. Water quality for location WEIR3 was similar to previous years, with the exception Cd, which increased from concentrations below MDL to 0.0033 mg/L for the first time since 1996. Sulphate and total Zn concentrations at WEIR3 ranged were 519 mg/L and 553 mg/L and were 0.007 and 0.008 mg/L, respectively.

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. The upper portion of the Faro Creek Diversion (location FDU) was sampled in the June and September of 2005. Most contaminant concentrations were below MDLs with the exception of Zn, which was 0.007 mg/L in September. The mid-section of the Faro Creek Diversion (location FDL) was sampled twice in 2005, in June and September. Sulphate concentrations remained low, at 2.4 mg/L and 2.6 mg/L in 2005. Total Zn concentrations at this site in 2005 were 0.05 mg/L in June and 0.007 mg/L in September.

The outfall of the Faro Creek Diversion into the North Fork of Rose Creek was sampled monthly from May to December 2005. Concentrations of SO_4 in 2005 were similar to those observed in previous years and ranged from 3.6 mg/L to 7.7 mg/L. The Zn concentrations in 2005 ranged from 0.009 mg/L to 0.091 mg/L, with the maximum annual concentration recorded in May. Zinc concentrations at this location continue to follow a seasonal trend, with peak concentrations observed during spring.

3.3.4 Groundwater

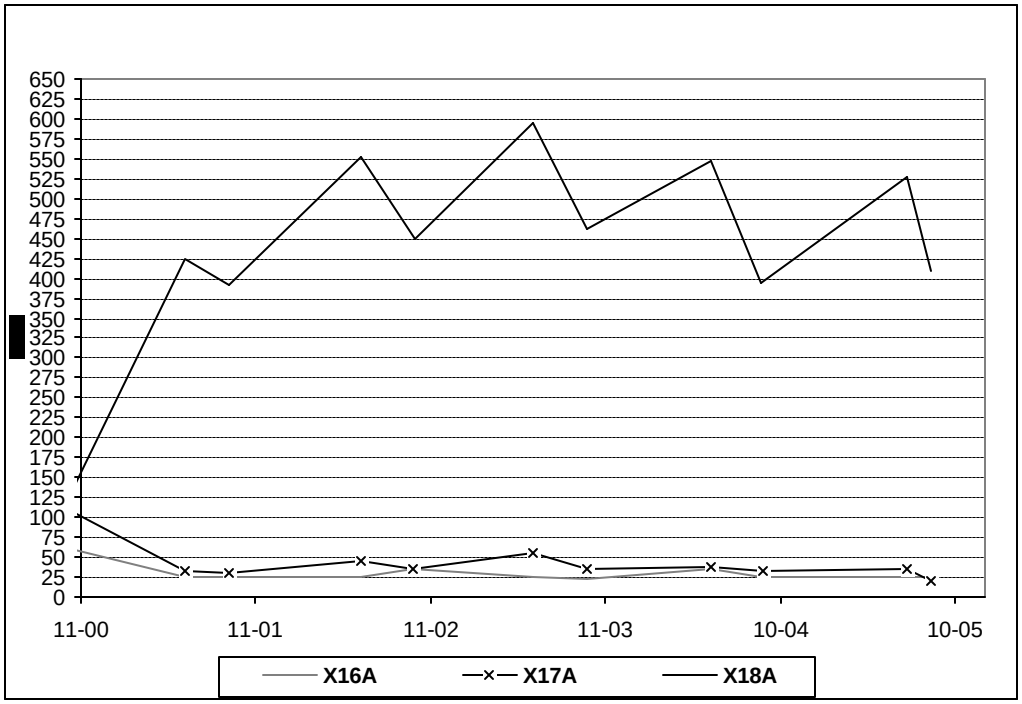
Groundwater quality in this area is monitored below the Cross Valley Dam. Some portion of the monitored groundwater is thought to discharge to surface and enter Rose Creek in the general vicinity of Rose Creek sampling location X14 and some portion is thought to remain in the aquifer as groundwater flow. 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 wells downgradient of the Cross Valley Dam were monitored twice in 2005 (spring and fall). This included locations X16 A/B, X17 A/B, X18 A/B, P01-01, P01-02, P01-11 and P03-09. The concentrations observed in wells X16 A/B, X17 A/B, X18 A/B generally fall within the ranges of values previously observed at these locations. The ranges of SO_4 and Zn in 2005 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 SO_4 and Zn Concentrations in Groundwater Downgradient of the Cross Valley Dam (2005)

Well	Max SO4 (mg/L)	Min SO4 (mg/L)	Max Dissolved Zn (mg/L)	Min Dissolved Zn (mg/L)
P01-11	914	904	0.0074	<0.015
X18A/B	566	203	0.012	<0.005
X17A/B	245	20.1	0.0109	0.0058
P01-01	559	377	0.0979	0.0065
X16 A/B	28	24	0.0108	<0.005
P03-09 (01-09)	437	309	0.0098	<0.005
P01-02 A/B	141	19	0.0087	<0.005

Figure 3-18. SO4 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. The above locations are sampled monthly with the exception of NF1 and NF2 which are sampled twice yearly, in the spring and fall.

Location R7 was sampled monthly in 2005. Water quality for 2005 was within normal ranges typically observed at this location. Zinc concentrations ranged from below MDL to 0.035 mg/L for both total and dissolved Zn. Concentrations of SO_4 ranged from 1.7 mg/L to 16.9 mg/L. Most contaminants, including As, Cd, and Pb were below the minimum detection limits throughout 2005.

A comparison of water quality at locations R7, R8, R9, R10 and X2 suggests that SO_4 and Zn concentrations undergo a general increase along the North Fork from R7 to X2. Figures 3-19 and 3-20 illustrate this trend for SO_4 and Zn, respectively. Between R7 and R10, as Rose Creek flows along the North Rock Dump and the Zone II area, SO_4 concentrations increase, most notable during winter baseflow periods. A more significant increase in SO_4 is apparent between stations R10 and X2, as Rose Creek flows along the Main/Intermediate Rock Dump area. Zinc concentrations between R7 and R10 showed no significant increase in 2005, however, an increase in Zn between stations R10 and X2 is apparent, most notably during winter months. New information on this topic is being developed through studies that are underway for development of the FCRP; however this information is not available for reporting at this time.

Stations R8, R9, R10 and X2 exhibited peaks in Fe and Pb during the month of May in 2005.

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

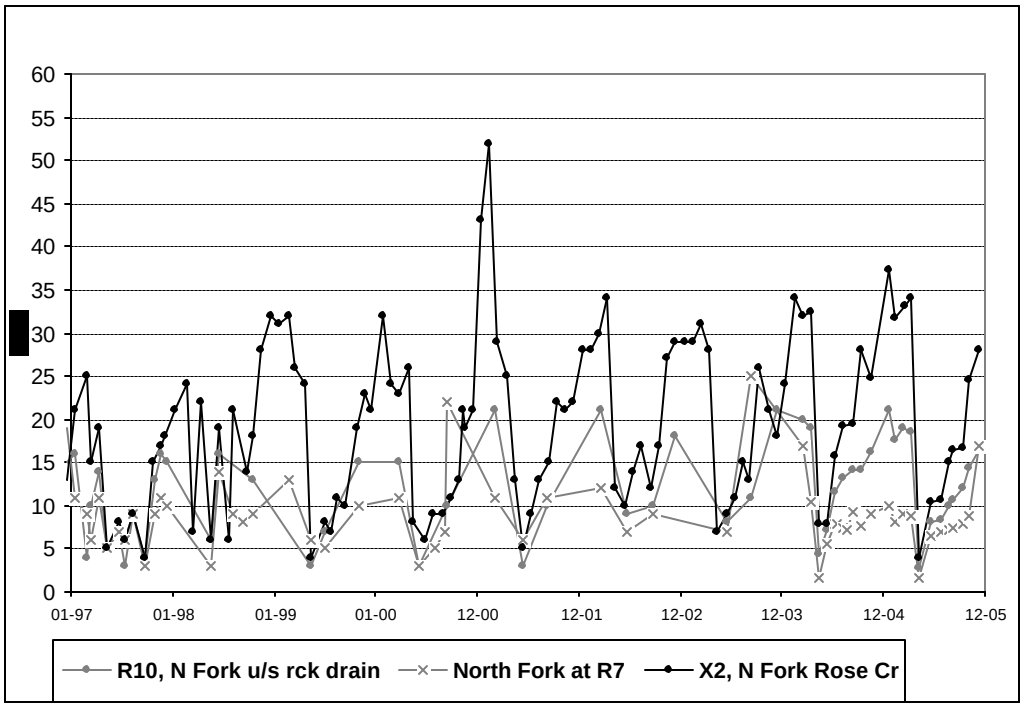
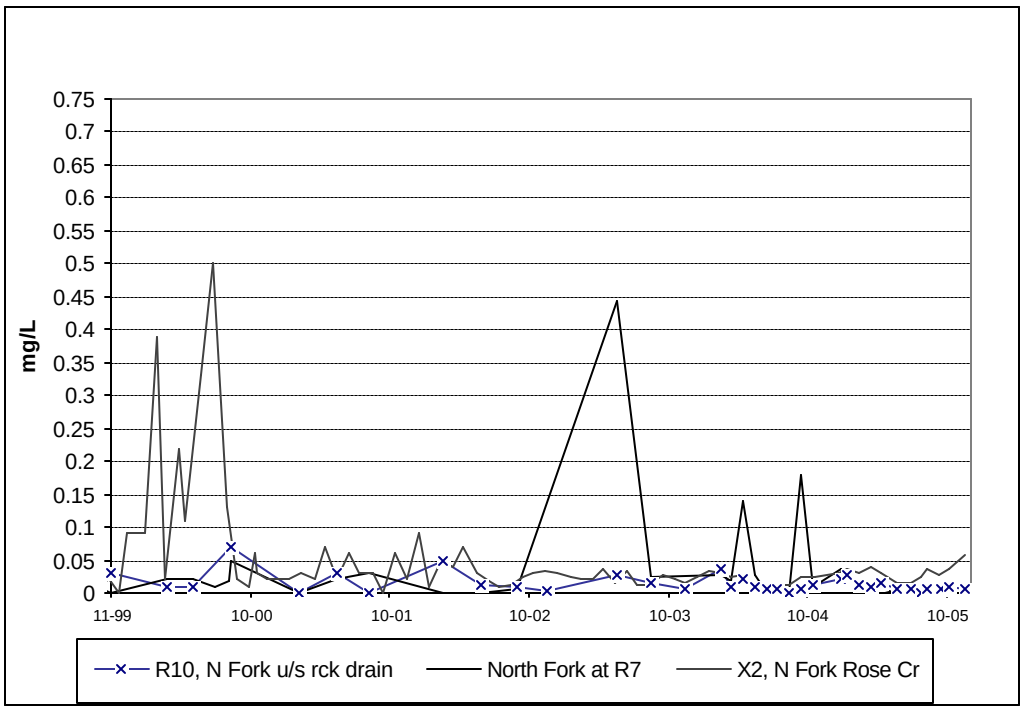


Figure 3-20. Zinc at R7, R10 and X2



A statistical analysis was performed on water quality data from location X2 for SO_4 and Zn for the period of 1996 to present. The objective of the analysis was to determine if there are any trends in the data at X2, particularly in the winter baseflow period. The preliminary analysis revealed that both SO_4 and Zn exhibit seasonal variability with higher concentrations observed in the winter season. This corresponds to the low flow period when groundwater inflows represent a greater portion of the creek flow. Conversely, groundwater influences can be masked in spring, summer and fall by surface water inflows. The analysis also indicated that SO_4 concentrations during the winter months are showing a statistically significant increasing trend (Figure 3-21). Zinc concentrations do not show a statistically significant increasing trend (Figure 3-22). The source of the sulphate and zinc that is observed, primarily during winter baseflow periods, may be groundwater seepage from the Intermediate Rock Dumps. New information on this topic is being developed through the studies that are being undertaken for development of the FCRP. However, this information is in a preliminary state and is not available for reporting at this time.

Figure 3-21. Winter Baseflow Sulphate at X2

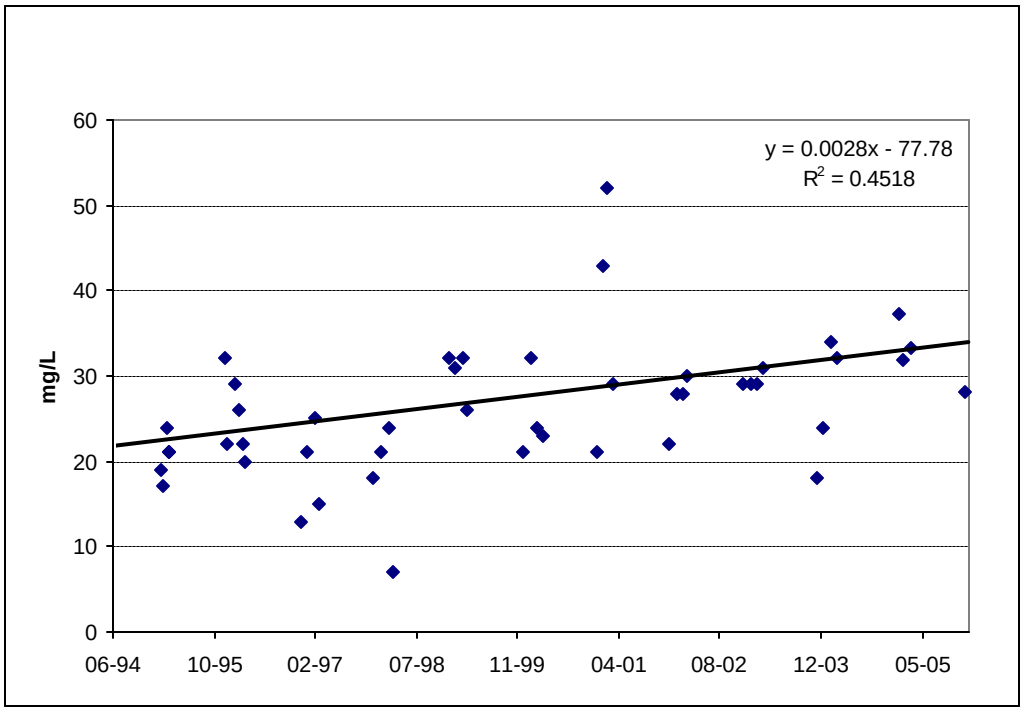
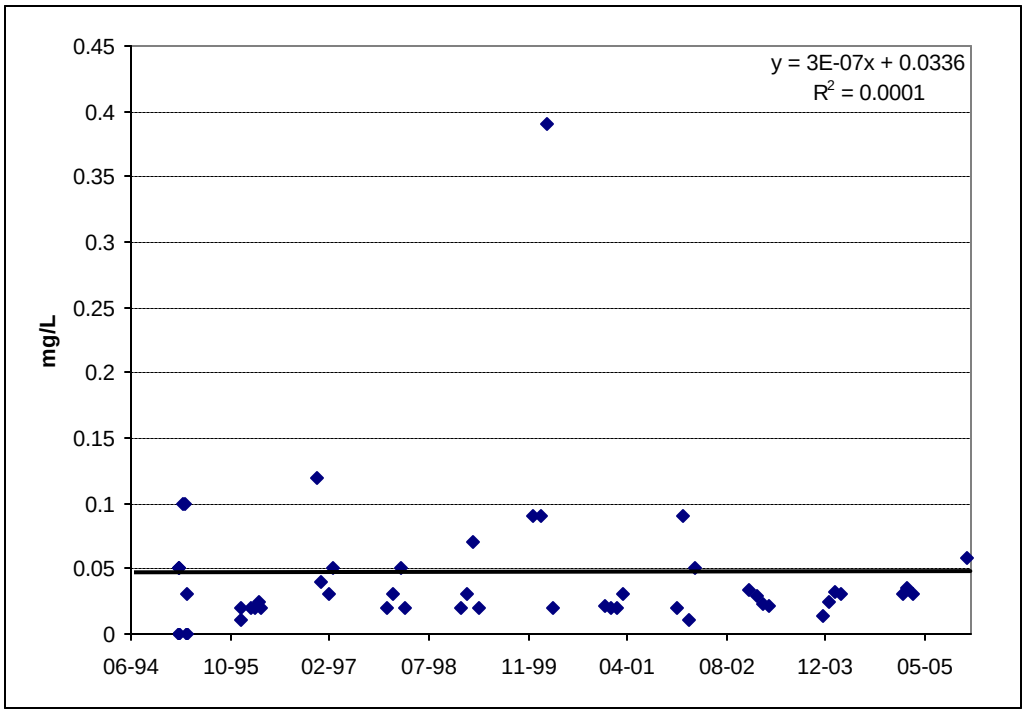


Figure 3-22. Winter Baseflow Zinc at X2



3.4.2 South Fork of Rose Creek

Location Grum Culvert (also "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. These locations are sampled on a monthly basis. GCULV was not sampled in May and K8 was not sampled in March due to low flow volumes. Sulphate concentrations at these two sites ranged from 3.0 mg/L to 15 mg/L and total zinc concentrations ranged from below MDL to 0.021 mg/L. Water quality results were forwarded directly to the Ross River Dena Council and to their technical consultant by the Interim Receiver on a monthly basis, as agreed through the Water Licence renewal process.

Location R1 is in the South Fork of Rose Creek below the previous freshwater reservoir area and upstream of the tailings impoundment area. This location was sampled twice in 2005, in March and August. The concentrations of SO_4 were 30 mg/L and 18 mg/L. The concentrations of total Zn were <0.005 mg/L and 0.013 mg/L.

3.4.3 Rose Creek Diversion Channel

Rose Creek is monitored at the upstream and downstream extents of the constructed diversion channel that passes Rose Creek around the Rose Creek tailings facility at locations X3 and X10, respectively. Twelve samples (monthly) were collected at each location in 2005.

Location X3 is located at the outflow from the pumphouse pond. The water monitored at location X3 includes 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.

In 2005, water chemistry at location X3 was within typical ranges for this site, with most contaminants below detection limits during most sampling events. Sulphate concentrations ranged from 5.9 mg/L to 35.2 mg/L, and total Zn concentrations ranged from 0.007 mg/L to 0.043 mg/L.

Location X10 is located near the downstream extent of the Rose Creek diversion channel adjacent to piezometer X16. The concentrations of total Zn and SO_4 at location X10 ranged from 0.014 mg/L to 0.062 mg/L and from 5.4 mg/L to 32.8 mg/L, respectively, similar to levels observed in recent years.

Trends in Zn and SO_4 concentrations at location X2, X3, and X10 generally mirror one another, with seasonal fluctuations of both constituents represented by higher concentrations observed during winter months (Figures 3-23 and 3-24). In 2005, Zn levels increased slightly between station X3 and Station X10. At all three stations, Fe and Pb peaked in concentration during the month of May.

Figure 3-23. Sulphate at X2, X3, X10

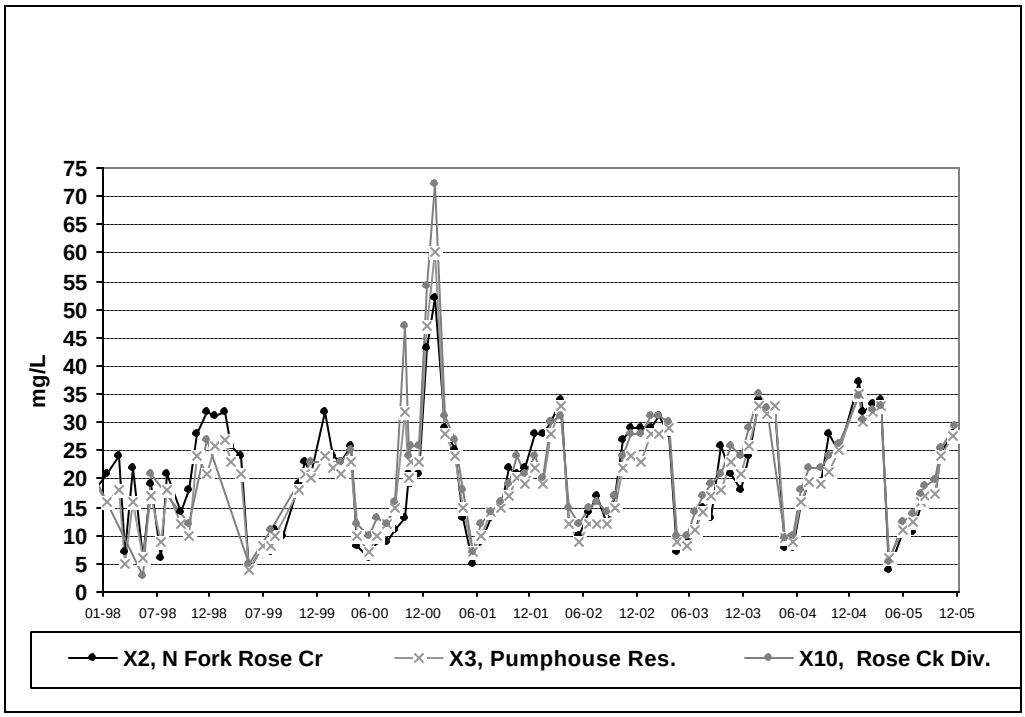
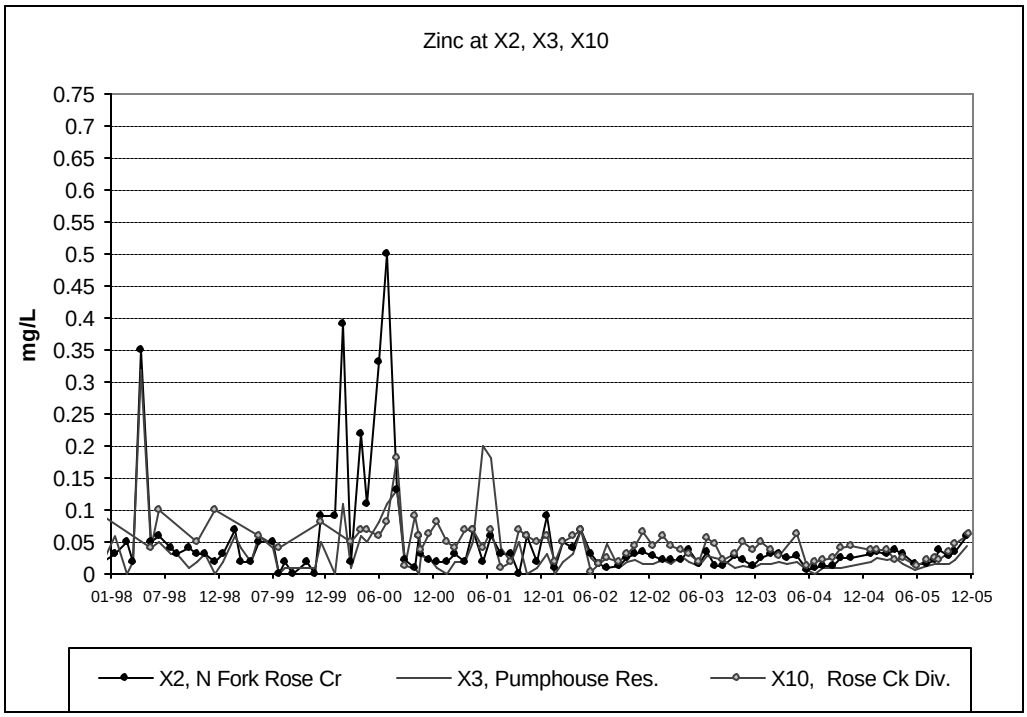


Figure 3-24. Zinc at X2, X3, and X10



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 (location X5). Water chemistry at location X14 has typically shown the influence of effluent discharge through elevated concentrations of SO_4 and total Zn that have been elevated in concert with periods of effluent discharge. In 2005, the highest concentrations of SO_4 and Zn were observed during spring, corresponding to peak volumes discharged from the Cross Valley Pond in preparation for spring freshet.

Water quality at location X14 in 2005 was similar to that observed in recent years at this site. In 2005, the concentration of SO_4 ranged from 34 mg/L to 557 mg/L (Figure 3-25) and total Zn concentrations ranged from 0.011 mg/L to 0.25 mg/L (Figure 3-26). Iron and Pb concentrations at this site exhibited a peak in May, similar to those observed in the Rose Creek Diversion Channel and the North Fork of Rose Creek.

Figure 3-25. Sulphate at X14

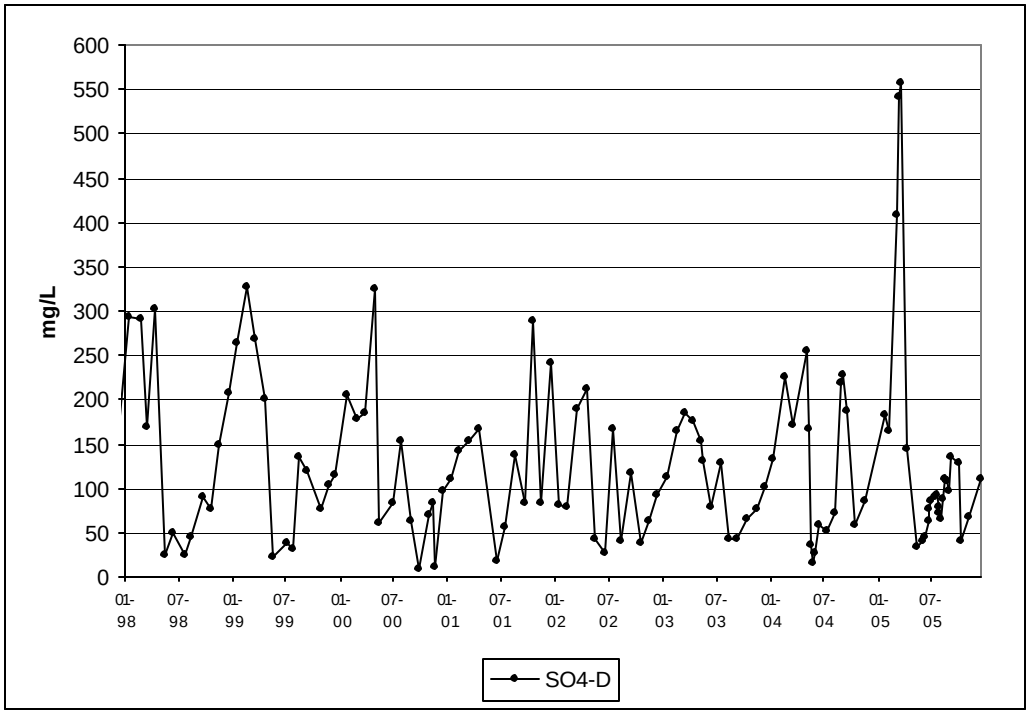
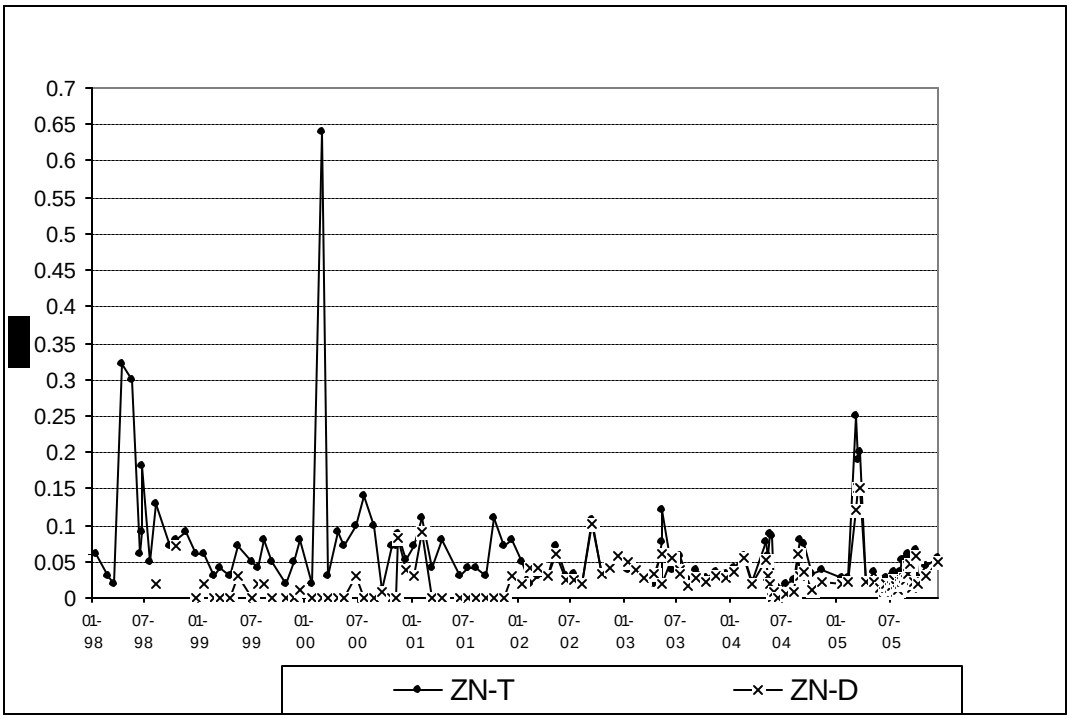


Figure 3-26. Zinc at X14



3.4.5 Rose Creek to Anvil Creek/Anvil Creek

Water sampling at locations R2 through R4 in Rose Creek and locations R5 and R6 located in Anvil Creek at the confluence with Rose are sampled twice a year, in summer and winter. Location R11 is located at the mouth of Anvil Creek.

Location R2 approximately coincides with routine monitoring location X14 in Rose Creek below the effluent-mixing zone. Location R2 is approximately 100 m downstream from location X14 with no significant surface inflows in between. Location R3 is in Rose Creek approximately mid-distance from location R2 to the mouth of Rose Creek at the confluence with Anvil Creek. Location R4 is at the mouth of Rose Creek approximately 26 km downstream of the tailings impoundments. Location R5 is in Anvil Creek downstream of the confluence with Rose Creek. Location R6 is in Anvil Creek upstream of the confluence with Rose Creek and is used to represent regional background conditions in the Anvil Creek area.

Since 1996, total Zn and SO_4 concentrations have displayed 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 SO_4 increase along Anvil Creek from R5 to R11 (2004 and 2005 data only), although Zn does not follow a similar trend.

The trends described above are illustrated by 2005 data as listed in Table 3-2.

Table 3-2: Total Zinc and Sulphate Concentrations in Rose Creek 2005

Location	March Total Zinc	August Total Zinc	March Sulphate	August Sulphate
R2 (near mine)	0.023	0.045	58.3	240
R3 (mid-Rose Ck)	0.01	0.034	49.4	180
R4 (mouth Rose Ck)	<0.005	0.025	54.1	148
R6 (Anvil Ck u/s Rose Ck)	0.006	<0.005	21.8	21.3
R5 (Anvil Ck d/s Rose Ck)	0.007	<0.005	21.4	26.7
R11 (Mouth of Anvil Ck)	0.008	0.006	60	36.3

All values expressed as mg/L.

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 2005, most of the water analyses were conducted by CanTest. The analytical data is managed through an electronic database that is managed by Gartner Lee Limited.

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 on either the Faro or Vangorda Plateau mine sites.

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 2005 is provided in Appendix 6. Bioassay results are provided in Appendix 7. A brief review of the data is provided in the following sections.

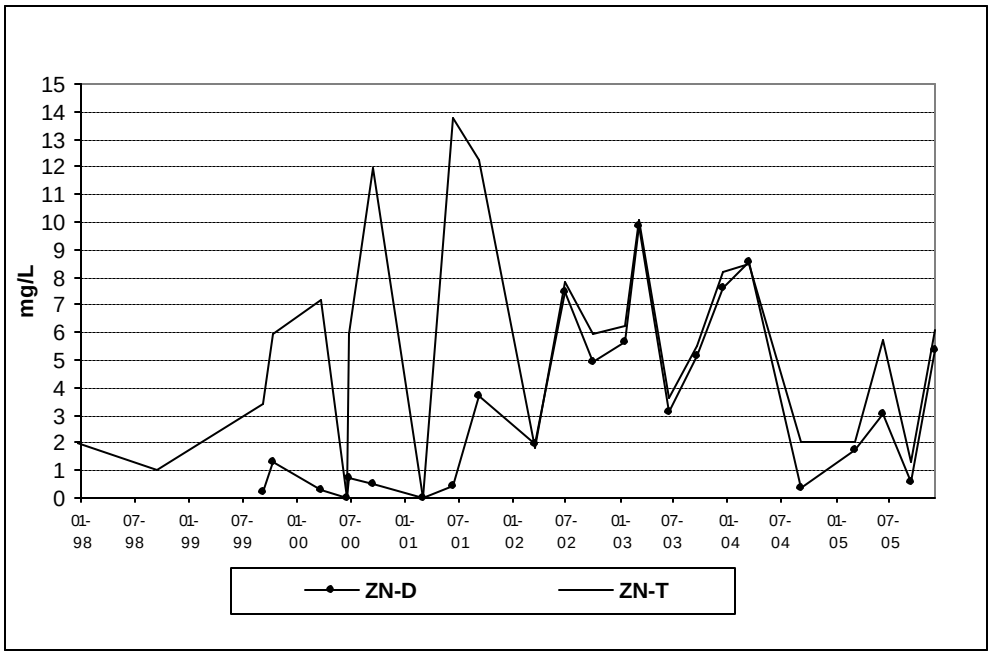
4.2 Open Pits and Rock Dumps

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.

Four samples were collected at location V23 in 2005, 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 Zn ranged from 1.34 mg/L to 6.1 mg/L and from 0.59 mg/L to 5.39 mg/L, respectively, in 2005. The concentration of Zn was lower through the second half of 2004 and 2005 as compared to previous years (Figure 4-1).

Figure 4-1. Zinc at V23



The reduced Zn concentrations in the surface water of Grum pit may be related to the successful pilot testing of biological pit lake treatment using algae. This test program was undertaken as part of the studies that are underway for development of the FCRP. The information is in a preliminary state, however, and not available for reporting at this time.

The concentration of SO_4 remained consistent with previous years through 2005 ranging from 252 mg/L to 441 mg/L. The pH remained neutral to slightly alkaline in 2005 ranging from 7.9 to 8.7.

4.2.2 Grum Rock Dump

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.

One sample was collected at location V14 in June 2005. Location V14 reported a pH of 8.2, a concentration of total Zn of less than 0.005 mg/L, and an SO_4 concentration of 554 mg/L. Zinc concentrations at V14 are within the range of historical values and SO_4 concentrations increased significantly between 2002 and 2004, followed by a significantly low result in 2005. Additional data is required to identify whether a trend is present or these high and low values are isolated events.

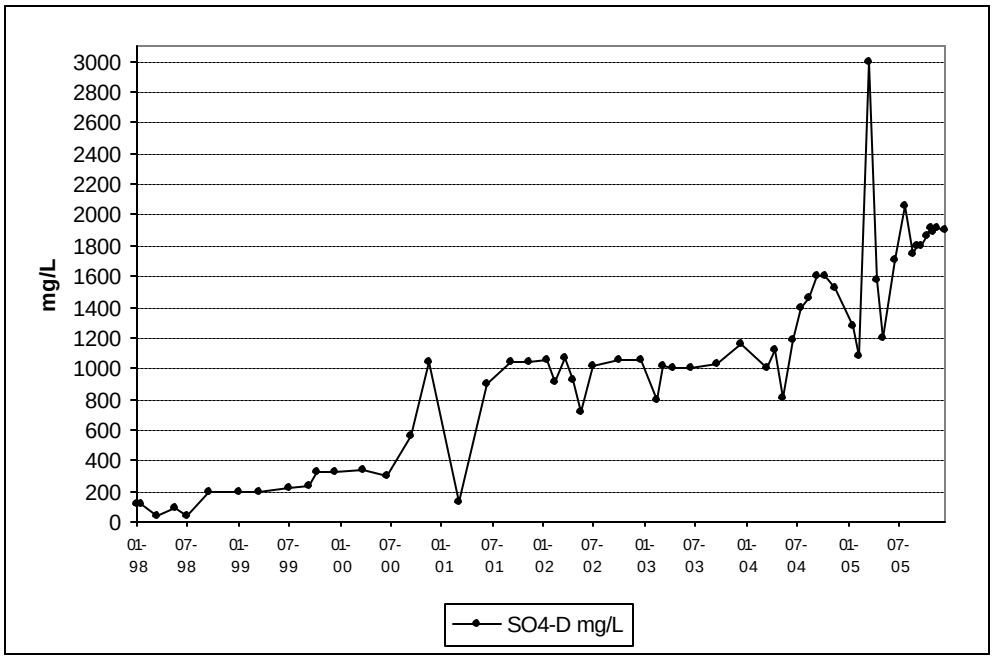
Two samples were collected at location V16 in June and September 2005. Location V16 exhibited pH values lower than location V14 of 6.9 and 7.3. Sulphate concentrations were 2,620 mg/L and 2,830 mg/L, which are susbstantially higher than any other SO_4 concentrations on record. There was neither a corresponding increase in the concentrations of total or dissolved Zn nor a corresponding decrease in pH. The Zn concentrations in 2005 were 0.011 mg/L and 0.031 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 small sump or "sediment trap" was constructed at this location in the past to collect flow and promote settlement of suspended sediment. Flow from this location enters Grum Creek upstream of monitoring location V2.

Monthly samples were collected at location V15 in 2005, and twice monthly in September, October and November. Water pH was consistently neutral at 7.4 to 7.9. The concentrations of total and dissolved Zn ranged from 0.008 mg/L to 0.048 mg/L and from 0.005 mg/L to 0.048 mg/L, respectively.

The concentration of SO_4 ranged from 1,080 mg/L to 2,990 mg/L in 2005 at location V15. A general increasing trend is evident from 1995 (beginning of sample record) to 2000, at which time the concentrations appear to have increased in a step-wise manner from around 325 mg/L to around 1,000 mg/L. Concentrations of SO_4 remained relatively stable from 2001 to mid-2004, after which concentrations have increased to the levels observed in 2005. The cause of the isolated peak concentration of 2,990 mg/L in March 2005 are not known. The historical concentrations of SO_4 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.

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 ground water wells allow monitoring of ground water 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 twice in 2005, in May and September. The concentrations of dissolved Zn were 0.019 mg/L and 0.016 mg/L and the concentrations of SO_4 were 994 mg/L and 1,600 mg/L. A possible increasing trend in SO_4 has been apparent since about 2000.

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

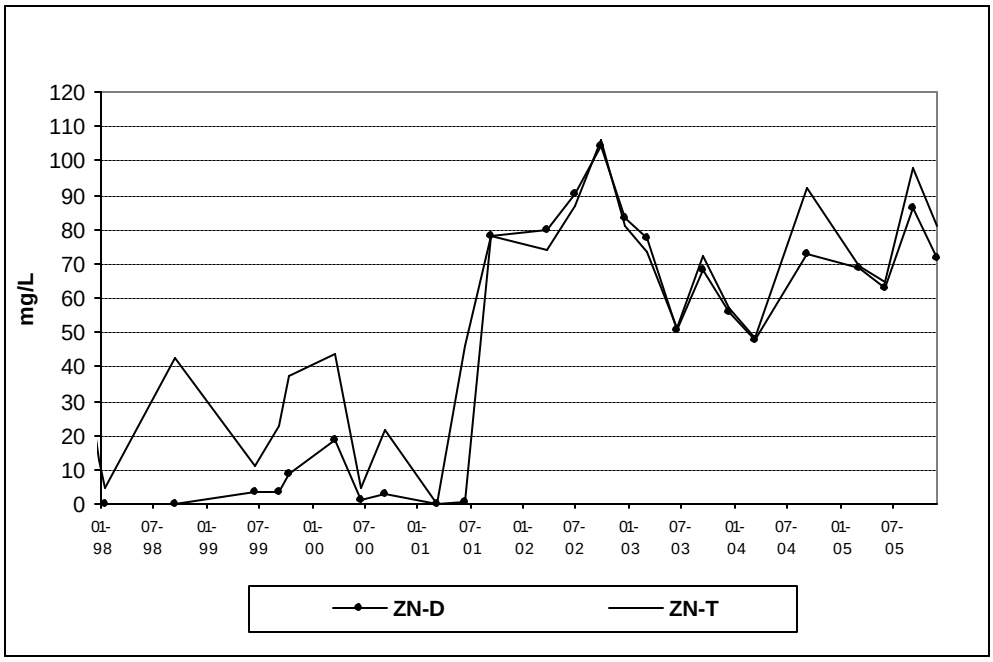
Vangorda pit water is monitored at location V22. During the period of active mining (pre-1998) when pit dewatering was underway, location V22 was sampled at the outflow of the dewatering pipe. Following the suspension of mining activities (and dewatering) in February 1998, location V22 has been sampled in the pit pond. The water that has accumulated in the Vangorda open pit since mine shut down has included natural inflows, water pumped periodically from Little Creek Dam and water pumped/syphoned periodically from the Sheep Pad Pond. Beginning in 2002, a summer season water pumping and treatment program has been conducted to maintain the pit pond water level within the desired range.

Four samples were collected at location V22 in 2005, in March, June, September and December. These samples were collected as grab samples from the surface of the pit pond. The concentrations of total and dissolved Zn ranged from 64.9 mg/L to 98.1 mg/L and from 63 mg/L to 86.2 mg/L, respectively. The sharp increase in Zn in 2002 (Figure 43) 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, Zn concentrations were observed to increase with depth in a 2000 pit survey and it is possible that the variability of Zn concentrations in surface grab samples is related to seasonal effects such as pond turnover.

The concentrations of SO_4 in 2005 ranged from 777 mg/L to 1,300 mg/L. These are within the ranges observed since 2002 although winter values (September and December) may be increasing in recent years. Water pH remained neutral in 2005 with values of 6.7 to 7.3.

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 has been undertaken since 2002. 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

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 sampled once in 2005, in June. The concentrations of dissolved Zn and SO_4 were 118 mg/L and 679 mg/L, respectively, with a pH of 6.6. Flow at this location has been intermittent in the past and 2004/05 are the first two consecutive years sampled. The concentration of SO_4 at drain #2 in 2004 was significantly higher (5,610 mg/L) than the sampling results from 2005.

Drain #3 (V30) was sampled twice in 2005, in June and September. The concentrations of dissolved Zn and SO_4 were 386 mg/L and 410 mg/L and were 5,240 mg/L and 5,340 mg/L, respectively. PH was near neutral at 6.1 and 6.3. The 2005 SO_4 concentrations at drain #3 were less than the peak values recorded in 2004 and generally consistent with historical values.

Drain #4 (V31) was sampled twice in 2005, in June and September. The concentrations of dissolved Zn and SO_4 were 1,160 mg/L and 2,160 mg/L and were 14,000 mg/L and 20,600 mg/L, respectively. PH was slightly acidic at 5.7 for both sampling events. Flow at this location has been intermittent in the past and 2005 is the first year sampled since 1998. Concentrations of dissolved Zn and SO_4 were greater in 2005 than 1998.

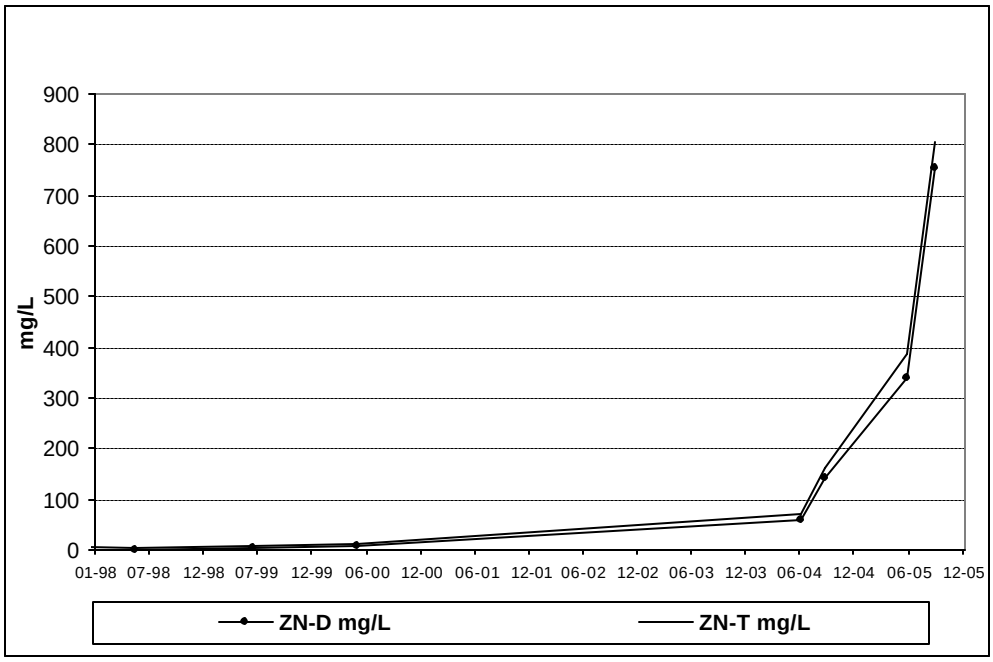
Drain #5 (V32) was sampled on two occasions in 2005 in June and September. Water quality at drain #5 continued to show high metal and SO_4 concentrations at acidic pH. The concentrations of dissolved Zn were 10,200 mg/L and 10,500 mg/L and the concentrations of SO_4 were 59,900 mg/L and 59,300 mg/L. The pH was 3.2 in June and 3.3 in September. Sulphate and Zn concentrations continue to exhibit a general increasing trend. Concentrations of cadmium exhibit a similar pattern with a maximum concentration of 19.9 mg/L in 2005. Additional data is required to identify whether this sharp increase is a consistent trend or an isolated peak. 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 on two occasions in 2005, in June and September. Flow has not been observed at this drain since 2001. Zinc and SO_4 concentrations at drain #6 were increased over previous years. The concentrations of dissolved Zn and SO_4 in June and September 2005 were 9,140 mg/L and 8,620 mg/L and were 63,700 mg/L and 66,600 mg/L, respectively. PH was acidic at 3.2 and 5.5, respectively. 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 Zn 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. LCD was sampled on two occasions in 2005, in June and September. The concentrations of total Zn were 385 mg/L and 807 mg/L and the concentrations of dissolved Zn were 341 mg/L and 754 mg/L, respectively. The concentrations of SO_4 were 3,480 mg/L and 5,450 mg/L, respectively, and pH was 6.7 and 4.1. The concentrations of total Zn (Figure 4-4) increased sharply in 2005.

Figure 4-4. Zinc at LCD



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 was sampled twice during 2005, in May and September. Piezometer GW94-05 (V38) has not been sampled since 1994.

Ground water quality in piezometers GW94-01 through GW94-04 continued, in 2005, to show low metal concentrations. The concentrations of dissolved Zn ranged from 0.0065 mg/L to 0.0243 mg/L in 2005. The concentrations of SO_4 in piezometers GW94-01 to GW94-04 ranged from 42.5 mg/L to 553 mg/L in 2005. The concentrations of SO_4 in piezometers GW94-02 and GW94-03 continued, in 2005, 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. Static water levels in these piezometers were monitored for physical stability assessments and no water quality monitoring was performed in 2005.

4.3 Water Quality Entering Vangorda Creek

4.3.1 Effluent Discharge

The established practice of pumping water from the Vangorda pit (location V22) for treatment through the Grum/Vangorda Water Treatment Plant was continued in 2005. The treated effluent is released from the plant's clarification pond (location V25) and flows through the Grum Interceptor Ditch to enter Vangorda Creek via the Sheep Pad Pond (location V25BSP). Location V25BSP is the "compliance" location where the effluent quality criteria must be achieved. In 2005, a greater volume of Vangorda pit water was treated such that there may not be a need for water pumping/treatment in 2006.

Water Treatment Plant

The Grum/Vangorda Water Treatment Plant, located near the Grum pit, is a conventional lime treatment system. The treatment process consists of pH modification using lime followed by enhanced settlement of treatment sediments with the aid of flocculant. This process does not reduce ammonia concentrations except, possibly, via retention time in the clarification pond. The water treatment system was successfully operated in 2005 to treat water pumped from the Vangorda pit.

The influent into the treatment plant in 2005 consisted only of water pumped from the Vangorda pit. Water quality described for the Vangorda pit pond (location V22) is representative of water quality entering the treatment plant in 2005.

A relatively small quantity of freshwater is required for mixing lime and flocculant in the water treatment plant. This water is pumped from a runoff holding pond located just to the north of the plant. This water (location V23A) was sampled on nine occasions in 2005 when the plant was operating and was demonstrated to be suitable for this purpose. The concentrations of total Zn ranged from 0.018 mg/L to 0.1 mg/L and the concentrations of SO_4 were all 4 mg/L.

Location V25 is the outlet of the Clarification Pond (i.e. subsequent to the settlement of treatment sediments). Location V25 was sampled on nine occasions through June, July and August when water was being released to the Grum Interceptor Ditch. The concentration of dissolved Zn was consistently less than detection at 0.005 mg/L in 2005. The concentrations of SO_4 ranged from 1,320 mg/L to 1,400 mg/L. As part of the plant start-up procedures, location V25 was sampled in May for acute lethality bioassay testing. The sample passed the 96-hour LC_{50} bioassay using rainbow trout, with no mortalities reported.

During discharge, water samples were collected on a four-hour schedule and analysed in-house for total Zn to verify compliance at location V25. This was done on an internal basis to provide the site managers and operators with immediate information to operate the system. All of these samples were compliant (i.e. less than 0.5 mg/L Zn) during periods of release. The in-house analyses utilized professional level atomic absorption (AA) equipment operated on-site by trained assayers. The individual results are

available at the mine site and were available for review by Water Resources Branch personnel during their site visits.

Sheep Pad Pond

Location V25BSP ("Below Sheep Pond") 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 20 samples were collected at location V25BSP from January to November with weekly samples collected through June, July and August.

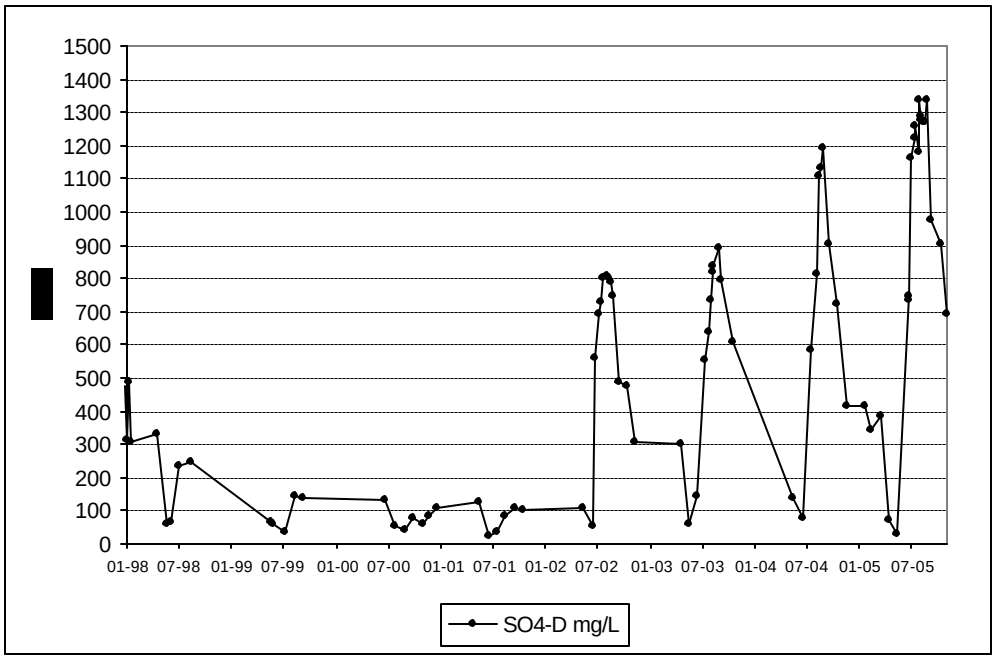
The concentrations of total suspended solids at location V25BSP were below the maximum allowable discharge limit of 15 mg/L with the exception of one occasion in May 2005 when the concentration of total suspended solids was slightly elevated at 34 mg/L. This brief period of elevated solids occurred during freshet and was further mitigated by pumping water from the Sheep Pad Pond to the Vangorda pit for a short time. This action reduced the outflow from the Sheep Pad Pond during this period.

The concentrations of total and dissolved Zn ranged from 0.044 mg/L to 0.26 mg/L and from less than detectable (< 0.005 mg/L) to 0.27 mg/L, respectively, in 2005. All values were less than the discharge criteria of 0.5 mg/L. The highest concentration occurred in April when there was no discharge of treated effluent.

The concentrations of SO_4 ranged from 27.8 mg/L to 1,340 mg/L with peak concentration occurring during the period of discharge from the water treatment plant. This trend is consistent with previous years (Figure 4-5). Operation and performance of the water treatment systems are described in Section 5.

Bioassay samples were collected at location V25BSP in June and September. Both samples passed (i.e., less than 50% rainbow trout mortality at 100% concentration over 96 hours), with no mortalities.

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. One sample was collected at location V19 in 2005, in June. Location V19 returned neutral pH of 7.8, non-detectable levels of total and dissolved Zn (<0.005 mg/L) and an SO_4 concentration of 2.2 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 ground water 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 2005. The diverted Grum Creek water is sampled at location V2A prior to entry into the Moose Pond.

Location V2

Location V2 was sampled monthly through 2005, and twice in September, October and November. The concentration of total suspended solids at location V2 continued to be greatly improved over previous years prior to about 1996. The concentrations of total suspended solids ranged from less than 1 mg/L to 18 mg/L in 2005.

The concentrations of total and dissolved Zn at location V2 in 2005 ranged from 0.008 mg/L to 0.035 mg/L and from less than 0.005 to 0.039 mg/L, respectively (Figure 4-6). There has been little variation in Zn concentrations since 2003.

The concentrations of SO_4 at location V2 in 2005 ranged from 630 mg/L to 957 mg/L (Figure 4-7). An increasing trend in the concentration of SO_4 at V2 is evident from 1989 (beginning of sample record) through 2005, with a sharp increase observed in 2000. There has not been a corresponding increase in the concentrations of total or dissolved Zn. This trend in SO_4 is consistent with upstream location V15 (Section 4.2.2). The SO_4 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 SO_4 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.

Quarterly bioassay samples were collected at location V2 in June, September and December. All samples passed with no mortalities at 100% concentration over 96 hours.

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

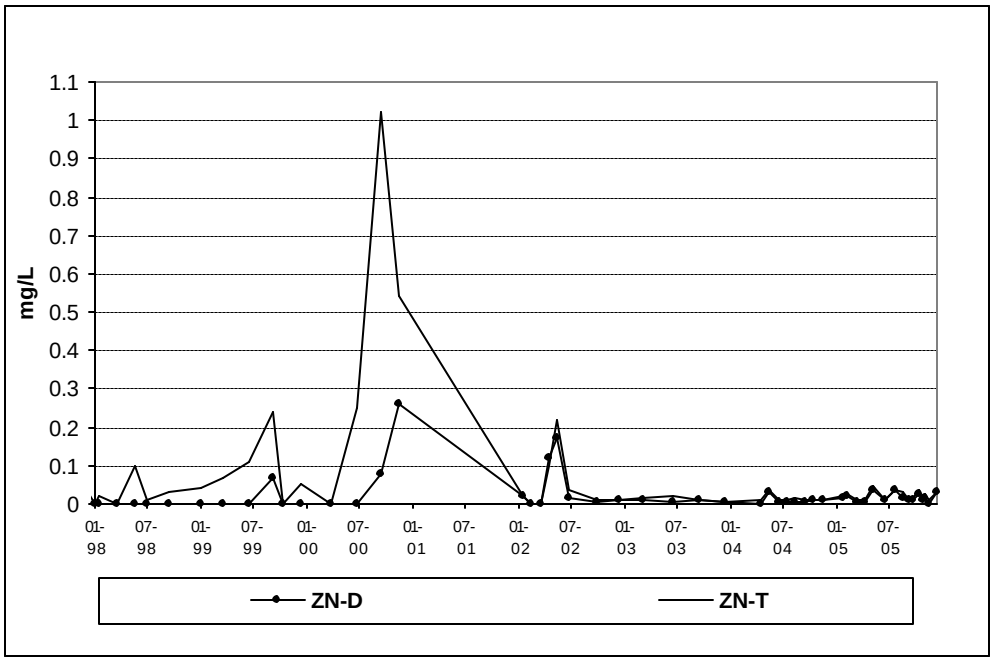
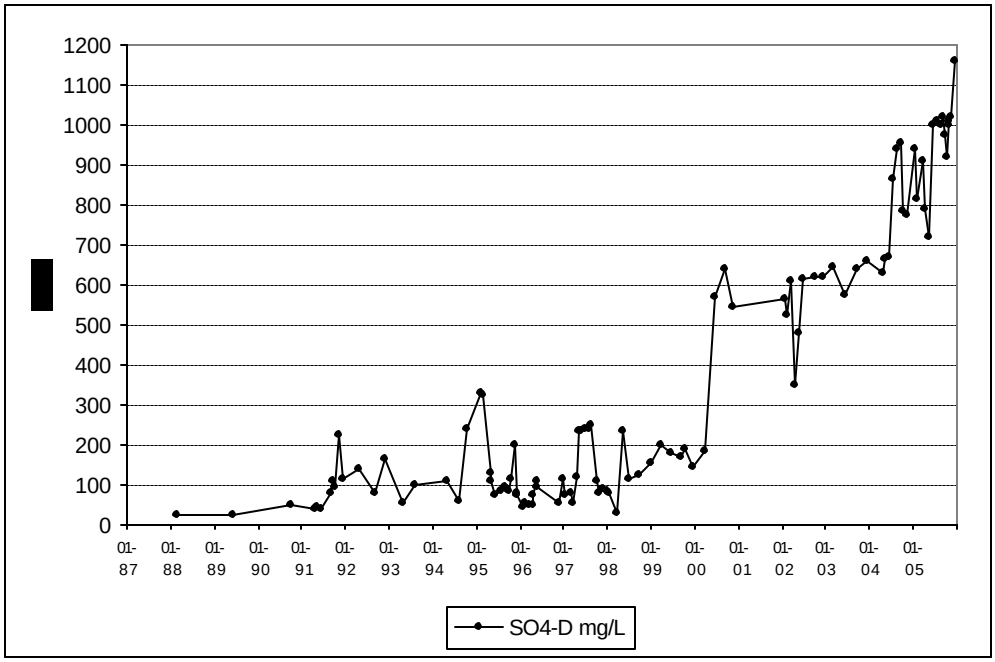


Figure 4-7. Grum Creek (V2) Sulphate



Location V2A

Location V2A was sampled monthly through 2005, and twice in September, October and November. Prior to around 2003, water quality entering the Moose Pond via location V2A was similar to that observed at location V2 in Grum Creek. Since 2003, this same trend has been observed for SO_4 but not for Zn. 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.

The concentrations of total and dissolved Zn at location V2A ranged from 0.091 mg/L to 1.52 mg/L and from 0.06 mg/L to 1.53 mg/L, respectively (Figure 4-8). A seasonal tend was continued in 2005 with peak concentrations observed in spring (June) followed by decline and return to lower winter concentrations. The concentrations of SO_4 at location V2A ranged from 325 mg/L to 886 mg/L in 2005 which is consistent with 2004 (Figure 4-9).

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

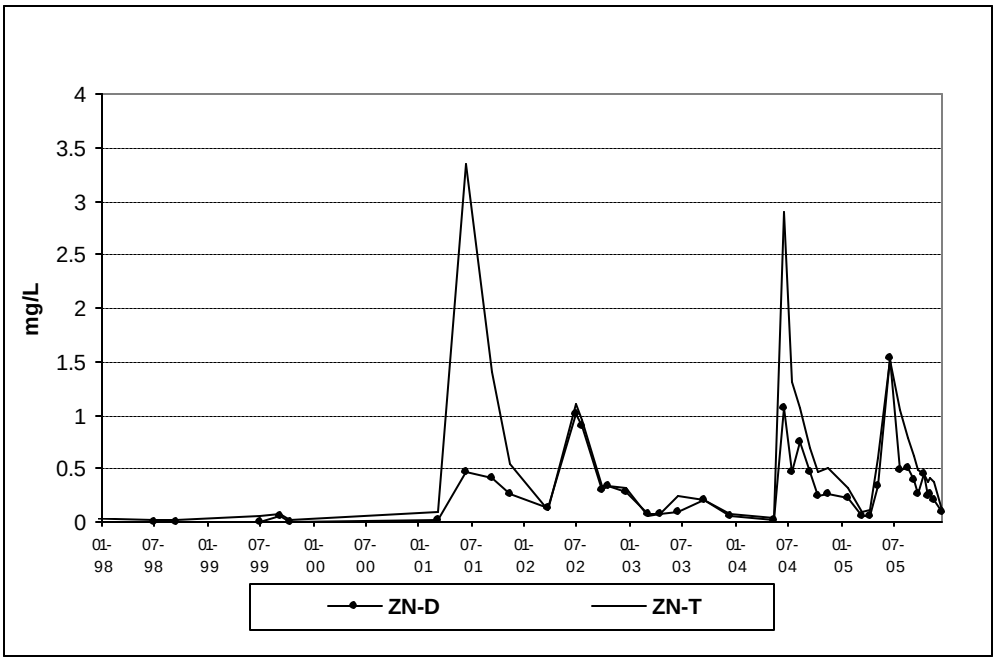
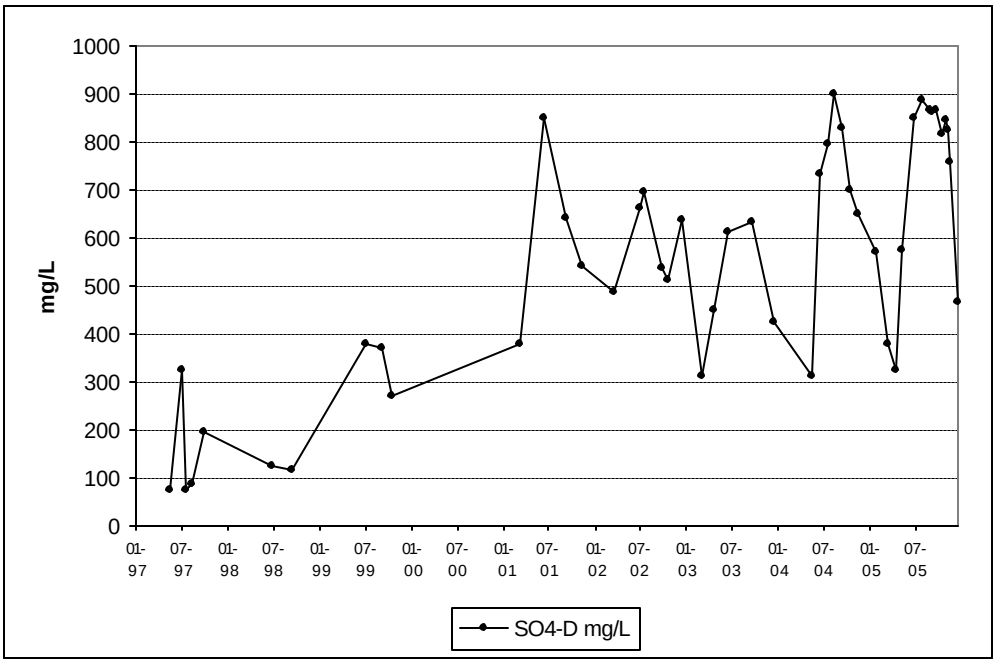


Figure 4-9. V2A Sulphate (mg/L)



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 2005, in June and September. The concentrations of SO_4 were 10.1 and 26.8 mg/L, consistent with previous data. The concentrations of total Zn were 0.006 and 0.29 mg/L. The peak Zn concentration is an order of magnitude higher than any other value on record and is suspected of being an outlier as it was not accompanied by correspondingly elevated concentrations of other parameters.

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 on four occasions in 2005, in March, June, September and December. The concentrations of total and dissolved Zn ranged from 0.014 mg/L to 0.031 mg/L and from 0.012 mg/L to 0.021 mg/L, respectively. The concentrations of SO_4 ranged from 21.3 mg/L to 53.5 mg/L. These concentrations are consistent with those observed since mine shut down in 1998.

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 all water around the Vangorda pit, per the original intent for the ditch.

One sample was collected at location V20 in 2005, in June. The concentrations of Zn and SO_4 at location V20 remained at low levels in 2005, consistent with previous data. Total and dissolved Zn concentrations in the month of June were 0.008 mg/L and 0.006 mg/L, respectively. The concentration of SO_4 was 6.4 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.

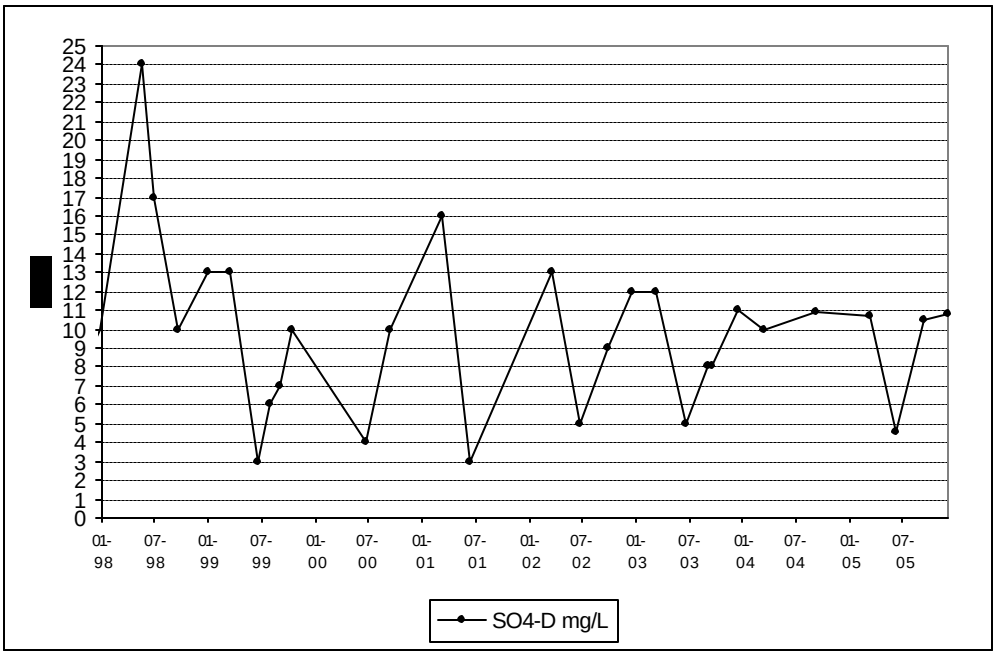
Location V4 was sampled in May and September of 2005. Total and dissolved Zn concentrations were 0.006 mg/L and 0.007 mg/L and were 0.006 mg/L and 0.008 mg/L, respectively. Sulphate concentrations were 29.1 mg/L and 46 mg/L. These concentrations are generally consistent with previous data.

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. 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 four times in 2005, in March, June, September and December. During 2005, SO_4 concentrations ranged from 4.6 mg/L to 10.8 mg/L, and total Zn concentrations ranged from 0.005 mg/L to 0.0068 mg/L. Zinc and SO_4 concentrations in 2005 are similar those previously recorded at this site, including a seasonal SO_4 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 at some times of the year (particularly winter and spring freshet) and water sampling is conducted accordingly, with maximum recognition of worker safety.

In 2005, location V27 was sampled in May and September. The concentrations of total Zn for the May and September sampling events were 0.031 mg/L and 0.017 mg/L, respectively. Sulphate concentrations were 28.5 mg/L and 48.5 mg/L. These concentrations are consistent with previous data.

4.4.3 Lower Vangorda Creek

"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.

The West Fork of Vangorda Creek represents natural run off and some minesite 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.

Water quality information that was collected in 2005 for each of locations V5, VGMAIN and V8 is described in the following sections and recent data for total suspended solids, total Zn and SO_4 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.

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.

Eleven samples were collected at location V5 throughout 2005. Total suspended solids (TSS) concentrations are similar to those recorded in recent years, ranging from 2 mg/L to 126 mg/L. In 2005, TSS concentrations continued to follow a previously established seasonal trend with maximum annual concentration of observed during spring peak flow conditions. The source of the sediment flushed into the creek during freshet is thought to originate from “non-mine” areas such as the landslide area and the old ski hill area.

Total and dissolved Zn concentrations at location V5 ranged from <0.005 mg/L to 0.03 mg/L and from <0.005 to 0.006 mg/L, consistent with recent years.

In 2005, concentrations of SO_4 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 (esp. Red River, Earn Group and Vangorda Formation) that influence surface run off and ground water discharge to surface. Sulphate and hardness concentrations were consistent with recent years, ranging from 28 mg/L to 167 mg/L and from 126 mg/L to 410 mg/L $CaCO_3$, respectively.

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.

Twelve (monthly) samples were collected at location VGMAIN in 2005. Total suspended solids concentrations typically remained <1 mg/L throughout 2005, with a peak concentration of 11 mg/L during freshet, less than observed at location V5 in the West Fork.

In 2005, the concentrations of total and dissolved Zn at location VGMAIN ranged from 0.01 mg/L to 0.041 mg/L and from 0.006 mg/L to 0.036 mg/L, respectively, which were within the ranges observed in recent years.

In 2005, peak concentrations of SO_4 and hardness were observed during July and August. These elevated concentrations correspond to peak discharge periods of (compliant) effluent from the Grum/Vangorda Water Treatment Plant. This is reasonable correlation since the lime-treated effluent represents a source of SO_4 and hardness. Higher concentrations of SO_4 and hardness were also 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 36 mg/L and 399 mg/L and from 107 mg/L to 526 mg/L $CaCO_3$, respectively, in 2005.

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 2005.

Total suspended solid concentrations at this site ranged from <1 mg/L to 67 mg/L in 2005, with the highest concentrations recorded in May, corresponding to peak concentrations observed at upstream monitoring location V5 (Figure 4-11).

In 2005, total and dissolved Zn concentrations at location V8 ranged from 0.007 mg/L to 0.037 mg/L and from below MDL to 0.037 mg/L, respectively. These concentrations are consistent within the ranges typically observed at this site in recent years (Figure 4-12).

As is observed at upstream locations V5 and VGMAIN, SO_4 and hardness concentrations at location V8 increased in the winter months of 2005, during periods of low flow and minimal surface runoff. Treated

effluent released from the Grum/Vangorda Water Treatment Plant also influenced SO_4 and hardness concentrations, as elevated concentrations were observed in July and August, as was observed at upstream location VGMAIN. Sulphate and hardness concentrations at location V8 ranged from 33 mg/L to 312 mg/L and from 116 mg/L to 449 mg/L $CaCO_3$, respectively, in 2005 (Figure 4-13).

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

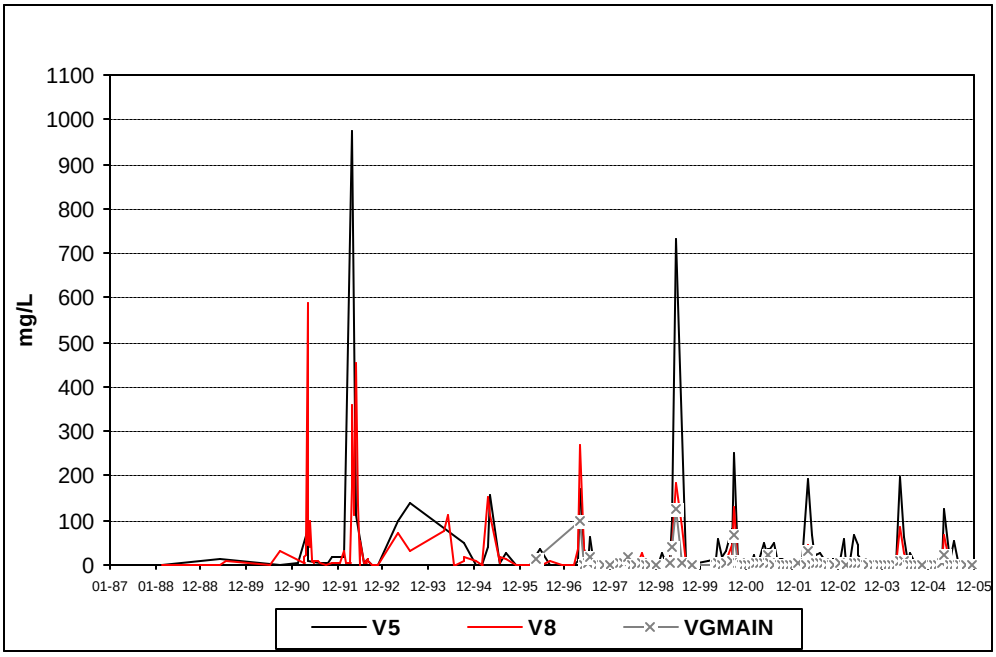


Figure 4-12. Lower Vangorda Creek (V5, VGMAIN, V8) Total Zinc

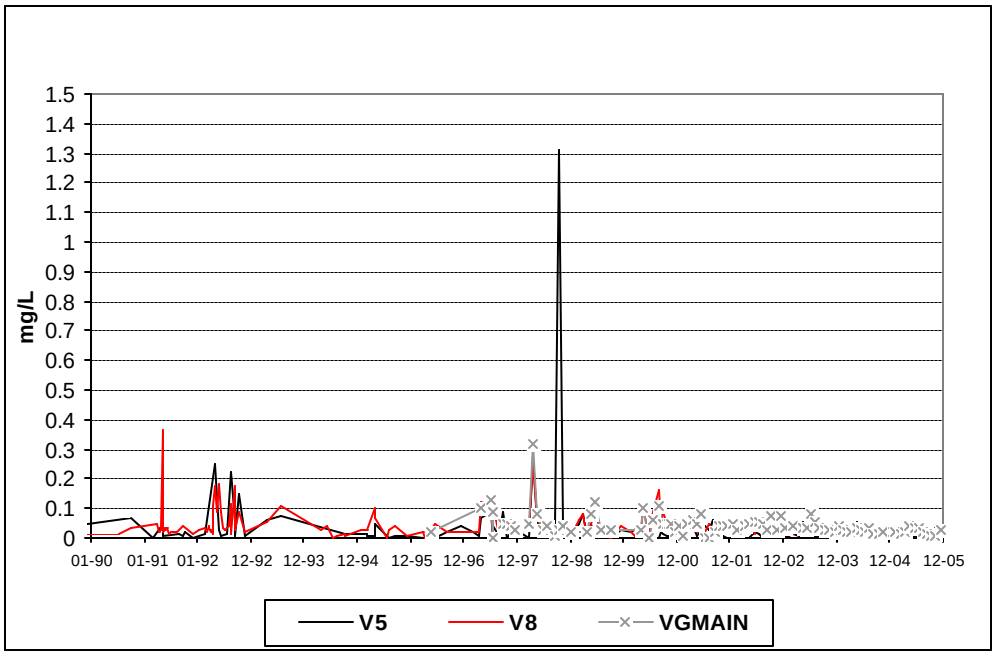
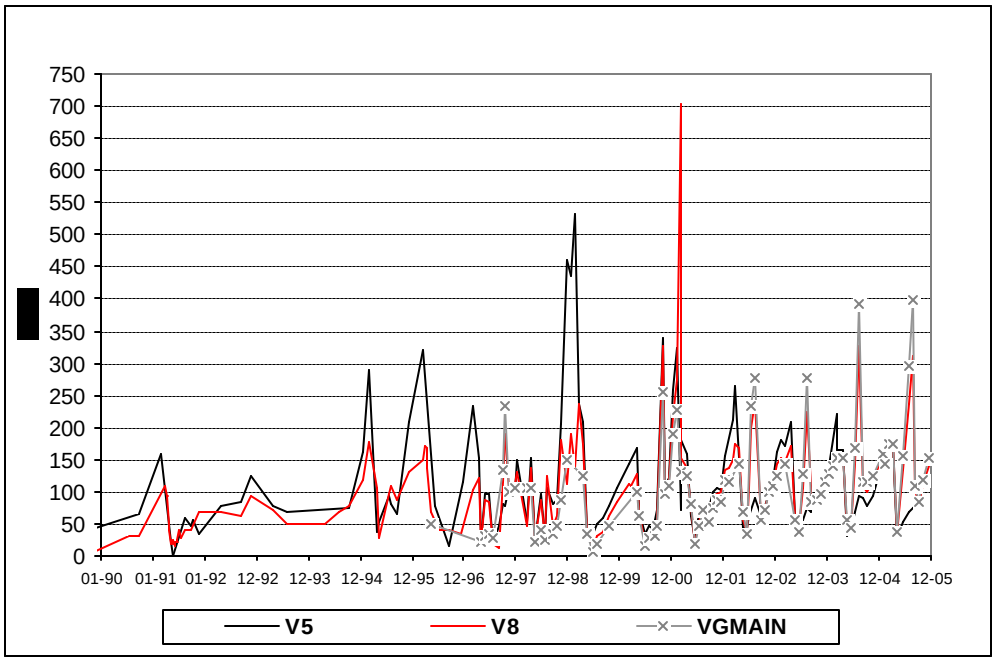


Figure 4-13. Lower Vangorda Creek (V5, VGMAIN, V8) Sulphate



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 2005 indicate that mining activities on the Vangorda Plateau have had an observable influence on concentrations of total suspended solids, total Zn, 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 SO_4. The information also confirms that there are significant concentrations of suspended sediments that can enter the Main Fork of Vangorda Creek downstream of the mine site that are not related to mine activities.

Concentrations of SO_4, total suspended solids and total Zn 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 2005.

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 during this period could be taken as representative of conditions largely unaffected by mine operations. This is evident through relatively low concentrations of total suspended solids, total Zn, ammonia, total lead and arsenic although the concentration of total Zn 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 Zn were 0.02 mg/L and 0.04 mg/L, respectively.

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 Zn, 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 Zn were 0.06 mg/L and 0.36 mg/L, respectively.

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 Zn 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 Zn were 0.03 mg/L and 0.11 mg/L, respectively.

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 Zn, 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 Zn were 0.04 mg/L and 0.12 mg/L, respectively.

1998 to 2005

During the period from 1998 to 2005, mining activities were again suspended. 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 2005 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 Zn and total arsenic were observed. During the period from 1998 to 2005, the average concentration of total suspended solids was 11 mg/L with a peak value of 184 mg/L. The average and peak concentrations of total Zn were 0.033 mg/L and 0.26 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

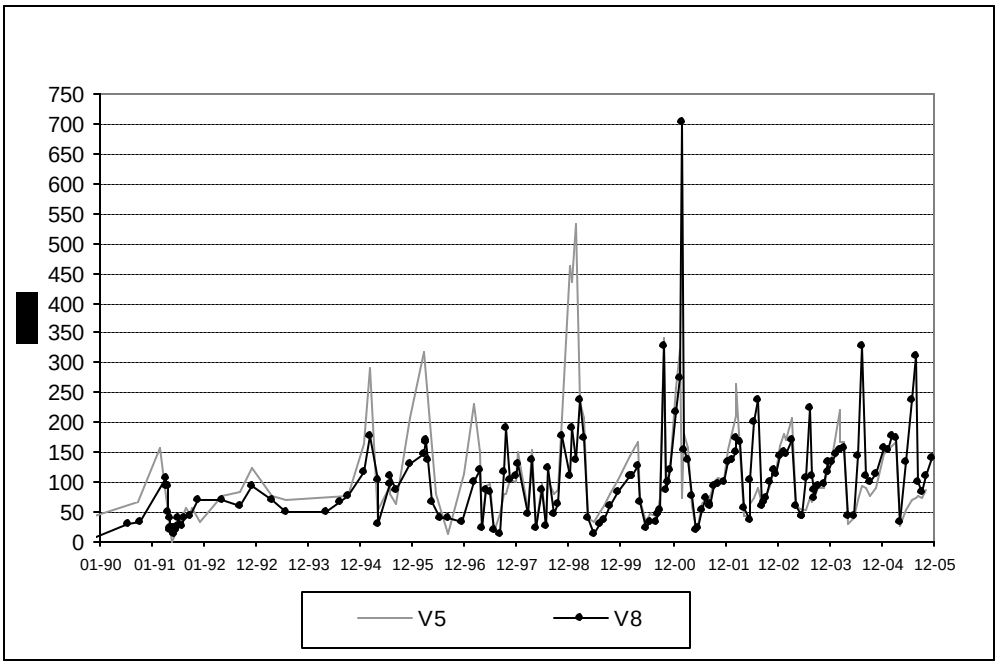


Figure 4-15. V5 and V8 Long Term Suspended Solids Trends

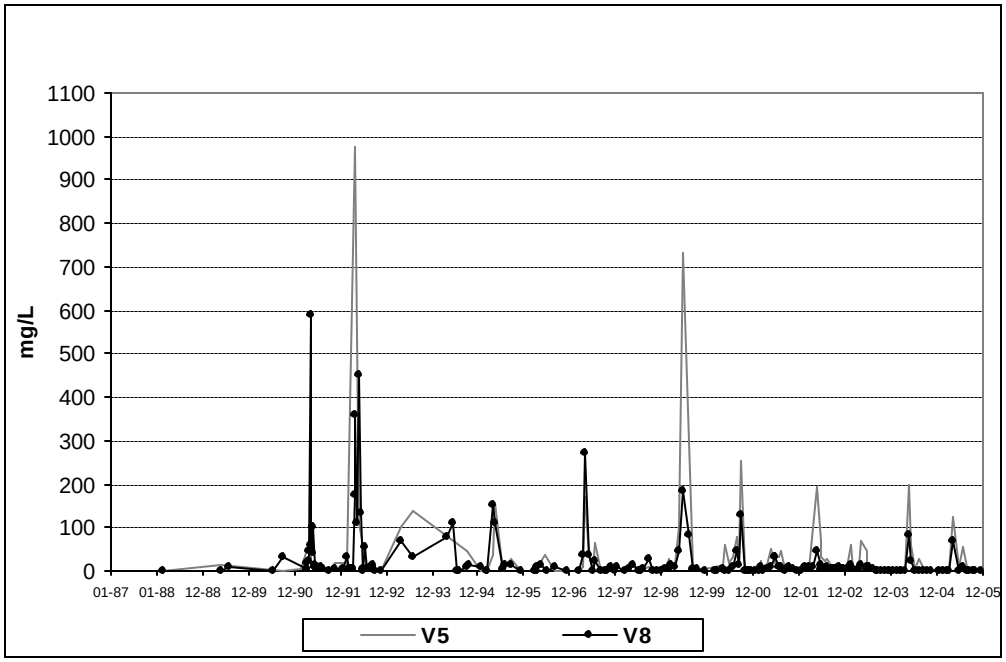
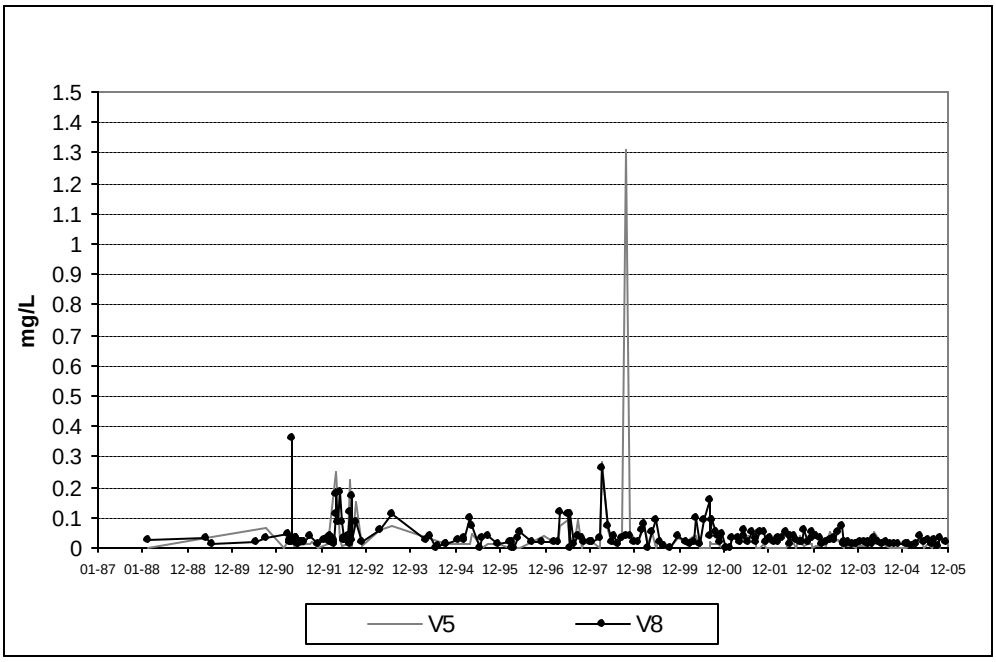


Figure 4-16. V5 and V8 Long Term Zinc Trends



5. Water Treatment Plant Performance

5.1 Introduction

5.1.1 Overview of Water Treatment Requirements

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 provides the maximum allowable concentrations of contaminants in any water released to the receiving environment.

Heavy metals, most notably zinc, that 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 is accomplished at three locations:

1. Grum/Vangorda Water Treatment Plant;
   Treats water from the Vangorda pit.
2. Mill Water Treatment System; and
   Treats water pumped from the Faro Main pit.
3. Down Valley Water Treatment System.
   Treats water syphoned 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 three 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.

5.1.2 Coordinated Operating Procedures

The three 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.

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 the Mill and Down Valley systems linked to the security guardhouse via radio and 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.

Water Quality Sampling

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 analysis 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 can also serve as a calibration check on the in-house assay procedures. Quarterly acute lethality tests (LC_{50} bioassays) are required for effluents.

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 treatment system 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.

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 back into Rose Creek 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.

Contaminated Water Collection

The collection of water that requires treatment is an important component of the water treatment systems. This 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 mine shut down, the system has been used exclusively to pump water from the Faro Main 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 providing 5,000 USgpm each to the mill (only one or occasionally two pumps are utilized for effluent discharge);
2. 30" sclair pipeline from the barge to the mill with flexible sections near the barge which prevent damage to the pipeline which 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 Main 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 Main 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 Main 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 Main pit water such that the plant 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.

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

The mill treatment system was constructed and debugged in 2001 and has been successfully operated since 2002. Water treatment has continued to be required at the outflow from the Intermediate Pond (Down Valley Treatment System). The volume of water requiring treatment in the Down Valley is reduced, however, because water pumped from the Main pit bypasses the Intermediate Pond.

The mill treatment system includes the following primary components:

1. New 24-inch influent pipeline from the Main 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 24-inch pipeline to settlement tanks;
5. Two settlement tanks (previous thickeners) 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 24-inch effluent pipeline with optional discharge into the Cross Valley Pond or the Cross Valley dam outflow spillway; and
10. treatment sediment removal and storage system (installed 2005).

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;
- ?? Productive use of existing infrastructure; and
- ?? Substantial reduction in the volume of water requiring treatment at the Cross Valley Pond.

5.2.2 Clean Water Diversions

Clean water is diverted around the Main 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 north area of the Faro Main pit were upgraded, which will improve the diversion of clean water away from the pit and into the catchment area of the North Wall Interceptor Ditch.

Faro Creek Diversion

The Faro Creek Diversion collects water from the original Faro Creek channel upstream of the Main pit and diverts the water around the northeast side of the Main 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 Main Pit. During 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 Main 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 noted a reduction in pit inflows following the 2002/03 work. A review of whether the benefits of this work are evident in a simple water balance for the pit is provided in Section 5.2.4, Water Quantities.

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 - Zone II Pit

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 Main pit at the south end. Pumping is typically required on an occasional basis through the summer season only.

5.2.4 2005 Operations

Water Quantities

An estimated 1.62 million m^3 was treated through the Mill in 2005. There were 124 pumping days in a single period from May 19 to September 19 (inclusive of occasional brief shut downs for maintenance).

The water level in the Main pit was lowered by approximately 6.7 m during the pumping period and ended the year at an estimated 3855.54 ft asl (mine datum), which was 2.1 m lower than at the start of the year. In essence, a relatively high volume was pumped in 2005 to "catch-up" after the lower than average pumping year in 2004. As a result, the storage volume created is adequate to contain the anticipated inflows until the scheduled restart of pumping in summer 2006. The pit water levels have been illustrated on Figures 2-2 and 2-3.

The volume pumped from the pit in 2005 was close to but slightly less than the volumes pumped from 2000 through 2003 (Table 5-1). The volume pumped in 2004 was considerably less due to issues regarding cyanide analyses, which were resolved early in 2005. Table 5-1 also lists the annual change in pit level, estimated annual net inflows and annual precipitation. These values suggest that the 2005 pumping program achieved a greater reduction of the water level than recent years without having pumped a larger volume of water. This is considered to be due, at least in part, to the beneficial effects (reduction of inflows) from maintenance of the Faro Creek Diversion (Section 5.2.2).

The estimated volumes of annual net inflows are plotted against annual precipitation on Figure 5-1. 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 5-1 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. Continued annual assessments of inflows, and particularly the detailed analyses being conducted for the FCRP, may confirm or disprove this suggestion.

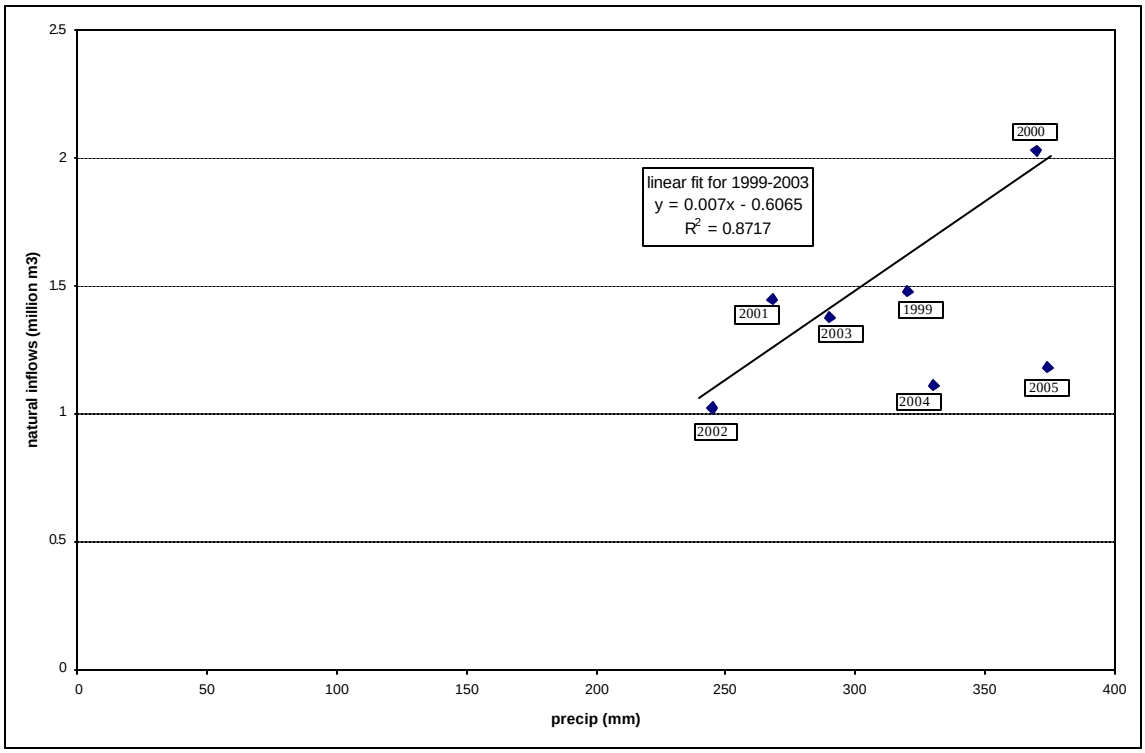
Table 5-1. Summary Main Pit Water Volumes

Year	Water Treated[1] (million m^3)	Annual Change in Pit Level[1]	Natural Inflows[1] (million m^3)	Annual Precipitation[2] (mm)
1999	1.06	+0.9 m	1.48	320
2000	1.80	+0.6 m	2.03	370
2001	1.93	-0.7 m	1.45	268
2002	1.94	-1.5 m	1.02	245
2003	1.76	-0.5 m	1.38	290
2004	0.78	+0.7 m	1.11	330
2005	1.62	-2.1 m	1.18	374

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.

Figure 5-1. Main Pit Precipitation versus Natural Inflows



Lime Consumption

A total of 172 t (190 tons) of lime was utilized in 2005 (170 tons new plus 20 tons residual from 2004) for an overall lime usage rate of 0.11 g/L.

This is less than the lime usage estimated for the Grum/Vangorda Water Treatment Plant, even though it is a purpose built water treatment facility. The lower lime usage in the Mill is likely related to the lower metal loading and higher pH of the influent water.

Water Quality

In order to monitor the treatment performance of the Mill, water samples of the (treated) Mill 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 water treatment system.

WTP operators recorded manual pH readings at the outflow of the Mill at least twice per day as a check on the automated pH monitoring probes. The pH readings through 2005 ranged from 9.5 to 11.8. Manual checks were recorded more frequently and at additional locations as required to manage the system.

Water that is treated in the Mill was not discharged directly to Rose Creek in 2005. The water was released into the southeast corner of the Cross Valley Pond, using a new inflow area that had been prepared for this purpose in early 2005. The new 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 (Section 8.5).

This new practice replaces the previous practice of releasing (treated) mill water 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. The new system is intended 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 reduction of flows in the spillway allows for better settlement and containment of solids from the (treated) Intermediate Pond water;
- 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 2005 confirmed that the new practice worked well and successfully provided the anticipated benefits over previous practices.

The water released from the Cross Valley Pond (location X5) is the final effluent discharged to Rose Creek and includes both water treated in the Mill and water siphoned (and treated) from the Intermediate Pond. Water quality for the final effluent (location X5) is described in Section 3.3. In 2005, 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.

Treatment Sediments

Treatment sediments from the Mill were deposited in 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.

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 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 sediment for several years of operation of the Mill and Down Valley water treatment systems.

The "new" disposal area was successfully utilized in 2005. In 2005, a greater than "normal" amount of sediments were pumped from the Mill. This was the result of the fertilizer test program in the Main pit, as described below under "Operating Issues".

Operating Issues

The largest operating issue in 2005 was an excess amount of algae entering the system from the Faro Main pit that required the system to be shut down periodically for cleaning and that increased maintenance demands. The algae were the result of a test program being conducted for the FCRP in which fertilizer was added directly into the pit to promote the growth of metal-reducing organisms. Once inside the water treatment system, the algae prevented effective mixing and settlement and effectively "clogged-up" the system. As a result, the pit fertilization program was stopped. The water treatment system was shut down for periods of one to 12 hours at a time through late June and July to allow the mill tanks to be flushed.

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

- EBA Engineering was retained to investigate suspected cracking in the base of the thickeners and clarifiers and provided a report;
- The bearing on the lime transfer auger was replaced in July;
- The underflow (sediment) pipe required repair of a minor break in July;
- The underflow (sediment) pumps required repair in August due to high usage;
- A fire that occurred in the Mill during removal of surplus equipment required the installation of I-Beam roof supports over the floatation cells; and
- Slumped soil near the lower end of the effluent discharge pipe required repair in September; pipe support stands were installed where the pipe crosses the Intermediate Dam spillway.

Comments for 2006 Operations

There are no substantive planned or recommended changes for 2006. The performance of the Mill as regards to water quality and mechanical availability was excellent. The operators maintained a detailed log book of activities and pH readings. The site manager maintained a monthly status report that also documented unusual events or repairs.

The following tasks are suggested for 2006 in addition to the continuation of the established operating procedures:

- ?? If the test program of fertilizing the Faro pit is to be continued in 2006, carefully consider the implications for the water treatment system base din the 2005 experince; integrate any necessary modifications into either process to ensure that the Mill will be effective in achieving compliant water;
- ?? Operate a more precise flow monitor on the Mill inflow pipeline; this will be helpful in resolving the apparent difference in flow rate and flow volume between the pit water balance and the current measurements in the Mill (Section 2.1);
- ?? Increase the frequency of staff gauge readings for the final effluent (location X5) and conduct periodic spot flow measurements to calibrate the staff gauge on an on-going basis; enhancement of this information will help to increase confidence in the water balances for the Mill and the Intermediate Pond;
- ?? Continue to monitor the performance of pH probes 9202 and 9203 (head end of the treatment circuit) closely as these are critical to the process and required close attention from operators and instrumentation staff in 2005;
- ?? continue use of the floating syphon intake for the Cross Valley Pond siphon; and
- ?? continue use of floating booms in the Cross Valley Pond to control wave action in the inflow/outflow areas at the discretion of the site manager.

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") 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 Main 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 overaddition of lime.

In 2002, the manner of treatment at the Intermediate Dam outflow spillway was upgraded with the installation of a treatment system which 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 2005.

The system consists of the following primary components:

- 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.

The system was operated successfully through 2005 as required to maintain the Intermediate Pond level below the overflow spillway, per the established management strategy.

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 Canal.

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 was not lined with erosion protection measures. 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 will improve the diversion of clean water away from the pit and into the catchment area of the North Wall Interceptor Ditch.

Rose Creek Diversion Canal

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 year) flood.

The canal 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

Contaminated water flows 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 plantsite area. The old Faro Creek channel is a drainage path for seepage from the rock dumps and plantsite areas. These channels are relatively short and lie completely within the Intermediate Pond cachment area such that little maintenance is required. Maintenance work has been focused on maintaining culverts at road crossings.

5.3.4 2005 Operations

Water Quantities

An estimated 686,500 m^3 was treated through the Down Valley system in 2005. There were 86 operating days over three periods in April, May/Jun and September.

The water level in the Intermediate Pond was drawn down over the course of the year by approximately 0.6 m. The storage volume created is adequate to contain the anticipated inflows until the scheduled restart of syphoning in 2006. The pond water levels have been illustrated on Figure 2-4.

The estimated volume moved in 2005 is consistent with the volume estimated for 2004, which was 0.64 million m^3.

Lime Consumption

A total of 236 t (260 tons) of lime was utilized for an overall lime usage rate of 0.34 g/L. This is more than the lime usage estimated for either the Mill or the Grum/Vangorda Water Treatment Plant, as has been observed in previous years.

The higher lime usage in the Down Valley is related to the higher target pH (11.0), which is necessary to achieve treatment because of the absence of intimate lime conditioning and flocculation. However, in 2005, the high lime consumption is also attributed to lower than usual pH (as low as 4) of the "influent" water syphoned from the Intermediate Pond (Section 3.2.4). Lime and soda ash were added directly into the Intermediate Pond in September 2005 to neutralize the low pH. By year end, the pond pH has returned to "normal"" winter levels. The cause of the low pH has not been identified.

Water Quality

Water that is treated in the Down Valley system is not discharged directly to Rose Creek. The lime treated water is released into the Cross Valley Pond at the base of the inflow spillway. An inflow area was developed by construction of a rock berm at the base of the inflow spillway. The berm dissipates inflow energy and promotes more effective settlement and containment of treatment sediments. The berm also directs inflow water towards the centre of the pond to minimize the risk of water "short-circuiting" to the outflow syphons. The Water Licence does not regulate the quality of water within the Mill water treatment system.

The experience of site management in 2005 confirmed that the new practice worked well and successfully provided the benefits that could be observed in the short term.

In order to monitor the performance of the Down Valley system routine manual pH measurements in the mixing box (where mixed lime is added into the water siphoned 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 2005 indicate 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 both Intermediate Pond water treated through the Down Valley system and (treated) water from the Faro Pit/Mill. Water quality for the final effluent (location X5) is described in Section 3.3. In 2005, 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.

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 Main 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 Mill 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 system, 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.

Treatment sediments were excavated from the Cross Valley Pond, following established practices, and hauled by truck to the new disposal area in March 2005 by First Nations contactors. An estimated 10,464 m^3 was moved. This scheduling made beneficial use of frozen conditions (both at the source and at the disposal location) and re-established the settlement area for the 2005 treatment season.

In October 2005, the sediment within the containment cell was piled to create storage space for sediment planned to be relocated from the Cross Valley Pond during the coming winter.

Mechanical / Electrical Issues

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

- the water supply pump failed; a spare was installed and the failed pump sent off-site for rebuild;
- log booms were installed on the Cross Valley Pond as a precautionary measure;
- mechanical problems were experienced with the lime mixers at the end of the season (in September); repairs are scheduled through the winter;
- the Cross Valley Pond syphon intake (with floats) was removed from the water at the end of the season to prevent ice damage; and
- maintenance of the diesel generator.

Comments for 2006 Operations

There are no substantive planned or recommended changes for 2006 with the exception of the disposal of treatment sediments in the new containment area. The performance of the treatment system as regards to water quality and mechanical availability was excellent. The operators maintained a detailed log book of activities and pH readings. The site manager maintained a monthly status report that also documented unusual events or repairs.

The following tasks are suggested for 2006 in addition to the continuation of the established operating procedures:

- ?? Increase the frequency of staff gauge readings for the final effluent (location X5) and conduct periodic spot flow measurements to calibrate the staff gauge on an on-going basis; enhancement of this information will help to increase confidence in the water balances for the Mill and the Intermediate Pond;
- ?? Document the routine calibration checks of the Down Valley pH probe in the operator's log book; a high-end (pH 12) calibration solution should be used; this is suggested because the manual pH tester is the primary means of controlling pH;
- ?? Continue to record frequent (minimum weekly) readings of the Intermediate Pond staff gauge to provide an indication of water volumes that pass through the system;
- ?? continue use of the floating syphon intake for the Cross Valley Pond syphon; and
- ?? continue use of floating booms in the Cross Valley Pond to control wave action in the inflow/outflow areas at the discretion of the site manager.

5.4 Grum/Vangorda Water Treatment System

5.4.1 Overview

The Grum/Vangorda Water Treatment Plant (the "WTP") is a conventional lime treatment system 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 then reactivated in 2002. Since 2002, the WTP has been operated during the summer season fundamentally as it had been during mine operations (pre-1998) although some mechanical and electrical upgrades were installed. Water is pumped to the WTP from the Vangorda pit on a seasonal summer basis to draw the pit water level down so that it remains below the recommended maximum elevation. There is no other water at the Vangorda Plateau mine site that requires treatment through the WTP since water for Little Creek Dam is incorporated into the Vangorda pit.

The need for reactivation of the WTP stemmed from the level of water in the Vangorda pit pond. In early 2002, the water level had reached the maximum desired elevation and, therefore, the water level needed to be drawn down in order to maintain adequate emergency storage capacity. The maximum desired water elevation was suggested to be 1091.8 m in a memo prepared by Gartner Lee Limited dated February 13, 2001. 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.

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; and
  Was initially underground and changed to above ground for 2002.
- 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

There are several substantial changes to the current water pumping and treatment systems 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 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:

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 2005 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.

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.

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.

Old Vangorda Creek Channel

Natural runoff water collects in the old Vangorda Creek channel immediately above the Vangorda pit. This 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. Prior to 2004, the pump was a gasoline pump operated on a manual basis through the summer season by the WTP operators. In May 2004, an electric pump was installed with automatic level controllers.

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.

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.

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 2005 Operations

WTP Start Up

The Clarification Pond was drained of water at the end of the 2004 treatment season, following the established shut down procedure. The start up phase for the WTP at the beginning of the 2005 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 2005, the start up pumping phase took place in May. Water quality samples were sent to the external laboratory and compliance was confirmed (including LC_{50} bioassay). The WTP was restarted and effluent release began on June 1.

Water Quantities

An estimated 924,352 m^3 (at an average pumping rate of 10,727 m3/day or 1,968 USgpm) was treated through the WTP in 2005, from June 1 to August 23 plus the 52-hour start up pumping. The water level in the Vangorda pit ended the year at an estimated 1077.48 m asl, which was 7.8 m lower than at the start of the year. The pit water levels have been illustrated on Figure 2-9.

The large storage volume created is anticipated to be adequate to contain inflow water through 2006, thereby deferring the next pumping/treatment program to 2007.

The pump barge was removed from water at the end of the season following the established procedure for end-of-season shut down.

The volume pumped in 2005 is larger than for 2003/2004 but similar to 2002 (Table 5-2). Table 5-2 also lists the annual change in pit level, estimated annual net inflows and annual precipitation.

The estimated volumes of annual net inflows are plotted against annual precipitation on Figure 5-2. 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 some substantive maintenance work was completed on the northeast diversion ditch.

Figure 5-2 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 5-2 does not clearly suggest that 2004 and 2005 show a different relationship between precipitation and estimated natural inflows. We note, however, 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 place this year with lower natural inflows, which could be related to a general reduction of inflows. If true, then this would confirm the observations of site management, who have suggested a noticeable effect. 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.

Table 5-2. Summary Vangorda Pit Water Volumes

Year	Water Treated[1] (m^3)	Annual Change in Pit Level	Natural Inflows[2] (m^3)	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

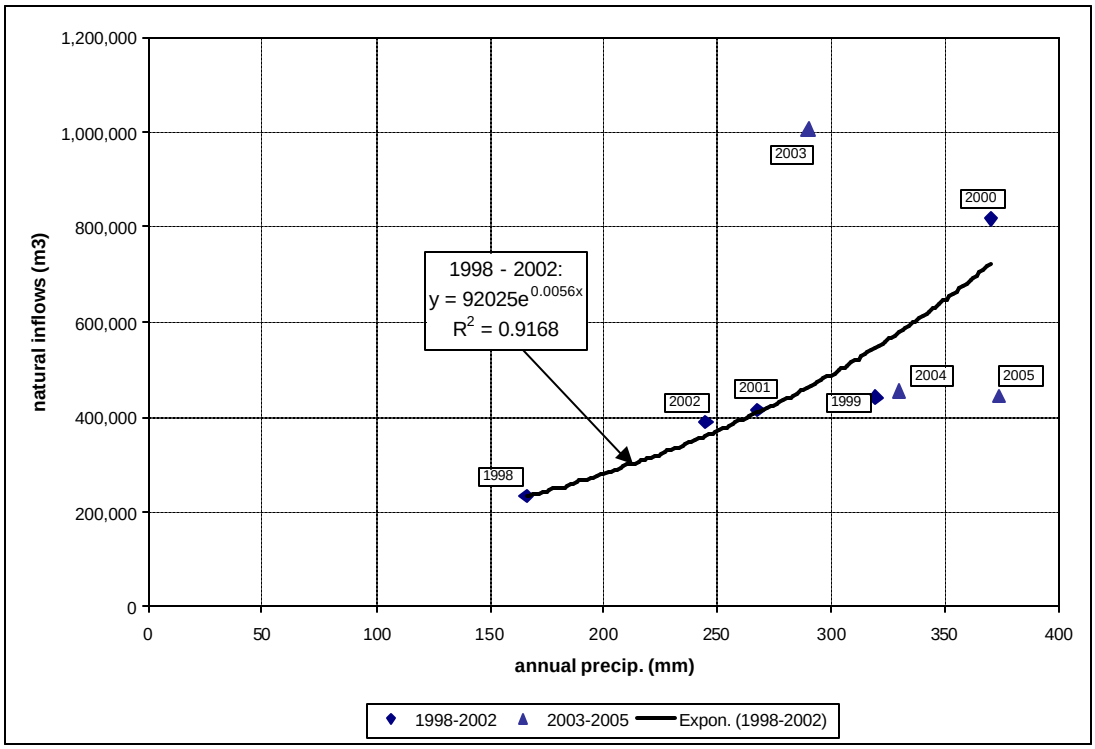
Notes: 1. As reported in the Annual Environmental Reports.

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 5-2. Natural Inflows to Vangorda Pit



Lime Consumption

A total of 190 t (210 tons) of lime was utilized for an overall lime usage rate of 0.21 g/L, as compared to previously estimated lime usage for 2004 (0.26 g/L), 2003 (0.19 g/L) and 2002 (0.18 g/L).

However, these individual annual estimates may not all account for any residual amounts of lime that might be carried from one season to the next. This effect can be "smoothed" by calculating an average lime usage over the 4-year operating period from 2002 to 2005. This combines the aggregate amount of lime used (643 t) with the aggregate volume of water treated (3,108,150 m^3) to provide an average lime usage of 0.21 g/L.

This is greater than the lime usage estimated for the Mill, even though the WTP is a purpose built water treatment facility versus the conversion of equipment for the same purpose in the Mill. The higher lime usage in the WTP is likely related to the higher metal loading and lower pH of the influent water.

Water Quality

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 in Section 4.3.1 and listed in Appendix 6. The specific results for each of the licenced parameters are summarized in Table 5-3. Acute lethality tests (LC_{50} bioassays) are required for location V25BSP and these were all passed.

All effluent released to the environment via location V25BSP was compliant with the discharge criteria in the Water Licence, with the single exception of a single, isolated concentration of total suspended solids during freshet. This result was reported to the Yukon Water Board in the monthly data report for May.

Table 5-3. Summary of V25 BSP 2005 Water Licence Compliance

Parameter	Discharge Limit	Location V25BSP
Total Suspended Solids	15	<1 – 34
PH	> 6.5	7.0 – 8.3
Ammonia (as N)	1.30	<0.01 – 0.46
Antimony (Sb)	0.10	<0.001
Arsenic (As)	0.05	<0.001 – 0.002
Barium (Ba)	1.00	0.017 – 0.054
Cadmium (Cd)	0.02	0.0004 – 0.0048
Copper (Cu)	0.20	<0.001 – 0.018
Cyanide (as CN)	0.05	<0.0050 – 0.0087
Lead (Pb)	0.20	<0.001 – 0.008
Mercury (Hg) *ug/L*	5	<0.02 – 0.02
Molybdenum (Mo)	0.50	<0.0005 – 0.0024
Nickel (Ni)	0.50	0.001 – 0.006
Selenium (Se)	0.05	<0.001 – 0.003
Silver (Ag)	0.10	<0.00025 – 0.0005
Zinc (Zn)	0.50	0.044 – 0.26

Notes: All units mg/L, except pH.
Metals data refers to total metals.

The water level in the Sheep Pad Pond was pumped down approximately 2 feet in October in preparation for removal of sediments prior to freshet 2006.

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

1. Discharge from Clarification Pond (location V25);
2. Grum Interceptor Ditch lower culvert (entrance to the Sheep pad Pond); and

3. Grum Interceptor Ditch below the Sheep Pad Pond (location V25BSP).

The pH readings that were collected by the WTP operators confirmed that the WTP was operating effectively (Table 5-4). The pH readings also document that effluent pH 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	Range in pH
V25 (Clarification Pond)	8.5 - 9.2
Entrance to Sheep Pad Pond	7.7 - 8.6
V25BSP	7.6 - 8.6

Notes: PH readings collected on a 6-hour schedule by WTP Operators.

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

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.

Treatment Sediments

At the end of the 2003 treatment season, treatment sediments from both the 2002 and 2003 treatment seasons 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% capacity.

Sediments continued to be moved in February 2005 using First Nations contactors. An estimated 8,000 m^3 was moved. This required the construction of an additional cell, for which the fencing was later

completed in summer. An estimated 3,000 m^3 of the total was placed into the new cell, which was full at the end of February.

Sediments that accumulated in the Clarification Pond during 2005 will remain in the pond through 2006 to provide for maximum compaction and resulting volume reduction. The sediments will be removed prior to the 2007 treatment season. This is based on the plan that no water treatment will be required in 2006.

Mechanical / Electrical Issues

The WTP operator's log book describes minor maintenance issues that were not of the type that would affect the performance of the system. The issues were all managed to prevent any negative effect on the treatment system. The issues included the following:

?? Shortly after start up in June, wind action caused a brief upset condition in the clarification pond; log booms with hanging geotextile "curtains" were installed which allowed the resumption of operations in 6 days.

Comments for Future Operations

There are no substantive planned or recommended changes for future operations, planned in 2007. The performance of the WTP as regards water quality and mechanical availability was excellent. The WTP operators maintained a detailed log book of activities and pH readings. The site manager maintained a monthly status report that also documented unusual events or repairs.

In 2006, water that may accumulate in the Clarification Pond should be sampled and tested for water quality and pumped out, provided that the water is compliant. This should be done late in the summer season unless high water levels indicate that it should be done sooner to maintain acceptable freeboard against the containment dyke.

The plant and related equipment should undergo a thorough mechanical and electrical check before re-activation in 2007.

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 is carried out in alternating years in the Rose Creek and Vangorda Creek drainage systems. In 2005, the program was conducted in Vangorda Creek by Laberge Environmental Services of Whitehorse (LES). A detailed report discussing the findings of the benthic invertebrate sampling program, as prepared by LES, is provided in Appendix 8. A summary of the report findings follows.

Four sampling stations within the Vangorda Creek system, identified as V1, V5, V8, and V27, were sampled for benthic invertebrates. Artificial substrate samplers were used for benthic invertebrate sampling. Samplers were placed in the creek system at each of the four sampling sites and left to colonize for five weeks. After five weeks the samplers were removed and the benthic invertebrates collected and preserved in vials for laboratory identification.

Three phyla: Arthropoda, Annelida and Nematoda were found in the study area, with a total of 61 distinct taxonomic groups identified from within the phyla. The orders Plecoptera (stoneflies) and/or Diptera (true flies) were dominant (i.e. > 25%) at all sites with the order Ephemeroptera (mayflies) sharing dominance with Diptera and Plecoptera at site V1.

The benthic communities at all sampling stations were similar in regards to abundance and diversity in 2005, with the exception of station V5, which had over double the population of the other three sites. Abundance values ranged from 5,534 individuals at site V1 to 13,570 individuals at site V5. Diversity values ranged from 34 distinct taxonomic groups at site V27 to 45 groups at site V8. Although the benthic invertebrate community at station V5 was diverse, it had less proportional representation from the sensitive insect orders than the other three sites.

Community abundance and diversity in the Vangorda Creek system was greater at all sites in 2005 as compared to 2003, with the exception of site V5 which had a higher benthic community diversity in 2003 and the highest since the beginning of the monitoring program in 1991.

Data on the abundance and diversity of the benthic communities in the Vangorda Creek system from the 2005 and previous sampling events indicate a diverse and stable community, which suggests minimal impact on the receiving environment as a result of mining related activities.

6.2 Stream Sediments

The Water Licence requires that stream sediment samples be collected in conjunction with the benthic invertebrate monitoring program. Laberge Environmental Services collected sediment samples in the Vangorda Creek system for metals analysis during their July field trip. A detailed report discussing the findings of the sediment sampling program, as prepared by LES, is provided in Appendix 8. A summary of the report findings follows.

Sediment samples were collected in triplicate from exposed areas of the stream bank at four sample sites V1, V5, V8 and V27. Samples were collected in glass jars, refrigerated and sent to the laboratory for the determination of total metals concentrations. Sediment samples were analysed for 29 metals, of which the metals copper, iron, lead and zinc were analysed in greater detail as to conform with past studies. Concentrations of these four metals were compared with the CCME (1999) interim freshwater sediment quality guidelines (ISQG) and to the probable effects level (PEL). Concentrations greater than the PEL have a 50% incidence of creating adverse biological effects.

Stream sediments at sites V1 and V5 had metal concentrations that met all applicable guidelines, with site V1 recording the lowest concentration of all metals examined. Sample site V8 recorded metal concentrations in exceedance of the ISQG for both lead and zinc. Site V27 had the highest concentration of the metals copper, iron, lead and zinc, as is anticipated for the location immediately downstream of the mineralized and mined areas. At site V27, the ISQG was exceeded for both copper and zinc and the PEL was exceeded for lead.

Metal concentrations of copper, iron, lead and zinc remained relatively consistent between 2003 and 2005 at sample sites V1, V5 and V8. Metal concentrations were lower at site V27 in 2005 as compared to 2003.

In general, metal concentrations of copper, lead and zinc have been decreasing since 1999 at sample site V27, with the most dramatic reduction seen in 2005. Metal concentrations, however, continue to exceed the ISQG and often the PEL. Exceedance of these levels would be a matter of concern if they were negatively affecting the benthic population at this site, however, the elevated concentrations of these metals at sample site V27 do not appear to be negatively affecting the benthic community.

6.3 Fish

The water licence requires that an annual fish monitoring report be undertaken. Fish sampling was completed August of 2005 by White Mountain Environmental Consulting of Whitehorse. A detailed report, as prepared by White Mountain, is provided in Appendix 9. A brief summary follows.

Fish sampling sites are consistent and include R1, R2, R4, R6 at the Faro mine site and V8 and B1 at the Vangorda site. At each of the sites a 100m section was selected for sampling where general fish habitat characteristics including velocity, channel configuration, bank stability, water temperature, fish cover, and riparian vegetation were recorded.

Sampling methods consisted mainly of electrofishing; however, Gee type minnow trapping, beach seining and angling were also used.

Arctic grayling and slimly sculpin samples were collected at each site for metals analysis. The results of the metals analysis of fish flesh were similar to those reported in 2004, with concentrations lower than those recorded in fish sampled in 1994 and 2002.

Sampling resulted in Arctic graying and slimly sculpin being captured at all sites, juvenile chinook salmon being capture at all sites except R1, R4, and R6, and burbot being captured at sites R1 and R2. No whitefish were captured during the 2005 sampling event. The abundance of juvenile chinook salmon are much greater in Vangorda and Blind Creek, at stations V8 and B1, than other stations. This distribution is consistent with 2004 fish sampling results. Utilization of sampled fish habitat by juvenile chinook salmon was lower in 2005 compared to results obtained in 2004.

The collection of juvenile chinook salmon in Rose Creek, particularly in the vicinity of the mine site, is indicative of a return of salmon after an extensive period of non-use. Salmon presence will continue to be monitored closely through this annual fisheries study.

6.4 Wildlife

Wildlife sitings on the mine property were recorded by site personnel on a routine basis throughout 2005. These included:

- ducks;
- sea gulls;
- raven;
- eagle;
- swans;
- grouse;
- ptarmigan;
- muskrat;
- otter;
- beaver;
- weasel;
- marmot;

- porcupine;
- rabbit;
- wolverine;
- fox;
- lynx;
- wolf;
- sheep;
- caribou;
- moose, including tagged moose;
- black bear;
- brown bear; and
- grizzly bear.

"No Hunting" signs were prepared for spring installation at each of the Faro, Grum and Vangorda sites.

7. Physical Stability Monitoring

7.1 Faro Mine Site

The geotechnical monitoring program required under Part G, Item 66 of the Water Licence was performed in 2005 by BGC Engineering Inc. (BGC). The full report prepared by BGC accompanies this report under separate cover.

The geotechnical instrumentation installed in and around the Rose Creek Diversion Canal, the Intermediate Dam, the Cross Valley Dam and the Freshwater Dam 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; dike crest, top of backslope and toe of slope;
- North Valley Wall Interceptor Ditch;
- North Fork Rose Creek flow-through rock drain;
- Selected portions of the Faro rock dumps;
- Secondary tailings impoundment; and
- Faro Creek Diversion Channel above the Faro Pit.

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.

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

The key recommendations that were made by BGC are summarized as follows:

- continue to gather instrumentation readings, including pond levels, on the recommended schedule and notify BGC of any changes in conditions;
- continue frequent inspections of structures by site personnel as recommended;

- operate continuous flow monitors (pressure transducers) upstream and downstream of the flow-through rock drain;
- continue visual and survey monitoring of the slope raveling near the Faro Creek Diversion;
- re-establish the crest of the Secondary tailings dam at the north abutment;
- physical maintenance at the Intermediate Dam as recommended, including the establishment of action "triggers" for instrument readings;
- survey the outfall section of the North Wall Interceptor Ditch to confirm hydraulic capacity; and
- blade the Rose Creek Diversion Canal containment dyke (roadway) after the fall inspection to fill open cracks.

7.2 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 2005, by Steffen, Robertson and Kirsten (Canada) Inc. ("SRK") who have conducted all of these inspections in the past. The full report 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). No significant trends were identified and no concerns were noted.

SRK conducted a site inspection in August. The inspection looked at the geotechnical performance and stability of the following structures:

- Vangorda rock dump and seepage collection system;
- Little Creek Dam;
- Vangorda Creek diversion;
- embankments of the WTP Clarification Pond;
- WTP Freshwater Supply Pond;
- Grum Interceptor Ditch;
- Sheep Pad Ponds; 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. Although the physical structures that were inspected appeared to be functioning acceptably well, some maintenance work was recommended.

The recommendations resulting from the inspection are summarized as follows:

- ?? continue visual inspection of all structures for signs of instability at various recommended schedules;
- ?? continue to gather instrumentation readings on the recommended schedule;
- ?? continue to monitor and remove periodically, as necessary, soil and debris that may accumulate in various ditches and spillways;
- ?? "top up" riprap along the Vangorda Creek diversion flume where rip rap has settled below the rim of the flume and repair any damage that may occur due to flood or slope failure; and
- ?? maintain the recommended freeboard in water retention ponds and maintain retention dykes by blading over open cracks to minimize infiltration.

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;
- ?? Steaming of road culverts;
- ?? 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;
- ?? Management provisions for a safe workplace; and
- ?? Other routine activities.

These routine activities are not described further in this report. However, several more substantive maintenance tasks were undertaken in 2005 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 Mine Closure Planning Office and technical consultants. These tasks were completed using mine-owned equipment and employee operators or First Nations contractors, wherever possible.

8.2 Rose Creek Diversion Canal

The Water Licence requires that "glaciation shall be monitored monthly during the winter season" and that "any corrective or preventative measures to address ice build up shall be documented and reported as a component of the annual report" (Part G, Item 69).

Ice build up was monitored more frequently than monthly through the winter season, and was monitored at least twice per day through spring by the Down Valley water treatment system operators. There was no excessive build up of ice and no corrective or preventative measures were necessary in 2005.

Two specific maintenance items were conducted in 2005:

- ?? high flows in the spring caused some minor damage to one location of the containment dyke near the Second Impoundment and this was repaired at that time; and
- ?? an access ramp was constructed in the containment berm to provide a creek crossing for a track-mounted drill rig and ATV's; this was necessary for a drilling program that was undertaken in the

backslope area for the FCRP; the ramp was removed and the dyke restored at the end of the summer.

8.3 Vangorda Creek Diversion Flume

Following from a severe flood in June 2004, it was proposed that an emergency relief structure be installed at the Headworks Dam that would safely pass a portion of extreme flood flows into the Vangorda Pit. This would reduce the risk of overflow and damage to the flume as was experienced in 2004. An emergency relief culvert was designed (SRK Consulting) and installed in 2005. The culvert entrance is protected with a steel trash rack.

Prior to installation of the emergency relief culvert in late summer 2005, flood flows were experienced that were great enough to cause minor damage to several sections of the flume, erode some areas of the plunge pool and wash a substantial quantity of rock into the flume. The flood flows did not result in overtopping of the flume or overflow into the Vangorda Pit. Following the flood, the damaged flume sections and the plunge pool were repaired, complete with anchors for the flume, and the washed-in rock was removed.

In late summer, general maintenance on a portion of the rock/soil wall overlooking the flume was conducted in the area where there have been previous incidents of sloughing and rockfalls. Minor sloughs and erosion were excavated and regarded.

8.4 North Wall Interceptor Ditch

Maintenance and upgrade work was completed on the North Wall Interceptor Ditch in the area of the approach to the culvert under the access road above the Cross Valley Pond. This culvert was upgraded in 2004 but was found to continue to be prone to glaciation. In 2005, a pilot channel was excavated and rip rap rock was placed to further reduce the potential for glaciation. The work was completed under the supervision of BGC Engineering.

In 2005, water diversions above the north area of the Faro Main pit were upgraded, which will improve the diversion of clean water away from the pit and into the catchment area of the North Wall Interceptor Ditch.

8.5 Cross Valley Pond

A rock berm was placed in the southeast corner of the Cross Valley Pond to create a stilling area for inflows from the Mill water treatment system. The piped inflow is released into a vertical steel culvert "drop box" that provides the initial energy dissipation. Inflow water then passes through the bermed

stilling area where energy is further dissipated and where residual sediment in the (treated) water can settle in a contained area.

8.6 Storage Cell for Faro Treatment Sediments

A storage cell for treatment sediments generated in the Mill and Down Valley water treatment systems was constructed on the Original Tailings Impoundment according to the design developed by SRK Consulting. The cell was constructed in winter by raising a berm of tailings to create a containment area that is accessible by haulage tuck under frozen conditions (i.e., sediment hauled from the Cross Valley Pond). A pipeline was installed from the mill system to the storage cell that was successfully utilized in 2005.

In summer 2005, water was pumped from a surface pool near the west side of the berm in order to prevent slumping of the berm. Minor repairs to the berm are required that are scheduled for winter 2005/06.

The storage cell is planned to be adequate for the term of the water licence.

8.7 Assay Laboratory

In June 2005, the "1100" model atomic absorption (AA) machine that is used for the routine on-site metal analyses broke down and a replacement "200" model was put into service. A professional service technician subsequently repaired the 1100 model on-site and the 200 model was sent off-site for servicing to ensure that it remains ready for service on an emergency basis, as was done in 2005.

8.8 Faro Main Pit Powerline

Studies undertaken in 2003 indicated that the overhead powerline from the substation adjacent to the Mill to the Main pit pumping barge required general maintenance and upgrading for safety and operating efficiency. The work was initiated in 2004 and completed in 2005. This included reversing the rotation of the Faro Pit pumps to match the new power line.

8.9 Operating Landfill

A permit was issued for continued use of the Operating Landfill based on an Operating Plan prepared by Gartner Lee. The work completed in 2005 was documented in an annual report under the operating permit. The work included the following:

- ?? regrading and general re-organization of the dumping area;
- ?? placement of wastes using a "bottom up" approach;

- ?? incorporation of covering layers;
- ?? initiation of a waste inventory and recording procedure; and
- ?? inspections against the terms of the permit.

8.10 Zone II Pit Pump

In July, the Zone II pump was raised to surface for inspection due to faulty operation. A damaged power cable was replaced and the pump was re-installed for continued use.

8.11 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 installed on-site. 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.

Additionally, waste oil that had been stored in 45 gallon drums was transferred into the bulk storage tank, thereby allowing the oil to be used for heat generation and allowing the drums to be disposed in the landfill.

8.12 Grum Power Line

Three power poles adjacent to the sloughing (southeast) Grum pit wall were relocated to prevent their failing into pit. The work was completed by Arctic Power, supported by mine equipment and operators.

8.13 Shrimp Creek Water Sample Location

Brush clearing was completed to provide safer access to the water sampling locations on Shrimp Creek (V4) and Vangorda Creek (V27). These sites are currently accessible only by foot on a steep slope and represented a serious safety risk. A helicopter landing area was also cleared to provide for emergency access, if necessary.

8.14 Faro Water Supply and Sewer

A water supply well was installed near the Faro Guardhouse that was used, in 2005, to provide washwater to the guardhouse and dry (shower) facility. The water was not used for drinking and a chlorination test is planned for early in 2006.

A new septic drainage field was constructed for the Guardhouse/Dry sewage system. The system was approved and put into operation in 2005.

8.15 Other Activities

Several other "maintenance" activities were undertaken in 2005 that are not requirements of the Water Licence but are of general interest. These included:

- Partial tear down of the Concentrate Storage Shed, focused primarily on the zinc area; also, relocation of lead concentrate to the (ex) coal crusher;
- Removal of old powerlines and powerpoles on the Faro site;
- Sale and removal from site of 106 used tires to Kal Tire for refurbishing;
- Sale and removal from site of various mill equipment and machinery including the secondary crushers, lime grinding mill, laboratory equipment, pumps, beams, blowers, hoists, jib-cranes and floatation cells;
- Removal from the mine property of all but a small quantity of (bagged) residual zinc concentrate for processing at the metal smelter in Trail, BC;
- Removal from site of residual laboratory chemicals and reagents for off-site disposal; this included seven drums of previously unidentified contents that were identified as waste grease;
- Unused groundwater pumping wells near the Faro pumphouse pond were capped and all associated surface structures removed;
- Tailings that were outside of the impoundments were relocated into the impoundments from the areas adjacent to the (ex) copper sulphate/bulk explosives yard and adjacent to the upper section of the Rose Creek Diversion;
- A scrap steel program that continued the cutting of heavy steel for (future) shipment off-site for recycle; and
- Major technical studies and field programs related to development of the FCRP, including extensive drill programs.

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, including some that were completed in 2005, 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. Reviewed, No Revisions Necessary.
F.49, Terrestrial Effects Study.	December 31, 2005.	Report Submitted. Followup Report to be Provided.
F.50, Town of Faro Water Supply Study.	2005 Annual Report (by February 28, 2006).	Complete. Report Appended.
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	Report Submitted. Followup Report to be Provided.
F.58, Final Closure and Reclamation Plan	December 31, 2006.	Underway.

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 2005 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. This study has been carried out 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.

Because of the complex scheduling of various aspects of the project, not all technical results were available at December 31, 2005. Further, additional discussions with the First Nations regarding the final results is necessary to complete the study.

An update report is to be submitted to the Board in March 2005 and a "final" study report will be submitted when all aspects of the study have been completed, which may be by June 30, 2006.

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 are to be submitted to the Board as part of the annual report for the year 2005.

This study has been carried out to meet the objectives stated in the Water Licence and is appended.

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 2005 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 2005, as prepared by Gartner Lee Limited, is provided in Appendix 10. That report provides several recommended numerical refinements to the triggers and thresholds. The Interim Receiver plans to implement these recommendations unless directed otherwise by the Board.

The Summary of that report is repeated below for ease of reference.

Excerpted Summary for Appendix 10:

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 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. 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 2005 activities:

1. Degraded Groundwater Quality in Rose Creek Valley Aquifer;
   One new trigger activated in 2005 for dissolved iron at X24A.
2. Degraded Water Quality in Vangorda Creek Downstream of the Mine Facilities;
   One trigger was activated in 2005 for sulphate. Data analysis demonstrated that this trigger was due to seasonal variation in sulphate. It is recommended that the sulphate trigger be modified to include two seasonal components: winter (November – April) 171 mg/L and open water (May – October) 75 mg/L).
3. Degraded Water Quality in Rose Creek Downstream of the Mine Facilities;
   Two triggers were activated in 2005 for sulphate and zinc. Data analysis demonstrated that this was an isolated event that was caused by relatively low flow conditions during a period of release of (compliant) effluent in March. It is recommended that the AMP Protocol be modified such that during periods of discharge and weekly sample collected that monthly average values be used for data review.
4. Degraded Seepage Quality from the Grum Rock Dump;
   No new triggers in 2005.

5. Degraded Water Quality in the North Fork of Rose Creek;
   One trigger was activated in 2005 for sulphate. Data analysis demonstrated that this trigger was due to seasonal variation in sulphate. It is recommended that the sulphate trigger be modified to include two seasonal components: winter (November – April) 29.5 mg/L and open water (May – October) 14.8 mg/L).
6. Water level in Grum Pit Reaches Maximum Desired Elevation;
   No triggers were activated in 2005.
7. Disruption of Fannin Sheep Migration Through the Mine Site; and
   No triggers were activated in 2005.
8. Wind Dispersed Tailings Result in Adverse Effects in the Terrestrial Environment.
   No triggers were activated in 20054.

Other than the specific recommendations listed above, the AMP program functioned as intended in 2005 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 ("CRA") 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 CRA 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 & 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 annual and involve a review of each risk element to reassess controls, and the studies & 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 review process directly inputs into the prioritisation and planning process for each fiscal year. As such, the 2001 CRA was reviewed and updated to reflect the 2002-2003 and 2003-2004 care and maintenance activities as well as the results of the numerous special projects completed during this timeframe. This process was also repeated during the planning of the 2004-2005 field season. As a result a number of additional studies were completed, the following being of particular importance:

- Formalization of the *Operation Procedures Manual & Employee Environmental, Health and Safety Training.*
- *Grum Pit In-situ Treatment Study* to provide accurate projections of the future fill rates, identify maximum recommended water elevations, and assess potential treatment requirements for the pit water.
- Continued *ARD Monitoring and Lab Studies* and associated seep surveys were conducted in the spring and fall including continued seasonal readings of temperature and gas monitors in the waste rock dumps.
- Continued *Dump Water Balance Investigations* involving snow surveys in April and May and the installation of additional instruments for measuring runoff prior to the spring melt.
- Development of *Faro / Grum / Vangorda Decommissioning Methods* including the initiation of mine area cover trials, completion of the Plug Dam and seepage investigations, solutions for long-term sludge handling and assessing backfill requirements for the Vangorda Pit.
- Development of the *Tailings Relocation Plan* involving pre-feasibility engineering studies of the preferred tailings relocation methods and costs.
- Continued monitoring of the *Tailings Cover Trial Areas* involving inspection of the trial area and cover designs.
- Design the *Rose Creek Dam Upgrades* involving investigations to support the design of upgrades to the tailings dams.

- Design *Rose Creek Diversion Modifications* involving the assessment of additional options for downstream spillways and methods to controlling tailings erosion.
- Collection of *Terrestrial Effects Risk Data* through a review of baseline data collected in the water licence renewal process, which included consultation with local First Nations to identify valued ecosystem components and traditional uses.
- Initiation of a *Level 2 Ecological Risk Assessment* associated with terrestrial and aquatic discharges from the site identified in the Terrestrial Effects Study Plan.
- Development of *Soil Contamination Remediation Plan* that primarily focused on the identification and initial delineation of contaminants in soil at the Faro plant site.
- A study to determine the *Impact of Tailings Outside of Tailings Facility* in four separate areas to determine whether any mitigation activities are required.
- *Water Licence Renewal Related Studies* that include an *Oxidized Fines Relocation Study*, the *Approval of a New Landfill* and *Approval of a Bioremediation Cell*.
- A study to investigate the *Relationship between Vangorda Creek and Town of Faro Drinking Water Supply Wells*
- *Fisheries Monitoring* that determined the presence of fish as well as the metals in fish tissue.
- An *Evaluation of the Water Management Regime for the Intermediate Pond* including an analysis of a variety of water management alternatives.
- A study to define *FCRP Closure Methods* involving a complete set of alternatives for the mine and tailings areas.
- *Building Removal and Disposition Activities* including activities at the Concentrate Load-Out Facilities and the Fresh Water Supply Dam Pump House.
- A *Complete Phase II Soil Remediation Study* at previous BXL and Brentag locations
- *Scrap Steel Recovery Program* to remove significant quantities of scrap steel from the property and send for recycling.

A major part of the 2005 review was to realign the existing risk rankings with the new *Indian and Northern Affairs Canada (INAC) – Northern Affairs Contaminated Sites Program Risk Matrix*. Realignment required changes in terminology and risk categories, however the overall methodology for annual reassessment of the CRA is similar. Realignment has resulted in five risk categories rather than the original six as the Low and Lowest Risk categories have been combined. The five new risk categories are Very High, High, Moderately High, Moderate and Low.

In May 2005, the CRA was updated to reflect the 2004-05 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 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, the largest changes, in terms of number of elements, were observed in the "High" risk category, which experienced a 38% decrease in the number of elements. This shift impacted primarily the "Low" risk category, which is the newly combined "Low" and "Lowest Risk" categories

from the original CRA framework, as evidenced by an increase of 72% in the number of elements in these categories.

Water quality issues in three areas (Vangorda Creek, Rose Creek and Emergency Tailings Area) are now ranked at "Very High" risk due to the anticipated consequence costs, however, there was no change in the true risk of these elements. One element was added in the 2004/05 review: Site Analytical Laboratory which relates to health and safety concerns. An additional two elements were retired during the 2004/05 review, which brings the total number of retired elements to seven, since 2001. Retired elements include the North Fork Rose Creek Diversion, Fresh Water Reservoir, Copper Sulphate Plant Pond, FWSD Access Road, Copper Sulphate Plant, Bulk Explosives Plant, and Grum Miscellaneous Buildings & Yards.

The Risk Classification Matrix for Elements on the Anvil Range Mine Site for the 2004-05 Review is provided in Appendix 11.

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	% Change from 2001
Highest Risk	1	1	0	**Very High**	3	200% increase
High	29	16	15	**High**	18	38% decrease
Moderately High	25	28	26	**Moderately High**	19	24% decrease
Moderate	26	26	21	**Moderate**	18	31% decrease
Low	25	34	38	**Low**	43	72% 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	
TOTAL	**106**	**106**	**107**		**108**	

Through the planned 2004 – 2005 care and maintenance activities and special projects, the elements included in this risk assessment will continue to be monitored and addressed with the aim of continued risk reduction. The risk assessment document will be updated in May 2006 to reflect ongoing activities at the mine site as well as the information gained through further studies. A further update on this work will be provided in the 2006 Annual Environmental Report to the Water Board.

Figure 9-1. Summary Risk Assessment Classification Matrix May 2005 Update (reflecting the 2004-2005 care and maintenance activities and investigations)

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

II.3; III.3; III.6; VII.11; VIII.9; VIII.10; VIII.14;

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

Risk Ranking Legend:		Changes in 2004/05 Review (Completed June 05)
Very High	Black	Risk ranking did not change
High	Blue	Risk ranking changed due to 2004/05 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	Turquoise	Risk ranking changed due to the addition/modification of an event
Element Retired	White	Risk ranking changed due to the alignment to the INAC Risk Matrix
	Grey	New element added in 2004/05 review

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

Part F, Item 58 of the Water Licence requires that a Final Closure and Reclamation Plan for the mine facilities be prepared and submitted to the Board by December 31, 2006. A number of investigative studies have been carried out during the past three years to assist in the development and design of the plan. During 2005, over forty investigative studies were carried out, which will further assist in advancing this process. The plan is being prepared under the general management of Indian and Northern Affairs Canada and the Government of Yukon through the Faro Mine Closure Planning Office. The plan is to be submitted by those two governments.

9.13 Community Liaison Committee

The Community Liaison Committee is a voluntary continuation of the Technical Advisory Committee (TAC) that was a requirement of a 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.

The distribution list for the committee includes:

- the Department of Fisheries and Oceans;
- the Department of Indian Affairs and Northern Development;
- Environment Canada;
- Faro Mine Closure Planning Office;
- Selkirk First Nation;
- Selkirk Renewable Resources Council;
- Ross River Dena Council;
- Town of Faro;
- Type II Mines Office;
- Yukon Government;
- Yukon Conservation Society; and
- Yukon Salmon Committee.

The second annual meeting of the Community Liaison Committee was held in Faro on July 6, 2006. The Interim Receiver provided a presentation on the care and maintenance activities and the Faro Mine Closure Planning Office provided an update on its activities. A tour of the mine site was provided by the Interim Receiver. A summary of the meeting, as was distributed by the Interim Receiver in August, is provided in Appendix 12.

The Interim Receiver's 39th court report was prepared in November and included, as usual, an Environmental Section that summarized all of the activities carried out during the operating period. The Interim Receiver circulated the Environmental Section of the court report and an update memo to the Community Liaison Committee members in December. This information is provided in Appendix 13.

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 3
2005 Surface Water Quality Data
Rose Creek Drainage

Table 1 Surface Water Routine Parameters

STATION	SAMPLE DATE	ALK-T mg/L	COND µS/cm	HARD mg/L	NH3 mg/L	SO4-D mg/L	TSS mg/L	TEMP °C	PH-F	FLOW L/sec
A25	23-Jun-05		356	193	< 0.01	18.6	3.0			
A25	20-Sep-05		331	221	< 0.01	19.1	5.0	8.0	7.4	
A30	23-Jun-05		1470	467	0.02	1060	< 1			
A30	19-Sep-05		887	523	< 0.01	563	1	4.7	6.4	
FAROCR	21-Jan-05							-0.5		
FAROCR	09-May-05		35	18	0.01	3.9	29.0	2.7	7.3	
FAROCR	20-Jun-05		148	25	0.08	4.3	< 1	6.5	7.5	
FAROCR	26-Jul-05		45	21	0.03	3.7	< 1	8.6	7.3	
FAROCR	23-Aug-05		57	27	< 0.01	3.6	< 1	8.0	7.7	
FAROCR	06-Sep-05		54	24	< 0.01	3.6	< 1	7.3	8.1	
FAROCR	11-Oct-05		64	33	0.02	4.86	< 1	0.5	7.5	
FAROCR	02-Nov-05		60	29	< 0.01	4.23	< 1	0.1	7.5	
FAROCR	13-Dec-05		116	58	< 0.01	7.69	< 1	0.3	7.7	
	average		72.4	29.4	0.0225	4.5	4.5	3.7	7.6	
	minimum		35	18.0	< 0.01	3.60	< 1	-0.5	7.3	
	maximum		148	58.0	0.08	7.69	29	8.6	8.1	
	N > DL		8	8	4	8	1	9	8	
	median		58.5	26.0	0.01	4.1	1.0	2.7	7.5	
FCO	22-Jun-05		242	95	< 0.01	128.0	2	12.7	5.1	
FCO	19-Sep-05		148	63	0.02	57.8	4	7.1	7.4	
FDL	22-Jun-05		32	13	< 0.01	2.6	< 1	11.8	7.8	
FDL	19-Sep-05		36	14	< 0.01	2.4	2	5.8	7.7	
FDU	22-Jun-05		27	11	0.01	1.6	< 1	7.4	7.4	
FDU	19-Sep-05		33	14	< 0.01	2.1	1	6.5	7.9	
GCULV	18-Jan-05		93		< 0.05	7	< 1	0.2	7.6	
GCULV	08-Feb-05		93		< 0.05	7	< 1			
GCULV	08-Mar-05		95		< 0.05	5	< 1	0.4	7.6	
GCULV	05-Apr-05	51	106		< 0.05	6	< 1	0.4	7.7	
GCULV	11-Jun-05				< 0.05	3				
GCULV	16-Jul-05		44		< 0.05	4	< 5			
GCULV	22-Aug-05		58		< 0.05	6		9.0	7.7	
GCULV	05-Sep-05	24	< 2	25	< 0.05	6	1	7.2	7.7	
GCULV	11-Oct-05	22	56	28	0.02	7.97	< 1	2.1	8.5	
GCULV	01-Nov-05	26	65	33	< 0.01	8.41	< 1	1.2	7.8	
GCULV	14-Dec-05	42	102	44	< 0.01	6.13	< 1	0.1	8.3	
	average	33.1	79.1	32.5	0.04	6.05	1.4	2.6	7.9	
	minimum	22	< 2	25	< 0.01	3.00	< 1	0.1	7.6	
	maximum	51	106	44	0.02	8.41	1	9.0	8.5	
	N > DL	5	9	4	1	11	1	8	8	
	median	26.3	93.0	30.5	0.05	6.00	1.0	0.8	7.7	
GHSCR1	22-Jun-05		1340	808	< 0.01	681	< 1	7.2	8.0	
GHSCR2	19-Sep-05		1040	763	< 0.01	641	1	6.2	8.1	

Appendix 3
2005 Surface Water Quality Data
Rose Creek Drainage

Table 1 Surface Water Routine Parameters

STATION	SAMPLE DATE	ALK-T mg/L	COND µS/cm	HARD mg/L	NH3 mg/L	SO4-D mg/L	TSS mg/L	TEMP °C	PH-F	FLOW L/sec
K8	18-Jan-05		155		< 0.05	14	< 1	-0.2	7.7	
K8	08-Feb-05		147		< 0.05	15	< 1			
K8	05-Apr-05	64	168		< 0.05	13	< 1	0.1	7.7	
K8	11-Jun-05				< 0.05	3				
K8	16-Jul-05		65		< 0.05	6	< 5			
K8	22-Aug-05		106		< 0.05	10		7.6	7.8	
K8	05-Sep-05	39	< 2	45	< 0.05	9	1	6.3	8.0	
K8	11-Oct-05	39	84	49	0.04	9.53	< 1	1.8	8.5	
K8	01-Nov-05	46	98	58	< 0.01	11	< 1	1.1	7.9	
K8	14-Dec-05	57	146	68	< 0.01	12.7	< 1	0.3	8.3	
	average	48.8	121.1	55.0	0.04	10.3	1.5	2.4	8.0	
	minimum	39	< 2	45	< 0.01	3.0	< 1	-0.2	7.7	
	maximum	64	168	68	0.04	15.0	1.0	7.6	8.5	
	N > DL	5	8	4	1	10	1	7	7	
	median	45.5	126.0	53.5	0.05	10.5	1.0	1.1	7.9	
NE1	23-Jun-05		1060	256	< 0.01	136	< 1			
NE1	20-Sep-05		437	332	< 0.01	266	< 1	3.7	7.8	
NE2	23-Jun-05		1040	595	< 0.01	391	33			
NE2	20-Sep-05		867	592	< 0.01	439	< 1	3.9	8.2	
NF1	23-Jun-05		144	73	< 0.01	9.8	7			
NF1	20-Sep-05		145	87	0.02	13.1	1	4.7	7.9	
NF2	23-Jun-05		142	72	< 0.01	8.6	1			
NF2	20-Sep-05		145	84	< 0.01	14.0	< 1	4.4	7.6	
R1	29-Mar-05	121	285	203	0.10	29.6	1	0.9	7.0	
R1	17-Aug-05	86	189	100	< 0.01	18	2	10.3	7.7	
R2	29-Mar-05	158	578	361	0.08	154	2	1.0	7.2	
R2	17-Aug-05	100	351	212	0.14	114	3	12.8	7.7	
R3	29-Mar-05	153	539	334	< 0.01	133	< 1	0.3	7.4	
R3	17-Aug-05	101	356	188	0.08	91.3	2	10.1	8.0	
R4	29-Mar-05	136	386	258	< 0.01	81.6	1	0.6	7.6	
R4	17-Aug-05	101	302	184	0.02	77.6	3	8.2	7.9	
R5	29-Mar-05	136	383	272	< 0.01	80.3	< 1	0.5	7.5	
R5	17-Aug-05	117	252	159	< 0.01	27.9	3	8.0	8.3	
R6	29-Mar-05	135	382	261	< 0.01	80.1	< 1	0.5	7.5	
R6	17-Aug-05	122	240	158	< 0.01	19.3	2	7.3	8.0	
R7	21-Jan-05							-0.5	7.3	
R7	22-Jan-05		240	133	< 0.01	10	< 1			
R7	09-Feb-05		240	134	0.02	8.2	< 1	0.5	7.4	
R7	14-Mar-05		229	143	0.01	9.1	< 1	0.7	7.8	
R7	11-Apr-05		238	132		8.9	< 1	1.5	7.7	
R7	09-May-05		53	28	0.02	1.7	15	3.0	7.8	
R7	20-Jun-05		133	68	0.07	6.5	2	8.9	7.9	

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Table 1 Surface Water Routine Parameters

STATION	SAMPLE DATE	ALK-T mg/L	COND µS/cm	HARD mg/L	NH3 mg/L	SO4-D mg/L	TSS mg/L	TEMP °C	PH-F	FLOW L/sec
R7	26-Jul-05		144	72	0.03	6.9	< 1	7.7	7.6	
R7	23-Aug-05		157	99	< 0.01	7.2	< 1	6.0	7.7	
R7	06-Sep-05		140	80	< 0.01	7.5	< 1	5.5	8.1	
R7	11-Oct-05		145	103	0.02	7.97	< 1	0.8	7.7	
R7	02-Nov-05		172	112	< 0.01	8.85	< 1	0.3	7.9	
R7	13-Dec-05		236	123	< 0.01	16.9	< 1	0.1	7.6	
	average		177.3	102.3	0.02	8.3	2.25	2.9	7.7	
	minimum		53	28	< 0.01	1.7	< 1	-0.5	7.3	
	maximum		240	143	0.07	16.9	15	8.9	8.1	
	N > DL		12	12	6	12	2	12	12	
	median		164.5	107.5	0.01	8.1	1.0	1.2	7.7	
R8	21-Jan-05							-0.5	7.2	
R8	22-Jan-05		237	137	< 0.01	9.4	< 1			
R8	09-Feb-05		239	130	0.02	8.0	< 1	-0.2	7.5	
R8	14-Mar-05		228	149	0.02	9.0	< 1	0.5	7.7	
R8	11-Apr-05		235	131		8.9	< 1	1.6	7.8	
R8	09-May-05		51	27	0.04	2.0	15	2.9	7.4	
R8	20-Jun-05		127	65	0.11	6.2	2	8.4	7.6	
R8	26-Jul-05		130	64	0.08	6.3	< 1	7.9	7.5	
R8	23-Aug-05		150	102	< 0.01	6.9	1	6.2	7.6	
R8	06-Sep-05		133	77	< 0.01	7.2	< 1	5.8	8.1	
R8	11-Oct-05		140	95	0.02	7.64	< 1	0.6	7.7	
R8	02-Nov-05		162	109	< 0.01	8.32	< 1	0.2	7.9	
	average		166.5	98.7	0.03	7.3	2.36	3.0	7.6	
	minimum		51	27	< 0.01	2.0	< 1	-0.5	7.2	
	maximum		239	149	0.11	9.4	15.0	8.4	8.1	
	N > DL		11	11	6	11	3	11	11	
	median		150.0	102.0	0.02	7.6	1.0	1.6	7.6	
R9	21-Jan-05							-0.6	7.4	
R9	22-Jan-05		264	152	< 0.01	20.5	< 1			
R9	09-Feb-05		267	157	< 0.01	18.6	< 1	0.0	7.4	
R9	14-Mar-05		250	149	0.04	19.1	< 1	0.2	7.5	
R9	11-Apr-05		250	150		18.4	< 1	1.4	7.3	
R9	09-May-05		56	29	0.03	2.7	17	3.0	7.2	
R9	20-Jun-05		136	70	0.09	7.9	3	7.0	7.5	
R9	26-Jul-05		140	78	0.03	8.3	< 1	7.9	7.5	
R9	23-Aug-05		161	102	< 0.01	9.9	< 1	6.3	7.6	
R9	06-Sep-05		143	81	< 0.01	10.5	< 1	6.7	8.1	
R9	11-Oct-05		153	100	0.02	11.8	< 1	0.7	7.8	
R9	02-Nov-05		174	113	< 0.01	14.2	< 1	0.2	7.9	
R9	13-Dec-05		255	128	< 0.01	16.4	< 1	-0.1	7.6	
	average		187.4	109.1	0.02	13.2	2.5	2.7	7.6	

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Table 1 Surface Water Routine Parameters

STATION	SAMPLE DATE	ALK-T mg/L	COND µS/cm	HARD mg/L	NH3 mg/L	SO4-D mg/L	TSS mg/L	TEMP °C	PH-F	FLOW L/sec
	minimum		56	29	< 0.01	2.7	< 1	-0.6	7.2	
	maximum		267	157	0.09	20.5	17	7.9	8.1	
	N > DL		12	12	5	12	2	12	12	
	median		167.5	107.5	0.01	13.0	1	1.1	7.5	
R10	21-Jan-05							0.2	7.5	
R10	22-Jan-05		266	174	< 0.01	21.1	< 1			
R10	09-Feb-05		266	146	< 0.01	17.7	< 1	-0.3	7.4	
R10	14-Mar-05		253	170	< 0.01	19.1	< 1	0.4	7.6	
R10	11-Apr-05		247	146		18.6	< 1	1.4	7.4	
R10	09-May-05		56	29	0.03	2.7	14	3.1	7.2	
R10	20-Jun-05		133	69	0.10	8.1	3	6.7	7.6	
R10	26-Jul-05		140	67	0.03	8.4	< 1	8.1	7.5	
R10	23-Aug-05		161	102	< 0.01	9.9	< 1	6.5	7.6	
R10	06-Sep-05		144	93	< 0.01	10.7	< 1	7.3	8.0	
R10	11-Oct-05		154	103	0.02	12	< 1	0.9	7.8	
R10	02-Nov-05		172	123	< 0.01	14.4	< 1	0.1	8.0	
R10	13-Dec-05		253	127	< 0.01	16.4	< 1	-0.3	8.0	
	average		187.1	112.4	0.02	13.3	2.25	2.8	7.6	
	minimum		56	29	< 0.01	2.7	< 1	-0.3	7.2	
	maximum		266	174	0.10	21.1	14	8.1	8.0	
	N > DL		12	12	4	12	2	12	12	
	median		166.5	113.0	0.01	13.2	1.0	1.2	7.6	
R11	29-Mar-05	137	383	290	< 0.01	81.9	< 1	0.8	7.4	
R11	17-Aug-05	101	245	147	0.02	38.6	4	9.3	7.5	
W10	22-Jun-05		98	49	< 0.01	3.4	< 1	7.4	7.5	
W10	20-Sep-05		107	60	< 0.01	4.2	1	5.0	7.9	
W5	23-Jun-05		909	496	< 0.01	320	< 1			
W5	20-Sep-05		692	424	< 0.01	289	< 1	3.0	7.6	
W8	22-Jun-05		102	49	< 0.01	5.3	< 1	9.4	7.0	
W8	20-Sep-05		95	52	< 0.01	4.2	1	4.9	7.6	
WEIR3	05-Jan-05							2.5	7.4	4.0
WEIR3	17-Jan-05							1.9	7.3	4.5
WEIR3	24-Jan-05							3.2	7.2	4.5
WEIR3	31-Jan-05							2.7	6.9	5.1
WEIR3	29-Mar-05	250	1300	686	0.69	553	4	3.8	6.8	3.5
WEIR3	02-Jun-05							5.7	7.2	3.5
WEIR3	09-Jun-05							8.0	7.0	4.0
WEIR3	16-Jun-05							8.3	7.0	4.5
WEIR3	23-Jun-05							6.9	7.0	4.5
WEIR3	30-Jun-05							8.4	7.1	4.5
WEIR3	17-Aug-05	238	1180	662	0.50	519	3	9.1	7.1	3.0
WEIR3	06-Oct-05							4.7	7.4	3.3

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WEIR3	13-Oct-05							4.7	7.4	2.9
WEIR3	20-Oct-05							3.8	7.5	3.3
WEIR3	27-Oct-05							4.3	7.3	3.3
	average							5.2	7.2	3.9
	minimum							1.9	6.8	2.9
	maximum							9.1	7.5	5.1
	N > DL	2	2	2	2	2	2	15	15	15
	median							4.7	7.2	4.0
X2	21-Jan-05		308	173	< 0.01	37.2	1	-0.3	7.2	
X2	08-Feb-05		305	187	< 0.01	31.8	< 1	-0.1	7.7	
X2	15-Mar-05		289	163	0.04	33.2	< 1	1.3	7.8	
X2	11-Apr-05		276	158	< 0.01	34	< 1	0.5	7.4	
X2	09-May-05		61	33	0.02	4	9	1.6	7.4	
X2	20-Jun-05		149	74	< 0.01	10.5	2	8.0	7.7	
X2	25-Jul-05		146	73	0.03	10.6	1	6.7	7.5	
X2	22-Aug-05		185	108	< 0.01	15.1	< 1	7.3	7.5	
X2	05-Sep-05		164	92	< 0.01	16.4	< 1	6.1	7.6	
X2	10-Oct-05		163	96	0.02	16.6	< 1	2.6	8.0	
X2	01-Nov-05		202	121	< 0.01	24.6	2	0.9	7.7	
X2	13-Dec-05		283	146	< 0.01	28.1	< 1	0.6	7.2	
	average		210.9	118.7	0.02	21.8	1.83	2.9	7.6	
	minimum		61	33	< 0.01	4	< 1	-0.3	7.2	
	maximum		308	187	0.04	37.2	9.0	8.0	8.0	
	N > DL		12	12	4	12	5	12	12	
	median		193.5	114.5	0.01	20.6	1.0	1.5	7.6	
X3	21-Jan-05		292	174	0.03	35.2	< 1	-0.2	7.3	
X3	08-Feb-05		294	169	0.03	30	< 1	-0.1	7.8	
X3	15-Mar-05		269	171	0.03	32	< 1	1.4	7.9	
X3	11-Apr-05		277	153	< 0.01	32.8	< 1	0.7	7.5	
X3	09-May-05		82	42	0.04	5.9	13	2.1	7.5	
X3	20-Jun-05		138	69	< 0.01	10.9	2	9.9	7.7	
X3	25-Jul-05		155	86	0.05	12.3	< 1	7.5	7.6	
X3	22-Aug-05		190	118	< 0.01	15.9	< 1		7.7	
X3	05-Sep-05		164	92	< 0.01	16.9	< 1	6.3	7.8	
X3	10-Oct-05		161	104	0.02	17.2	< 1	2.9	8.0	
X3	01-Nov-05		196	126	< 0.01	24	1	0.8	7.7	
X3	13-Dec-05		283	159	< 0.01	27.6	< 1	0.4	7.2	
	average		208.4	121.9	0.02	21.7	2.08	2.9	7.6	
	minimum		82	42	< 0.01	5.9	< 1	-0.2	7.2	
	maximum		294	174	0.05	35.2	13	9.9	8.0	
	N > DL		12	12	6	12	3	11	12	
	median		193.0	122.0	0.02	20.6	1.0	1.4	7.7	

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STATION	SAMPLE DATE	ALK-T mg/L	COND µS/cm	HARD mg/L	NH3 mg/L	SO4-D mg/L	TSS mg/L	TEMP °C	PH-F	FLOW L/sec
X4	21-Jan-05		1510	846	0.19	891	5	-0.2	7.0	
X4	08-Feb-05		1440	801	0.21	742	6	-0.2	7.4	
X4	15-Mar-05		1330	792	0.25	696	11	2.0	6.5	
X4	11-Apr-05		961	537	0.13	496	12	1.9	6.8	
X4	09-May-05		1430	645	0.16	776	11	4.5	6.6	
X4	21-Jun-05		1290	686	0.25	817	1	14.1	5.9	
X4	25-Jul-05		1320	756	0.18	909	< 1	14.5	4.4	
X4	23-Aug-05		1350	886	0.16	949	< 1	12.8	4.6	
X4	06-Sep-05		1190	716	0.17	1010	< 1	10.6	4.4	
X4	11-Oct-05		1480	769	0.19	1040	3	2.6	6.0	
X4	02-Nov-05		1170	895	0.17	1080	3	0.8	5.9	
X4	15-Dec-05		1730	810	0.20	993	40	0.5	6.9	
	average		1350.1	761.6	0.19	866.6	7.92	5.3	6.0	
	minimum		961	537	0.13	496	< 1	-0.2	4.4	
	maximum		1730	895	0.25	1080	40	14.5	7.4	
	N > DL		12	12	12	12	9	12	12	
	median		1340.0	780.5	0.19	900.0	4.0	2.3	6.3	
X5	08-Mar-05			1230	0.93	755	< 1			
X5	14-Mar-05		1790	1040	0.96	881	1	4.0	7.1	
X5	22-Mar-05		1750	1090	0.89	908	< 1			
X5	10-May-05		1430	692	0.71	712	1	7.0	7.2	
X5	31-May-05		1130	579	0.55	566	< 1			
X5	07-Jun-05							12.5	8.5	
X5	11-Jun-05		1190	661	0.57	641	< 1			
X5	19-Jun-05		1190	666	0.56	643	< 1			
X5	21-Jun-05		1210	642	0.74	664	< 1	13.4	7.9	
X5	02-Jul-05		1210	677	0.65	704	< 1	15.8	8.3	
X5	10-Jul-05	94	1140	596	0.71	581	< 1	14.1	8.2	
X5	17-Jul-05		1110	582	0.97	576	< 1	14.1	7.8	
X5	24-Jul-05		1060	563	1.04	537	< 1	13.9	8.2	
X5	25-Jul-05	83	1130	601	1.67	660	1	13.7	8.2	
X5	31-Jul-05	105	1040	538	0.99	555	< 1	11.8	8.1	
X5	06-Aug-05		1190	656	0.99	591	< 1	11.9	7.8	
X5	13-Aug-05		1210	687	1.00	581	< 1	15.4	7.6	
X5	20-Aug-05		1140	664	1.12	593	< 1	13.6	7.6	
X5	23-Aug-05	106	1120	808	1.25	664	< 1	13.1	7.7	
X5	27-Aug-05		1100	671	0.94	664	< 1	13.2	7.7	
X5	05-Sep-05	721	1040	679	1.13		< 1	11.0	8.4	
X5	06-Sep-05	92	1040	660	1.04	746	1	10.6	8.7	
X5	11-Sep-05	722	1160	703	1.00		< 1	11.0	8.6	
X5	18-Sep-05	749	1120	710	0.95		5	10.4	8.7	
X5	24-Sep-05	791	1400	683	0.89		< 1	8.1	8.5	

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X5	01-Oct-05		1460	806	0.86	774	1			
	average	384.8	1223.3	715.4	0.92	666.5	1.16	11.9	8.0	
	minimum	83	1040	538	0.55	537.0	< 1	4.0	7.1	
	maximum	791	1790	1230	1.67	908.0	5	15.8	8.7	
	N > DL	9	24	25	25	21	6	20	20	
	median	106.0	1150.0	671.0	0.95	660.0	1.0	12.8	8.2	
X5P	21-Jan-05		1500	884	0.93	683	1	-0.2	7.4	
X5P	08-Feb-05		1410	746	0.96	566	< 1	0.2	7.5	
X5P	11-Apr-05		1370	658	0.80	550	2	2.5	7.4	
X5P	02-Nov-05	201	1550	980	0.76	912	3	0.3	7.7	
X5P	15-Dec-05	227	1930	1010	0.76	935	< 1	0.9	7.5	
	average		1552.0	855.6	0.84	729.2	1.6	0.7	7.5	
	minimum		1370	658	0.76	550	< 1	-0.2	7.4	
	maximum		1930	1010	0.96	935	3.0	2.5	7.7	
	N > DL	2	5	5	5	5	3	5	5	
	median		1500.0	884.0	0.80	683.0	1.0	0.3	7.5	
X7	23-Jun-05		9460	3420	1.06	7480	117			
X7	20-Sep-05		10900	3260	1.28	8910	144	5.2	5.7	
X10	11-Apr-05		282	160	< 0.01	32.8	< 1	2.1	7.7	
X10	09-May-05		79	40	0.03	5.4	14	2.8	5.0	
X10	21-Jun-05		153	76	0.02	12.4	< 1	7.9	8.1	
X10	25-Jul-05	81.2	174	92	0.02	13.9	< 1	9.5	8.1	
X10	23-Aug-05	92.4	185	128	< 0.01	17.4	< 1	8.7	8.2	
X10	06-Sep-05	91.2	162	98	< 0.01	18.9	< 1	8.7	8.4	
X10	11-Oct-05	94.5	173	117	0.03	19.8	< 1	1.4	8.5	
X10	02-Nov-05	107.0	200	136	< 0.01	25.6	< 1	1.2	8.0	
X10	15-Dec-05	122.0	302	156	< 0.01	29.2	< 1	0.8	7.8	
	average	98.1	190.0	111.4	0.02	19.5	2.44	4.8	7.8	
	minimum	81.2	79	40	< 0.01	5.4	< 1	0.8	5.0	
	maximum	122.0	302	160	0.03	32.8	14	9.5	8.5	
	N > DL	6	9	9	4	9	1	9	9	
	median	93.5	174.0	117.0	0.01	18.9	1	2.8	8.1	
X11	05-Jan-05							3.9	7.0	12
X11	17-Jan-05							1.9	7.2	12
X11	24-Jan-05							3.8	7.0	12
X11	31-Jan-05							2.3	6.9	13
X11	29-Mar-05	278	2100	1150	0.80	1040	6	2.8	7.2	
X11	02-Jun-05							5.6	7.6	23
X11	09-Jun-05							7.6	7.4	18
X11	16-Jun-05							9.0	7.1	15
X11	23-Jun-05							9.1	7.2	13
X11	30-Jun-05							7.4	7.2	14

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X11	17-Aug-05	249	1710	1100	0.64	996	7	6.7	7.1	9
X11	06-Oct-05							5.1	7.2	5
X11	13-Oct-05							4.8	7.1	4
X11	20-Oct-05							3.0	7.1	5
X11	27-Oct-05							4.2	7.1	5
	average							5.1	7.2	11
	minimum							1.9	6.9	4
	maximum							9.1	7.6	23
	N > DL	2	2	2	2	2	2	15	15	14
	median							4.8	7.1	12
X12	05-Jan-05							2.0	7.8	0.1
X12	17-Jan-05							1.4	7.5	0.1
X12	24-Jan-05							1.9	7.5	0.5
X12	31-Jan-05							1.1	7.2	0.5
X12	02-Jun-05							6.2	7.5	0.5
X12	09-Jun-05							7.5	7.4	0.5
X12	16-Jun-05							7.1	7.3	0.5
X12	23-Jun-05							7.3	7.4	0.5
X12	30-Jun-05							8.2	7.5	0.5
X12	18-Aug-05	200	908	530	< 0.01	345	4	9.4	7.2	0.5
X12	06-Oct-05							4.8	7.4	0.2
X12	13-Oct-05							6.4	7.5	0.2
X12	20-Oct-05							3.9	7.8	0.2
X12	27-Oct-05							4.9	7.3	0.2
	average							5.2	7.5	0.4
	minimum							1.1	7.2	0.1
	maximum							9.4	7.8	0.5
	N > DL	1	1	1	0	1	1	14	14	14
	median							5.6	7.5	0.5
X13	05-Jan-05							3.7	7.1	31
X13	17-Jan-05							1.7	7.1	31
X13	21-Jan-05		1720	830	0.64	811	6	1.8	7.1	31
X13	22-Jan-05							3.3	7.2	
X13	24-Jan-05							3.8	7.1	31
X13	31-Jan-05							2.2	7.0	31
X13	08-Feb-05		1490	854	0.66	643	4	3.3	7.3	31
X13	14-Mar-05		1420	760	0.58	567	3	4.0	7.3	22
X13	11-Apr-05		1520	738	0.62	592	4	3.8	7.1	16
X13	09-May-05		1520	758	0.64	718	5	5.9	7.1	34
X13	02-Jun-05							5.5	7.4	42
X13	07-Jun-05							7.5	7.2	
X13	09-Jun-05							8.5	7.4	34

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STATION	SAMPLE DATE	ALK-T mg/L	COND µS/cm	HARD mg/L	NH3 mg/L	SO4-D mg/L	TSS mg/L	TEMP °C	PH-F	FLOW L/sec
X13	16-Jun-05								7.1	34
X13	21-Jun-05		1420	769	0.77	637	3	6.2	7.1	38
X13	23-Jun-05							8.1	7.1	42
X13	30-Jun-05							7.7	7.3	34
X13	25-Jul-05	273	1370	758	0.72	681	3	7.5	7.1	31
X13	23-Aug-05	253	1160	838	0.52	548	3	7.1	7.3	22
X13	06-Sep-05	250	1140	694	0.62	674	3	6.4	7.4	25
X13	06-Oct-05							4.7	7.3	19
X13	11-Oct-05	254	1100	702	0.65	689	4	3.4	7.7	19
X13	13-Oct-05							4.2	7.2	19
X13	20-Oct-05							3.3	7.1	19
X13	27-Oct-05							4.1	7.2	19
X13	02-Nov-05	235	852	578	0.35	422	1	1.7	7.6	19
X13	15-Dec-05	258	1720	739	0.58	714	3	4.7	7.3	28
	average	253.8	1369.3	751.5	0.61	641.3	3.5	4.8	7.2	28
	minimum	235	852	578	0.35	422	1	1.7	7.0	16
	maximum	273	1720	854	0.77	811	6	8.5	7.7	42
	N > DL	6	12	12	12	12	12	26	27	25
	median	253.5	1420.0	758.0	0.63	658.5	3.0	4.2	7.2	31
X14	21-Jan-05		598	313	0.10	182	1	0.5	7.5	
X14	08-Feb-05		588	359	0.11	165	< 1	0.5	7.7	
X14	08-Mar-05			639	0.42	409	< 1			
X14	14-Mar-05		1330	717	0.56	541	1	3.0	7.3	
X14	22-Mar-05		1220	793	0.54	557	< 1			
X14	11-Apr-05		562	315	0.04	145	< 1	2.6	7.6	
X14	10-May-05		149	74	0.04	34	16	3.0	7.5	
X14	31-May-05		185	94	0.03	41	4			
X14	11-Jun-05		207	100	0.03	45	4			
X14	19-Jun-05		267	133	0.01	64	1			
X14	21-Jun-05		284	140	0.01	77	1	8.3	7.9	
X14	02-Jul-05		301	153	0.02	86	2	10.8	7.9	
X14	10-Jul-05	85	325	154	0.05	90	< 1	9.6	8.0	
X14	17-Jul-05		332	169	0.11	92	< 1	10.7	7.7	
X14	24-Jul-05		1030	160	0.11	80	< 1	8.9	8.2	
X14	25-Jul-05	93	279	143	0.10	71	< 1	9.9	8.0	
X14	31-Jul-05	105	270	132	0.07	65	1	8.9	7.8	
X14	06-Aug-05		331	170	0.10	89	< 1	10.1	8.1	
X14	13-Aug-05		377	206	0.12	111	< 1	12.8	8.0	
X14	20-Aug-05		349	195	0.11	109	< 1	9.1	7.9	
X14	23-Aug-05	100	314	206	0.13	109	1	8.9	8.0	
X14	27-Aug-05		286	173	0.12	98	< 1	9.3	8.0	
X14	05-Sep-05	139	288	202	0.15		< 1	8.1	8.2	

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STATION	SAMPLE DATE	ALK-T mg/L	COND µS/cm	HARD mg/L	NH3 mg/L	SO4-D mg/L	TSS mg/L	TEMP °C	PH-F	FLOW L/sec
X14	06-Sep-05	97	411	203	0.16	136	< 1	8.7	8.3	
X14	11-Sep-05	130	340	198	0.15		< 1	6.7	8.0	
X14	18-Sep-05	123	305	187	0.11		1	5.9	8.2	
X14	24-Sep-05	111	321	174	0.11		1	6.6	8.2	
X14	01-Oct-05		296	209	0.11	129	< 1	4.0	7.9	
X14	11-Oct-05	101	192	142	0.05	41.4	1	1.7	8.4	
X14	02-Nov-05	121	252	187	0.01	67	< 1	0.6	8.0	
X14	15-Dec-05	140	477	250	0.04	111	< 1	0.8	7.7	
	average	112.1	415.5	235.2	0.12	138.7	1.71	6.5	7.9	
	minimum	85	149	74	0.01	34	< 1	0.5	7.3	
	maximum	140	1330	793	0.56	557	16	12.8	8.4	
	N > DL	12	30	31	31	27	13	26	26	
	median	108.0	317.5	187.0	0.11	91.6	1.0	8.2	8.0	
X22B	21-Jan-05		1340	626	5.23	640	< 1	-0.2	7.3	
X22B	08-Feb-05		1110	631	1.18	543	< 1	0.3	8.0	
X22B	14-Mar-05		1350	606	1.20	646	< 1	1.2	7.4	
X22B	11-Apr-05		1170	542	0.69	533	< 1	2.0	7.0	
X22B	09-May-05		1240	569	1.20	603	< 1	5.8	7.3	
X22B	21-Jun-05		1170	593	1.72	591	< 1	10.4	7.1	
X22B	25-Jul-05		1100	585	1.89	609	< 1	13.4	7.3	
X22B	22-Aug-05		1070	647	1.67	601	< 1	14.1	7.4	
X22B	06-Sep-05		956	561	1.77	624	< 1	10.7	7.7	
X22B	11-Oct-05		950	595	2.20	635	< 1	5.1	7.9	
X22B	01-Nov-05		955	620	1.93	689	< 1	2.7	7.5	
X22B	14-Dec-05		1260	682	1.86	681	< 1	0.3	7.7	
	average		1139.3	604.8	1.88	616.3	1	5.5	7.5	
	minimum		950	542	0.69	533	< 1	-0.2	7.0	
	maximum		1350	682	5.23	689	< 1	14.1	8.0	
	N > DL		12	12	12	12	0	12	12	
	median		1140.0	600.5	1.75	616.5	1	3.9	7.4	
X23	21-Jan-05							2.1	6.4	2
X23	22-Jan-05		9470	4060	0.84	5060	90			
X23	09-Feb-05		8610	4200	0.90	4730	92	1.2	6.7	3
X23	15-Mar-05		6540	4410	1.04	4970	126	2.3	7.0	2
X23	11-Apr-05		9390	4420	0.82	5070	141	2.8	7.1	
X23	09-May-05		7550	3840	0.75	5910	182	9.0	6.0	
X23	20-Jun-05		11500	4660	0.90	6510	226	12.4	6.4	
X23	25-Jul-05		6300	4300	0.97	5500	161	8.0	6.6	
X23	22-Aug-05		7150	4970	0.83	5800	188	12.3	6.7	
X23	06-Sep-05		7350	4150	0.84	5850	186	7.6	6.4	
X23	10-Oct-05		7480	4620	0.86	6490	224	5.6	6.6	
X23	02-Nov-05		8400	4370	0.91	6730	26	5.5	6.9	

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X23	13-Dec-05		10400	4670	0.86	6820	188	0.9	6.7	
	average		8345.0	4389.2	0.88	5786.7	152.5	5.8	6.6	
	minimum		6300	3840	0.75	4730	26	0.9	6.0	
	maximum		11500	4970	1.04	6820	226	12.4	7.1	
	N > DL		12	12	12	12	12	12	12	
	median		7975.0	4390.0	0.86	5825.0	171.5	5.6	6.7	
X26	25-Jul-05		4340	2570	1.75	3250	16	3.9	6.0	
X26	22-Aug-05		4900	2710	1.55	3410	35	4.5	6.1	
X26	06-Sep-05		3440	2320	1.35	2700	34	4.3	6.4	
	average		4226.7	2533.3	1.55	3120.0	28.3	4.2	6.2	
	minimum		3440	2320	1.35	2700	16	3.9	6.0	
	maximum		4900	2710	1.75	3410	35	4.5	6.4	
	N > DL		3	3	3	3	3	3	3	
	median		4340.0	2570.0	1.55	3250.0	34.0	4.3	6.1	

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 that are 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 contrasting with conversion to 0 for all charts

Appendix 3
2005 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	CN-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	LA-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	S-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	W-T mg/L	ZN-T mg/L	ZR-T mg/L
A25	23-Jun-05	< 0.00025	0.009	< 0.001	0.066	< 0.001	< 0.001	< 0.05	53.2	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	2		0.01	14.6	< 0.001	0.0007	2.85	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.7	< 0.001	0.58		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0013	< 0.001		0.007	< 0.01
A25	20-Sep-05	< 0.00025	0.028	< 0.001	0.088	< 0.001	< 0.001	< 0.05	62.8	< 0.0002		< 0.001	< 0.001	< 0.001	0.05	< 0.00002	2.2		0.01	15.5	0.004	0.0006	3.36	< 0.001	0.002	< 0.15	< 0.001	< 0.001	5.7	< 0.001	0.66		< 0.001	< 0.0005	0.002	< 0.0001	0.0014	< 0.001		0.01	< 0.01
A30	23-Jun-05	0.0013	13.4	< 0.001	0.011	0.007	< 0.001	< 0.05	53.3	0.13		0.24	0.004	1.46	4.77	< 0.0002	1.6		0.041	81	6.16	< 0.0005	3.54	0.2	1.3	< 0.15	< 0.001	< 0.001	23.8	< 0.001	0.18		< 0.001	0.002	< 0.001	0.0005	0.017	< 0.001		90.9	< 0.01
A30	19-Sep-05	< 0.00025	0.053	< 0.001	0.017	< 0.001	< 0.001	< 0.05	86.7	0.05		< 0.001	< 0.001	0.019	< 0.05	< 0.00002	1.9		0.035	74.4	0.11	< 0.0005	4.13	0.15	0.003	< 0.15	< 0.001	0.002	28.5	< 0.001	0.29		< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		58.5	< 0.01
FAROCR	09-May-05	< 0.00025	1.08	0.002	0.041	< 0.001	< 0.001	< 0.05	4.85	0.0002		< 0.001	0.002	0.01	1.44	0.00003	1.2		0.003	1.41	0.031	< 0.0005	1.1	0.004	0.055	0.2	< 0.001	< 0.001	10.1	< 0.001	0.026		< 0.001	< 0.0005	0.034	< 0.0001	< 0.0005	0.002		0.091	< 0.01
FAROCR	20-Jun-05	< 0.00025	0.11	< 0.001	0.021	< 0.001	< 0.001	< 0.05	7.11	< 0.0002		< 0.001	< 0.001	0.004	0.1	< 0.00002	0.4		0.003	1.79	0.003	< 0.0005	2.2	0.002	0.006	< 0.15	< 0.001	< 0.001	17.3	< 0.001	0.036		< 0.001	< 0.0005	0.002	< 0.0001	< 0.0005	< 0.001		0.039	< 0.01
FAROCR	26-Jul-05	< 0.00025	0.099	< 0.001	0.021	< 0.001	< 0.001	< 0.05	5.97	< 0.0002		< 0.001	< 0.001	0.002	< 0.05	< 0.00002	0.2		0.003	1.4	0.004	< 0.0005	1.79	< 0.001	0.007	< 0.15	< 0.001	< 0.001	15.2	< 0.001	0.032		< 0.001	< 0.0005	0.002	< 0.0001	< 0.0005	< 0.001		0.028	< 0.01
FAROCR	23-Aug-05	< 0.00025	0.057	< 0.001	0.018	< 0.001	< 0.001	< 0.05	7.78	< 0.0002		< 0.001	< 0.001	0.001	< 0.05	< 0.00002	0.2		0.003	1.78	< 0.001	< 0.0005	1.93	< 0.001	0.003	< 0.15	< 0.001	< 0.001	13.1	< 0.001	0.037		< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.009	< 0.01
FAROCR	06-Sep-05	< 0.00025	0.048	< 0.001	0.019	< 0.001	< 0.001	< 0.05	6.57	< 0.0002		< 0.001	< 0.001	0.002	< 0.05	< 0.00002	0.2		0.003	1.81	< 0.001	< 0.0005	1.89	< 0.001	0.003	< 0.15	< 0.001	< 0.001	15	< 0.001	0.036		< 0.001	0.001	< 0.001	< 0.0001	< 0.0005	< 0.001		0.011	< 0.01
FAROCR	11-Oct-05	< 0.00025	0.046	< 0.001	0.024	< 0.001	< 0.001	< 0.05	9.23	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.3		0.003	2.45	0.001	0.0006	2.15	< 0.001	0.002	< 0.15	< 0.001	< 0.001	17.1	0.002	0.046		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0006	< 0.001		0.009	< 0.01
FAROCR	02-Nov-05	< 0.00025	0.028	< 0.001	0.023	< 0.001	< 0.001	< 0.05	8.12	< 0.0002		< 0.001	< 0.001	0.001	< 0.05	< 0.00002	0.3		0.003	2	< 0.001	0.0005	1.6	< 0.001	0.002	< 0.15	< 0.001	< 0.001	14.8	< 0.001	0.041		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0005	< 0.001		0.011	< 0.01
FAROCR	13-Dec-05	< 0.00025	0.026	< 0.001	0.036	< 0.001	< 0.001	< 0.05	15.9	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.5		0.006	4.56	< 0.001	0.0022	2.55	< 0.001	0.001	< 0.15	< 0.001	< 0.001	7.1	< 0.001	0.067		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001		0.013	< 0.01
	average	0.00025	0.18675	0.001	0.025	0.001	0.001	0.050	8.191	0.0002		0.001	0.001	0.003	0.230	0.00002	0.413		0.003	2.150	0.005	0.001	1.901	0.002	0.010	0.156	0.001	0.001	13.713	0.001	0.040		0.001	0.0006	0.005	0.000	0.001	0.001		0.026	0.010
	minimum	< 0.00025	0.026	< 0.001	0.018	< 0.001	< 0.001	< 0.05	4.85	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.2		0.003	1.4	< 0.001	< 0.0005	1.1	< 0.001	0.001	< 0.15	< 0.001	< 0.001	7.1	< 0.001	0.026		< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.009	< 0.01
	maximum	< 0.00025	1.08	0.002	0.041	< 0.001	< 0.001	< 0.05	15.9	0.0002		< 0.001	0.002	0.01	1.44	0.00003	1.2		0.006	4.56	0.031	0.0022	2.55	0.004	0.055	0.2	< 0.001	0.001	17.3	0.002	0.067		< 0.001	0.001	0.034	< 0.0001	0.0014	0.002		0.091	< 0.01
	N > DL	0	8	1	8	0	0	0	8	1		0	1	6	2	1	8		8	8	4	3	8	2	8	1	0	1	8	1	8		0	1	3	0	3	1		8	0
	median	0.00025	0.0525	0.001	0.022	0.001	0.001	0.05	7.445	0.0002		0.001	0.001	0.0015	0.05	0.00002	0.3		0.003	1.8	0.001	0.0005	1.91	0.001	0.003	0.15	0.001	0.001	14.9	0.001	0.0365		0.001	0.0005	0.001	0.0001	0.0005	0.001		0.012	0.01
FCO	22-Jun-05	< 0.00025	1.8	< 0.001	0.072	< 0.001	< 0.001	< 0.05	22.6	0.0087		0.015	< 0.001	0.37	0.64	< 0.00002	0.5		0.009	9.22	0.24	< 0.0005	2.97	0.03	0.005	< 0.15	< 0.001	< 0.001	19	< 0.001	0.1		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001		6.06	< 0.01
FCO	19-Sep-05	< 0.00025	0.59	< 0.001	0.05	< 0.001	< 0.001	< 0.05	16.7	0.0043		0.006	< 0.001	0.099	0.26	< 0.00002	0.6		0.007	5.11	0.14	< 0.0005	2.97	0.014	< 0.001	< 0.15	< 0.001	< 0.001	18.5	< 0.001	0.076		< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		3.38	< 0.01
FDL	22-Jun-05	< 0.00025	0.11	< 0.001	0.018	< 0.001	< 0.001	< 0.05	4.04	< 0.0002		< 0.001	< 0.001	0.003	< 0.05	< 0.00002	0.1		0.002	0.83	0.007	< 0.0005	1.74	< 0.001	0.009	< 0.15	< 0.001	< 0.001	14.4	< 0.001	0.024		< 0.001	< 0.0005	0.002	< 0.0001	< 0.0005	< 0.001		0.05	< 0.01
FDL	19-Sep-05	< 0.00025	0.052	< 0.001	0.018	< 0.001	< 0.001	< 0.05	4.35	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.2		0.002	0.88	0.002	< 0.0005	1.97	< 0.001	0.003	< 0.15	< 0.001	< 0.001	16.2	0.011	0.025		< 0.001	< 0.0005	0.001	< 0.0001	< 0.0005	< 0.001		0.007	< 0.01
FDU	22-Jun-05	< 0.00025	0.078	< 0.001	0.014	< 0.001	< 0.001	< 0.05	3.27	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	< 0.1		0.002	0.66	0.002	< 0.0005	1.64	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	14	< 0.001	0.02		< 0.001	< 0.0005	0.001	< 0.0001	< 0.0005	< 0.001		< 0.005	< 0.01
FDU	19-Sep-05	< 0.00025	0.047	< 0.001	0.015	< 0.001	< 0.001	< 0.05	4.11	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.2		0.002	0.79	0.002	< 0.0005	1.92	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	15.8	< 0.001	0.023		< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.007	< 0.01
GCULV	18-Jan-05	< 0.0002	0.056	< 0.003	0.037	< 0.0002	< 0.01	< 0.05	14.9	< 0.0002	< 0.01	< 0.001	< 0.001	0.01	0.199	< 0.0001	0.5	0.007		2.4	0.008	< 0.001	1.5	< 0.001	0.002	< 0.01	< 0.002	< 0.005		0.003	0.072	2.1			0.01	< 0.002		< 0.001	< 0.03	0.005	
GCULV	08-Feb-05	< 0.0002	0.094	< 0.003	0.033	< 0.0002	< 0.01	< 0.05	15	< 0.0002	< 0.01	< 0.001	< 0.001	0.013	0.207	< 0.0001	0.4	< 0.001		2.5	0.004	< 0.001	0.9	< 0.001	< 0.002	0.02	< 0.002	< 0.005		< 0.002	0.049	1.9			0.012	< 0.002		< 0.001	< 0.03	0.008	
GCULV	08-Mar-05	< 0.0002	0.035	< 0.003	0.039	< 0.0002	< 0.01	< 0.05	17.2	< 0.0002	< 0.01	< 0.001	0.001	0.025	0.572	< 0.0001	0.5	0.005		2.7	0.01	< 0.001	1.3	0.003	< 0.002	0.03	< 0.002	< 0.005		< 0.002	0.079	2			0.004	< 0.002		0.001	< 0.03	0.004	
GCULV	05-Apr-05	< 0.0002	0.03	< 0.003	0.049	< 0.0002	< 0.01	0.14	21.1	< 0.0002	< 0.01	< 0.001	0.001	0.012	0.674	< 0.0001	1	0.006		3.2	0.004	< 0.001	2.9	0.005	< 0.002	0.01	< 0.002	< 0.005		< 0.002	0.112	1.6			0.027	< 0.002		< 0.001	< 0.03	0.007	
GCULV	11-Jun-05	0.0006	0.018	< 0.003	0.014	< 0.0002	< 0.01	0.12	5.1	< 0.0002	< 0.01	< 0.001	0.002	0.005	0.101	< 0.0001	0.5	< 0.001		0.8	0.007	< 0.001	1	< 0.001	0.002	0.01	< 0.002	< 0.005		0.004	0.031	1			0.035	< 0.002		0.001	< 0.03	< 0.001	
GCULV	16-Jul-05	< 0.0002	0.076	< 0.003	0.024	< 0.0002	< 0.01	0.14	8.3	< 0.0002	< 0.01	< 0.001	< 0.001	0.025	0.19	< 0.0001	0.2	0.004		1.1	0.008	0.004	0.9	< 0.001	0.008	< 0.01	< 0.002	< 0.005		0.005	0.029	1.6			0.003	< 0.002		0.001	< 0.03	0.004	
GCULV	22-Aug-05	< 0.0002	0.023	< 0.003	0.025	< 0.0002	< 0.01	< 0.05	8.6	< 0.0002	< 0.01	0.001	< 0.001	0.029	0.134	< 0.0001	0.4	0.001		1.4	0.013	< 0.001	1.7	< 0.001	< 0.002	< 0.01	< 0.002	< 0.005		< 0.002	0.042	1.8			< 0.001	< 0.002		< 0.001	< 0.03	0.005	
GCULV	05-Sep-05	< 0.0002	0.051	< 0.003	0.024	< 0.0002	< 0.01	0.05	9.2	< 0.0002	< 0.005	< 0.001	< 0.001	0.039	0.218	< 0.0001	0.3	< 0.001		1.3	0.012	< 0.001	0.7	0.002	< 0.002	< 0.01	< 0.002	< 0.005		< 0.002	0.041	2.1			< 0.001	< 0.002		< 0.001	< 0.03	0.001	
GCULV	11-Oct-05	< 0.00025	0.047	< 0.001	0.025	< 0.001	< 0.001	< 0.05	8.81	< 0.0002	<0.005	< 0.001	< 0.001	0.011	0.1	< 0.00002	0.4		< 0.001	1.49	0.018	< 0.0005	1.78	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	9.1	< 0.001	0.051		< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.014	< 0.01
GCULV	01-Nov-05	< 0.00025	0.015	< 0.001	0.03	< 0.001	< 0.001	< 0.05	10.3	< 0.0002	<0.005	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.3		0.001	1.66	0.007	< 0.0005	1.53	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10	< 0.001	0.059		< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		< 0.005	< 0.01
GCULV	14-Dec-05	< 0.00025	0.012	< 0.001	0.038	< 0.001	< 0.001	< 0.05	13.7	< 0.0002	<0.005	< 0.001	< 0.001	< 0.001	0.08	< 0.00002	0.4		0.001	2.4	0.003	< 0.0005	2.09	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.6	< 0.001	0.066		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001		< 0.005	< 0.01
	average	0.0184	0.0415	0.0025	0.0307	0.0186	0.0075	0.0727	12.02	0.0184	0.0082	0.0010	0.0011	0.0155	0.2295	0.0001	0.445	0.0033	0.0010	1.9045	0.0085	0.0011	1.4818	0.0016	0.0023	0.0509	0.0017	0.0039	7.9000	0.0023	0.0574	1.7625	0.0010	0.0005	0.0087	0.0015	0.0006	0.0010	0.0300	0.0054	0.0100
	minimum	< 0.0002	0.012	< 0.001	0.014	< 0.0002	< 0.001	< 0.05	5.1	< 0.0002	< 0.005	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.2	< 0.001	< 0.001	0.8	0.003	< 0.0005	0.7	< 0.001	< 0.001	0.01	< 0.001	< 0.001	4.6	< 0.001	0.029	1	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.03	< 0.001	< 0.01
	maximum	0.0006	0.094	< 0.003	0.049	< 0.001	< 0.01	0.14	21.1	< 0.0002	< 0.01	0.001	0.002	0.039	0.674	< 0.0001	1	0.007	0.001	3.2	0.018	0.004	2.9	0.005	0.008	0.03	< 0.002	< 0.005	10	0.005	0.112	2.1	< 0.001	< 0.0005	0.035	< 0.002	0.0009	0.001	< 0.03	0.014	< 0.01
	N > DL	1	11	0	11	0	0	4	11	0	0	1	3	9	10	0	11	5	2	11	11	1	11	3	3	4	0	0	3	3	11	8	0	0	6	0	1	3	0	8	0
	median	0.0002	0.035	0.003	0.03	0.0002	0.01	0.05	10.3	0.0002	0.01	0.001	0.001	0.012	0.19	0.0001	0.4	0.0025	0.001	1.66	0.008	0.001	1.5	0.001	0.002	0.01	0.002	0.005	9.1	0.002	0.051	1.85	0.001	0.0005	0.003	0.002	0.0005	0.001	0.03	0.005	0.01
GHSCR1	22-Jun-05	< 0.00025	0.009	< 0.001	0.047	< 0.001	< 0.001	< 0.05	221	0.0031		0.001	< 0.001	0.001	2.62	< 0.00002	3.9		0.009	62.2	0.25	< 0.0005	10.3	0.01	0.004	< 0.15	< 0.001	< 0.001	12.7	< 0.001	0.9		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0018	< 0.001		4.59	< 0.01
GHSCR2	19-Sep-05	< 0.00025	< 0.005	< 0.001	0.05	< 0.001	< 0.001	< 0.05	212	0.0017		< 0.001	< 0.001	0.001	0.06	< 0.00002	4.7		0.009	56.7	0.37	< 0.0005	10.3	0.008	0.002	< 0.15	< 0.001	0.001	14	< 0.001	0.86		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	< 0.001		2.75	< 0.01
K8	18-Jan-05	< 0.0002	0.05	< 0.003	0.031	< 0.0002	0.01	< 0.05	27.9	< 0.0002	< 0.01	< 0.001	< 0.001	0.01	0.156	< 0.0001	0.7	0.006		3.4	0.008	< 0.001	1.7	< 0.001	< 0.002	< 0.01	< 0.002	< 0.005		0.003	0.16	4.4			0.01	< 0.002		< 0.001	< 0.03	0.005	
K8	08-Feb-05	< 0.0002	0.117	< 0.003	0.027	< 0.0002	< 0.01	< 0.05	28.4	< 0.0002	< 0.01	0.001	< 0.001	0.012	0.252	< 0.0001	0.6	0.005		3.5	0.006	< 0.001	1.7	< 0.001	< 0.002	< 0.01	< 0.002	< 0.005		< 0.002	0.115	4.5			0.014	< 0.002		< 0.001	< 0.03	0.004	
K8	05-Apr-05	< 0.0002	0.059	< 0.003	0.031	< 0.0002	< 0.01	0.15	30.5	< 0.0002	< 0.01	< 0.001	< 0.001	0.006	0.184	< 0.0001	1.1	0.006		3.8	0.005	< 0.001	2.7	< 0.001	< 0.002	< 0.01	< 0.002	< 0.005		< 0.002	0.205	4.2			0.013	< 0.002		< 0.001	< 0.03	0.004	
K8	11-Jun-05	< 0.0002	0.03	< 0.003	0.01	< 0.0002	< 0.01	0.05	6	< 0.0002	< 0.01	< 0.001	< 0.001	0.009	0.029	< 0.0001	0.5	< 0.001		0.8	0.001	0.001	1.1	< 0.001	0.006	< 0.01	< 0.002	< 0.005		< 0.002	0.035	0.9			< 0.001	< 0.002		< 0.001	< 0.03	< 0.001	
K8	16-Jul-05	< 0.0002	0.028	< 0.003	0.02	< 0.0002	< 0.01	0.14	13.6	< 0.0002	<0.005	< 0.001	< 0.001	0.018	0.059	< 0.0001	0.3	0.003		1.6	0.002	< 0.001	0.6	0.002	< 0.002	< 0.01	< 0.002	< 0.005		< 0.002	0.052	2.2			0.002	< 0.002		< 0.001	< 0.03	0.003	
K8	22-Aug-05	0.0002	0.025	< 0.003	0.026	< 0.0002	< 0.01	0.05	18	< 0.0002	<0.005	< 0.001	0.002	0.098	0.03	< 0.0001	0.6	0.003		2.3	0.005	< 0.001	1.5	0.002	0.002	< 0.01	< 0.002	< 0.005		0.002	0.094	3.1			< 0.001	< 0.002		< 0.001	< 0.03	0.021	
K8	05-Sep-05	< 0.0002	0.113	< 0.003	0.024	< 0.0002	< 0.01	0.05	17.1	< 0.0002	<0.005	< 0.001	< 0.001	0.031	0.138	< 0.0001	0.5	0.002		2.1	0.005	< 0.001	1.1	< 0.001	< 0.002	0.02	< 0.002	< 0.005		< 0.002	0.087	2.8			< 0.001	< 0.002		< 0.001	< 0.03	0.007	
K8	11-Oct-05	< 0.00025	< 0.005	< 0.001	0.025	< 0.001	< 0.001	< 0.05	16	< 0.0002	<0.005	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.4		0.002	2.23	< 0.001	< 0.0005	1.95	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	11.9	< 0.001	0.095		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001		< 0.005	< 0.01
K8	01-Nov-05	< 0.00025	0.012	< 0.001	0.028	< 0.001	< 0.001	< 0.05	19.2	< 0.0002	<0.005	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.5		0.002	2.45	< 0.001	< 0.0005	1.72	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	11.4	< 0.001	0.12		< 0.001	< 0.0005	0.002	< 0.0001	0.0021	< 0.001		< 0.005	< 0.01
K8	14-Dec-05	< 0.00025	< 0.005	< 0.001	0.03	< 0.001	< 0.001	< 0.05	22.3	< 0.0002	<0.005	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.5		0.002	2.91	< 0.001	< 0.0005	2.18	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5	< 0.001	0.12		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0025	< 0.001		< 0.005	< 0.01
	average	0.0002	0.0444	0.0024	0.0252	0.0004	0.0073	0.0690	19.9	0.0002	0.0070	0.0010	0.0011	0.0187	0.0998	0.00008	0.57	0.0037	0.0020	2.51	0.0035	0.0009	1.63	0.0012	0.0021	0.0530	0.0017	0.0038	9.43	0.0018	0.1083	3.16	0.0010	0.0005	0.0046	0.0014	0.0019	0.0010	0.03	0.0060	0.01
	minimum	< 0.00025	< 0.005	< 0.001	0.0100	< 0.0002	< 0.001	< 0.05	6.00	< 0.0002	<0.005	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.30	< 0.001	0.002	0.8	< 0.001	< 0.0005	0.6	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.0	< 0.001	0.035	0.9	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001	< 0.03	0.0034	< 0.01
	maximum	0.0002	0.1170	< 0.003	0.0310	< 0.001	0.0100	0.1500	30.5	< 0.0002	< 0.01	0.0010	0.0020	0.0980	0.2520	< 0.0001	1.10	0.0060	0.002	3.8	0.0080	0.0010	2.7	0.0020	0.0060	0.0200	< 0.002	< 0.005	11.9	0.0030	0.205	4.5	< 0.001	< 0.0005	0.0140	< 0.002	0.0025	< 0.001	< 0.03	0.0210	< 0.01
	N > DL	1	8	0	10	0	2	5	10	0	0	1	1	7	7	0	10	6	3	10	7	1	10	2	2	1	0	0	3	2	10	7	0	0	5	0	3	0	0	6	0
	median	0.0002	0.0290	0.0030	0.0265	0.0002	0.0100	0.0500	18.6	0.0002	0.0100	0.0010	0.0010	0.0095	0.0545	0.0001	0.50	0.0030	0.0020	2.38	0.0035	0.0010	1.70	0.0010	0.0020	0.0100	0.0020	0.0050	11.40	0.0020	0.1050	3.10	0.0010	0.0005	0.0015	0.0020	0.0021	0.0010	0.03	0.0050	0.01
NE1	23-Jun-05	< 0.00025	0.01	< 0.001	0.015	< 0.001	< 0.001	< 0.05	67	< 0.0002		< 0.001	< 0.001	0.004	< 0.05	< 0.00002	2.7		0.01	21.5	< 0.001	0.0073	4.21	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	9.4	< 0.001	0.31		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001		0.011	< 0.01
NE1	20-Sep-05	< 0.00025	< 0.005	< 0.001	0.019	< 0.001	< 0.001	< 0.05	88.1	< 0.0002		< 0.001	< 0.001	0.002	< 0.05	< 0.00002	2.9		0.012	27.2	< 0.001	0.0044	5.03	0.001	< 0.001	< 0.15	< 0.001	0.001	9.5	< 0.001	0.43		< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001		< 0.005	< 0.01
NE2	23-Jun-05	< 0.00025	0.24	< 0.001	0.041	< 0.001	< 0.001	< 0.05	106	< 0.0002		< 0.001	< 0.001	0.002	0.29	< 0.00002	2.8		0.016	80.1	0.012	< 0.0005	6.02	0.005	< 0.001	< 0.15	< 0.001	< 0.001	11.8	< 0.001	0.48		< 0.001	< 0.0005	0.008	< 0.0001	0.0057	< 0.001		0.12	< 0.01
NE2	20-Sep-05	< 0.00025	0.13	< 0.001	0.039	< 0.001	< 0.001	< 0.05	108	< 0.0002		< 0.001	< 0.001	0.002	0.13	< 0.00002	2.9		0.017	78.4	0.004	< 0.0005	5.77	0.005	< 0.001	< 0.15	< 0.001	< 0.001	11.3	< 0.001	0.49		< 0.001	< 0.0005	0.005	< 0.0001	0.0047	< 0.001		0.085	< 0.01
NF1	23-Jun-05	< 0.00025	0.078	0.001	0.04	< 0.001	< 0.001	< 0.05	21.3	< 0.0002		< 0.001	< 0.001	< 0.001	0.21	< 0.00002	0.5		0.002	4.9	0.036	< 0.0005	1.

Appendix 3
2005 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	CN-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	LA-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	S-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	W-T mg/L	ZN-T mg/L	ZR-T mg/L
R6	29-Mar-05	0.0017	0.017	< 0.001	0.094	< 0.001	< 0.001	< 0.05	77.8	< 0.0002		< 0.001	< 0.001	< 0.001	0.11	< 0.00002	1.9		0.004	16	0.018	0.0014	5.5	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.8	< 0.001	0.25		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0031	< 0.001		0.006	< 0.01
R6	17-Aug-05	< 0.00025	0.028	< 0.001	0.068	< 0.001	< 0.001	< 0.05	43.7	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	1		0.001	11.8	0.014	0.001	1.41	< 0.001	< 0.001	< 0.15	< 0.001	0.002	8.8	< 0.001	0.12		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0017	< 0.001		< 0.005	< 0.01
R7	22-Jan-05	< 0.00025	0.01	< 0.001	0.068	< 0.001	< 0.001	< 0.05	40.3	< 0.0002		< 0.001	< 0.001	< 0.001	0.2	< 0.00002	1		0.008	8.7	0.15	0.0007	2.99	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.3	< 0.001	0.16		< 0.001	< 0.0005	< 0.001	< 0.0001	0.002	< 0.001		0.035	< 0.01
R7	09-Feb-05	< 0.00025	0.005	< 0.001	0.068	< 0.001	< 0.001	< 0.05	40.6	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.9		0.007	7.88	0.014	0.0007	3.24	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.6	< 0.001	0.16		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0021	< 0.001		0.025	< 0.01
R7	14-Mar-05	< 0.00025	0.018	< 0.001	0.077	< 0.001	< 0.001	< 0.05	43.9	< 0.0002		< 0.001	< 0.001	< 0.001	0.22	< 0.00002	1.2		0.008	7.99	0.01	0.0009	3.76	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	14	< 0.001	0.19		< 0.001	< 0.0005	0.001	< 0.0001	0.0024	< 0.001		0.013	< 0.01
R7	11-Apr-05	< 0.00025	0.007	< 0.001	0.065	< 0.001	< 0.001	< 0.05	39.9	< 0.0002		< 0.001	< 0.001	< 0.001	0.07	< 0.00002	1		0.008	7.85	0.005	0.0008	3.45	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	13.2	< 0.001	0.18		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0023	< 0.001		< 0.005	< 0.01
R7	09-May-05	< 0.00025	0.31	0.001	0.031	< 0.001	< 0.001	< 0.05	8.41	< 0.0002		< 0.001	< 0.001	0.002	0.72	< 0.00002	1.4		0.001	1.62	0.056	< 0.0005	0.8	0.001	< 0.001	0.2	< 0.001	< 0.001	5.3	< 0.001	0.035		< 0.001	< 0.0005	0.008	< 0.0001	< 0.0005	< 0.001		0.007	< 0.01
R7	20-Jun-05	0.0004	0.072	< 0.001	0.038	< 0.001	< 0.001	< 0.05	19.6	< 0.0002		< 0.001	< 0.001	< 0.001	0.22	< 0.00002	0.5		0.002	4.65	0.019	< 0.0005	1.56	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	9.7	< 0.001	0.07		< 0.001	< 0.0005	0.002	< 0.0001	0.0007	< 0.001		< 0.005	< 0.01
R7	26-Jul-05	< 0.00025	0.038	< 0.001	0.048	< 0.001	< 0.001	< 0.05	21.8	< 0.0002		< 0.001	< 0.001	0.003	0.07	< 0.00002	0.4		0.003	4.16	0.023	< 0.0005	1.7	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.5	< 0.001	0.091		< 0.001	< 0.0005	0.001	< 0.0001	0.0008	< 0.001		< 0.005	< 0.01
R7	23-Aug-05	< 0.00025	0.024	0.001	0.046	< 0.001	< 0.001	< 0.05	29.7	< 0.0002		< 0.001	< 0.001	< 0.001	0.11	< 0.00002	0.5		0.004	6.01	0.024	0.0005	2.11	< 0.001	< 0.001	< 0.15	< 0.001	0.001	10	< 0.001	0.11		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001		< 0.005	< 0.01
R7	06-Sep-05	< 0.00025	0.02	< 0.001	0.042	< 0.001	< 0.001	< 0.05	23.7	< 0.0002		< 0.001	< 0.001	< 0.001	0.19	< 0.00002	0.5		0.003	5.07	0.02	< 0.0005	2.62	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.8	< 0.001	0.1		< 0.001	0.002	< 0.001	< 0.0001	0.0013	< 0.001		0.006	< 0.01
R7	11-Oct-05	< 0.00025	0.029	< 0.001	0.054	< 0.001	< 0.001	< 0.05	30.6	< 0.0002		< 0.001	< 0.001	< 0.001	0.11	< 0.00002	0.7		0.004	6.57	0.026	0.0005	2.32	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.8	0.002	0.12		< 0.001	< 0.0005	0.001	< 0.0001	0.0011	< 0.001		< 0.005	< 0.01
R7	02-Nov-05	< 0.00025	0.01	< 0.001	0.058	< 0.001	< 0.001	< 0.05	33.6	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.7		0.005	6.73	0.013	0.0006	2.1	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.4	< 0.001	0.13		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	< 0.001		< 0.005	< 0.01
R7	13-Dec-05	< 0.00025	0.009	< 0.001	0.07	< 0.001	< 0.001	< 0.05	37.3	< 0.0002		< 0.001	< 0.001	< 0.001	0.11	< 0.00002	0.8		0.007	7.33	0.015	0.0006	2.73	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.9	< 0.001	0.13		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	< 0.001		< 0.005	< 0.01
	average	0.00026	0.0460	0.0010	0.0554	0.0010	0.0010	0.0500	30.78	0.0002		0.0010	0.0010	0.0013	0.1767	0.00002	0.8		0.0050	6.2133	0.0313	0.0006	2.45	0.0010	0.0010	0.154	0.0010	0.0010	10.79	0.0011	0.1230		0.0010	0.0006	0.0017	0.0001	0.0015	0.0010		0.0101	0.0100
	minimum	< 0.00025	0.0050	< 0.001	0.031	< 0.001	< 0.001	< 0.05	8.4	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.4		0.0010	1.62	0.005	< 0.0005	0.80	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.3	< 0.001	0.0350		< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		< 0.005	< 0.01
	maximum	0.0004	0.3100	0.0010	0.077	< 0.001	< 0.001	< 0.05	43.9	< 0.0002		< 0.001	< 0.001	0.0030	0.7200	< 0.00002	1.4		0.0080	8.70	0.150	0.0009	3.76	0.0010	< 0.001	0.20	< 0.001	0.0010	14.0	0.0020	0.1900		< 0.001	0.0020	0.0080	< 0.0001	0.0024	< 0.001		0.0350	< 0.01
	N > DL	1	12	2	12	0	0	0	12	0		0	0	2	10	0	12		12	12	12	8	12	1	0	1	0	1	12	1	12		0	1	5	0	11	0		5	0
	median	0.00025	0.0190	0.0010	0.0560	0.0010	0.0010	0.0500	32.1	0.0002		0.0010	0.0010	0.0010	0.1100	0.00002	0.75		0.0045	6.6500	0.0195	0.0006	2.47	0.0010	0.0010	0.150	0.0010	0.0010	11.55	0.0010	0.1250		0.0010	0.0005	0.0010	0.0001	0.0015	0.0010		0.0050	0.0100
R8	22-Jan-05	< 0.00025	0.023	< 0.001	0.074	< 0.001	< 0.001	< 0.05	41.5	< 0.0002		< 0.001	< 0.001	< 0.001	0.14	< 0.00002	1		0.008	8.07	0.021	0.0008	3.16	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.5	< 0.001	0.17		< 0.001	< 0.0005	0.002	< 0.0001	0.002	< 0.001		0.024	< 0.01
R8	09-Feb-05	< 0.00025	0.006	< 0.001	0.07	< 0.001	< 0.001	< 0.05	39.1	< 0.0002		< 0.001	< 0.001	< 0.001	0.09	< 0.00002	0.9		0.007	7.89	0.019	0.0008	3.16	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.9	< 0.001	0.17		< 0.001	< 0.0005	< 0.001	< 0.0001	0.002	< 0.001		0.011	< 0.01
R8	14-Mar-05	< 0.00025	0.011	< 0.001	0.078	< 0.001	< 0.001	< 0.05	45.8	< 0.0002		< 0.001	< 0.001	< 0.001	0.28	< 0.00002	1.3		0.008	9.04	0.018	0.0009	3.91	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	14.3	< 0.001	0.19		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0025	< 0.001		< 0.005	< 0.01
R8	11-Apr-05	< 0.00025	0.006	< 0.001	0.067	< 0.001	< 0.001	< 0.05	39.7	< 0.0002		< 0.001	< 0.001	< 0.001	0.13	< 0.00002	1		0.008	7.78	0.014	0.0008	3.46	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	13.6	< 0.001	0.18		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0023	< 0.001		< 0.005	< 0.01
R8	09-May-05	< 0.00025	0.39	0.001	0.032	< 0.001	< 0.001	< 0.05	7.99	< 0.0002		< 0.001	< 0.001	0.003	0.75	< 0.00002	1.3		0.002	1.59	0.056	< 0.0005	0.84	0.001	0.005	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.035		< 0.001	< 0.0005	0.011	< 0.0001	< 0.0005	< 0.001		0.043	< 0.01
R8	20-Jun-05	< 0.00025	0.069	< 0.001	0.037	< 0.001	< 0.001	< 0.05	18.6	< 0.0002		< 0.001	< 0.001	< 0.001	0.21	< 0.00002	0.4		0.003	4.47	0.017	< 0.0005	1.63	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.2	< 0.001	0.068		< 0.001	< 0.0005	0.002	< 0.0001	0.0007	< 0.001		< 0.005	< 0.01
R8	26-Jul-05	< 0.00025	0.039	< 0.001	0.041	< 0.001	< 0.001	< 0.05	19.4	< 0.0002		< 0.001	< 0.001	< 0.001	0.09	< 0.00002	0.4		0.003	3.77	0.019	< 0.0005	1.7	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	11.1	< 0.001	0.081		< 0.001	< 0.0005	0.001	< 0.0001	0.0007	< 0.001		< 0.005	< 0.01
R8	23-Aug-05	< 0.00025	0.028	0.001	0.047	< 0.001	< 0.001	< 0.05	30.6	< 0.0002		< 0.001	< 0.001	< 0.001	0.06	< 0.00002	0.6		0.004	6.12	0.021	< 0.0005	2.31	< 0.001	< 0.001	< 0.15	< 0.001	0.003	11.4	< 0.001	0.11		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001		< 0.005	< 0.01
R8	06-Sep-05	< 0.00025	0.026	0.001	0.041	< 0.001	< 0.001	< 0.05	22.7	< 0.0002		< 0.001	< 0.001	< 0.001	0.17	< 0.00002	0.5		0.003	4.87	0.017	< 0.0005	2.08	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	11.2	< 0.001	0.096		< 0.001	0.0017	0.001	< 0.0001	0.0012	< 0.001		0.007	< 0.01
R8	11-Oct-05	< 0.00025	0.027	< 0.001	0.049	< 0.001	< 0.001	< 0.05	28.1	< 0.0002		< 0.001	< 0.001	< 0.001	0.1	< 0.00002	0.6		0.004	6.05	0.023	0.0005	2.21	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.6	0.001	0.11		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001		< 0.005	< 0.01
R8	02-Nov-05	< 0.00025	0.012	< 0.001	0.06	< 0.001	< 0.001	< 0.05	32.5	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.7		0.005	6.63	0.02	0.0006	2.12	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.9	< 0.001	0.12		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	< 0.001		< 0.005	< 0.01
	average	0.00025	0.0579	0.0010	0.0542	0.0010	0.0010	0.0500	29.64	0.0002		0.0010	0.0010	0.0012	0.1882	0.0000	0.79		0.005	6.03	0.0223	0.0006	2.42	0.0010	0.0014	0.1500	0.0010	0.0012	11.66	0.0010	0.1209		0.001	0.0006	0.0021	0.0001	0.0014	0.001		0.011	0.010
	minimum	< 0.00025	0.0060	< 0.001	0.0320	< 0.001	< 0.001	< 0.05	7.99	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.40		0.002	1.59	0.014	< 0.0005	0.84	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.60	< 0.001	0.035		< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		< 0.005	< 0.01
	maximum	< 0.00025	0.3900	0.0010	0.0780	< 0.001	< 0.001	< 0.05	45.80	< 0.0002		< 0.001	< 0.001	0.0030	0.750	< 0.00002	1.30		0.008	9.04	0.056	0.0009	3.91	0.0010	0.0050	< 0.15	< 0.001	0.0030	14.30	0.0010	0.190		< 0.001	0.0017	0.0110	< 0.0001	0.0025	< 0.001		0.0430	< 0.01
	N > DL	0	11	3	11	0	0	0	11	0		0	0	1	10	0	11		11	11	11	6	11	1	1	0	0	1	11	1	11		0	1	5	0	10	0		4	0
	median	0.00025	0.0260	0.0010	0.0490	0.0010	0.0010	0.0500	30.60	0.0002		0.0010	0.0010	0.0010	0.1300	0.0000	0.70		0.004	6.12	0.0190	0.0005	2.21	0.0010	0.0010	0.1500	0.0010	0.0010	12.50	0.0010	0.1100		0.001	0.0005	0.0010	0.0001	0.0012	0.001		0.005	0.010
R9	22-Jan-05	< 0.00025	0.005	< 0.001	0.076	< 0.001	< 0.001	< 0.05	44.9	< 0.0002		< 0.001	< 0.001	< 0.001	0.09	< 0.00002	1.1		0.008	9.61	0.023	0.0007	3.14	< 0.001	< 0.001	< 0.15	< 0.001	0.001	12.5	< 0.001	0.19		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0024	< 0.001		0.019	< 0.01
R9	09-Feb-05	< 0.00025	0.008	< 0.001	0.074	< 0.001	< 0.001	< 0.05	46.1	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	1.1		0.008	10	0.023	0.0009	3.62	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	13.7	< 0.001	0.2		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0026	< 0.001		0.013	< 0.01
R9	14-Mar-05	< 0.00025	0.016	< 0.001	0.073	< 0.001	< 0.001	< 0.05	45.5	< 0.0002		< 0.001	< 0.001	< 0.001	0.17	< 0.00002	1		0.007	8.64	0.018	0.0008	3.44	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	11.8	< 0.001	0.2		< 0.001	< 0.0005	0.001	< 0.0001	0.0027	< 0.001		< 0.005	< 0.01
R9	11-Apr-05	< 0.00025	0.026	< 0.001	0.068	< 0.001	< 0.001	< 0.05	44.7	< 0.0002		< 0.001	< 0.001	< 0.001	0.07	< 0.00002	1.1		0.008	9.34	0.016	0.0008	3.66	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	14.3	< 0.001	0.2		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0027	< 0.001		< 0.005	< 0.01
R9	09-May-05	< 0.00025	0.32	0.001	0.03	< 0.001	< 0.001	< 0.05	8.72	< 0.0002		< 0.001	< 0.001	0.003	0.65	< 0.00002	1.3		0.002	1.77	0.046	< 0.0005	0.88	0.001	0.005	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.039		< 0.001	< 0.0005	0.008	< 0.0001	< 0.0005	< 0.001		0.013	< 0.01
R9	20-Jun-05	< 0.00025	0.066	< 0.001	0.038	< 0.001	< 0.001	< 0.05	19.9	< 0.0002		< 0.001	< 0.001	< 0.001	0.2	< 0.00002	0.5		0.003	4.77	0.016	< 0.0005	1.68	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.3	< 0.001	0.075		< 0.001	< 0.0005	0.002	< 0.0001	0.0007	< 0.001		< 0.005	< 0.01
R9	26-Jul-05	< 0.00025	0.049	< 0.001	0.048	< 0.001	< 0.001	< 0.05	23.4	< 0.0002		< 0.001	< 0.001	< 0.001	0.08	< 0.00002	0.5		0.003	4.68	0.019	< 0.0005	1.91	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.5	< 0.001	0.1		< 0.001	< 0.0005	0.002	< 0.0001	0.0009	< 0.001		0.006	< 0.01
R9	23-Aug-05	< 0.00025	0.025	0.001	0.045	< 0.001	< 0.001	< 0.05	30.5	< 0.0002		< 0.001	< 0.001	< 0.001	0.06	< 0.00002	0.6		0.004	6.19	0.021	< 0.0005	2.17	< 0.001	< 0.001	< 0.15	< 0.001	0.002	10.6	< 0.001	0.12		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0013	< 0.001		< 0.005	< 0.01
R9	06-Sep-05	< 0.00025	0.24	< 0.001	0.042	< 0.001	< 0.001	< 0.05	23.9	< 0.0002		< 0.001	< 0.001	0.002	0.18	< 0.00002	0.5		0.004	5.21	0.018	< 0.0005	1.98	< 0.001	0.002	< 0.15	< 0.001	< 0.001	10.9	< 0.001	0.11		< 0.001	0.0015	< 0.001	< 0.0001	0.0013	< 0.001		0.011	< 0.01
R9	11-Oct-05	< 0.00025	0.016	< 0.001	0.049	< 0.001	< 0.001	< 0.05	29.3	< 0.0002		< 0.001	< 0.001	< 0.001	0.14	< 0.00002	0.7		0.004	6.54	0.026	0.0005	2.2	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	11.9	< 0.001	0.12		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001		< 0.005	< 0.01
R9	02-Nov-05	< 0.00025	0.01	< 0.001	0.056	< 0.001	< 0.001	< 0.05	33.6	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.8		0.005	7.05	0.019	0.0006	2.11	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.2	< 0.001	0.13		< 0.001	< 0.0005	0.001	< 0.0001	0.0017	< 0.001		0.005	< 0.01
R9	13-Dec-05	< 0.00025	0.012	< 0.001	0.067	< 0.001	< 0.001	< 0.05	38.1	< 0.0002		< 0.001	< 0.001	< 0.001	0.11	< 0.00002	0.9		0.007	7.91	0.023	0.0006	2.74	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.14		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0017	< 0.001		< 0.005	< 0.01
	average	0.00025	0.0661	0.001	0.056	0.001	0.001	0.050	32.39	0.0002		0.001	0.001	0.0013	0.1542	0.00002	0.842		0.0053	6.809	0.0223	0.0006	2.461	0.0010	0.0014	0.150	0.001	0.001	10.99	0.001	0.1353		0.0010	0.0006	0.0018	0.0001	0.0016	0.001		0.008	0.010
	minimum	< 0.00025	0.0050	< 0.001	0.0300	< 0.001	< 0.001	< 0.05	8.72	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.5		0.002	1.77	0.016	< 0.0005	0.88	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.60	< 0.001	0.039		< 0.001	0.0015	< 0.001	< 0.0001	< 0.0005	< 0.001		< 0.005	< 0.01
	maximum	< 0.00025	0.3200	0.0010	0.0760	< 0.001	< 0.001	< 0.05	46.1	< 0.0002		< 0.001	< 0.001	0.0030	0.6500	< 0.00002	1.3		0.008	10	0.046	0.0009	3.66	0.0010	0.0050	< 0.15	< 0.001	0.0020	14.30	< 0.001	0.200		< 0.001	0.0015	0.0080	< 0.0001	0.0027	< 0.001		0.0190	< 0.01
	N > DL	0	12	2	12	0	0	0	12	0		0	0	2	10	0	12		12	12	12	7	12	1	3	0	0	2	12	0	12		0	1	5	0	11	0		6	0
	median	0.00025	0.0205	0.001	0.053	0.001	0.001	0.050	32.05	0.0002		0.001	0.001	0.0010	0.1000	0.00002	0.850		0.0045	6.795	0.0200	0.0006	2.185	0.0010	0.0010	0.150	0.001	0.001	11.85	0.001	0.1250		0.0010	0.0005	0.0010	0.0001	0.0015	0.001		0.005	0.010
R10	22-Jan-05	< 0.00025	0.007	< 0.001	0.084	< 0.001	< 0.001	< 0.05	51.6	< 0.0002		< 0.001	< 0.001	0.002	0.1	< 0.00002	1.3		0.009	10.8	0.026	0.0008	3.76	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	14.5	< 0.001	0.22		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0027	< 0.001		0.022	< 0.01
R10	09-Feb-05	< 0.00025	0.006	< 0.001	0.068	< 0.001	< 0.001	< 0.05	43.2	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	1		0.007	9.1	0.022	0.0007	3.26	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.5	< 0.001	0.18		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0024	< 0.001		0.028	< 0.01
R10	14-Mar-05	< 0.00025	0.018	< 0.001	0.081	< 0.001	< 0.001	< 0.05	51.9	< 0.0002		< 0.001	< 0.001	< 0.001	0.22	< 0.00002	1.2		0.008	9.78	0.021	0.0009	4.18	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	14.4	< 0.001	0.22		< 0.001	< 0.0005	0.001	< 0.0001	0.0029	< 0.001		0.013	< 0.01
R10	11-Apr-05	< 0.00025	0.01	< 0.001	0.066	< 0.001	< 0.001	< 0.05	43.2	< 0.0002		< 0.001	< 0.001	< 0.001	0.07	< 0.00002	1.1		0.008	9.14	0.015	0.0009	3.58	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	13.7	< 0.001	0.19		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0026	< 0.001		0.008	< 0.01
R10	09-May-05	< 0.00025	0.34	0.001	0.03	< 0.001	< 0.001	< 0.05	8.77	< 0.0002		< 0.001	< 0.001	0.003	0.72	< 0.00002	1.4		0.002	1.82	0.052	< 0.0005	0.87	0.001	0.005	0.2	< 0.001	< 0.001	5.7	< 0.001	0.039		< 0.001	< 0.0005	0.01	< 0.0001	< 0.0005	< 0.001		0.015	< 0.01
R10	20-Jun-05	< 0.00025	0.069	< 0.001	0.037	< 0.001	< 0.001	< 0.05	19.8	< 0.0002		< 0.001	< 0.001	< 0.001	0.21	< 0.00002	0.5		0.003	4.8	0.016	< 0.0005	1.67	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.3	< 0.001	0.075		< 0.001	< 0.0005	0.002	< 0.0001	0.0007	< 0.001		0.006	< 0.01
R10	26-Jul-05	< 0.00025	0.038	< 0.001	0.042	< 0.001	< 0.001	< 0.05	20.2	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.4		0.003	4.01	0.017	< 0.0005	1.69	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.7	0.001	0.089		< 0.001	< 0.0005	0.001	< 0.0001	0.0008	< 0.001		0.007	< 0.01
R10	23-Aug-05	< 0.00025	0.029	0.001	0.044	< 0.001	< 0.001	< 0.05	30.6	< 0.0002		< 0.001	< 0.001	< 0.001	0.08	< 0.00002	0.6		0.004	6.19	0.02	< 0.0005	2.19	< 0.001	< 0.001	< 0.15	< 0.001	0.002	10.8	< 0.001	0.12		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0013	< 0.001		< 0.005	< 0.01
R10	06-Sep-05	< 0.00025	0.02	0.001	0.041	< 0.001	< 0.001	< 0.05	25.4	< 0.0002

Appendix 3
2005 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	CN-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	LA-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	S-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	W-T mg/L	ZN-T mg/L	ZR-T mg/L
W5	20-Sep-05	< 0.00025	0.026	< 0.001	0.021	< 0.001	< 0.001	< 0.05	79.8	0.0012		< 0.001	< 0.001	0.002	< 0.05	< 0.00002	2.9		0.02	54.5	< 0.001	< 0.0005	4.76	0.019	< 0.001	< 0.15	< 0.001	0.001	11.6	0.001	0.36		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0047	< 0.001		1.37	< 0.01
W8	22-Jun-05	< 0.00025	0.02	< 0.001	0.049	< 0.001	< 0.001	< 0.05	15.8	< 0.0002		< 0.001	< 0.001	0.002	< 0.05	< 0.00002	0.5		0.001	2.25	< 0.001	< 0.0005	1.77	< 0.001	0.002	< 0.15	< 0.001	< 0.001	14.5	< 0.001	0.055		< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.064	< 0.01
W8	20-Sep-05	< 0.00025	0.014	< 0.001	0.056	< 0.001	< 0.001	< 0.05	17.2	< 0.0002		< 0.001	< 0.001	0.001	< 0.05	< 0.00002	0.7		0.002	2.31	0.001	< 0.0005	2.02	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	15.9	< 0.001	0.056		< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.015	< 0.01
W10	22-Jun-05	< 0.00025	0.043	< 0.001	0.015	< 0.001	< 0.001	< 0.05	16.1	< 0.0002		< 0.001	< 0.001	0.001	< 0.05	< 0.00002	0.5		< 0.001	2.11	< 0.001	< 0.0005	1.79	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	14.7	0.001	0.053		< 0.001	< 0.0005	0.002	< 0.0001	< 0.0005	< 0.001		< 0.005	< 0.01
W10	20-Sep-05	< 0.00025	0.012	< 0.001	0.018	< 0.001	< 0.001	< 0.05	20	< 0.0002		< 0.001	< 0.001	0.001	< 0.05	< 0.00002	0.6		0.001	2.5	< 0.001	< 0.0005	1.97	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	16	< 0.001	0.063		< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.005	< 0.01
WEIR3	29-Mar-05	0.0008	0.005	0.002	0.12	< 0.001	< 0.001	< 0.05	182	< 0.0002		0.006	< 0.001	0.001	2.14	< 0.00002	5.7		0.01	56.3	7.71	0.0013	40.9	0.017	< 0.001	< 0.15	< 0.001	< 0.001	19.9	< 0.001	0.75		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0082	< 0.001		0.008	< 0.01
WEIR3	17-Aug-05	< 0.00025	< 0.005	0.001	0.077	< 0.001	< 0.001	< 0.05	201	0.0042		0.004	< 0.001	< 0.001	0.63	0.00002	4.1		0.007	38.7	7.06	0.0009	29.1	0.017	< 0.001	< 0.15	< 0.001	0.002	12.8	< 0.001	0.51		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0069	< 0.001		0.007	< 0.01
X2	21-Jan-05	< 0.00025	0.059	< 0.001	0.077	< 0.001	< 0.001	< 0.05	50.2	< 0.0002		< 0.001	< 0.001	0.002	0.33	< 0.00002	1.1		0.008	11.6	0.094	0.0007	3.75	0.001	< 0.001	< 0.15	< 0.001	< 0.001	13.8	< 0.001	0.21		< 0.001	< 0.0005	0.003	< 0.0001	0.0024	< 0.001		0.031	< 0.01
X2	08-Feb-05	< 0.00025	0.007	< 0.001	0.079	< 0.001	< 0.001	< 0.05	53.4	< 0.0002		< 0.001	< 0.001	< 0.001	0.2	< 0.00002	1.3		0.009	12.9	0.092	0.0008	4.31	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	14.8	< 0.001	0.23		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0028	< 0.001		0.035	< 0.01
X2	15-Mar-05	< 0.00025	0.01	< 0.001	0.07	< 0.001	< 0.001	< 0.05	47.6	< 0.0002		< 0.001	< 0.001	< 0.001	0.18	< 0.00002	1.3		0.009	10.8	0.091	0.0009	3.57	0.001	< 0.001	< 0.15	< 0.001	< 0.001	11.2	< 0.001	0.2		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0027	< 0.001		0.031	< 0.01
X2	11-Apr-05	< 0.00025	0.007	< 0.001	0.068	< 0.001	< 0.001	< 0.05	45.3	< 0.0002		< 0.001	< 0.001	< 0.001	0.18	< 0.00002	1.1		0.008	10.9	0.091	0.0008	3.72	0.001	< 0.001	< 0.15	< 0.001	< 0.001	13.4	< 0.001	0.2		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0025	< 0.001		0.038	< 0.01
X2	09-May-05	< 0.00025	0.27	0.001	0.03	< 0.001	< 0.001	< 0.05	9.71	< 0.0002		< 0.001	< 0.001	0.003	0.66	< 0.00002	1.3		0.002	2.03	0.051	< 0.0005	0.91	0.002	0.007	< 0.15	< 0.001	< 0.001	5.3	< 0.001	0.043		< 0.001	< 0.0005	0.008	< 0.0001	< 0.0005	< 0.001		0.031	< 0.01
X2	20-Jun-05	< 0.00025	0.11	< 0.001	0.041	< 0.001	< 0.001	< 0.05	21.2	< 0.0002		< 0.001	< 0.001	0.001	0.25	< 0.00002	0.5		0.003	4.99	0.029	< 0.0005	1.77	< 0.001	0.002	< 0.15	< 0.001	< 0.001	9.9	< 0.001	0.083		< 0.001	< 0.0005	0.002	< 0.0001	0.0008	< 0.001		0.016	< 0.01
X2	25-Jul-05	< 0.00025	0.029	< 0.001	0.041	< 0.001	< 0.001	< 0.05	21.7	< 0.0002		< 0.001	< 0.001	0.001	0.07	< 0.00002	0.4		0.003	4.51	0.019	< 0.0005	1.73	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.7	< 0.001	0.092		< 0.001	< 0.0005	0.001	< 0.0001	0.0007	< 0.001		0.015	< 0.01
X2	22-Aug-05	< 0.00025	0.025	< 0.001	0.05	< 0.001	< 0.001	< 0.05	31.1	< 0.0002		< 0.001	< 0.001	< 0.001	0.1	< 0.00002	0.7		0.004	7.29	0.05	< 0.0005	3.05	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.9	< 0.001	0.12		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001		0.023	< 0.01
X2	05-Sep-05	< 0.00025	0.016	< 0.001	0.041	< 0.001	< 0.001	< 0.05	26.9	< 0.0002		< 0.001	< 0.001	< 0.001	0.23	< 0.00002	0.7		0.004	5.93	0.048	0.0009	2.05	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.7	< 0.001	0.11		< 0.001	0.0006	< 0.001	< 0.0001	0.0011	< 0.001		0.036	< 0.01
X2	10-Oct-05	< 0.00025	< 0.005	< 0.001	0.044	< 0.001	< 0.001	< 0.05	27.9	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.7		0.004	6.3	0.047	< 0.0005	2.07	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.5	< 0.001	0.12		< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001		0.028	< 0.01
X2	01-Nov-05	< 0.00025	0.015	< 0.001	0.059	< 0.001	< 0.001	< 0.05	34.6	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.8		0.005	8.45	0.09	0.0006	2.26	0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.3	< 0.001	0.14		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0015	< 0.001		0.035	< 0.01
X2	13-Dec-05	< 0.00025	0.017	< 0.001	0.07	< 0.001	< 0.001	< 0.05	41.9	< 0.0002		< 0.001	< 0.001	< 0.001	0.18	< 0.00002	1		0.007	10	0.09	0.0007	3.14	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.2	< 0.001	0.16		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0019	< 0.001		0.058	< 0.01
	average	0.00025	0.0475	0.001	0.056	0.001	0.001	0.050	34.29	0.000		0.001	0.001	0.001	0.207	0.00002	0.91		0.006	7.98	0.066	0.0007	2.69	0.001	0.002	0.150	0.001	0.001	10.81	0.001	0.142		0.001	0.0005	0.002	0.0001	0.0016	0.001		0.031	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.030	< 0.001	< 0.001	< 0.05	9.71	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.4		0.002	2.03	0.019	< 0.0005	0.91	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.3	< 0.001	0.043		< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.015	< 0.01
	maximum	< 0.00025	0.2700	0.0010	0.079	< 0.001	< 0.001	< 0.05	53.40	< 0.0002		< 0.001	< 0.001	0.0030	0.660	< 0.00002	1.3		0.009	12.90	0.094	0.0009	4.31	0.0020	0.0070	< 0.15	< 0.001	< 0.001	14.8	< 0.001	0.230		< 0.001	0.0006	0.0080	< 0.0001	0.0028	< 0.001		0.058	< 0.01
	N > DL	0	11	1	12	0	0	0	12	0		0	0	4	10	0	12		12	12	12	7	12	5	2	0	0	0	12	0	12		0	1	4	0	11	0		12	0
	median	0.00025	0.0165	0.001	0.055	0.001	0.001	0.050	32.85	0.000		0.001	0.001	0.001	0.180	0.00002	0.90		0.005	7.87	0.071	0.0007	2.66	0.001	0.001	0.150	0.001	0.001	10.80	0.001	0.130		0.001	0.0005	0.001	0.0001	0.0014	0.001		0.031	0.010
X3	21-Jan-05	< 0.00025	0.045	< 0.001	0.079	< 0.001	< 0.001	< 0.05	51.7	< 0.0002		< 0.001	< 0.001	0.001	0.37	< 0.00002	1.3		0.007	10.8	0.14	0.0007	3.54	0.001	< 0.001	< 0.15	< 0.001	< 0.001	13	< 0.001	0.23		< 0.001	< 0.0005	0.002	< 0.0001	0.0024	< 0.001		0.018	< 0.01
X3	08-Feb-05	< 0.00025	0.007	< 0.001	0.073	< 0.001	< 0.001	< 0.05	49.8	< 0.0002		< 0.001	< 0.001	< 0.001	0.22	< 0.00002	1.2		0.007	10.8	0.12	0.0006	3.64	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.8	< 0.001	0.22		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0025	< 0.001		0.024	< 0.01
X3	15-Mar-05	< 0.00025	0.011	< 0.001	0.073	< 0.001	< 0.001	< 0.05	51.1	< 0.0002		< 0.001	< 0.001	< 0.001	0.32	< 0.00002	1.5		0.007	10.4	0.11	0.0007	4.32	0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.8	< 0.001	0.23		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0028	< 0.001		0.023	< 0.01
X3	11-Apr-05	< 0.00025	0.031	< 0.001	0.068	< 0.001	< 0.001	< 0.05	45	< 0.0002		< 0.001	< 0.001	< 0.001	0.24	< 0.00002	1.1		0.007	9.86	0.098	0.0006	3.52	0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.6	< 0.001	0.21		< 0.001	< 0.0005	0.001	< 0.0001	0.0024	< 0.001		0.026	< 0.01
X3	09-May-05	< 0.00025	0.35	0.001	0.032	< 0.001	< 0.001	< 0.05	12.4	< 0.0002		< 0.001	< 0.001	0.003	1.02	< 0.00002	1.2		0.002	2.58	0.095	< 0.0005	0.96	0.002	0.004	< 0.15	< 0.001	< 0.001	5.7	< 0.001	0.057		< 0.001	< 0.0005	0.011	< 0.0001	0.0005	< 0.001		0.017	< 0.01
X3	20-Jun-05	< 0.00025	0.056	< 0.001	0.039	< 0.001	< 0.001	< 0.05	20.4	< 0.0002		< 0.001	< 0.001	< 0.001	0.25	< 0.00002	0.6		0.002	4.33	0.037	< 0.0005	1.74	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	9.2	< 0.001	0.092		< 0.001	< 0.0005	0.002	< 0.0001	0.0008	< 0.001		0.007	< 0.01
X3	25-Jul-05	< 0.00025	0.03	< 0.001	0.048	< 0.001	< 0.001	< 0.05	26.1	< 0.0002		< 0.001	< 0.001	0.001	0.12	< 0.00002	0.6		0.003	5.16	0.038	< 0.0005	2.05	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	11.1	< 0.001	0.12		< 0.001	< 0.0005	0.001	< 0.0001	0.0011	< 0.001		0.012	< 0.01
X3	22-Aug-05	< 0.00025	0.02	< 0.001	0.055	< 0.001	< 0.001	< 0.05	35	< 0.0002		< 0.001	< 0.001	< 0.001	0.14	< 0.00002	0.9		0.004	7.51	0.055	< 0.0005	3.88	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	11	< 0.001	0.15		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001		0.015	< 0.01
X3	05-Sep-05	< 0.00025	0.024	< 0.001	0.04	< 0.001	< 0.001	< 0.05	27.3	< 0.0002		< 0.001	< 0.001	< 0.001	0.27	< 0.00002	0.8		0.003	5.73	0.046	0.0006	2.04	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	9.9	< 0.001	0.12		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001		0.017	< 0.01
X3	10-Oct-05	< 0.00025	< 0.005	< 0.001	0.047	< 0.001	< 0.001	< 0.05	30.7	< 0.0002		< 0.001	< 0.001	< 0.001	0.1	< 0.00002	0.8		0.003	6.68	0.051	< 0.0005	2.21	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.7	< 0.001	0.13		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001		0.016	< 0.01
X3	01-Nov-05	< 0.00025	0.015	< 0.001	0.058	< 0.001	< 0.001	< 0.05	36.7	< 0.0002		< 0.001	< 0.001	< 0.001	0.11	< 0.00002	1		0.004	8.31	0.092	< 0.0005	2.28	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.2	< 0.001	0.15		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	< 0.001		0.021	< 0.01
X3	13-Dec-05	< 0.00025	0.02	< 0.001	0.074	< 0.001	< 0.001	< 0.05	46.6	< 0.0002		< 0.001	< 0.001	< 0.001	0.21	< 0.00002	1.2		0.006	10.4	0.11	0.0006	3.35	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.5	< 0.001	0.19		< 0.001	< 0.0005	0.001	< 0.0001	0.002	< 0.001		0.043	< 0.01
	average	0.00025	0.0512	0.001	0.057	0.001	0.001	0.05	36.07	0.000		0.001	0.001	0.001	0.281	0.00002	1.02		0.005	7.713	0.083	0.0006	2.79	0.001	0.001	0.150	0.001	0.001	10.63	0.001	0.158		0.001	0.0005	0.002	0.0001	0.0017	0.001		0.020	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.032	< 0.001	< 0.001	< 0.05	12.40	< 0.0002		< 0.001	< 0.001	< 0.001	0.100	< 0.00002	0.6		0.002	2.58	0.037	< 0.0005	0.96	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.7	< 0.001	0.057		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0005	< 0.001		0.007	< 0.01
	maximum	< 0.00025	0.3500	0.0010	0.079	< 0.001	< 0.001	< 0.05	51.70	< 0.0002		< 0.001	< 0.001	0.0030	1.020	< 0.00002	1.5		0.007	10.80	0.140	0.0007	4.32	0.0020	0.0040	< 0.15	< 0.001	< 0.001	13.0	< 0.001	0.230		< 0.001	< 0.0005	0.0110	< 0.0001	0.0028	< 0.001		0.043	< 0.01
	N > DL	0	11	1	12	0	0	0	12	0		0	0	3	12	0	12		12	12	12	6	12	4	1	0	0	0	12	0	12		0	0	6	0	12	0		12	0
	median	0.00025	0.0220	0.001	0.057	0.001	0.001	0.05	35.85	0.000		0.001	0.001	0.001	0.230	0.00002	1.05		0.004	7.910	0.094	0.0006	2.82	0.001	0.001	0.150	0.001	0.001	11.05	0.001	0.150		0.001	0.0005	0.001	0.0001	0.0015	0.001		0.018	0.010
X4	21-Jan-05	0.0018	0.025	< 0.001	0.012	< 0.001	< 0.001	< 0.05	230	0.011		0.058	< 0.001	0.003	8.69	< 0.00002	4.6		0.018	65.9	13.2	< 0.0005	15.7	0.073	< 0.001	< 0.15	< 0.001	< 0.001	9.8	< 0.001	0.78		< 0.001	< 0.0005	0.002	0.0011	< 0.0005	< 0.001		15.7	< 0.01
X4	08-Feb-05	< 0.00025	< 0.005	< 0.001	0.012	< 0.001	< 0.001	< 0.05	220	0.01		0.055	< 0.001	0.001	12.8	< 0.00002	4.2		0.017	61.1	14	< 0.0005	14.8	0.068	< 0.001	< 0.15	< 0.001	< 0.001	10.1	< 0.001	0.75		< 0.001	< 0.0005	< 0.001	0.0011	0.0007	< 0.001		16.7	< 0.01
X4	15-Mar-05	< 0.00025	0.021	< 0.001	0.021	< 0.001	< 0.001	< 0.05	237	0.0063		0.047	< 0.001	0.003	23.1	< 0.00002	4.7		0.015	48.4	14.4	< 0.0005	15.2	0.057	0.003	< 0.15	< 0.001	< 0.001	12.5	< 0.001	0.74		< 0.001	< 0.0005	0.001	0.0008	0.0014	< 0.001		12	< 0.01
X4	11-Apr-05	< 0.00025	0.057	< 0.001	0.02	< 0.001	< 0.001	< 0.05	164	0.0019		0.029	< 0.001	0.001	20.5	< 0.00002	3.6		0.01	30.7	10.6	< 0.0005	10.3	0.031	0.004	< 0.15	< 0.001	< 0.001	11.7	< 0.001	0.52		< 0.001	< 0.0005	0.003	< 0.0001	0.0013	< 0.001		5.69	< 0.01
X4	09-May-05	< 0.00025	0.24	< 0.001	0.012	< 0.001	< 0.001	< 0.05	173	0.016		0.054	< 0.001	0.059	9.71	< 0.00002	3.1		0.013	51.5	12.9	< 0.0005	11	0.067	0.15	< 0.15	< 0.001	< 0.001	5.7	< 0.001	0.61		< 0.001	< 0.0005	< 0.001	0.0012	0.0005	< 0.001		23.4	< 0.01
X4	21-Jun-05	< 0.00025	0.042	< 0.001	0.024	< 0.001	< 0.001	< 0.05	169	0.019		0.06	< 0.001	0.028	3.85	< 0.00002	3.2		0.018	64.2	12.2	< 0.0005	11.7	0.079	0.045	< 0.15	< 0.001	< 0.001	6.9	< 0.001	0.65		< 0.001	< 0.0005	< 0.001	0.0013	< 0.0005	< 0.001		29.9	< 0.01
X4	25-Jul-05	< 0.00025	0.2	0.001	0.031	< 0.001	< 0.001	< 0.05	185	0.021		0.071	< 0.001	0.066	7.28	< 0.00002	3.5		0.021	71.5	12.9	< 0.0005	11.5	0.093	0.23	< 0.15	< 0.001	0.002	8.3	< 0.001	0.7		< 0.001	< 0.0005	0.001	0.0016	0.0006	< 0.001		29.2	< 0.01
X4	23-Aug-05	< 0.00025	0.23	0.001	0.017	< 0.001	< 0.001	< 0.05	217	0.022		0.077	< 0.001	0.073	7.61	< 0.00002	3.9		0.021	83.5	13.8	< 0.0005	14.9	0.1	0.27	< 0.15	< 0.001	0.003	8.1	< 0.001	0.81		< 0.001	< 0.0005	< 0.001	0.0017	0.0008	< 0.001		30.4	< 0.01
X4	06-Sep-05	0.0011	0.2	< 0.001	0.01	< 0.001	< 0.001	< 0.05	174	0.017		0.067	< 0.001	0.065	7.11	< 0.00002	3.3		0.018	68.4	13.8	< 0.0005	13.7	0.09	0.22	< 0.15	< 0.001	< 0.001	8.3	< 0.001	0.65		< 0.001	0.0008	< 0.001	0.0014	0.0007	< 0.001		32.1	< 0.01
X4	11-Oct-05	< 0.00025	0.17	< 0.001	0.029	< 0.001	< 0.001	< 0.05	188	0.016		0.065	< 0.001	0.054	9.71	< 0.00002	3.6		0.019	72.7	15.9	< 0.0005	13.7	0.09	0.18	< 0.15	< 0.001	< 0.001	8.1	< 0.001	0.74		< 0.001	< 0.0005	0.001	0.0012	0.0006	< 0.001		33.3	< 0.01
X4	02-Nov-05	< 0.00025	0.16	0.001	0.044	< 0.001	< 0.001	< 0.05	217	0.018		0.076	< 0.001	0.061	10.9	< 0.00002	4.1		0.022	85.3	15.4	< 0.0005	16.2	0.11	0.18	< 0.15	< 0.001	< 0.001	9.7	< 0.001	0.8		< 0.001	< 0.0005	< 0.001	0.0014	0.0007	< 0.001		30.4	< 0.01
X4	15-Dec-05	< 0.00025	0.048	< 0.001	0.014	< 0.001	< 0.001	< 0.05	211	0.011		0.067	< 0.001	0.03	39	< 0.00002	4.8		0.02	68.5	16.3	< 0.0005	16	0.078	0.021	< 0.15	< 0.001	0.001	6.5	< 0.001	0.85		< 0.001	< 0.0005	< 0.001	0.0009	0.0012	< 0.001		22.7	< 0.01
	average	0.0005	0.1165	0.001	0.021	0.001	0.001	0.05	198.8	0.014		0.061	0.001	0.037	13.36	0.00002	3.88		0.018	64.31	13.783	0.0005	13.73	0.078	0.109	0.15	0.001	0.001	8.81	0.001	0.717		0.001	0.0005	0.001	0.0012	0.0008	0.001		23.46	0.01
	minimum	< 0.00025	< 0.005	< 0.001	0.0100	< 0.001	< 0.001	< 0.05	164	0.0019		0.0290	< 0.001	0.0010	3.85	< 0.00002	3.1		0.010	30.7	10.6	< 0.0005	10.3	0.031	< 0.001	< 0.15	< 0.001	< 0.001	5.70	< 0.001	0.520		< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		5.69	< 0.01
	maximum	0.0018	0.2400	0.0010	0.0440	< 0.001	< 0.001	< 0.05	237	0.0220		0.0770	< 0.001	0.0730	39.00	< 0.00002	4.8		0.022	85.3	16.3	< 0.0005	16.2	0.110	0.270	< 0.15	< 0.001	0.0030	12.50	< 0.001	0.850		< 0.001	0.0008	0.0030	0.0017	0.0014	< 0.001		33.30	< 0.01
	N > DL	2	11	3	12	0	0	0	12	12		12	0	12	12	0	12		12	12	12	0	12	12	10	0	0	3	12	0	12		0	1	5	11	10	0		12	0
	median	0.0003	0.1085	0.001	0.019	0.001	0.001	0.05	199.5	0.016		0.063	0.001	0.042	9.71	0.00002	3.75		0.018	67.15	13.800	0.0005	14.25	0.079	0.098	0.15	0.001	0.001	8.30	0.001	0.740		0.001	0.0005	0.001	0.0012	0.0007	0.001		26.30	0.01
X5	01-Mar-05										<0.0050																													
X5	05-Mar-05										<0.0050																													
X5	08-Mar-05	0.001	0.012	< 0.001	0.04	< 0.001	< 0.001	< 0.05	361	< 0.0002	<0.0050	0.019	< 0.001	0.005	0.77	< 0.00002	8.7		0.024	80.8	16.4	0.0044	45.1	0.035	< 0.001	< 0.15	< 0.001	0.001	17.7	< 0.001	0.97		< 0.001	< 0.0005	0.002	0.0003	0.0055	< 0.001		0.47	< 0.01
X5	14-Mar-05	< 0.00025	0.008	< 0.001	0.026	< 0.001	< 0.001	< 0.05	315	< 0.0002		0.021	< 0.001	0.002	0.75	< 0.00002	6.1		0.014	62	19.4	0.0009	40.8	0.039	< 0.001		< 0.001	< 0.001	16.5	< 0.001	0.89		< 0.001	< 0.0005	0.001	< 0.0001	0.0045	< 0.001		0.34	< 0.01
X5	22-Mar-05	< 0.00025	0.013	< 0.001	0.03	< 0.001	< 0.001	< 0.05	292	< 0.0002	0.0169	0.026	< 0.001	0.001	1.02	< 0.00002	8		0.018	86.2	17.5	0.0011	49.8	0.046	< 0.001	< 0.15	< 0.001	< 0.001	20.5	< 0.001	1.03		< 0.001

Appendix 3
2005 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	CN-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	LA-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	S-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	W-T mg/L	ZN-T mg/L	ZR-T mg/L
X5	31-Jul-05	< 0.00025	0.016	< 0.001	0.023	< 0.001	< 0.001	< 0.05	158	< 0.0002	0.0275	0.004	< 0.001	0.001	0.14	< 0.00002	6.1		0.029	34.5	2.68	0.0014	18	0.007	0.001	< 0.15	< 0.001	< 0.001	6.9	< 0.001	0.54		< 0.001	< 0.0005	< 0.001	0.0003	0.0011	< 0.001		0.11	< 0.01
X5	06-Aug-05	0.001	0.012	0.001	0.023	< 0.001	< 0.001	< 0.05	190	0.0005	0.0082	0.008	< 0.001	0.002	0.19	< 0.00002	6.3		0.03	44	5.85	0.002	22.6	0.014	0.002	< 0.15	0.001	0.001	8	0.001	0.61		< 0.001	0.0006	< 0.001	0.0007	0.002	0.001		0.3	< 0.01
X5	13-Aug-05	< 0.00025	0.005	< 0.001	0.023	< 0.001	< 0.001	< 0.05	195	< 0.0002	< 0.005	0.008	< 0.001	0.001	0.2	< 0.00002	6.7		0.029	48.4	5.9	0.0016	24	0.014	0.002	< 0.15	< 0.001	< 0.001	8.2	< 0.001	0.64		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0018	< 0.001		0.28	< 0.01
X5	20-Aug-05	< 0.00025	0.007	0.001	0.021	< 0.001	< 0.001	< 0.05	188	< 0.0002	0.0051	0.007	< 0.001	< 0.001	0.16	< 0.00002	6.9		0.035	47.1	4.82	0.0017	22.1	0.011	0.003	< 0.15	< 0.001	0.001	6.3	< 0.001	0.6		< 0.001	< 0.0005	< 0.001	0.0003	0.0017	< 0.001		0.24	< 0.01
X5	23-Aug-05	< 0.00025	0.012	< 0.001	0.021	< 0.001	< 0.001	< 0.05	228	< 0.0002	< 0.005	0.008	< 0.001	0.001	0.28	< 0.00002	8.3		0.045	57.5	6.05	0.0021	28.8	0.013	0.003	< 0.15	< 0.001	0.001	7	< 0.001	0.76		< 0.001	< 0.0005	< 0.001	0.0004	0.0018	0.001		0.29	< 0.01
X5	27-Aug-05	< 0.00025	0.02	0.001	0.019	< 0.001	< 0.001	< 0.05	194	< 0.0002	< 0.005	0.008	< 0.001	0.001	0.24	< 0.00002	6.7		0.03	45.2	6.2	0.0016	22.9	0.014	0.003	< 0.15	< 0.001	0.003	6.1	< 0.001	0.63		< 0.001	< 0.0005	0.001	0.0003	0.0015	< 0.001		0.3	< 0.01
X5	05-Sep-05	< 0.00025	0.008	< 0.001	0.017	< 0.001	< 0.001	< 0.05	196	< 0.0002	< 0.005	0.006	< 0.001	0.001	0.54	< 0.00002	6.4		0.034	45.8	4.21	0.0021	21.9	0.011	0.004	< 0.15	< 0.001	< 0.001	6.5	< 0.001	0.64		< 0.001	< 0.0005	< 0.001	0.0004	0.0013	0.001		0.28	< 0.01
X5	06-Sep-05	< 0.00025	0.017	< 0.001	0.014	< 0.001	< 0.001	< 0.05	191	< 0.0002	0.0058	0.005	< 0.001	0.002	0.55	< 0.00002	6		0.033	44.4	3.54	0.0012	20.3	0.009	0.005	< 0.15	< 0.001	0.001	5.8	< 0.001	0.61		< 0.001	0.0006	< 0.001	0.0004	0.001	< 0.001		0.29	< 0.01
X5	11-Sep-05	< 0.00025	< 0.005	< 0.001	0.016	< 0.001	< 0.001	< 0.05	210	0.0003	< 0.005	0.005	< 0.001	0.001	0.17	< 0.00002	6.3		0.031	43.2	4.11	0.0015	22.9	0.009	0.004	< 0.15	< 0.001	< 0.001	5.9	< 0.001	0.69		< 0.001	< 0.0005	< 0.001	0.0004	0.001	< 0.001		0.24	< 0.01
X5	18-Sep-05	< 0.00025	< 0.005	< 0.001	0.013	< 0.001	< 0.001	< 0.05	224	< 0.0002	< 0.005	0.004	< 0.001	0.001	< 0.05	< 0.00002	6		0.032	36.5	3.02	0.0012	22.6	0.007	0.001	< 0.15	< 0.001	< 0.001	5.8	< 0.001	0.72		< 0.001	< 0.0005	0.002	0.0004	0.0008	< 0.001		0.099	< 0.01
X5	24-Sep-05	< 0.00025	0.021	< 0.001	0.015	< 0.001	< 0.001	< 0.05	213	< 0.0002	< 0.005	0.004	< 0.001	< 0.001	0.06	< 0.00002	5.8		0.026	36.4	3.38	0.001	24.2	0.009	< 0.001	< 0.15	< 0.001	< 0.001	5.5	0.009	0.7		< 0.001	< 0.0005	0.002	0.0004	0.0008	< 0.001		0.067	< 0.01
X5	01-Oct-05	< 0.00025	0.006	< 0.001	0.02	< 0.001	< 0.001	< 0.05	245	0.0004	< 0.005	0.009	< 0.001	0.001	0.31	< 0.00002	5.9		0.025	47	7.84	0.0012	29.3	0.018	0.004	< 0.15	< 0.001	< 0.001	8.1	0.002	0.77		< 0.001	< 0.0005	< 0.001	0.0004	0.0016	< 0.001		0.39	< 0.01
	average	0.0003	0.0108	0.001	0.020	0.001	0.001	0.05	209.4	0.0002	0.012	0.007	0.001	0.001	0.281	0.00002	6.34		0.029	46.57	5.58	0.002	24.57	0.013	0.002	0.150	0.001	0.001	7.72	0.001	0.671		0.001	0.0005	0.001	0.0004	0.0017	0.001		0.229	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.0130	< 0.001	< 0.001	< 0.05	158	< 0.0002	< 0.005	0.0030	< 0.001	< 0.001	< 0.05	< 0.00002	4.6		0.014	34.50	1.80	0.0009	16.50	0.0060	< 0.001	< 0.15	< 0.001	< 0.001	4.70	< 0.001	0.53		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0008	< 0.001		0.066	< 0.01
	maximum	0.0010	0.0210	0.0010	0.0400	< 0.001	< 0.001	< 0.05	361	0.0006	0.0275	0.0260	< 0.001	0.0050	1.0200	< 0.00002	8.7		0.045	86.20	19.40	0.0044	49.80	0.0460	0.0050	< 0.15	0.0010	0.0030	20.50	0.0090	1.03		< 0.001	0.0006	0.0020	0.0007	0.0055	0.0010		0.470	< 0.01
	N > DL	3	21	3	25	0	0	0	25	5	15	25	0	20	24	0	25		25	25	25	25	25	25	15	0	1	7	25	3	25		0	2	6	22	25	3		25	0
	median	0.0003	0.0100	0.001	0.020	0.001	0.001	0.05	195.0	0.0002	0.005	0.005	0.001	0.001	0.190	0.00002	6.10		0.029	43.20	3.54	0.001	22.10	0.009	0.001	0.150	0.001	0.001	6.30	0.001	0.630		0.001	0.0005	0.001	0.0004	0.0011	0.001		0.240	0.010
X5P	21-Jan-05	< 0.00025	0.022	< 0.001	0.035	< 0.001	< 0.001	< 0.05	254	< 0.0002	0.0208	0.011	< 0.001	0.002	0.44	< 0.00002	7.4		0.024	60.3	8.88	0.0019	34.4	0.02	0.001	< 0.15	< 0.001	< 0.001	14.9	< 0.001	0.71		< 0.001	< 0.0005	0.002	0.0002	0.0043	< 0.001		0.4	< 0.01
X5P	08-Feb-05	< 0.00025	< 0.005	< 0.001	0.037	< 0.001	< 0.001	< 0.05	215	< 0.0002	0.0114	0.008	< 0.001	0.001	0.21	< 0.00002	6.1		0.017	50.6	7.36	0.0015	28.3	0.014	< 0.001	< 0.15	< 0.001	< 0.001	13.2	< 0.001	0.62		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0043	< 0.001		0.27	< 0.01
X5P	11-Apr-05	< 0.00025	0.014	< 0.001	0.034	< 0.001	< 0.001	< 0.05	189	< 0.0002	<0.0050	0.007	< 0.001	0.002	0.16	< 0.00002	5.4		0.015	45.1	6.44	0.0015	27.9	0.013	0.002	< 0.15	< 0.001	< 0.001	13.3	< 0.001	0.55		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0043	< 0.001		0.22	< 0.01
X5P	31-May-05	0.0008	0.009	< 0.001	0.017	< 0.001	< 0.001	< 0.05	169	0.0006	0.0744	0.003	< 0.001	0.001	0.31	< 0.00002	4.9		0.023	38	1.8	0.0014	16.5	0.006	0.001	< 0.15	< 0.001	< 0.001	4.7	< 0.001	0.53		< 0.001	< 0.0005	< 0.001	0.0005	0.001	< 0.001		0.2	< 0.01
X5P	02-Nov-05	< 0.00025	0.009	< 0.001	0.029	< 0.001	< 0.001	< 0.05	297	0.0004	<0.0050	0.014	< 0.001	0.002	0.43	< 0.00002	5.9		0.021	57.4	13.8	0.0011	32.7	0.029	0.025	< 0.15	< 0.001	< 0.001	11.8	< 0.001	0.76		< 0.001	< 0.0005	< 0.001	0.0003	0.0029	< 0.001		0.65	< 0.01
X5P	15-Dec-05	< 0.00025	< 0.005	< 0.001	0.027	< 0.001	< 0.001	< 0.05	300	0.0004	<0.0050	0.015	< 0.001	0.002	0.34	< 0.00002	6.3		0.021	62	14.5	0.0014	37	0.027	0.013	< 0.15	< 0.001	< 0.001	6.5	< 0.001	0.84		< 0.001	< 0.0005	< 0.001	0.0003	0.0038	< 0.001		0.61	< 0.01
	average	0.00025	0.0110	0.001	0.032	0.001	0.001	0.050	251.0	0.0003	0.028	0.011	0.001	0.002	0.316	0.00002	6.22		0.020	55.08	10.20	0.0015	32.06	0.021	0.008	0.15	0.001	0.001	11.94	0.001	0.696		0.001	0.0005	0.001	0.0002	0.0039	0.001		0.430	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.017	< 0.001	< 0.001	< 0.05	169	< 0.0002	<0.0050	0.003	< 0.001	0.001	0.16	< 0.00002	4.9		0.0150	38.0	1.80	0.0011	16.5	0.0060	< 0.001	< 0.15	< 0.001	< 0.001	4.70	< 0.001	0.53		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0010	< 0.001		0.20	< 0.01
	maximum	< 0.00025	0.0220	< 0.001	0.037	< 0.001	< 0.001	< 0.05	300	0.0006	0.0744	0.015	< 0.001	0.002	0.44	< 0.00002	7.4		0.0240	62.0	14.50	0.0019	37.0	0.0290	0.0250	< 0.15	< 0.001	< 0.001	14.90	< 0.001	0.84		< 0.001	< 0.0005	0.0020	0.0005	0.0043	< 0.001		0.65	< 0.01
	N > DL	1	4	0	6	0	0	0	6	3	3	6	0	6	6	0	6		6	6	6	6	6	6	5	0	0	0	6	0	6		0	0	1	4	6	0		6	0
	median	0.00025	0.009	0.001	0.034	0.001	0.001	0.050	254.0	0.0002	0.031	0.011	0.001	0.002	0.340	0.00002	6.10		0.021	57.40	8.88	0.0015	32.70	0.020	0.002	0.15	0.001	0.001	13.20	0.001	0.710		0.001	0.0005	0.001	0.0002	0.004	0.001		0.400	0.010
X7	23-Jun-05	< 0.00025	0.78	0.009	0.011	< 0.001	< 0.001	< 0.05	439	0.0039		0.46	< 0.001	0.002	1460	< 0.00002	9.4		0.083	564	56.7	< 0.0005	62.6	0.59	0.019	< 0.15	< 0.001	0.004	34.5	< 0.001	2.43		< 0.001	< 0.0005	0.001	0.0003	0.0043	0.001		342	< 0.01
X7	20-Sep-05	< 0.00025	1	0.009	0.012	< 0.001	< 0.001	< 0.05	432	0.0042		0.51	0.002	0.004	1850	< 0.00002	10.3		0.098	530	64.3	< 0.0005	114	0.58	0.02	< 0.15	< 0.001	0.007	34.1	0.001	3.68		< 0.001	< 0.0005	0.001	0.0003	0.0047	0.002		472	< 0.01
X10	21-Jan-05	< 0.00025	0.011	< 0.001	0.078	< 0.001	< 0.001	< 0.05	52.2	< 0.0002		< 0.001	< 0.001	< 0.001	0.26	< 0.00002	1.3		0.006	11.6	0.061	0.0005	3.28	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.1	< 0.001	0.23		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0024	< 0.001		0.039	< 0.01
X10	08-Feb-05	< 0.00025	0.005	< 0.001	0.068	< 0.001	< 0.001	< 0.05	46	< 0.0002		< 0.001	< 0.001	< 0.001	0.17	< 0.00002	1.1		0.006	10.7	0.047	0.0005	3.19	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12	< 0.001	0.21		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0023	< 0.001		0.038	< 0.01
X10	14-Mar-05	< 0.00025	< 0.005	< 0.001	0.077	< 0.001	< 0.001	< 0.05	53.4	< 0.0002		< 0.001	< 0.001	< 0.001	0.3	< 0.00002	1.4		0.006	11.2	0.027	0.001	4.09	0.001	< 0.001	< 0.15	< 0.001	< 0.001	11.8	< 0.001	0.23		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0028	< 0.001		0.039	< 0.01
X10	11-Apr-05	< 0.00025	0.007	< 0.001	0.067	< 0.001	< 0.001	< 0.05	46.5	< 0.0002		< 0.001	< 0.001	0.001	0.16	< 0.00002	1.1		0.006	10.6	0.015	0.0007	3.42	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.5	< 0.001	0.21		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0025	< 0.001		0.023	< 0.01
X10	09-May-05	< 0.00025	0.25	0.001	0.031	< 0.001	< 0.001	< 0.05	11.7	< 0.0002		< 0.001	< 0.001	0.002	0.81	< 0.00002	1.2		0.001	2.55	0.086	< 0.0005	0.84	0.001	0.005	< 0.15	< 0.001	< 0.001	4.9	0.001	0.05		< 0.001	< 0.0005	0.008	< 0.0001	< 0.0005	< 0.001		0.024	< 0.01
X10	21-Jun-05	< 0.00025	0.041	< 0.001	0.039	< 0.001	< 0.001	< 0.05	22	< 0.0002		< 0.001	< 0.001	< 0.001	0.26	< 0.00002	0.5		0.002	5.19	0.033	< 0.0005	1.63	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	8.7	< 0.001	0.092		< 0.001	< 0.0005	0.001	< 0.0001	0.0008	< 0.001		0.014	< 0.01
X10	25-Jul-05	< 0.00025	0.027	< 0.001	0.047	< 0.001	< 0.001	< 0.05	26.4	< 0.0002		< 0.001	< 0.001	< 0.001	0.16	< 0.00002	0.6		0.003	6.3	0.037	< 0.0005	1.8	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.2	< 0.001	0.12		< 0.001	< 0.0005	0.001	< 0.0001	0.001	< 0.001		0.022	< 0.01
X10	23-Aug-05	0.0023	0.019	< 0.001	0.054	< 0.001	< 0.001	< 0.05	36.7	< 0.0002		< 0.001	< 0.001	< 0.001	0.27	< 0.00002	0.8		0.004	8.81	0.05	< 0.0005	2.55	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.1	< 0.001	0.16		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001		0.026	< 0.01
X10	06-Sep-05	< 0.00025	0.021	< 0.001	0.042	< 0.001	< 0.001	< 0.05	27.9	< 0.0002		< 0.001	< 0.001	< 0.001	0.35	< 0.00002	0.7		0.003	6.76	0.041	0.0007	2.02	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	9.2	0.001	0.12		< 0.001	0.0025	< 0.001	< 0.0001	0.0016	< 0.001		0.021	< 0.01
X10	11-Oct-05	< 0.00025	< 0.005	< 0.001	0.05	< 0.001	< 0.001	< 0.05	33.1	< 0.0002		< 0.001	< 0.001	< 0.001	0.25	< 0.00002	0.8		0.003	8.25	0.06	0.0005	2.08	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10	< 0.001	0.14		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001		0.035	< 0.01
X10	02-Nov-05	< 0.00025	0.016	< 0.001	0.061	< 0.001	< 0.001	< 0.05	38.9	< 0.0002		< 0.001	< 0.001	< 0.001	0.24	< 0.00002	0.9		0.004	9.32	0.084	< 0.0005	2.1	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	11.4	< 0.001	0.15		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	< 0.001		0.047	< 0.01
X10	15-Dec-05	< 0.00025	0.006	< 0.001	0.069	< 0.001	< 0.001	< 0.05	45.2	< 0.0002		< 0.001	< 0.001	< 0.001	0.19	< 0.00002	1.1		0.006	10.5	0.072	0.0005	3	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.7	< 0.001	0.18		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0019	< 0.001		0.062	< 0.01
	average	0.0004	0.0344	0.001	0.057	0.001	0.001	0.05	36.67	0.0002		0.001	0.001	0.001	0.285	0.00002	0.958		0.004	8.482	0.051	0.0006	2.50	0.001	0.001	0.15	0.001	0.001	9.88	0.001	0.158		0.001	0.0007	0.002	0.0001	0.0017	0.001		0.033	0.01
	minimum	< 0.00025	< 0.005	< 0.001	0.031	< 0.001	< 0.001	< 0.05	11.7	< 0.0002		< 0.001	< 0.001	< 0.001	0.16	< 0.00002	0.5		0.001	2.55	0.015	< 0.0005	0.84	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.05		< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.014	< 0.01
	maximum	0.0023	0.2500	0.0010	0.078	< 0.001	< 0.001	< 0.05	53.4	< 0.0002		< 0.001	< 0.001	0.0020	0.81	< 0.00002	1.4		0.006	11.60	0.086	0.0010	4.09	0.0010	0.0050	< 0.15	< 0.001	< 0.001	12.5	0.0010	0.23		< 0.001	0.0025	0.0080	< 0.0001	0.0028	< 0.001		0.062	< 0.01
	N > DL	1	10	1	12	0	0	0	12	0		0	0	2	12	0	12		12	12	12	7	12	2	1	0	0	0	12	2	12		0	1	3	0	11	0		12	0
	median	0.0003	0.0135	0.001	0.058	0.001	0.001	0.05	37.80	0.0002		0.001	0.001	0.001	0.255	0.00002	1.000		0.004	9.065	0.049	0.0005	2.325	0.001	0.001	0.15	0.001	0.001	10.15	0.001	0.155		0.001	0.0005	0.001	0.0001	0.0016	0.001		0.031	0.01
X11	29-Mar-05	0.0006	0.005	0.003	0.067	< 0.001	< 0.001	< 0.05	311	0.0004		0.024	< 0.001	0.001	3.41	< 0.00002	8.1		0.015	89.9	16	0.0008	48.5	0.028	< 0.001	< 0.15	< 0.001	< 0.001	20.9	0.002	1.14		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0059	< 0.001		0.012	< 0.01
X11	17-Aug-05	< 0.00025	0.008	0.004	0.055	< 0.001	< 0.001	< 0.05	323	< 0.0002	< 0.005	0.017	< 0.001	< 0.001	2.26	< 0.00002	6.5		0.013	70.1	15.3	0.0007	34.7	0.019	< 0.001	< 0.15	< 0.001	0.002	14.4	< 0.001	0.86		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0052	< 0.001		0.006	< 0.01
X12	18-Aug-05	< 0.00025	0.067	< 0.001	0.058	< 0.001	< 0.001	< 0.05	156	< 0.0002	< 0.005	< 0.001	< 0.001	< 0.001	0.09	< 0.00002	5.1		0.006	34.2	0.16	0.0005	19	< 0.001	0.001	< 0.15	< 0.001	0.002	11.6	< 0.001	0.48		< 0.001	< 0.0005	0.003	< 0.0001	0.0082	< 0.001		< 0.005	< 0.01
X13	21-Jan-05	< 0.00025	0.019	0.002	0.085	< 0.001	< 0.001	< 0.05	251	< 0.0002	<0.0050	0.007	< 0.001	0.001	2.02	< 0.00002	4.8		0.009	49.3	10.1	0.0012	32.7	0.014	< 0.001	< 0.15	< 0.001	< 0.001	16	< 0.001	0.64		< 0.001	< 0.0005	0.001	< 0.0001	0.0054	< 0.001		0.007	< 0.01
X13	08-Feb-05	< 0.00025	< 0.005	0.002	0.079	< 0.001	< 0.001	< 0.05	256	0.0003	<0.0050	0.008	< 0.001	0.001	2.16	< 0.00002	5		0.009	52.1	10.6	0.0012	33.8	0.016	< 0.001	< 0.15	< 0.001	< 0.001	15.8	< 0.001	0.66		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0053	< 0.001		0.007	< 0.01
X13	14-Mar-05	< 0.00025	< 0.005	0.001	0.1	< 0.001	< 0.001	< 0.05	237	< 0.0002	<0.0050	0.004	< 0.001	< 0.001	1.64	< 0.00002	4.2		0.007	40.5	8.56	0.0017	30.2	0.015	< 0.001	< 0.15	< 0.001	< 0.001	14	< 0.001	0.61		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0061	< 0.001		0.008	< 0.01
X13	11-Apr-05	< 0.00025	0.009	0.002	0.083	< 0.001	< 0.001	< 0.05	224	< 0.0002	<0.0050	0.004	< 0.001	0.001	1.9	< 0.00002	4.4		0.008	43.4	9.29	0.0011	31.6	0.014	< 0.001	< 0.15	< 0.001	< 0.001	16.3	< 0.001	0.59		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0058	< 0.001		0.005	< 0.01
X13	09-May-05	< 0.00025	0.009	0.003	0.065	< 0.001	< 0.001	< 0.05	229	< 0.0002	<0.0050	0.009	< 0.001	< 0.001	2.24	< 0.00002	4.6		0.008	45.1	11.7	0.0008	29.7	0.016	< 0.001	< 0.15	< 0.001	< 0.001	14.5	< 0.001	0.61		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0042	< 0.001		0.006	< 0.01
X13	21-Jun-05	< 0.00025	0.014	0.002	0.073	< 0.001	< 0.001	< 0.05	231	< 0.0002	<0.0050	0.006	< 0.001	< 0.001	1.95	< 0.00002	4.8		0.011	46.6	9.47	0.0009	30.6	0.014	< 0.001	< 0.15	< 0.001	< 0.001	16.3	< 0.001	0.62		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0048	< 0.001		< 0.005	< 0.01
X13	25-Jul-05	< 0.00025	< 0.005	0.002	0.078	< 0.001	< 0.001	< 0.05	227	< 0.0002	<0.0050	0.006	< 0.001	< 0.001	1.7	< 0.00002	4.7		0.01	46.3	9.4	0.0012	29.4	0.013	< 0.001	< 0.15	< 0.001	< 0.001	15.3	< 0.001	0.6		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0055	< 0.001		0.005	< 0.01
X13	23-Aug-05	< 0.00025	0.006	0.002	0.089	< 0.001	< 0.001	< 0.05	250	0.0006	<0.0050	0.005	< 0.001	< 0.001	1.6	< 0.00002	5.1		0.011	51.9	9.12	0.0017	35.5	0.013	< 0.001	< 0.15	< 0.001	< 0.001	16.1	< 0.001	0.66		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0065	< 0.001		0.007	< 0.01
X13	06-Sep-05	< 0.00025	0.007	0.002	0.067	< 0.001	< 0.001	< 0.05	208	< 0.0002	<0.0050	0.005	< 0.001	< 0.001	1.94	< 0.00002	4.2		0.009	42.4	7.94	0.0015	28.7	0.013	< 0.001	< 0.15	< 0.001	< 0.001	14.9	< 0.001	0.53		< 0.001	0.0024	< 0.001	< 0.0001	0.0055	< 0.001		0.013	< 0.01
X13	11-Oct-05	< 0.00025	< 0.005	0.001	0.079	< 0.001	< 0.001	< 0.05	211	0.0003	<0.0050	0.006	< 0.001	< 0.001	1.6	< 0.00002	4.3		0.009	42.3	8.96	0.0013	29.5	0.013	< 0.001	< 0.15	< 0.001	< 0.001	14.7	< 0.001	0.57		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0051	< 0.001		< 0.005	< 0.01
X13	02-Nov-05	< 0.00025	0.009	< 0.001	0.081	< 0.001	< 0.001	< 0.05	173	< 0.0002	<0.0050	0.002	< 0.001	< 0.001	0.55	< 0.00002	3.7		0.008	35.4	6.01	0.0018	25.4	0.011	< 0.001	< 0.15	< 0.001	< 0.001	13.5	< 0.001	0.44		< 0.001	< 0.0005	< 0.001	< 0.0001	0.005	< 0.001

Appendix 3
2005 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	CN-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	LA-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	S-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	W-T mg/L	ZN-T mg/L	ZR-T mg/L
X14	10-May-05	< 0.00025	0.31	0.001	0.036	< 0.001	< 0.001	< 0.05	22	< 0.0002	<0.0050	< 0.001	< 0.001	0.003	0.86	< 0.00002	1.3		0.002	4.71	0.41	< 0.0005	2	0.003	0.006	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.078		< 0.001	< 0.0005	0.009	< 0.0001	0.0005	< 0.001		0.035	< 0.01
X14	31-May-05	< 0.00025	0.091	< 0.001	0.026	< 0.001	< 0.001	< 0.05	26.5	< 0.0002	0.0068	< 0.001	< 0.001	0.001	0.24	< 0.00002	0.9		0.002	6.64	0.19	< 0.0005	2.56	0.001	0.001	0.2	< 0.001	< 0.001	9.3	< 0.001	0.094		< 0.001	< 0.0005	0.002	< 0.0001	0.0007	< 0.001		0.019	< 0.01
X14	11-Jun-05	< 0.00025	0.063	< 0.001	0.032	< 0.001	< 0.001	< 0.05	28.9	< 0.0002	<0.005	< 0.001	< 0.001	< 0.001	0.25	< 0.00002	0.8		0.003	6.62	0.23	< 0.0005	3.13	0.001	0.001	< 0.15	< 0.001	< 0.001	8.3	< 0.001	0.11		< 0.001	< 0.0005	0.003	< 0.0001	0.0006	< 0.001		0.017	< 0.01
X14	19-Jun-05	< 0.00025	0.046	< 0.001	0.038	< 0.001	< 0.001	< 0.05	38.8	< 0.0002	0.0057	< 0.001	< 0.001	0.001	0.28	< 0.00002	1		0.004	8.88	0.32	< 0.0005	3.5	0.001	< 0.001	< 0.15	< 0.001	< 0.001	9.5	< 0.001	0.14		< 0.001	< 0.0005	0.001	< 0.0001	0.0009	< 0.001		0.022	< 0.01
X14	21-Jun-05	< 0.00025	0.041	< 0.001	0.04	< 0.001	< 0.001	< 0.05	41	< 0.0002	<0.0050	< 0.001	< 0.001	< 0.001	0.34	< 0.00002	1.1		0.005	9.14	0.4	< 0.0005	3.75	0.002	< 0.001	< 0.15	< 0.001	< 0.001	8.9	< 0.001	0.15		< 0.001	< 0.0005	0.001	< 0.0001	0.0009	< 0.001		0.027	< 0.01
X14	26-Jun-05										<0.0050																													
X14	02-Jul-05	< 0.00025	0.008	< 0.001	0.039	< 0.001	< 0.001	< 0.05	44.3	0.0003	<0.0050	< 0.001	< 0.001	< 0.001	0.12	< 0.00002	1.3		0.007	10.2	0.3	0.0006	4.71	0.002	< 0.001	< 0.15	< 0.001	< 0.001	10	< 0.001	0.17		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001		0.011	< 0.01
X14	10-Jul-05	< 0.00025	0.028	< 0.001	0.04	< 0.001	< 0.001	< 0.05	44.4	< 0.0002	0.0057	< 0.001	< 0.001	0.002	0.28	< 0.00002	1.3		0.005	10.4	0.45	0.0005	4.11	0.002	< 0.001	< 0.15	< 0.001	< 0.001	9.7	< 0.001	0.16		< 0.001	< 0.0005	0.001	< 0.0001	0.001	< 0.001		0.029	< 0.01
X14	17-Jul-05	< 0.00025	0.021	< 0.001	0.046	< 0.001	< 0.001	< 0.05	48.7	< 0.0002	0.0086	< 0.001	< 0.001	< 0.001	0.28	< 0.00002	1.4		0.005	11.4	0.54	0.0005	4.47	0.002	< 0.001	< 0.15	< 0.001	< 0.001	10.3	< 0.001	0.18		< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001		0.035	< 0.01
X14	24-Jul-05	< 0.00025	0.02	< 0.001	0.045	< 0.001	< 0.001	< 0.05	45.4	< 0.0002	0.0071	< 0.001	< 0.001	< 0.001	0.3	< 0.00002	1.2		0.006	11.3	0.47	0.0005	4.24	0.002	< 0.001	< 0.15	< 0.001	< 0.001	9.8	< 0.001	0.17		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001		0.032	< 0.01
X14	25-Jul-05	< 0.00025	0.023	< 0.001	0.046	< 0.001	< 0.001	< 0.05	41.4	< 0.0002	0.0060	< 0.001	< 0.001	< 0.001	0.14	< 0.00002	1.2		0.006	9.66	0.36	< 0.0005	3.68	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	9.8	< 0.001	0.16		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001		0.024	< 0.01
X14	31-Jul-05	< 0.00025	0.032	< 0.001	0.042	< 0.001	< 0.001	< 0.05	38.3	< 0.0002	0.0083	< 0.001	< 0.001	0.001	0.23	0.00002	1.1		0.004	8.81	0.38	< 0.0005	3.43	0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.6	< 0.001	0.15		< 0.001	< 0.0005	0.002	< 0.0001	0.0009	< 0.001		0.029	< 0.01
X14	06-Aug-05	0.0003	0.021	< 0.001	0.05	< 0.001	< 0.001	< 0.05	49.2	< 0.0002	0.0061	< 0.001	< 0.001	0.001	0.28	< 0.00002	1.4		0.006	11.5	0.59	0.0006	4.54	0.002	0.001	< 0.15	< 0.001	0.002	9.8	< 0.001	0.19		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001		0.037	< 0.01
X14	13-Aug-05	< 0.00025	0.016	< 0.001	0.053	< 0.001	< 0.001	< 0.05	58.6	< 0.0002	<0.0050	0.001	< 0.001	< 0.001	0.29	< 0.00002	1.6		0.007	14.5	0.92	0.0007	5.75	0.002	< 0.001	< 0.15	< 0.001	< 0.001	10	< 0.001	0.23		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001		0.051	< 0.01
X14	20-Aug-05	< 0.00025	0.011	0.001	0.048	< 0.001	< 0.001	< 0.05	56	< 0.0002	<0.0050	0.001	< 0.001	< 0.001	0.22	< 0.00002	1.5		0.006	13.3	0.89	0.0006	4.82	0.002	< 0.001	< 0.15	< 0.001	0.001	8.3	< 0.001	0.21		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001		0.051	< 0.01
X14	23-Aug-05	< 0.00025	0.022	< 0.001	0.047	< 0.001	< 0.001	< 0.05	58.5	< 0.0002	<0.0050	< 0.001	< 0.001	< 0.001	0.25	< 0.00002	1.7		0.008	14.5	0.8	0.0007	5.96	0.002	< 0.001	< 0.15	< 0.001	< 0.001	9	< 0.001	0.22		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0015	< 0.001		0.05	< 0.01
X14	27-Aug-05	< 0.00025	0.02	< 0.001	0.046	< 0.001	< 0.001	< 0.05	50.3	< 0.0002	<0.0050	< 0.001	< 0.001	0.004	0.25	< 0.00002	1.5		0.006	11.5	0.84	0.0005	4.72	0.003	0.003	< 0.15	< 0.001	0.002	8.1	< 0.001	0.19		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001		0.049	< 0.01
X14	05-Sep-05	< 0.00025	0.013	< 0.001	0.043	< 0.001	< 0.001	< 0.05	58.4	< 0.0002	<0.0050	0.001	< 0.001	0.001	0.4	< 0.00002	1.8		0.008	13.6	0.85	0.0009	5.45	0.003	< 0.001	< 0.15	< 0.001	< 0.001	9.3	< 0.001	0.21		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001		0.06	< 0.01
X14	06-Sep-05	< 0.00025	0.015	< 0.001	0.042	< 0.001	< 0.001	< 0.05	58.9	< 0.0002	<0.0050	< 0.001	< 0.001	< 0.001	0.42	< 0.00002	1.8		0.008	13.6	0.78	0.0014	5.47	0.002	< 0.001	< 0.15	< 0.001	< 0.001	9.4	< 0.001	0.21		< 0.001	0.0016	< 0.001	< 0.0001	0.0015	< 0.001		0.057	< 0.01
X14	11-Sep-05	< 0.00025	0.014	< 0.001	0.046	< 0.001	< 0.001	< 0.05	58.3	< 0.0002	<0.0050	< 0.001	< 0.001	< 0.001	0.24	< 0.00002	1.6		0.007	12.8	0.82	0.0006	5.44	0.002	< 0.001	< 0.15	< 0.001	< 0.001	9.5	< 0.001	0.21		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001		0.05	< 0.01
X14	18-Sep-05	< 0.00025	0.017	< 0.001	0.042	< 0.001	< 0.001	< 0.05	56	< 0.0002		< 0.001	< 0.001	< 0.001	0.19	< 0.00002	1.5		0.006	11.3	0.58	< 0.0005	5.19	0.002	< 0.001	< 0.15	< 0.001	< 0.001	10.5	< 0.001	0.21		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001		0.03	< 0.01
X14	24-Sep-05	< 0.00025	0.015	< 0.001	0.046	< 0.001	< 0.001	< 0.05	52.4	< 0.0002		< 0.001	< 0.001	< 0.001	0.19	< 0.00002	1.3		0.005	10.6	0.64	< 0.0005	4.68	0.002	< 0.001	< 0.15	< 0.001	< 0.001	8.5	0.005	0.18		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001		0.034	< 0.01
X14	01-Oct-05	< 0.00025	0.01	< 0.001	0.053	< 0.001	< 0.001	< 0.05	62	< 0.0002	<0.0050	0.001	< 0.001	< 0.001	0.34	< 0.00002	1.5		0.006	13.1	1.15	< 0.0005	6.11	0.003	0.001	< 0.15	< 0.001	< 0.001	9.7	0.002	0.22		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0013	< 0.001		0.066	< 0.01
X14	11-Oct-05	< 0.00025	< 0.005	< 0.001	0.051	< 0.001	< 0.001	< 0.05	40.5	< 0.0002		< 0.001	< 0.001	< 0.001	0.24	< 0.00002	1		0.003	9.78	0.33	< 0.0005	3.09	0.001	< 0.001	< 0.15	< 0.001	< 0.001	9.8	< 0.001	0.16		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001		0.028	< 0.01
X14	02-Nov-05	< 0.00025	0.018	< 0.001	0.064	< 0.001	< 0.001	< 0.05	53.8	< 0.0002	<0.0050	< 0.001	< 0.001	< 0.001	0.29	< 0.00002	1.2		0.005	12.6	0.62	0.0005	4.17	0.001	< 0.001	< 0.15	< 0.001	< 0.001	11.8	< 0.001	0.19		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0018	< 0.001		0.043	< 0.01
X14	15-Dec-05	< 0.00025	0.01	< 0.001	0.073	< 0.001	< 0.001	< 0.05	73.3	< 0.0002	<0.0050	< 0.001	< 0.001	0.002	0.34	< 0.00002	1.6		0.007	16.3	1.23	0.0006	6.67	0.001	< 0.001	< 0.15	< 0.001	< 0.001	6.1	< 0.001	0.25		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0022	< 0.001		0.056	< 0.01
	average	0.0003	0.0311	0.001	0.049	0.001	0.001	0.050	68.97	0.0002	0.006	0.002	0.001	0.001	0.326	0.00002	1.72		0.006	15.25	1.59	0.001	6.99	0.004	0.001	0.152	0.001	0.001	10.14	0.001	0.23		0.001	0.0005	0.001	0.0001	0.0016	0.001		0.053	0.01
	minimum	< 0.00025	< 0.005	< 0.001	0.026	< 0.001	< 0.001	< 0.05	22.0	< 0.0002	<0.0050	< 0.001	< 0.001	< 0.001	0.12	< 0.00002	0.8		0.002	4.71	0.19	< 0.0005	2.0	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.08		< 0.001	< 0.0005	< 0.001	< 0.0001	0.0005	< 0.001		0.0110	< 0.01
	maximum	0.0012	0.3100	0.0010	0.079	< 0.001	< 0.001	< 0.05	236.0	0.0003	0.0086	0.0120	< 0.001	0.0040	0.86	0.00002	4.9		0.013	49.60	11.20	0.0014	27.7	0.0220	0.0060	0.20	< 0.001	0.0020	15.2	0.0050	0.63		< 0.001	0.0016	0.0090	< 0.0001	0.0043	< 0.001		0.2500	< 0.01
	N > DL	2	30	2	31	0	0	0	31	1	8	9	0	11	31	1	31		31	31	31	20	31	30	6	1	0	3	31	2	31		0	1	12	0	31	0		31	0
	median	0.0003	0.0160	0.001	0.046	0.001	0.001	0.050	53.80	0.0002	0.005	0.001	0.001	0.001	0.280	0.00002	1.50		0.006	11.50	0.64	0.001	4.72	0.002	0.001	0.150	0.001	0.001	9.80	0.001	0.19		0.001	0.0005	0.001	0.0001	0.0012	0.001		0.035	0.01
X22B	21-Jan-05	0.0019	0.014	< 0.001	0.017	< 0.001	< 0.001	< 0.05	148	0.012		0.041	< 0.001	0.015	0.17	< 0.00002	9.5		0.056	61.9	2.59	0.0028	22	0.097	< 0.001	< 0.15	0.002	< 0.001	7.3	< 0.001	0.52		< 0.001	< 0.0005	< 0.001	0.0006	0.0027	< 0.001		12.6	< 0.01
X22B	08-Feb-05	< 0.00025	0.008	< 0.001	0.016	< 0.001	< 0.001	< 0.05	150	0.012		0.042	< 0.001	0.01	0.09	< 0.00002	9.8		0.051	62.1	2.65	0.0028	22.7	0.098	0.001	< 0.15	0.002	< 0.001	7.4	< 0.001	0.52		< 0.001	< 0.0005	< 0.001	0.0007	0.0029	< 0.001		12.1	< 0.01
X22B	14-Mar-05	< 0.00025	0.012	< 0.001	0.018	< 0.001	< 0.001	< 0.05	147	0.013		0.047	< 0.001	0.025	0.28	< 0.00002	8.6		0.048	57.8	2.71	0.0037	21.5	0.11	< 0.001	< 0.15	0.002	< 0.001	7.8	< 0.001	0.56		< 0.001	< 0.0005	< 0.001	0.0007	0.0024	< 0.001		14.6	< 0.01
X22B	11-Apr-05	< 0.00025	0.02	< 0.001	0.014	< 0.001	< 0.001	< 0.05	123	0.014		0.036	< 0.001	0.037	0.08	< 0.00002	7.1		0.044	57.2	1.91	0.0015	17.3	0.087	0.001	< 0.15	< 0.001	< 0.001	9.5	< 0.001	0.48		< 0.001	< 0.0005	< 0.001	0.0006	0.0016	< 0.001		15.1	< 0.01
X22B	09-May-05	< 0.00025	0.038	< 0.001	0.016	< 0.001	< 0.001	< 0.05	137	0.011		0.04	< 0.001	0.011	0.23	< 0.00002	8.8		0.047	55.2	2.6	0.0028	20.8	0.092	0.004	< 0.15	0.002	< 0.001	6.6	< 0.001	0.49		< 0.001	< 0.0005	< 0.001	0.0007	0.0028	< 0.001		12.5	< 0.01
X22B	21-Jun-05	< 0.00025	0.029	< 0.001	0.017	< 0.001	< 0.001	< 0.05	139	0.014		0.042	< 0.001	0.012	0.27	< 0.00002	8.9		0.056	59.8	2.57	0.0024	21.3	0.097	0.003	< 0.15	0.001	< 0.001	7.2	< 0.001	0.53		< 0.001	< 0.0005	< 0.001	0.0006	0.0027	< 0.001		14	< 0.01
X22B	25-Jul-05	< 0.00025	0.02	< 0.001	0.02	< 0.001	< 0.001	< 0.05	133	0.0029		0.045	< 0.001	0.005	0.06	< 0.00002	8.4		0.057	61.1	2.53	0.0024	20.1	0.099	0.005	< 0.15	0.001	< 0.001	7.6	< 0.001	0.52		< 0.001	< 0.0005	< 0.001	0.0007	0.0025	< 0.001		12.5	< 0.01
X22B	22-Aug-05	< 0.00025	0.007	< 0.001	0.017	< 0.001	< 0.001	< 0.05	149	0.0038		0.045	< 0.001	0.005	0.05	< 0.00002	9.1		0.059	66.8	2.8	0.0024	21.9	0.1	0.003	< 0.15	0.001	0.002	6.8	< 0.001	0.58		< 0.001	< 0.0005	< 0.001	0.0006	0.0022	< 0.001		13.3	< 0.01
X22B	06-Sep-05	< 0.00025	0.017	< 0.001	0.014	< 0.001	< 0.001	< 0.05	129	0.003		0.043	< 0.001	0.005	0.41	< 0.00002	8		0.051	57.9	2.37	0.0029	18.8	0.098	0.003	< 0.15	0.001	< 0.001	7.4	< 0.001	0.48		< 0.001	0.0015	< 0.001	0.0006	0.0019	< 0.001		12.7	< 0.01
X22B	11-Oct-05	< 0.00025	< 0.005	< 0.001	0.016	< 0.001	< 0.001	< 0.05	138	0.0029		0.042	< 0.001	0.004	0.14	< 0.00002	8.8		0.056	60.8	2.58	0.0021	20.4	0.1	0.002	< 0.15	0.001	< 0.001	7	< 0.001	0.54		< 0.001	< 0.0005	< 0.001	0.0006	0.0019	< 0.001		14.1	< 0.01
X22B	01-Nov-05	< 0.00025	0.01	< 0.001	0.016	< 0.001	< 0.001	< 0.05	146	0.0024		0.046	< 0.001	0.003	0.45	< 0.00002	9.7		0.057	61.9	2.79	0.002	21.8	0.11	0.001	< 0.15	0.001	< 0.001	7.2	< 0.001	0.52		< 0.001	< 0.0005	< 0.001	0.0006	0.0021	< 0.001		14.5	< 0.01
X22B	14-Dec-05	< 0.00025	0.012	< 0.001	0.018	< 0.001	< 0.001	< 0.05	159	0.0017		0.047	0.001	0.004	0.32	< 0.00002	10.5		0.063	69	3.02	0.0024	23.7	0.11	0.003	< 0.15	0.001	< 0.001	3.6	< 0.001	0.6		< 0.001	< 0.0005	< 0.001	0.0006	0.0022	< 0.001		14	< 0.01
	average	0.0004	0.0160	0.001	0.017	0.001	0.001	0.05	141.5	0.0077		0.043	0.001	0.011	0.21	0.00002	8.93		0.054	60.96	2.593	0.0025	21.03	0.100	0.002	0.150	0.001	0.001	7.12	0.001	0.528		0.001	0.0006	0.001	0.0006	0.0023	0.001		13.50	0.01
	minimum	< 0.00025	< 0.005	< 0.001	0.0140	< 0.001	< 0.001	< 0.05	123	0.0017		0.036	< 0.001	0.003	0.050	< 0.00002	7.1		0.044	55.2	1.91	0.0015	17.3	0.087	< 0.001	< 0.15	< 0.001	< 0.001	3.60	< 0.001	0.48		< 0.001	< 0.0005	< 0.001	0.0006	0.0016	< 0.001		12.1	< 0.01
	maximum	0.0019	0.0380	< 0.001	0.0200	< 0.001	< 0.001	< 0.05	159	0.0140		0.047	0.0010	0.037	0.450	< 0.00002	10.5		0.063	69.0	3.02	0.0037	23.7	0.110	0.0050	< 0.15	0.0020	0.0020	9.50	< 0.001	0.60		< 0.001	0.0015	< 0.001	0.0007	0.0029	< 0.001		15.1	< 0.01
	N > DL	1	11	0	12	0	0	0	12	12		12	1	12	12	0	12		12	12	12	12	12	12	10	0	11	1	12	0	12		0	1	0	12	12	0		12	0
	median	0.0003	0.0130	0.001	0.017	0.001	0.001	0.05	142.5	0.0074		0.043	0.001	0.008	0.20	0.00002	8.85		0.056	60.95	2.595	0.0024	21.40	0.099	0.003	0.150	0.001	0.001	7.25	0.001	0.520		0.001	0.0005	0.001	0.0006	0.0023	0.001		13.65	0.01
X23	22-Jan-05	0.0005	0.007	0.003	0.017	< 0.001	< 0.001	< 0.05	483	0.037		0.7	< 0.001	0.017	56.7	< 0.00002	17		0.15	692	62.2	< 0.0005	64.6	0.84	0.001	< 0.15	< 0.001	0.011	15.3	< 0.001	3.22		< 0.001	< 0.0005	0.001	0.0012	0.011	< 0.001		283	< 0.01
X23	09-Feb-05	< 0.00025	0.008	0.002	0.015	< 0.001	< 0.001	< 0.05	495	0.031		0.62	< 0.001	0.016	50.5	< 0.00002	15.9		0.15	720	63.2	< 0.0005	55.6	0.74	0.002	< 0.15	< 0.001	0.007	14.3	< 0.001	3.41		< 0.001	< 0.0005	0.001	0.0012	0.012	< 0.001		295	< 0.01
X23	15-Mar-05	< 0.00025	0.017	0.002	0.018	< 0.001	< 0.001	< 0.05	554	0.031		0.8	< 0.001	0.03	93.1	< 0.00002	14.5		0.1	735	75.2	< 0.0005	61.6	0.95	0.001	< 0.15	< 0.001	0.009	14.8	0.001	4.15		< 0.001	< 0.0005	0.003	0.0012	0.013	< 0.001		295	< 0.01
X23	11-Apr-05	0.0007	0.006	0.002	0.016	< 0.001	< 0.001	< 0.05	516	0.031		0.65	< 0.001	0.02	90.4	0.00002	16.7		0.15	761	73.2	< 0.0005	63.7	0.8	0.001	< 0.15	< 0.001	0.007	18.8	< 0.001	3.78		< 0.001	< 0.0005	0.001	0.0014	0.017	< 0.001		289	< 0.01
X23	09-May-05	< 0.00025	8.15	0.019	0.021	0.004	< 0.001	< 0.05	444	0.847		1.16	0.004	6.8	86.7	0.00004	12.8		0.17	662	73.4	< 0.0005	37.3	1.47	0.11	< 0.15	< 0.001	0.027	19.5	< 0.001	2.45		< 0.001	0.0025	0.001	0.0019	0.032	< 0.001		808	< 0.01
X23	20-Jun-05	< 0.00025	0.04	0.004	0.017	< 0.001	< 0.001	< 0.05	495	0.211		1.08	< 0.001	0.14	190	< 0.00002	14.7		0.21	832	83.8	< 0.0005	51.1	1.31	0.005	< 0.15	< 0.001	0.017	18.7	< 0.001	3.55		< 0.001	< 0.0005	< 0.001	0.0017	0.0091	< 0.001		655	< 0.01
X23	25-Jul-05	< 0.00025	0.009	0.002	0.016	< 0.001	< 0.001	< 0.05	469	0.134		0.87	< 0.001	0.078	140	< 0.00002	13.9		0.18	760	69.9	< 0.0005	47.8	1.05	0.003	< 0.15	< 0.001	0.01	17	< 0.001	3.37		< 0.001	< 0.0005	< 0.001	0.0015	0.01	< 0.001		480	< 0.01
X23	22-Aug-05	< 0.00025	< 0.005	0.005	0.016	< 0.001	< 0.001	< 0.05	578	0.132		1.07	< 0.001	0.063	167	< 0.00002	16.8		0.22	854	89	< 0.0005	60.1	1.21	0.002	< 0.15	< 0.001	0.018	17.4	< 0.001	4.09		< 0.001	< 0.0005	0.001	0.0017	0.013	< 0.001		449	< 0.01
X23	06-Sep-05	< 0.00025	0.011	0.001	0.013	< 0.001	< 0.001	< 0.05	450	0.099		0.88	< 0.001	0.05	135	< 0.00002	13.4		0.15	735	71.1	< 0.0005	47	1.04	0.002	< 0.15	< 0.001	0.004	16.1	< 0.001	3.04		< 0.001	0.0069	< 0.001	0.0014	0.01	< 0.001		505	< 0.01
X23	10-Oct-05	< 0.00025	< 0.005	0.002	0.015	< 0.001	< 0.001	< 0.05	471	0.091		0.94	< 0.001	0.038	148	< 0.00002	14.3		0.15	835	78.3	< 0.0005	50.5	1.06	0.003	< 0.15	< 0.001	0.008	16.1	< 0.001	3.23		< 0.001	< 0.0005	< 0.001	0.0013	0.0097	< 0.001		510	< 0.01
X23	02-Nov-05	< 0.00025	0.006	0.001	0.016	< 0.001	< 0.001	< 0.05	459	0.098		1.17	< 0.001	0.038	142	< 0.00002	16.8		0.18	783	78.5	< 0.0005	57	1.36	0.002	< 0.15	< 0.001	0.004	16.9	< 0.001	3.11		< 0.001	< 0.0005	< 0.001	0.0016	0.013	< 0.001		494	< 0.01
X23	13-Dec-05	< 0.00025	< 0.005	0.002	0.015	< 0.001	< 0.001	< 0.05	490	0.074		0.92	< 0.001	0.02	131	< 0.00002	15.6		0.16	835	85.5	< 0.0005	58.7	1.02	0.002	< 0.15	< 0.001	0.006	7	< 0.001	3.3		< 0.001	< 0.0005	< 0.001	0.0014	0.0099	< 0.001		493	< 0.01
	average	0.0003	0.6891	0.004	0.016	0.001	0.001	0.050	492.0	0.151		0.905	0.001	0.609	119.20	0.00002	15.20		0.164	767.0	75.28	0.001	54.58	1.071	0.011	0.15	0.001	0.011	15.99	0.001	3.39		0.001	0.0012	0.001	0.0015	0.013	0.001		463.0	0.01
	minimum	< 0.00025	< 0.005	0.001	0.013	< 0.001	< 0.001	< 0.05	444	0.031		0.62	< 0.001	0.016	50.5	< 0.00002	12.8		0.10	662	62.2	< 0.0005	37.3	0.74	0.001	< 0.15	< 0.001	0.0040	7.0	< 0.001	2.45		< 0.001	< 0.0005	< 0.001	0.0012	0.0091

Appendix 3
2005 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	HG-D mg/L	K-D mg/L	LA-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	S-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	W-D mg/L	ZN-D mg/L	ZR-D mg/L
A25	23-Jun-05	< 0.00025	0.008	< 0.001	0.056	< 0.05	< 0.001	< 0.001	46.5	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1.6		0.008	12.7	< 0.001	0.0006	2.43	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	4	< 0.001	0.51	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001		0.008	< 0.01
A25	20-Sep-05	< 0.00025	< 0.005	< 0.001	0.091	< 0.05	< 0.001	< 0.001	65.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		2.2		0.01	16	< 0.001	0.0006	3.15	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	5.3	< 0.001	0.67	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0013	< 0.001		0.005	< 0.01
A30	23-Jun-05	0.001	11.8	< 0.001	0.009	< 0.05	0.005	< 0.001	46.1	0.111	0.2	0.004	1.26	4.07		1.3		0.034	69.2	5.2	< 0.0005	2.93	0.18	1.13	< 0.15	< 0.001		< 0.001	21.7	< 0.001	0.16	< 0.001	0.0017	< 0.001	0.0004	0.014	< 0.001		76.6	< 0.01
A30	19-Sep-05	< 0.00025	0.044	< 0.001	0.016	< 0.05	< 0.001	< 0.001	78.8	0.046	< 0.001	< 0.001	0.017	< 0.05		1.7		0.032	67.3	0.1	< 0.0005	3.78	0.14	0.002	< 0.15	< 0.001		0.002	25.5	< 0.001	0.26	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		54	< 0.01
FAROCR	09-May-05	< 0.00025	0.23	< 0.001	0.022	< 0.05	< 0.001	< 0.001	4.2	< 0.0002	< 0.001	< 0.001	0.006	0.25		0.9		0.002	0.95	0.014	< 0.0005	0.96	0.002	0.019	< 0.15	< 0.001		< 0.001	6.3	< 0.001	0.021	< 0.001	< 0.0005	0.002	< 0.0001	< 0.0005	< 0.001		0.062	< 0.01
FAROCR	20-Jun-05	< 0.00025	0.045	< 0.001	0.015	< 0.05	< 0.001	< 0.001	5.4	< 0.0002	< 0.001	< 0.001	0.002	0.06		0.3		0.002	1.34	0.004	< 0.0005	1.51	< 0.001	0.002	< 0.15	< 0.001		< 0.001	12.5	< 0.001	0.027	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.03	< 0.01
FAROCR	26-Jul-05	< 0.00025	0.051	< 0.001	0.019	< 0.05	< 0.001	< 0.001	5.53	< 0.0002	< 0.001	< 0.001	0.002	< 0.05		0.2		0.002	1.31	0.002	< 0.0005	1.63	< 0.001	0.003	< 0.15	< 0.001		< 0.001	15.3	< 0.001	0.03	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.021	< 0.01
FAROCR	23-Aug-05	< 0.00025	0.022	< 0.001	0.018	< 0.05	< 0.001	< 0.001	7.59	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.2		0.003	1.77	< 0.001	< 0.0005	1.84	< 0.001	0.001	< 0.15	< 0.001		0.001	13	< 0.001	0.036	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.009	< 0.01
FAROCR	06-Sep-05	< 0.00025	0.019	< 0.001	0.019	< 0.05	< 0.001	< 0.001	6.3	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.3		0.003	1.5	< 0.001	< 0.0005	1.86	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	12.9	< 0.001	0.033	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.011	< 0.01
FAROCR	11-Oct-05	< 0.00025	0.013	< 0.001	0.02	< 0.05	< 0.001	< 0.001	7.84	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.3		0.003	2.11	< 0.001	0.0005	1.8	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	15.9	< 0.001	0.04	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.007	< 0.01
FAROCR	02-Nov-05	< 0.00025	0.016	< 0.001	0.024	< 0.05	< 0.001	< 0.001	8.83	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.3		0.003	2.17	< 0.001	0.0005	1.76	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	15.5	< 0.001	0.044	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.008	< 0.01
FAROCR	13-Dec-05	< 0.00025	0.009	< 0.001	0.029	< 0.05	< 0.001	< 0.001	14.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.5		0.005	3.98	< 0.001	0.0019	2.26	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	6.2	< 0.001	0.058	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001		0.013	< 0.01
	average	0.00025	0.051	0.001	0.021	0.05	0.001	0.001	7.51	0.000	0.001	0.001	0.002	0.08		0.38		0.003	1.891	0.003	0.0007	1.70	0.001	0.004	0.150	0.001		0.001	12.20	0.001	0.036	0.001	0.0005	0.001	0.0001	0.0006	0.001		0.020	0.01
	minimum	< 0.00025	0.009	< 0.001	0.015	< 0.05	< 0.001	< 0.001	4.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.2		0.002	0.95	< 0.001	< 0.0005	0.96	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	6.2	< 0.001	0.021	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.007	< 0.01
	maximum	< 0.00025	0.23	< 0.001	0.029	< 0.05	< 0.001	< 0.001	14.4	< 0.0002	< 0.001	< 0.001	0.006	0.25		0.9		0.005	3.98	0.014	0.0019	2.26	0.002	0.019	< 0.15	< 0.001		0.001	15.9	< 0.001	0.058	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001		0.062	< 0.01
	N > DL	0	8	0	8	0	0	0	8	0	0	0	3	2		8		8	8	3	3	8	1	4	0	0		1	8	0	8	0	0	1	0	1	0		8	0
	median	0.00025	0.021	0.001	0.020	0.05	0.001	0.001	6.95	0.000	0.001	0.001	0.001	0.05		0.30		0.003	1.635	0.001	0.0005	1.78	0.001	0.001	0.150	0.001		0.001	12.95	0.001	0.035	0.001	0.0005	0.001	0.0001	0.0005	0.001		0.012	0.01
FCO	22-Jun-05	< 0.00025	0.93	< 0.001	0.059	< 0.05	< 0.001	< 0.001	18.3	0.0072	0.013	< 0.001	0.3	0.12		0.5		0.007	7.44	0.19	< 0.0005	2.44	0.022	0.004	< 0.15	< 0.001		< 0.001	14.4	< 0.001	0.085	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0007	< 0.001		5.21	< 0.01
FCO	19-Sep-05	< 0.00025	0.011	< 0.001	0.054	< 0.05	< 0.001	< 0.001	17.4	0.0044	0.006	< 0.001	0.045	< 0.05		0.5		0.007	5.24	0.13	< 0.0005	2.89	0.015	< 0.001	< 0.15	< 0.001		< 0.001	17.9	< 0.001	0.079	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		3.15	< 0.01
FDL	22-Jun-05	< 0.00025	0.049	< 0.001	0.014	< 0.05	< 0.001	< 0.001	3.38	< 0.0002	< 0.001	< 0.001	0.002	< 0.05		< 0.1		0.002	0.68	0.005	< 0.0005	1.46	< 0.001	0.005	< 0.15	< 0.001		< 0.001	12.1	< 0.001	0.02	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.042	< 0.01
FDL	19-Sep-05	< 0.00025	0.022	< 0.001	0.019	< 0.05	< 0.001	< 0.001	4.64	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.1		0.002	0.9	0.001	< 0.0005	1.9	< 0.001	0.002	< 0.15	< 0.001		< 0.001	15.6	< 0.001	0.027	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.007	< 0.01
FDU	22-Jun-05	< 0.00025	0.035	< 0.001	0.012	< 0.05	< 0.001	< 0.001	3.21	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		< 0.1		0.001	0.63	< 0.001	< 0.0005	1.49	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.9	< 0.001	0.019	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		< 0.005	< 0.01
FDU	19-Sep-05	< 0.00025	0.022	< 0.001	0.016	< 0.05	< 0.001	< 0.001	4.17	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		< 0.1		0.002	0.81	0.001	< 0.0005	1.87	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	15.8	< 0.001	0.024	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		< 0.005	< 0.01
GCULV	18-Jan-05	< 0.0002	0.052	< 0.003	0.036	< 0.05	< 0.0002	< 0.01	14.9	< 0.0002	< 0.001	< 0.001	0.011	0.161	< 0.0001	0.5	0.004		2.4	0.007	< 0.001	1.7	< 0.001	< 0.002	0.01	< 0.002	2.2	< 0.005		< 0.002	0.072			0.012	< 0.002		< 0.001	< 0.03	0.002	
GCULV	08-Feb-05	< 0.0002	0.081	< 0.003	0.03	< 0.05	< 0.0002	< 0.01	13.6	< 0.0002	< 0.001	< 0.001	0.014	0.183	< 0.0001	0.4	< 0.001		2.3	0.005	0.001	1.1	< 0.001	< 0.002	0.01	< 0.002	2.2	< 0.005		< 0.002	0.045			0.01	< 0.002		< 0.001	< 0.03	0.003	
GCULV	08-Mar-05	< 0.0002	0.028	< 0.003	0.045	< 0.05	< 0.0002	< 0.01	17.6	< 0.0002	< 0.001	< 0.001	0.015	0.375	< 0.0001	0.5	0.005		2.8	0.004	0.001	1.6	0.001	0.003	0.01	< 0.002	1.9	< 0.005		< 0.002	0.081			0.004	< 0.002		< 0.001	< 0.03	0.002	
GCULV	05-Apr-05	< 0.0002	0.012	< 0.003	0.013	0.11	< 0.0002	< 0.01	15.6	< 0.0002	< 0.001	< 0.001	0.007	0.013	< 0.0001	0.7	0.003		2.9	0.003	< 0.001	2.5	< 0.001	< 0.002	< 0.01	< 0.002	2	< 0.005		< 0.002	0.08			0.002	< 0.002		< 0.001	< 0.03	< 0.001	
GCULV	11-Jun-05	< 0.0002	0.011	< 0.003	0.016	0.12	< 0.0002	0.01	4.6	< 0.0002	< 0.001	< 0.001	0.009	0.089	< 0.0001	0.3	< 0.001		0.6	< 0.001	0.001	1	0.001	< 0.002	< 0.01	< 0.002	0.9	< 0.005		0.004	0.03			0.008	< 0.002		< 0.001	< 0.03	0.002	
GCULV	16-Jul-05	< 0.0002	0.007	< 0.003	0.008	0.12	< 0.0002	0.01	6	< 0.0002	< 0.001	0.001	0.018	0.076	< 0.0001	0.2	< 0.001		1	0.002	< 0.001	0.2	0.002	0.006	< 0.01	< 0.002	1.5	< 0.005		0.003	0.017			0.003	< 0.002		0.003	< 0.03	0.002	
GCULV	22-Aug-05	< 0.0002	0.019	< 0.003	0.029	0.05	< 0.0002	0.01	8.8	< 0.0002	< 0.001	< 0.001	0.024	0.112	< 0.0001	0.4	< 0.001		1.4	0.003	< 0.001	1.3	< 0.001	< 0.002	< 0.01	< 0.002	1.9	< 0.005		0.002	0.04			0.001	< 0.002		< 0.001	< 0.03	0.006	
GCULV	05-Sep-05	< 0.0002	0.063	< 0.003	0.025	0.05	< 0.0002	< 0.01	9.2	< 0.0002	< 0.001	< 0.001	0.033	0.13	< 0.0001	0.3	0.001		1.3	0.012	< 0.001	0.4	< 0.001	0.002	< 0.01	< 0.002	2	< 0.005		< 0.002	0.04			0.002	< 0.002		0.001	< 0.03	0.001	
GCULV	11-Oct-05	< 0.00025	< 0.005	< 0.001	0.021	< 0.05	< 0.001	< 0.001	7.62	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.3		< 0.001	1.28	0.003	< 0.0005	1.41	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	8.4	< 0.001	0.044	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		< 0.005	< 0.01
GCULV	01-Nov-05	< 0.00025	0.006	< 0.001	0.025	< 0.05	< 0.001	< 0.001	9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.3		0.001	1.46	0.001	< 0.0005	1.25	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	8.7	< 0.001	0.053	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		< 0.005	< 0.01
GCULV	14-Dec-05	< 0.00025	< 0.005	< 0.001	0.037	< 0.05	< 0.001	< 0.001	13.3	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.4		0.001	2.31	< 0.001	< 0.0005	2.57	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	4.5	< 0.001	0.064	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0008	< 0.001		< 0.005	< 0.01
	average	0.00020	0.026	0.002	0.026	0.07	0.0004	0.008	10.93	0.0184	0.001	0.001	0.012	0.117	0.0001	0.391	0.002	0.001	1.80	0.004	0.0009	1.37	0.001	0.002	0.048	0.002	1.83	0.004	7.20	0.002	0.051	0.001	0.0005	0.004	0.0015	0.0006	0.001	0.03	0.003	0.01
	minimum	< 0.0002	< 0.005	< 0.003	0.0080	< 0.05	< 0.0002	< 0.001	4.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.0001	0.2	< 0.001	< 0.001	0.6	< 0.001	< 0.0005	0.20	< 0.001	< 0.001	< 0.01	< 0.001	0.9	< 0.001	4.5	< 0.001	0.017	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.03	< 0.005	< 0.01
	maximum	< 0.00025	0.0810	< 0.003	0.0450	0.1200	< 0.001	0.0100	17.6	< 0.0002	< 0.001	0.0010	0.0330	0.3750	< 0.0001	0.7	0.0050	0.001	2.9	0.012	0.0010	2.57	0.002	0.006	0.010	< 0.002	2.2	< 0.005	8.7	0.004	0.081	< 0.001	< 0.0005	0.012	< 0.002	0.0008	0.0030	< 0.03	0.006	< 0.01
	N > DL	0	9	0	11	5	0	3	11	0	0	1	8	8	0	11	4	2	11	9	3	11	3	3	3	0	8	0	3	3	11	0	0	8	0	1	2	0	7	0
	median	0.00025	0.012	0.003	0.025	0.05	0.0002	0.010	9.20	0.0002	0.001	0.001	0.011	0.089	0.0001	0.400	0.001	0.001	1.46	0.003	0.0010	1.30	0.001	0.002	0.010	0.002	1.95	0.005	8.40	0.002	0.045	0.001	0.0005	0.002	0.0020	0.0005	0.001	0.03	0.002	0.01
GHSCR1	22-Jun-05	< 0.00025	< 0.005	< 0.001	0.042	< 0.05	< 0.001	< 0.001	194	0.0027	< 0.001	< 0.001	0.001	< 0.05		3.3		0.008	54.2	0.13	< 0.0005	9.15	0.009	< 0.001	< 0.15	< 0.001		< 0.001	11.5	< 0.001	0.79	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	< 0.001		3.29	< 0.01
GHSCR2	19-Sep-05	< 0.00025	< 0.005	< 0.001	0.044	< 0.05	< 0.001	< 0.001	189	0.0013	< 0.001	< 0.001	< 0.001	< 0.05		4		0.008	49.8	0.33	< 0.0005	9.23	0.007	< 0.001	< 0.15	< 0.001		< 0.001	12.1	< 0.001	0.77	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001		1.72	< 0.01
K8	18-Jan-05	< 0.0002	0.046	< 0.003	0.03	< 0.05	< 0.0002	0.01	28.2	< 0.0002	< 0.001	< 0.001	0.011	0.133	< 0.0001	0.7	0.006		3.4	0.009	< 0.001	1.8	< 0.001	< 0.002	< 0.01	< 0.002	4.3	< 0.005		< 0.002	0.162			0.011	< 0.002		< 0.001	< 0.03	0.007	
K8	08-Feb-05	< 0.0002	0.103	< 0.003	0.029	< 0.05	< 0.0002	< 0.01	27.1	< 0.0002	< 0.001	< 0.001	0.014	0.217	< 0.0001	0.6	0.005		3.4	0.007	< 0.001	1	0.002	< 0.002	0.02	< 0.002	4.7	< 0.005		< 0.002	0.107			0.013	< 0.002		< 0.001	< 0.03	0.006	
K8	05-Apr-05	< 0.0002	0.045	< 0.003	0.012	0.15	< 0.0002	< 0.01	26.8	< 0.0002	< 0.001	0.001	0.006	0.011	< 0.0001	0.9	0.005		3.6	0.004	< 0.001	2.3	< 0.001	< 0.002	< 0.01	< 0.002	4.4	< 0.005		< 0.002	0.172			< 0.001	< 0.002		< 0.001	< 0.03	0.002	
K8	11-Jun-05	< 0.0002	0.024	< 0.003	0.012	0.07	< 0.0002	< 0.01	5.7	< 0.0002	< 0.001	< 0.001	0.002	0.009	< 0.0001	0.3	< 0.001		0.7	< 0.001	< 0.001	0.8	< 0.001	< 0.002	< 0.01	< 0.002	0.7	< 0.005		< 0.002	0.034			0.003	< 0.002		0.002	< 0.03	< 0.001	
K8	16-Jul-05	< 0.0002	0.009	< 0.003	0.009	0.1	< 0.0002	< 0.01	11.5	< 0.0002	< 0.001	< 0.001	0.009	0.005	< 0.0001	0.3	0.003		1.5	0.002	< 0.001	0.4	0.002	0.009	< 0.01	< 0.002	2.2	< 0.005		< 0.002	0.037			< 0.001	< 0.002		< 0.001	< 0.03	< 0.001	
K8	22-Aug-05	< 0.0002	0.03	< 0.003	0.026	0.1	< 0.0002	< 0.01	17.9	< 0.0002	< 0.001	< 0.001	0.064	0.03	< 0.0001	0.6	0.004		2.3	0.004	< 0.001	2	< 0.001	< 0.002	< 0.01	< 0.002	3.3	< 0.005		< 0.002	0.093			0.001	< 0.002		< 0.001	< 0.03	0.017	
K8	05-Sep-05	< 0.0002	0.044	< 0.003	0.023	0.05	< 0.0002	< 0.01	17	< 0.0002	< 0.001	< 0.001	0.022	0.114	< 0.0001	0.5	0.001		2	0.004	< 0.001	0.9	< 0.001	< 0.002	< 0.01	< 0.002	3	< 0.005		< 0.002	0.086			< 0.001	< 0.002		< 0.001	< 0.03	0.002	
K8	11-Oct-05	< 0.00025	< 0.005	< 0.001	0.025	< 0.05	< 0.001	< 0.001	15.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.4		0.002	2.11	< 0.001	< 0.0005	1.86	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	12.2	< 0.001	0.09	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001		< 0.005	< 0.01
K8	01-Nov-05	< 0.00025	< 0.005	< 0.001	0.024	< 0.05	< 0.001	< 0.001	17.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.4		0.002	2.23	< 0.001	< 0.0005	1.47	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	10.5	< 0.001	0.1	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0017	< 0.001		< 0.005	< 0.01
K8	14-Dec-05	< 0.00025	< 0.005	< 0.001	0.027	< 0.05	< 0.001	< 0.001	21.3	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.5		0.002	2.78	< 0.001	< 0.0005	2.1	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	4.8	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0022	< 0.001		< 0.005	< 0.01
	average	0.00022	0.032	0.002	0.022	0.072	0.000	0.007	18.83	0.0202	0.001	0.001	0.013	0.067	0.000	0.52	0.004	0.002	2.40	0.003	0.0009	1.463	0.001	0.002	0.053	0.002	3.23	0.004	9.17	0.002	0.099	0.001	0.0005	0.003	0.001	0.0016	0.001	0.03	0.005	0.01
	minimum	< 0.0002	< 0.005	< 0.001	0.0090	< 0.05	< 0.0002	< 0.001	5.7	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.0001	0.3	< 0.001	0.002	0.7	< 0.001	< 0.0005	0.40	< 0.001	< 0.001	< 0.01	< 0.001	0.70	< 0.001	4.80	< 0.001	0.034	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001	< 0.03	< 0.001	< 0.01
	maximum	< 0.00025	0.1030	< 0.003	0.0300	0.1500	< 0.001	0.0100	28.2	< 0.0002	0.0010	0.0010	0.0640	0.2170	< 0.0001	0.9	0.006	0.002	3.6	0.0090	< 0.001	2.30	0.0020	0.0090	0.0200	< 0.002	4.70	< 0.005	12.20	< 0.002	0.172	< 0.001	< 0.0005	0.0130	< 0.002	0.0022	0.0020	< 0.03	0.017	< 0.01
	N > DL	0	7	0	10	5	0	1	10	0	2	1	7	7	0	10	6	3	10	6	0	10	2	1	1	0	7	0	3	0	10	0	0	4	0	3	1	0	5	0
	median	0.00020	0.027	0.003	0.025	0.050	0.000	0.010	17.65	0.0002	0.001	0.001	0.008	0.050	0.000	0.50	0.004	0.002	2.27	0.003	0.0010	1.635	0.001	0.002	0.010	0.002	3.30	0.005	10.50	0.002	0.097	0.001	0.0005	0.001	0.002	0.0017	0.001	0.03	0.005	0.01
NE1	23-Jun-05	< 0.00025	0.01	< 0.001	0.013	< 0.05	< 0.001	< 0.001	57.8	< 0.0002	< 0.001	< 0.001	0.002	< 0.05		2.2		0.008	18.7	< 0.001	0.0064	3.54	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	8.2	< 0.001	0.27	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001		0.011	< 0.01
NE1	20-Sep-05	< 0.00025	< 0.005	< 0.001	0.018	< 0.05	< 0.001	< 0.001	82	< 0.0002	< 0.001	< 0.001	0.001	< 0.05		2.6		0.012	25.5	< 0.001	0.0042	4.6	0.001	< 0.001	< 0.15	< 0.001		< 0.001	8.9	< 0.001	0.41	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001		< 0.005	< 0.01
NE2	23-Jun-05	< 0.00025	0.011	< 0.001	0.032	< 0.05	< 0.001	< 0.001	91.4	< 0.0002	< 0.001	< 0.001	0.001	< 0.05		2.3		0.014	70.2	< 0.001	< 0.0005	5.23	0.004	< 0.001	< 0.15	< 0.001		< 0.001	9.9	< 0.001	0.41	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0048	< 0.001		0.1	< 0.01
NE2	20-Sep-05	< 0.00025	< 0.005	< 0.001	0.034	< 0.05	< 0.001	< 0.001	102	< 0.0002	< 0.001	< 0.001	0.001	< 0.05		2.6		0.016	73.9	0.001	< 0.0005	5.48	0.004	< 0.001	< 0.15	< 0.001		< 0.001	10.9	< 0.001	0.46	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0044	< 0.001		0.077	< 0.01
NF1	23-Jun-05	< 0.00025	0.017	< 0.001	0.034	< 0.05	< 0.001	< 0.001	19.3	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.4		0.002	4.63	0.01	< 0.0005	1.51	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	9.1	< 0.001	0.075	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0006	< 0.001		0.01	< 0.01
NF1	20-Sep-05	< 0.00025	< 0.005	< 0.001	0.04	< 0.05	< 0.001	< 0.001	23.7	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.6		0.003	4.83	0.033	< 0.0005	1.97	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	9.9	< 0.001	0.095	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0008	< 0.001		0.011	< 0.01
NF2	23-Jun-05	< 0.00025	0.012	< 0.001	0.032	< 0.05	< 0.001	< 0.001	18.1	< 0.0002	< 0.001

Appendix 3
2005 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	HG-D mg/L	K-D mg/L	LA-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	S-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	W-D mg/L	ZN-D mg/L	ZR-D mg/L
R2	29-Mar-05	< 0.00025	0.006	< 0.001	0.084	< 0.05	< 0.001	< 0.001	104	< 0.0002	0.001	< 0.001	< 0.001	< 0.05		2.1		0.008	21.9	1.7	0.0009	10.1	0.002	< 0.001	< 0.15	< 0.001		< 0.001	13.2	< 0.001	0.36	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0032	< 0.001		0.01	< 0.01
R2	17-Aug-05	< 0.00025	< 0.005	< 0.001	0.04	< 0.05	< 0.001	< 0.001	47.7	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1.1		0.006	11.6	0.6	0.0006	4.1	< 0.001	< 0.001	< 0.15	< 0.001		0.001	8.3	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001		0.019	< 0.01
R3	29-Mar-05	< 0.00025	< 0.005	< 0.001	0.063	< 0.05	< 0.001	< 0.001	86.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1.7		0.005	18.3	0.001	< 0.0005	7.57	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11	< 0.001	0.29	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0025	< 0.001		< 0.005	< 0.01
R3	17-Aug-05	< 0.00025	< 0.005	< 0.001	0.037	< 0.05	< 0.001	< 0.001	41.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1		0.004	9.72	0.41	< 0.0005	3.28	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	7.8	< 0.001	0.15	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001		0.011	< 0.01
R4	29-Mar-05	< 0.00025	< 0.005	< 0.001	0.081	< 0.05	< 0.001	< 0.001	65.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1.5		0.003	13.6	< 0.001	0.001	4.64	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	10.3	< 0.001	0.2	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0026	< 0.001		< 0.005	< 0.01
R4	17-Aug-05	< 0.00025	< 0.005	< 0.001	0.049	< 0.05	< 0.001	< 0.001	40.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.9		0.003	9.18	0.3	0.0005	2.84	< 0.001	< 0.001	< 0.15	< 0.001		0.002	7	< 0.001	0.15	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001		0.014	< 0.01
R5	29-Mar-05	< 0.00025	< 0.005	< 0.001	0.089	< 0.05	< 0.001	< 0.001	71.2	< 0.0002	< 0.001	< 0.001	< 0.001	0.05		1.6		0.004	14.7	0.001	0.001	4.95	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.3	< 0.001	0.22	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0027	< 0.001		< 0.005	< 0.01
R5	17-Aug-05	< 0.00025	< 0.005	< 0.001	0.051	< 0.05	< 0.001	< 0.001	34.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.7		0.001	8.91	0.052	0.0008	1.27	< 0.001	< 0.001	< 0.15	< 0.001		0.001	7.3	< 0.001	0.1	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001		< 0.005	< 0.01
R6	29-Mar-05	< 0.00025	< 0.005	< 0.001	0.092	< 0.05	< 0.001	< 0.001	71.7	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1.6		0.004	14.7	0.002	0.0011	4.99	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.5	< 0.001	0.22	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0028	< 0.001		< 0.005	< 0.01
R6	17-Aug-05	< 0.00025	0.005	< 0.001	0.058	< 0.05	< 0.001	< 0.001	38.1	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.7		< 0.001	10.3	0.01	0.0009	1.17	< 0.001	< 0.001	< 0.15	< 0.001		0.002	8.1	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0015	< 0.001		< 0.005	< 0.01
R7	22-Jan-05	< 0.00025	< 0.005	< 0.001	0.064	< 0.05	< 0.001	< 0.001	37.6	< 0.0002	< 0.001	< 0.001	< 0.001	0.11		0.9		0.007	7.94	0.017	0.0006	2.77	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.5	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001		0.035	< 0.01
R7	09-Feb-05	< 0.00025	< 0.005	< 0.001	0.062	< 0.05	< 0.001	< 0.001	35.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.8		0.007	6.94	0.011	0.0007	2.89	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.6	< 0.001	0.15	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0019	< 0.001		0.013	< 0.01
R7	14-Mar-05	< 0.00025	0.006	< 0.001	0.069	< 0.05	< 0.001	< 0.001	40.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.18		1.1		0.006	7.26	0.01	0.0007	3.41	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.2	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	< 0.0001	0.002	< 0.001		0.013	< 0.01
R7	11-Apr-05	< 0.00025	< 0.005	< 0.001	0.061	< 0.05	< 0.001	< 0.001	38.5	< 0.0002	< 0.001	< 0.001	< 0.001	0.06		0.9		0.007	7.52	0.004	0.0007	3.24	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	12.4	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0022	< 0.001		< 0.005	< 0.01
R7	09-May-05	< 0.00025	0.092	< 0.001	0.022	< 0.05	< 0.001	< 0.001	7.25	< 0.0002	< 0.001	< 0.001	0.001	0.17		1		0.001	1.34	0.009	< 0.0005	0.69	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	4.3	< 0.001	0.03	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.006	< 0.01
R7	20-Jun-05	< 0.00025	0.022	< 0.001	0.034	< 0.05	< 0.001	< 0.001	18	< 0.0002	< 0.001	< 0.001	< 0.001	0.11		0.4		0.002	4.27	0.015	< 0.0005	1.4	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	9.2	< 0.001	0.064	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0006	< 0.001		< 0.005	< 0.01
R7	26-Jul-05	< 0.00025	0.008	< 0.001	0.044	< 0.05	< 0.001	< 0.001	22.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.4		0.003	4.32	0.004	< 0.0005	1.66	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.3	< 0.001	0.088	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0007	< 0.001		< 0.005	< 0.01
R7	23-Aug-05	< 0.00025	< 0.005	< 0.001	0.039	< 0.05	< 0.001	< 0.001	26.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.4		0.003	5.4	0.014	< 0.0005	1.87	< 0.001	< 0.001	< 0.15	< 0.001		0.001	8.9	< 0.001	0.099	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001		< 0.005	< 0.01
R7	06-Sep-05	< 0.00025	< 0.005	< 0.001	0.042	< 0.05	< 0.001	< 0.001	23	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.5		0.003	4.56	0.012	< 0.0005	1.83	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	8.8	< 0.001	0.087	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0008	< 0.001		< 0.005	< 0.01
R7	11-Oct-05	< 0.00025	< 0.005	< 0.001	0.042	< 0.05	< 0.001	< 0.001	23.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.5		0.003	5.03	0.017	< 0.0005	1.72	< 0.001	< 0.001		< 0.001		< 0.001	10.7	< 0.001	0.091	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001		< 0.005	< 0.01
R7	02-Nov-05	< 0.00025	< 0.005	< 0.001	0.054	< 0.05	< 0.001	< 0.001	30.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.6		0.005	6.12	0.01	0.0005	1.81	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.1	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001		< 0.005	< 0.01
R7	13-Dec-05	< 0.00025	< 0.005	< 0.001	0.065	< 0.05	< 0.001	< 0.001	35.1	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.8		0.006	7.13	0.007	0.0006	2.55	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	5.5	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0015	< 0.001		< 0.005	< 0.01
	average	0.00025	0.014	0.001	0.050	0.050	0.001	0.001	28.18	0.000	0.001	0.001	0.001	0.08		0.69		0.004	5.65	0.011	0.0006	2.15	0.001	0.001	0.15	0.001		0.001	9.7	0.001	0.112	0.001	0.0005	0.001	0.0001	0.0012	0.001		0.009	0.01
	minimum	< 0.00025	< 0.005	< 0.001	0.0220	< 0.05	< 0.001	< 0.001	7.25	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.4		0.001	1.34	0.004	< 0.0005	0.69	< 0.001	< 0.001	< 0.15	< 0.001		0.001	4.3	< 0.001	0.03	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		< 0.005	< 0.01
	maximum	< 0.00025	0.0920	< 0.001	0.0690	< 0.05	< 0.001	< 0.001	40.7	< 0.0002	< 0.001	< 0.001	0.0010	0.1800		1.1		0.007	7.94	0.017	0.0007	3.41	< 0.001	< 0.001	< 0.15	< 0.001		0.001	12.4	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0022	< 0.001		0.035	< 0.01
	N > DL	0	4	0	12	0	0	0	12	0	0	0	1	5		12		12	12	12	6	12	0	0	0	0		1	12	0	12	0	0	0	0	11	0		4	0
	median	0.00025	0.005	0.001	0.049	0.050	0.001	0.001	28.40	0.000	0.001	0.001	0.001	0.05		0.70		0.004	5.76	0.011	0.0005	1.85	0.001	0.001	0.15	0.001		0.001	10.9	0.001	0.110	0.001	0.0005	0.001	0.0001	0.0012	0.001		0.005	0.01
R8	22-Jan-05	< 0.00025	< 0.005	< 0.001	0.063	< 0.05	< 0.001	< 0.001	35.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.05		0.8		0.007	6.98	0.019	0.0006	2.64	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.6	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001		0.013	< 0.01
R8	09-Feb-05	< 0.00025	< 0.005	< 0.001	0.066	< 0.05	< 0.001	< 0.001	38.8	< 0.0002	< 0.001	< 0.001	< 0.001	0.08		0.8		0.007	7.79	0.019	0.0007	3.02	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	12.3	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	< 0.0001	0.002	< 0.001		0.011	< 0.01
R8	14-Mar-05	< 0.00025	< 0.005	< 0.001	0.071	< 0.05	< 0.001	< 0.001	41.9	< 0.0002	< 0.001	< 0.001	< 0.001	0.13		1.1		0.007	8.28	0.018	0.0007	3.54	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	10.9	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0021	< 0.001		< 0.005	< 0.01
R8	11-Apr-05	< 0.00025	< 0.005	< 0.001	0.059	< 0.05	< 0.001	< 0.001	36.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.8		0.007	7.45	0.012	0.0008	3.14	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	12.7	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0021	< 0.001		< 0.005	< 0.01
R8	09-May-05	< 0.00025	0.097	< 0.001	0.021	< 0.05	< 0.001	< 0.001	6.93	< 0.0002	< 0.001	< 0.001	0.002	0.16		1		0.001	1.31	0.004	< 0.0005	0.73	0.001	0.001	< 0.15	< 0.001		< 0.001	4.6	< 0.001	0.03	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.01	< 0.01
R8	20-Jun-05	< 0.00025	0.021	< 0.001	0.031	< 0.05	< 0.001	< 0.001	15.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.1		0.3		0.002	3.73	0.01	< 0.0005	1.33	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	9	< 0.001	0.058	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0005	< 0.001		< 0.005	< 0.01
R8	26-Jul-05	< 0.00025	0.01	< 0.001	0.036	< 0.05	< 0.001	< 0.001	17.5	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.3		0.003	3.41	0.018	< 0.0005	1.44	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	10.5	< 0.001	0.072	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0006	< 0.001		< 0.005	< 0.01
R8	23-Aug-05	< 0.00025	0.006	0.001	0.038	< 0.05	< 0.001	< 0.001	25.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.4		0.004	5.22	0.013	< 0.0005	1.89	< 0.001	< 0.001	< 0.15	< 0.001		0.002	9.4	< 0.001	0.095	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001		< 0.005	< 0.01
R8	06-Sep-05	< 0.00025	< 0.005	< 0.001	0.039	< 0.05	< 0.001	< 0.001	21.5	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.5		0.003	4.26	0.01	< 0.0005	1.85	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	9.2	< 0.001	0.084	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0008	< 0.001		0.007	< 0.01
R8	11-Oct-05	< 0.00025	< 0.005	< 0.001	0.041	< 0.05	< 0.001	< 0.001	23.5	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.5		0.003	5.11	0.016	< 0.0005	1.8	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.1	< 0.001	0.09	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0008	< 0.001		< 0.005	< 0.01
R8	02-Nov-05	< 0.00025	0.005	< 0.001	0.05	< 0.05	< 0.001	< 0.001	27.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.6		0.005	5.64	0.015	0.0005	1.72	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.1	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001		< 0.005	< 0.01
	average	0.00025	0.015	0.001	0.047	0.050	0.001	0.001	26.49	0.0002	0.001	0.001	0.001	0.075		0.65		0.0045	5.38	0.014	0.0006	2.10	0.001	0.001	0.15	0.001		0.001	10.22	0.001	0.107	0.0010	0.0005	0.001	0.0001	0.0012	0.001		0.007	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.021	< 0.05	< 0.001	< 0.001	6.93	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.3		0.001	1.31	0.004	< 0.0005	0.73	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	4.6	< 0.001	0.03	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		< 0.005	< 0.01
	maximum	< 0.00025	0.0970	0.0010	0.071	< 0.05	< 0.001	< 0.001	41.90	< 0.0002	< 0.001	< 0.001	0.0020	0.1600		1.1		0.007	8.28	0.019	0.0008	3.54	0.001	0.001	< 0.15	< 0.001		0.002	12.7	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0021	< 0.001		0.013	< 0.01
	N > DL	0	5	1	11	0	0	0	11	0	0	0	1	5		11		11	11	11	5	11	1	1	0	0		1	11	0	11	0	0	0	0	10	0		4	0
	median	0.00025	0.005	0.001	0.041	0.050	0.001	0.001	25.60	0.0002	0.001	0.001	0.001	0.05		0.60		0.0040	5.22	0.015	0.0005	1.85	0.001	0.001	0.15	0.001		0.001	10.90	0.001	0.095	0.0010	0.0005	0.001	0.0001	0.0010	0.001		0.005	0.010
R9	22-Jan-05	< 0.00025	< 0.005	< 0.001	0.063	< 0.05	< 0.001	< 0.001	39	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.9		0.007	8.36	0.02	0.0006	2.77	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.7	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0018	< 0.001		0.013	< 0.01
R9	09-Feb-05	< 0.00025	< 0.005	< 0.001	0.06	< 0.05	< 0.001	< 0.001	37.8	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.8		0.007	8.02	0.021	0.0006	2.96	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.9	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0021	< 0.001		0.011	< 0.01
R9	14-Mar-05	< 0.00025	0.017	< 0.001	0.069	< 0.05	< 0.001	< 0.001	42.6	< 0.0002	< 0.001	< 0.001	< 0.001	0.18		1		0.007	8.25	0.003	0.0008	3.37	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	10.9	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0023	< 0.001		< 0.005	< 0.01
R9	11-Apr-05	< 0.00025	< 0.005	< 0.001	0.058	< 0.05	< 0.001	< 0.001	38.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.9		0.007	8.18	0.012	0.0007	3.18	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	12.2	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0023	< 0.001		< 0.005	< 0.01
R9	09-May-05	< 0.00025	0.11	< 0.001	0.021	< 0.05	< 0.001	< 0.001	7.63	< 0.0002	< 0.001	< 0.001	0.002	0.17		1.1		0.001	1.51	0.004	< 0.0005	0.77	0.001	0.001	< 0.15	< 0.001		< 0.001	4.8	< 0.001	0.034	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.01	< 0.01
R9	20-Jun-05	< 0.00025	0.02	< 0.001	0.032	< 0.05	< 0.001	< 0.001	17.1	< 0.0002	< 0.001	< 0.001	< 0.001	0.1		0.4		0.002	4.01	0.009	< 0.0005	1.37	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	8.9	< 0.001	0.063	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0006	< 0.001		< 0.005	< 0.01
R9	26-Jul-05	< 0.00025	0.011	< 0.001	0.037	< 0.05	< 0.001	< 0.001	19.1	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.4		0.003	3.83	0.001	< 0.0005	1.56	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	10.9	< 0.001	0.081	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0007	< 0.001		< 0.005	< 0.01
R9	23-Aug-05	< 0.00025	< 0.005	0.001	0.037	< 0.05	< 0.001	< 0.001	26.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.5		0.004	5.49	0.012	< 0.0005	1.9	< 0.001	< 0.001	< 0.15	< 0.001		0.002	9.2	< 0.001	0.098	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001		< 0.005	< 0.01
R9	06-Sep-05	< 0.00025	< 0.005	< 0.001	0.039	< 0.05	< 0.001	< 0.001	23.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.6		0.003	4.75	0.011	< 0.0005	1.9	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	9.3	< 0.001	0.093	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001		< 0.005	< 0.01
R9	11-Oct-05	< 0.00025	< 0.005	< 0.001	0.043	< 0.05	< 0.001	< 0.001	27.1	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.6		0.004	6.02	0.021	< 0.0005	1.98	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.6	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001		< 0.005	< 0.01
R9	02-Nov-05	< 0.00025	< 0.005	< 0.001	0.056	< 0.05	< 0.001	< 0.001	33.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.7		0.005	7.03	0.016	0.0006	2.05	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	12.1	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0017	< 0.001		< 0.005	< 0.01
R9	13-Dec-05	< 0.00025	< 0.005	< 0.001	0.064	< 0.05	< 0.001	< 0.001	37.1	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.8		0.007	7.73	0.016	0.0006	2.67	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	5.5	< 0.001	0.13	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	< 0.001		< 0.005	< 0.01
	average	0.00025	0.017	0.001	0.048	0.05	0.001	0.001	29.09	0.0002	0.001	0.001	0.001	0.075		0.73		0.005	6.10	0.012	0.0006	2.21	0.001	0.001	0.15	0.001		0.001	9.92	0.001	0.117	0.001	0.0005	0.001	0.0001	0.0014	0.001		0.007	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.0210	< 0.05	< 0.001	< 0.001	7.63	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.4		0.001	1.51	0.001	< 0.0005	0.77	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	4.8	< 0.001	0.034	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		< 0.005	< 0.01
	maximum	< 0.00025	0.1100	0.0010	0.0690	< 0.05	< 0.001	< 0.001	42.60	< 0.0002	< 0.001	< 0.001	0.0020	0.180		1.1		0.007	8.36	0.021	0.0008	3.37	0.001	0.001	< 0.15	< 0.001		0.002	12.2	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0023	< 0.001		0.013	< 0.01
	N > DL	0	4	1	12	0	0	0	12	0	0	0	1	3		12		12	12	12	6	12	1	1	0	0		1	12	0	12	0	0	0	0	11	0		3	0
	median	0.00025	0.005	0.001	0.050	0.05	0.001	0.001	30.15	0.0002	0.001	0.001	0.001	0.050		0.75		0.005	6.53	0.012	0.0006	2.02	0.001	0.001	0.15	0.001		0.001	10.90	0.001	0.120	0.001	0.0005	0.001	0.0001	0.0014	0.001		0.005	0.010
R10	22-Jan-05	< 0.00025	< 0.005	< 0.001	0.064	< 0.05	< 0.001	< 0.001	39.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.9		0.007	8.49	0.02	0.0006	2.82	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	12.3	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0018	< 0.001		0.019	< 0.01
R10	09-Feb-05	< 0.00025	< 0.005	< 0.001	0.063	< 0.05	< 0.001	< 0.001	39.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.9		0.007	8.44	0.021	0.0006	2.98	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.5	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0022	< 0.001		0.022	< 0.01
R10	14-Mar-05	< 0.00025	< 0.005	< 0.001	0.

Appendix 3
2005 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	HG-D mg/L	K-D mg/L	LA-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	S-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	W-D mg/L	ZN-D mg/L	ZR-D mg/L
R10	26-Jul-05	< 0.00025	0.011	< 0.001	0.038	< 0.05	< 0.001	< 0.001	18.8	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.4		0.003	3.71	0.001	< 0.0005	1.53	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	10.4	< 0.001	0.082	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0007	< 0.001		< 0.005	< 0.01
R10	23-Aug-05	< 0.00025	0.006	0.001	0.036	< 0.05	< 0.001	< 0.001	25.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.5		0.004	5.14	0.01	< 0.0005	1.79	< 0.001	< 0.001	< 0.15	< 0.001		0.002	8.6	< 0.001	0.096	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001		< 0.005	< 0.01
R10	06-Sep-05	< 0.00025	< 0.005	< 0.001	0.043	< 0.05	< 0.001	< 0.001	23.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.5		0.003	4.84	0.012	< 0.0005	1.91	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	9.2	< 0.001	0.094	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001		< 0.005	< 0.01
R10	11-Oct-05	< 0.00025	< 0.005	< 0.001	0.042	< 0.05	< 0.001	< 0.001	25.8	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.6		0.004	5.69	0.02	< 0.0005	1.88	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.2	< 0.001	0.1	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001		< 0.005	< 0.01
R10	02-Nov-05	< 0.00025	0.006	< 0.001	0.058	< 0.05	< 0.001	< 0.001	34.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.8		0.005	7.34	0.018	0.0005	2.13	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	12.7	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0017	< 0.001		0.005	< 0.01
R10	13-Dec-05	< 0.00025	< 0.005	< 0.001	0.064	< 0.05	< 0.001	< 0.001	36.8	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.8		0.007	7.59	0.014	0.0006	2.65	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	5.5	< 0.001	0.13	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	< 0.001		0.006	< 0.01
	average	0.00025	0.014	0.001	0.049	0.050	0.001	0.001	29.22	0.0002	0.001	0.001	0.001	0.067		0.73		0.005	6.06	0.012	0.0006	2.19	0.001	0.001	0.150	0.001		0.001	9.83	0.001	0.117	0.001	0.0005	0.001	0.0001	0.0014	0.001		0.009	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.0200	< 0.05	< 0.001	< 0.001	7.17	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.4		0.001	1.40	0.001	0.0005	0.71	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	4.6	< 0.001	0.032	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		< 0.005	< 0.01
	maximum	< 0.00025	0.0890	0.0010	0.0640	< 0.05	< 0.001	< 0.001	41.50	< 0.0002	< 0.001	< 0.001	0.0020	0.1500		1.0		0.008	8.55	0.021	0.0008	3.30	< 0.001	0.001	< 0.15	< 0.001		0.002	12.7	< 0.001	0.180	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0025	< 0.001		0.022	< 0.01
	N > DL	0	6	1	12	0	0	0	12	0	0	0	1	3		12		12	12	12	6	12	0	1	0	0		1	12	0	12	0	0	0	0	11	0		8	0
	median	0.00025	0.006	0.001	0.051	0.050	0.001	0.001	30.20	0.0002	0.001	0.001	0.001	0.050		0.80		0.005	6.52	0.012	0.0005	2.02	0.001	0.001	0.150	0.001		0.001	10.40	0.001	0.115	0.001	0.0005	0.001	0.0001	0.0013	0.001		0.007	0.010
R11	29-Mar-05	< 0.00025	< 0.005	< 0.001	0.087	< 0.05	< 0.001	< 0.001	72.8	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1.7		0.004	15.3	0.004	0.0011	5.33	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	12	< 0.001	0.23	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0027	< 0.001		< 0.005	< 0.01
R11	17-Aug-05	< 0.00025	< 0.005	< 0.001	0.049	< 0.05	< 0.001	< 0.001	34.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.9		0.002	8.07	0.038	0.0007	1.84	< 0.001	< 0.001	< 0.15	< 0.001		0.001	6.6	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001		< 0.005	< 0.01
SP5-6	22-Jun-05	< 0.00025	0.045	< 0.001	0.022	< 0.05	< 0.001	< 0.001	99	0.0028	0.005	< 0.001	0.005	< 0.05		3.2		0.024	79.5	0.19	< 0.0005	5.24	0.024	0.001	< 0.15	< 0.001		< 0.001	11.7	< 0.001	0.4	< 0.001	< 0.0005	< 0.001	< 0.0001	0.003	< 0.001		2.32	< 0.01
SP5-6	19-Sep-05	< 0.00025	0.038	< 0.001	0.028	< 0.05	< 0.001	< 0.001	144	0.0039	0.012	< 0.001	0.005	< 0.05		4		0.032	123	0.58	< 0.0005	7.92	0.04	< 0.001	< 0.15	< 0.001		< 0.001	11.7	< 0.001	0.62	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0061	< 0.001		3.18	< 0.01
W5	23-Jun-05	< 0.00025	0.01	< 0.001	0.02	< 0.05	< 0.001	< 0.001	74.2	0.0017	< 0.001	< 0.001	0.003	< 0.05		2.7		0.017	59.8	0.001	< 0.0005	4.4	0.022	< 0.001	< 0.15	< 0.001		< 0.001	10.5	< 0.001	0.31	< 0.001	< 0.0005	< 0.001	0.0001	0.0053	< 0.001		2.01	< 0.01
W5	20-Sep-05	< 0.00025	< 0.005	< 0.001	0.019	< 0.05	< 0.001	< 0.001	73.8	0.0011	< 0.001	< 0.001	0.001	< 0.05		2.6		0.017	49.4	< 0.001	< 0.0005	4.18	0.017	< 0.001	< 0.15	< 0.001		0.001	10.3	< 0.001	0.31	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0041	< 0.001		1.17	< 0.01
W8	22-Jun-05	< 0.00025	0.014	< 0.001	0.048	< 0.05	< 0.001	< 0.001	14.9	< 0.0002	< 0.001	< 0.001	0.002	< 0.05		0.5		0.001	2.1	< 0.001	< 0.0005	1.64	< 0.001	0.001	< 0.15	< 0.001		< 0.001	13.5	< 0.001	0.051	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.063	< 0.01
W8	20-Sep-05	< 0.00025	< 0.005	< 0.001	0.049	< 0.05	< 0.001	< 0.001	14.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.5		0.001	2.02	< 0.001	< 0.0005	1.74	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	14.1	< 0.001	0.049	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.011	< 0.01
W10	22-Jun-05	< 0.00025	0.013	< 0.001	0.012	< 0.05	< 0.001	< 0.001	13.8	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.3		< 0.001	1.9	< 0.001	< 0.0005	1.58	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	12.8	< 0.001	0.047	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		< 0.005	< 0.01
W10	20-Sep-05	< 0.00025	0.006	< 0.001	0.014	< 0.05	< 0.001	< 0.001	17.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.5		< 0.001	2.19	< 0.001	< 0.0005	1.71	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	13.3	< 0.001	0.054	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.005	< 0.01
WEIR3	29-Mar-05	< 0.00025	< 0.005	< 0.001	0.098	< 0.05	< 0.001	< 0.001	165	< 0.0002	0.005	< 0.001	0.001	0.11		5		0.009	49.1	6.94	0.0012	36	0.015	< 0.001	< 0.15	< 0.001		< 0.001	17.2	< 0.001	0.67	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0072	< 0.001		< 0.005	< 0.01
WEIR3	17-Aug-05	< 0.00025	< 0.005	< 0.001	0.06	< 0.05	< 0.001	< 0.001	159	0.0033	0.003	< 0.001	< 0.001	< 0.05		2.9		0.006	31.3	5.74	0.0008	23.3	0.015	< 0.001	< 0.15	< 0.001		0.001	12.6	< 0.001	0.4	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0059	< 0.001		0.005	< 0.01
X2	21-Jan-05	< 0.00025	0.044	< 0.001	0.066	< 0.05	< 0.001	< 0.001	44.4	< 0.0002	< 0.001	< 0.001	0.002	0.19		0.9		0.007	10.5	0.082	0.0007	3.37	0.001	< 0.001	< 0.15	< 0.001		< 0.001	13.2	< 0.001	0.19	< 0.001	< 0.0005	0.002	< 0.0001	0.0019	< 0.001		0.024	< 0.01
X2	08-Feb-05	< 0.00025	0.005	< 0.001	0.067	< 0.05	< 0.001	< 0.001	44	< 0.0002	< 0.001	< 0.001	< 0.001	0.12		1		0.007	10.4	0.078	0.0007	3.46	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	12.6	< 0.001	0.19	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0022	< 0.001		0.031	< 0.01
X2	15-Mar-05	< 0.00025	0.006	< 0.001	0.066	< 0.05	< 0.001	< 0.001	44.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1.3		0.008	10.2	0.077	0.0009	3.37	0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.1	< 0.001	0.19	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0025	< 0.001		0.024	< 0.01
X2	11-Apr-05	< 0.00025	0.007	< 0.001	0.063	< 0.05	< 0.001	< 0.001	42.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.9		0.007	10.1	0.081	0.0007	3.38	0.001	< 0.001	< 0.15	< 0.001		< 0.001	12.5	< 0.001	0.19	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0022	< 0.001		0.031	< 0.01
X2	09-May-05	< 0.00025	0.079	< 0.001	0.021	< 0.05	< 0.001	< 0.001	8.55	< 0.0002	< 0.001	< 0.001	0.002	0.16		1		0.001	1.91	0.005	< 0.0005	0.77	0.001	0.001	< 0.15	< 0.001		< 0.001	4.1	< 0.001	0.038	< 0.001	< 0.0005	0.001	< 0.0001	< 0.0005	< 0.001		0.03	< 0.01
X2	20-Jun-05	< 0.00025	0.019	< 0.001	0.034	< 0.05	< 0.001	< 0.001	18.9	< 0.0002	< 0.001	< 0.001	< 0.001	0.11		0.4		0.002	4.45	0.016	< 0.0005	1.66	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	9	< 0.001	0.073	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0006	< 0.001		0.011	< 0.01
X2	25-Jul-05	< 0.00025	0.008	< 0.001	0.037	< 0.05	< 0.001	< 0.001	20.1	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.3		0.003	4.16	0.001	< 0.0005	1.54	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	10.6	< 0.001	0.085	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0007	< 0.001		0.006	< 0.01
X2	22-Aug-05	< 0.00025	0.008	< 0.001	0.045	< 0.05	< 0.001	< 0.001	28.5	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.6		0.004	6.77	0.03	< 0.0005	2.5	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	10.2	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001		0.018	< 0.01
X2	05-Sep-05	< 0.00025	< 0.005	< 0.001	0.042	< 0.05	< 0.001	< 0.001	25.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.6		0.004	5.72	0.043	< 0.0005	2.04	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	9.7	< 0.001	0.095	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001		0.025	< 0.01
X2	10-Oct-05	< 0.00025	< 0.005	< 0.001	0.042	< 0.05	< 0.001	< 0.001	27.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.6		0.004	6.21	0.043	< 0.0005	2.1	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	10.5	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001		0.025	< 0.01
X2	01-Nov-05	< 0.00025	0.007	< 0.001	0.056	< 0.05	< 0.001	< 0.001	34.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.8		0.005	8.23	0.084	0.0005	2.22	0.001	< 0.001	< 0.15	< 0.001		< 0.001	12	< 0.001	0.13	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001		0.03	< 0.01
X2	13-Dec-05	< 0.00025	< 0.005	< 0.001	0.07	< 0.05	< 0.001	< 0.001	44.1	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1		0.007	10.6	0.084	0.0007	3.28	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	6.4	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	< 0.0001	0.002	< 0.001		0.059	< 0.01
	average	0.00025	0.017	0.001	0.051	0.050	0.001	0.001	31.95	0.0002	0.001	0.001	0.001	0.082		0.78		0.005	7.438	0.052	0.0006	2.474	0.001	0.001	0.150	0.001		0.001	10.16	0.001	0.131	0.001	0.0005	0.001	0.0001	0.0014	0.001		0.026	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.021	< 0.05	< 0.001	< 0.001	8.55	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.3		0.001	1.91	0.001	< 0.0005	0.77	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	4.1	< 0.001	0.038	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.006	< 0.01
	maximum	< 0.00025	0.0790	< 0.001	0.070	< 0.05	< 0.001	< 0.001	44.90	< 0.0002	< 0.001	< 0.001	0.0020	0.1900		1.3		0.008	10.60	0.084	0.0009	3.46	0.001	0.001	< 0.15	< 0.001		< 0.001	13.2	< 0.001	0.190	< 0.001	< 0.0005	0.0020	< 0.0001	0.0025	< 0.001		0.059	< 0.01
	N > DL	0	9	0	12	0	0	0	12	0	0	0	2	4		12		12	12	12	6	12	5	1	0	0		0	12	0	12	0	0	2	0	11	0		12	0
	median	0.00025	0.007	0.001	0.051	0.050	0.001	0.001	31.35	0.0002	0.001	0.001	0.001	0.050		0.85		0.005	7.500	0.060	0.0005	2.360	0.001	0.001	0.150	0.001		0.001	10.55	0.001	0.120	0.001	0.0005	0.001	0.0001	0.0012	0.001		0.025	0.010
X3	21-Jan-05	< 0.00025	0.032	< 0.001	0.062	< 0.05	< 0.001	< 0.001	40.5	< 0.0002	< 0.001	< 0.001	0.001	0.15		0.9		0.005	8.49	0.11	0.0007	2.77	0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.2	< 0.001	0.18	< 0.001	< 0.0005	0.002	< 0.0001	0.0018	< 0.001		0.013	< 0.01
X3	08-Feb-05	< 0.00025	< 0.005	< 0.001	0.073	< 0.05	< 0.001	< 0.001	47.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.21		1.1		0.006	10.2	0.11	0.0006	3.34	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	12.3	< 0.001	0.22	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0025	< 0.001		0.023	< 0.01
X3	15-Mar-05	< 0.00025	< 0.005	< 0.001	0.066	< 0.05	< 0.001	< 0.001	46.3	< 0.0002	< 0.001	< 0.001	< 0.001	0.05		1.5		0.006	8.89	0.069	0.0006	3.95	0.001	< 0.001	< 0.15	< 0.001		< 0.001	10.5	< 0.001	0.2	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0024	< 0.001		0.015	< 0.01
X3	11-Apr-05	< 0.00025	< 0.005	< 0.001	0.062	< 0.05	< 0.001	< 0.001	42	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1		0.006	9.06	0.085	0.0007	3.18	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.3	< 0.001	0.2	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0022	< 0.001		0.019	< 0.01
X3	09-May-05	< 0.00025	0.048	< 0.001	0.021	< 0.05	< 0.001	< 0.001	11.4	< 0.0002	< 0.001	< 0.001	0.001	0.17		1		< 0.001	2.69	0.017	< 0.0005	0.84	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		0.009	< 0.01
X3	20-Jun-05	< 0.00025	0.018	< 0.001	0.032	< 0.05	< 0.001	< 0.001	18.8	< 0.0002	< 0.001	< 0.001	< 0.001	0.13		0.5		0.002	3.89	0.029	< 0.0005	1.58	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	8.4	< 0.001	0.082	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0007	< 0.001		0.006	< 0.01
X3	25-Jul-05	< 0.00025	0.009	< 0.001	0.036	< 0.05	< 0.001	< 0.001	21	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.5		0.002	4.24	0.006	< 0.0005	1.63	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	9.4	< 0.001	0.097	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0008	< 0.001		< 0.005	< 0.01
X3	22-Aug-05	< 0.00025	0.011	< 0.001	0.052	< 0.05	< 0.001	< 0.001	33.7	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.8		0.004	7.36	0.037	< 0.0005	2.63	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.3	< 0.001	0.15	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0013	< 0.001		0.014	< 0.01
X3	05-Sep-05	< 0.00025	< 0.005	< 0.001	0.042	< 0.05	< 0.001	< 0.001	26.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.7		0.003	5.56	0.038	< 0.0005	2.03	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	8.7	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001		0.014	< 0.01
X3	10-Oct-05	< 0.00025	< 0.005	< 0.001	0.039	< 0.05	< 0.001	< 0.001	26.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.6		0.003	5.81	0.043	< 0.0005	1.91	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	10.5	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001		0.009	< 0.01
X3	01-Nov-05	< 0.00025	0.005	< 0.001	0.053	< 0.05	< 0.001	< 0.001	33.8	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.9		0.004	7.56	0.077	< 0.0005	2.02	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.1	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001		0.02	< 0.01
X3	13-Dec-05	< 0.00025	< 0.005	< 0.001	0.068	< 0.05	< 0.001	< 0.001	43.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1.1		0.006	9.73	0.097	0.0006	3.79	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	6.1	0.002	0.18	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0019	< 0.001		0.043	< 0.01
	average	0.00025	0.013	0.001	0.051	0.05	0.001	0.001	32.68	0.0002	0.001	0.001	0.001	0.09		0.88		0.004	6.96	0.060	0.0006	2.47	0.001	0.001	0.15	0.001		0.001	9.62	0.001	0.143	0.001	0.0005	0.001	0.0001	0.0015	0.001		0.016	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.021	< 0.05	< 0.001	< 0.001	11.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.5		0.002	2.69	0.006	< 0.0005	0.84	< 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
	maximum	< 0.00025	0.0480	< 0.001	0.073	< 0.05	< 0.001	< 0.001	47.7	< 0.0002	< 0.001	< 0.001	0.0010	0.2100		1.5		0.006	10.20	0.110	0.0007	3.95	0.001	< 0.001	< 0.15	< 0.001		< 0.001	12.3	0.002	0.22	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0025	< 0.001		0.043	< 0.01
	N > DL	0	6	0	12	0	0	0	12	0	0	0	2	5		12		11	12	12	5	12	3	0	0	0		0	12	1	12	0	0	1	0	11	0		11	0
	median	0.00025	0.005	0.001	0.053	0.05	0.001	0.001	33.75	0.0002	0.001	0.001	0.001	0.05		0.90		0.004	7.460	0.056	0.0005	2.33	0.001	0.001	0.15	0.001		0.001	10.50	0.001	0.145	0.001	0.0005	0.001	0.0001	0.0014	0.001		0.014	0.010
X4	21-Jan-05	< 0.00025	0.024	< 0.001	0.01	< 0.05	< 0.001	< 0.001	190	0.0094	0.048	< 0.001	0.001	6.16		3.3		0.014	52.5	12.4	< 0.0005	12.3	0.06	< 0.001	< 0.15	< 0.001		< 0.001	8.4	< 0.001	0.64	< 0.001	< 0.0005	0.001	0.0008	< 0.0005	< 0.001		14.8	< 0.01
X4	08-Feb-05	< 0.00025	< 0.005	< 0.001	0.012	< 0.05	< 0.001	< 0.001	218	0.01	0.055	< 0.001	0.001	12.8		4		0.016	60.9	13	< 0.0005	14.4	0.068	< 0.001	< 0.15	< 0.001		< 0.001	9.7	< 0.001	0.73	< 0.001	< 0.0005	< 0.001	0.0009	0.0006	< 0.001		15.2	< 0.01
X4	15-Mar-05	< 0.00025	< 0.005	< 0.001	0.018	< 0.05	< 0.001	< 0.001	218	0.0054	0.046	< 0.001	0.001	1.75		4.6		0.014	46.3	12.4	< 0.0005	15.1	0.053	< 0.001	< 0.15	< 0.001		< 0.001	10.4	< 0.001	0.69	< 0.001	< 0.0005	< 0.001	0.0007	< 0.0005	< 0.001		9.79	< 0.01
X4	11-Apr-05	< 0.00025	< 0.005	< 0.001	0.014	< 0.05	< 0.001	< 0.001	150	0.0017	0.027	< 0.001	< 0.001	12.9		3.1		0.009	28.3	9.35	< 0.0005	9.59	0.029	< 0.001	< 0.15	< 0.001		< 0.001	10.1	< 0.001	0.48	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001		5.13	< 0.01
X4	09-May-05	< 0.00025	0.041	< 0.001	0.01	< 0.05	< 0.001	< 0.001	160	0.015	0.051	< 0.001	0.042	4.45		2.9		0.013	48.6	11.2	< 0.0005	10.5	0.063	0.01	< 0.15	< 0.001		< 0.001	5.5	< 0.001	0.56	< 0.001	< 0.0005	< 0.001	0.0011	< 0.0005	< 0.001		20.6	< 0.01
X4	21-Jun-05	< 0.00025	0.035	< 0.001	0.012	< 0.05	< 0.001	< 0.001	159	0.018	0.055	< 0.001	0.025	2.96		3		0.017	60	10.4

Appendix 3
2005 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	HG-D mg/L	K-D mg/L	LA-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	S-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	W-D mg/L	ZN-D mg/L	ZR-D mg/L
X4	11-Oct-05	< 0.00025	0.13	< 0.001	0.008	< 0.05	< 0.001	< 0.001	170	0.014	0.059	< 0.001	0.049	8.1		3.1		0.017	65.9	13.5	< 0.0005	12.4	0.083	0.15	< 0.15	< 0.001		< 0.001	7.7	< 0.001	0.67	< 0.001	< 0.0005	< 0.001	0.001	0.0006	< 0.001		28.7	< 0.01
X4	02-Nov-05	< 0.00025	0.13	< 0.001	0.009	< 0.05	< 0.001	< 0.001	188	0.016	0.066	< 0.001	0.052	8.45		3.6		0.019	73.3	15.6	< 0.0005	14	0.094	0.13	< 0.15	< 0.001		< 0.001	8.5	< 0.001	0.69	< 0.001	< 0.0005	< 0.001	0.0011	0.0006	< 0.001		30.5	< 0.01
X4	15-Dec-05	< 0.00025	< 0.005	< 0.001	0.012	< 0.05	< 0.001	< 0.001	203	0.011	0.069	< 0.001	0.003	12.3		5		0.021	71.4	15.5	< 0.0005	16.8	0.078	< 0.001	< 0.15	< 0.001		< 0.001	6	< 0.001	0.89	< 0.001	< 0.0005	< 0.001	0.001	< 0.0005	< 0.001		21.4	< 0.01
	average	0.00033	0.078	0.001	0.012	0.05	0.001	0.001	182.2	0.013	0.056	0.001	0.030	7.34		3.53		0.016	59.41	12.67	0.0005	12.76	0.072	0.081	0.150	0.001		0.001	7.95	0.001	0.67	0.001	0.0005	0.001	0.0010	0.0006	0.001		21.43	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.008	< 0.05	< 0.001	< 0.001	150	0.0017	0.027	< 0.001	< 0.001	1.75		2.7		0.009	28.3	9.35	< 0.0005	9.59	0.0290	< 0.001	< 0.15	< 0.001		0.0020	5.5	< 0.001	0.48	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		5.13	< 0.01
	maximum	0.0012	0.2300	0.0010	0.018	< 0.05	< 0.001	< 0.001	218	0.0220	0.077	< 0.001	0.0750	12.90		5.0		0.021	83.0	15.60	< 0.0005	16.80	0.1000	0.2700	< 0.15	< 0.001		0.0020	10.4	< 0.001	0.89	< 0.001	< 0.0005	0.0010	0.0016	0.0009	< 0.001		30.5	< 0.01
	N > DL	1	8	1	12	0	0	0	12	12	12	0	11	12		12		12	12	12	0	12	12	7	0	0		1	12	0	12	0	0	1	11	7	0		12	0
	median	0.00025	0.038	0.001	0.012	0.05	0.001	0.001	179.0	0.015	0.056	0.001	0.034	6.68		3.20		0.017	60.45	12.70	0.0005	12.35	0.075	0.021	0.150	0.001		0.001	7.95	0.001	0.66	0.001	0.0005	0.001	0.0011	0.0006	0.001		23.55	0.010
X5	08-Mar-05	< 0.00025	< 0.005	< 0.001	0.024	< 0.05	< 0.001	< 0.001	239	< 0.0002	0.013	< 0.001	0.001	0.14		6		0.016	55	11.6	0.0012	31.3	0.023	< 0.001	< 0.15	< 0.001		< 0.001	14.1	< 0.001	0.63	< 0.001	< 0.0005	< 0.001	0.0002	0.0036	< 0.001		0.38	< 0.01
X5	14-Mar-05	< 0.00025	< 0.005	< 0.001	0.026	< 0.05	< 0.001	< 0.001	270	< 0.0002	0.02	< 0.001	0.001	0.16		6		0.013	62.9	19	0.0009	40	0.039	< 0.001		< 0.001		< 0.001	15.6	< 0.001	0.81	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0041	< 0.001		0.34	< 0.01
X5	22-Mar-05	< 0.00025	0.009	< 0.001	0.017	< 0.05	< 0.001	< 0.001	288	< 0.0002	0.017	< 0.001	< 0.001	0.07		5.6		0.014	64.6	16.3	0.0007	36.2	0.032	< 0.001	< 0.15	< 0.001		< 0.001	15.3	< 0.001	0.73	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0046	< 0.001		0.28	< 0.01
X5	10-May-05	< 0.00025	0.007	< 0.001	0.02	< 0.05	< 0.001	< 0.001	187	< 0.0002	0.007	< 0.001	< 0.001	< 0.05		3.8		0.012	36.2	5.73	0.0009	19.3	0.013	< 0.001	< 0.15	< 0.001		< 0.001	7	< 0.001	0.55	< 0.001	< 0.0005	< 0.001	0.0003	0.0021	< 0.001		0.22	< 0.01
X5	31-May-05	< 0.00025	0.008	< 0.001	0.014	< 0.05	< 0.001	< 0.001	128	0.0006	0.003	< 0.001	< 0.001	0.24		3.6		0.021	29.9	1.44	0.0012	12.9	0.005	< 0.001	< 0.15	< 0.001		< 0.001	4.1	< 0.001	0.43	< 0.001	< 0.0005	< 0.001	0.0004	0.0008	< 0.001		0.058	< 0.01
X5	11-Jun-05	< 0.00025	< 0.005	< 0.001	0.017	< 0.05	< 0.001	< 0.001	168	< 0.0002	0.003	< 0.001	< 0.001	< 0.05		4.5		0.025	34.7	1.95	0.0012	16.3	0.006	< 0.001	< 0.15	< 0.001		< 0.001	4.4	< 0.001	0.55	< 0.001	< 0.0005	< 0.001	0.0003	0.0009	< 0.001		0.055	< 0.01
X5	19-Jun-05	< 0.00025	< 0.005	< 0.001	0.016	< 0.05	< 0.001	< 0.001	192	< 0.0002	0.003	< 0.001	< 0.001	< 0.05		5.7		0.026	38.9	2.03	0.0015	18.3	0.006	< 0.001	< 0.15	< 0.001		< 0.001	4.7	< 0.001	0.62	< 0.001	< 0.0005	< 0.001	0.0005	0.0008	< 0.001		0.03	< 0.01
X5	21-Jun-05	< 0.00025	0.009	< 0.001	0.014	< 0.05	< 0.001	< 0.001	166	< 0.0002	0.004	< 0.001	< 0.001	0.12		4.5		0.025	34.7	2.41	0.0012	16.5	0.008	< 0.001	< 0.15	< 0.001		< 0.001	4.8	< 0.001	0.55	< 0.001	< 0.0005	< 0.001	0.0004	0.0008	< 0.001		0.15	< 0.01
X5	02-Jul-05	< 0.00025	< 0.005	< 0.001	0.01	< 0.05	< 0.001	< 0.001	155	< 0.0002	0.003	< 0.001	< 0.001	< 0.05		5		0.037	37.8	1.47	0.0011	20.6	0.005	< 0.001	< 0.15	< 0.001		< 0.001	5	< 0.001	0.51	< 0.001	< 0.0005	< 0.001	0.0004	0.0007	< 0.001		< 0.005	< 0.01
X5	10-Jul-05	< 0.00025	0.006	< 0.001	0.017	< 0.05	< 0.001	< 0.001	156	< 0.0002	0.004	< 0.001	< 0.001	< 0.05		5.3		0.025	35.7	2.13	0.0013	16.5	0.006	< 0.001	< 0.15	< 0.001		< 0.001	5.6	< 0.001	0.51	< 0.001	< 0.0005	< 0.001	0.0003	0.0009	< 0.001		0.042	< 0.01
X5	17-Jul-05	< 0.00025	< 0.005	< 0.001	0.02	< 0.05	< 0.001	< 0.001	152	< 0.0002	0.004	< 0.001	< 0.001	< 0.05		5.6		0.026	36.6	2.44	0.0013	17.3	0.007	< 0.001	< 0.15	< 0.001		< 0.001	5.9	< 0.001	0.52	< 0.001	< 0.0005	< 0.001	0.0004	0.001	< 0.001		0.11	< 0.01
X5	24-Jul-05	< 0.00025	< 0.005	< 0.001	0.023	< 0.05	< 0.001	< 0.001	161	< 0.0002	0.004	< 0.001	< 0.001	< 0.05		5.6		0.03	38.5	2.75	0.0014	18.5	0.008	< 0.001	< 0.15	< 0.001		0.001	6.6	< 0.001	0.54	< 0.001	< 0.0005	< 0.001	0.0002	0.0011	< 0.001		0.035	< 0.01
X5	25-Jul-05	< 0.00025	< 0.005	< 0.001	0.017	< 0.05	< 0.001	< 0.001	180	< 0.0002	0.004	< 0.001	0.001	< 0.05		6.4		0.041	40.4	2.24	0.0017	21.1	0.006	< 0.001	< 0.15	< 0.001		< 0.001	5.9	< 0.001	0.61	< 0.001	< 0.0005	< 0.001	0.0004	0.0011	< 0.001		0.053	< 0.01
X5	31-Jul-05	< 0.00025	0.013	< 0.001	0.022	< 0.05	< 0.001	< 0.001	159	< 0.0002	0.004	< 0.001	0.001	< 0.05		5.8		0.029	34.6	2.56	0.0016	17.9	0.007	< 0.001	< 0.15	< 0.001		< 0.001	7.1	< 0.001	0.55	< 0.001	< 0.0005	< 0.001	0.0003	0.0011	< 0.001		0.026	< 0.01
X5	06-Aug-05	0.0008	< 0.005	0.001	0.025	< 0.05	< 0.001	< 0.001	167	0.0005	0.007	< 0.001	0.002	< 0.05		5.4		0.026	38.6	4.97	0.0017	19	0.012	< 0.001	< 0.15	< 0.001		0.002	8.3	< 0.001	0.54	< 0.001	0.0007	< 0.001	0.0005	0.002	< 0.001		0.19	< 0.01
X5	13-Aug-05	< 0.00025	< 0.005	< 0.001	0.021	< 0.05	< 0.001	< 0.001	185	< 0.0002	0.008	< 0.001	< 0.001	< 0.05		6.1		0.028	46.6	5.72	0.0015	23	0.014	< 0.001	< 0.15	< 0.001		< 0.001	7.9	< 0.001	0.61	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0017	< 0.001		0.21	< 0.01
X5	20-Aug-05	< 0.00025	< 0.005	< 0.001	0.017	< 0.05	< 0.001	< 0.001	155	< 0.0002	0.006	< 0.001	< 0.001	< 0.05		5.2		0.028	38.4	4.04	0.0015	17.7	0.01	< 0.001	< 0.15	< 0.001		< 0.001	5.4	< 0.001	0.49	< 0.001	< 0.0005	< 0.001	0.0002	0.0014	< 0.001		0.17	< 0.01
X5	23-Aug-05	< 0.00025	0.007	< 0.001	0.016	< 0.05	< 0.001	< 0.001	190	< 0.0002	0.007	< 0.001	< 0.001	< 0.05		6.8		0.038	49.7	5.07	0.0018	24.9	0.012	< 0.001	< 0.15	< 0.001		0.001	6.3	< 0.001	0.63	< 0.001	< 0.0005	< 0.001	0.0002	0.0015	< 0.001		0.22	< 0.01
X5	27-Aug-05	< 0.00025	< 0.005	< 0.001	0.015	< 0.05	< 0.001	< 0.001	180	< 0.0002	0.007	< 0.001	< 0.001	< 0.05		6.2		0.03	44.3	5.8	0.0015	22.1	0.013	< 0.001	< 0.15	< 0.001		0.003	5.8	< 0.001	0.59	< 0.001	< 0.0005	< 0.001	0.0002	0.0014	< 0.001		0.21	< 0.01
X5	05-Sep-05	< 0.00025	0.006	< 0.001	0.015	< 0.05	< 0.001	< 0.001	180	< 0.0002	0.005	< 0.001	< 0.001	0.17		6		0.031	42.7	3.99	0.0015	20.4	0.009	0.003	< 0.15	< 0.001		< 0.001	5.5	< 0.001	0.62	< 0.001	< 0.0005	< 0.001	0.0003	0.001	< 0.001		0.26	< 0.01
X5	06-Sep-05	< 0.00025	< 0.005	< 0.001	0.013	< 0.05	< 0.001	< 0.001	181	< 0.0002	0.004	< 0.001	0.001	< 0.05		5.8		0.03	41.3	2.75	0.0013	19.5	0.007	< 0.001	< 0.15	< 0.001		< 0.001	4.9	< 0.001	0.58	< 0.001	< 0.0005	< 0.001	0.0004	0.0007	< 0.001		0.015	< 0.01
X5	11-Sep-05	< 0.00025	< 0.005	< 0.001	0.016	< 0.05	< 0.001	< 0.001	222	< 0.0002	0.005	< 0.001	< 0.001	< 0.05		6.7		0.033	46.3	4.21	0.0015	22.8	0.01	< 0.001	< 0.15	< 0.001		< 0.001	6.3	< 0.001	0.71	< 0.001	< 0.0005	< 0.001	0.0004	0.0011	< 0.001		0.13	< 0.01
X5	18-Sep-05	< 0.00025	< 0.005	< 0.001	0.012	< 0.05	< 0.001	< 0.001	201	< 0.0002	0.003	< 0.001	< 0.001	< 0.05		5.6		0.028	35.6	2.19	0.0012	20.6	0.007	< 0.001	< 0.15	< 0.001		< 0.001	4.9	< 0.001	0.68	< 0.001	< 0.0005	< 0.001	0.0003	0.0007	< 0.001		< 0.005	< 0.01
X5	24-Sep-05	< 0.00025	0.008	< 0.001	0.015	< 0.05	< 0.001	< 0.001	196	< 0.0002	0.003	< 0.001	< 0.001	< 0.05		5.5		0.026	37.2	3.12	0.001	23.7	0.008	< 0.001	< 0.15	< 0.001		< 0.001	4.9	< 0.001	0.7	< 0.001	< 0.0005	< 0.001	0.0003	0.0008	< 0.001		0.04	< 0.01
X5	01-Oct-05	< 0.00025	< 0.005	< 0.001	0.017	< 0.05	< 0.001	< 0.001	227	0.0004	0.008	< 0.001	< 0.001	< 0.05		5.2		0.023	43.7	7.45	0.0011	26.6	0.016	< 0.001	< 0.15	< 0.001		< 0.001	8.1	< 0.001	0.71	< 0.001	< 0.0005	< 0.001	0.0003	0.0016	< 0.001		0.37	< 0.01
	average	0.00027	0.006	0.001	0.018	0.050	0.001	0.001	187.4	0.0002	0.006	0.001	0.001	0.07		5.52		0.026	41.80	4.93	0.0013	21.72	0.012	0.001	0.15	0.001		0.001	6.98	0.001	0.599	0.001	0.0005	0.001	0.0003	0.0015	0.001		0.144	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.010	< 0.05	< 0.001	< 0.001	128	< 0.0002	0.0030	< 0.001	< 0.001	< 0.05		3.6		0.012	29.9	1.44	0.0007	12.90	0.005	< 0.001	< 0.15	< 0.001		< 0.001	4.1	< 0.001	0.43	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0007	< 0.001		< 0.005	< 0.01
	maximum	0.0008	0.0130	0.0010	0.026	< 0.05	< 0.001	< 0.001	288	0.0006	0.0200	< 0.001	0.0020	0.2400		6.8		0.041	64.6	19.00	0.0018	40.00	0.039	0.003	< 0.15	< 0.001		0.003	15.6	< 0.001	0.81	< 0.001	0.0007	< 0.001	0.0005	0.0046	< 0.001		0.380	< 0.01
	N > DL	1	9	1	25	0	0	0	25	3	25	0	6	6		25		25	25	25	25	25	25	1	0	0		4	25	0	25	0	1	0	22	25	0		23	0
	median	0.00025	0.005	0.001	0.017	0.050	0.001	0.001	180.0	0.0002	0.004	0.001	0.001	0.05		5.60		0.026	38.60	3.12	0.0013	20.40	0.008	0.001	0.15	0.001		0.001	5.90	0.001	0.590	0.001	0.0005	0.001	0.0003	0.0011	0.001		0.130	0.010
X5P	21-Jan-05	< 0.00025	0.009	< 0.001	0.026	< 0.05	< 0.001	< 0.001	190	< 0.0002	0.008	< 0.001	0.001	0.13		5.1		0.019	45.6	6.61	0.0015	25.8	0.015	< 0.001	< 0.15	< 0.001		< 0.001	11.3	< 0.001	0.54	< 0.001	< 0.0005	< 0.001	0.0001	0.0032	< 0.001		0.31	< 0.01
X5P	08-Feb-05	< 0.00025	< 0.005	< 0.001	0.033	< 0.05	< 0.001	< 0.001	195	< 0.0002	0.007	< 0.001	0.001	0.19		5.4		0.016	46.1	6.7	0.0014	25.9	0.012	< 0.001	< 0.15	< 0.001		< 0.001	12.5	< 0.001	0.56	< 0.001	< 0.0005	< 0.001	< 0.0001	0.004	< 0.001		0.24	< 0.01
X5P	11-Apr-05	< 0.00025	< 0.005	< 0.001	0.031	< 0.05	< 0.001	< 0.001	179	< 0.0002	0.007	< 0.001	0.001	0.06		4.8		0.014	42.4	6.07	0.0014	25.9	0.013	< 0.001	< 0.15	< 0.001		< 0.001	12.7	< 0.001	0.52	< 0.001	< 0.0005	< 0.001	< 0.0001	0.004	< 0.001		0.18	< 0.01
X5P	02-Nov-05	< 0.00025	< 0.005	< 0.001	0.019	< 0.05	< 0.001	< 0.001	246	0.0004	0.013	< 0.001	0.002	< 0.05		5.2		0.019	52.4	11.6	0.0009	29.6	0.027	0.001	< 0.15	< 0.001		< 0.001	10.7	< 0.001	0.7	< 0.001	< 0.0005	< 0.001	0.0002	0.0026	< 0.001		0.59	< 0.01
X5P	15-Dec-05	< 0.00025	< 0.005	< 0.001	0.026	< 0.05	< 0.001	< 0.001	281	0.0003	0.016	< 0.001	0.001	< 0.05		6.4		0.022	64.6	13.4	0.0014	38.1	0.029	< 0.001	< 0.15	< 0.001		< 0.001	6.9	< 0.001	0.87	< 0.001	< 0.0005	< 0.001	0.0002	0.0038	< 0.001		0.61	< 0.01
	average	0.00025	0.006	0.001	0.027	0.05	0.001	0.001	218.2	0.0003	0.010	0.001	0.001	0.10		5.38		0.018	50.22	8.88	0.0013	29.06	0.019	0.001	0.15	0.001		0.001	10.82	0.001	0.638	0.001	0.0005	0.001	0.0001	0.0035	0.001		0.39	0.01
	minimum	< 0.00025	< 0.005	< 0.001	0.019	< 0.05	< 0.001	< 0.001	179	< 0.0002	0.007	< 0.001	0.001	0.060		4.8		0.014	42.4	6.07	0.0009	25.8	0.012	< 0.001	< 0.15	< 0.001		< 0.001	6.9	< 0.001	0.52	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0026	< 0.001		0.18	< 0.01
	maximum	< 0.00025	0.0090	< 0.001	0.033	< 0.05	< 0.001	< 0.001	281	0.0004	0.016	< 0.001	0.002	0.190		6.4		0.022	64.6	13.40	0.0015	38.1	0.029	0.0010	< 0.15	< 0.001		< 0.001	12.7	< 0.001	0.87	< 0.001	< 0.0005	< 0.001	0.0002	0.0040	< 0.001		0.61	< 0.01
	N > DL	0	1	0	5	0	0	0	5	2	5	0	5	3		5		5	5	5	5	5	5	1	0	0		0	5	0	5	0	0	0	3	5	0		5	0
	median	0.00025	0.005	0.001	0.026	0.05	0.001	0.001	195.0	0.0002	0.008	0.001	0.001	0.06		5.20		0.019	46.10	6.70	0.0014	25.90	0.015	0.001	0.15	0.001		0.001	11.30	0.001	0.56	0.001	0.0005	0.001	0.0001	0.0038	0.001		0.31	0.01
X7	23-Jun-05	< 0.00025	0.28	0.001	0.01	< 0.05	< 0.001	< 0.001	374	0.0037	0.44	< 0.001	< 0.001	1210		8.8		0.081	469	49.3	< 0.0005	59.9	0.55	< 0.001	< 0.15	< 0.001		0.004	31	< 0.001	2.42	< 0.001	< 0.0005	< 0.001	0.0003	0.0032	< 0.001		292	< 0.01
X7	20-Sep-05	< 0.00025	0.45	0.002	0.01	< 0.05	< 0.001	< 0.001	431	0.0037	0.46	< 0.001	0.003	1840		9.2		0.092	473	57.8	< 0.0005	99.6	0.52	< 0.001	< 0.15	< 0.001		0.007	29.4	< 0.001	2.48	< 0.001	< 0.0005	< 0.001	0.0003	0.0033	< 0.001		432	< 0.01
X10	21-Jan-05	< 0.00025	0.006	< 0.001	0.063	< 0.05	< 0.001	< 0.001	43.9	< 0.0002	< 0.001	< 0.001	< 0.001	0.1		1		0.005	9.9	0.059	< 0.0005	2.77	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	12	< 0.001	0.19	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0018	< 0.001		0.029	< 0.01
X10	08-Feb-05	< 0.00025	0.005	< 0.001	0.066	< 0.05	< 0.001	< 0.001	45.9	< 0.0002	< 0.001	< 0.001	< 0.001	0.15		1.1		0.005	10.4	0.041	0.0005	3.19	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.4	< 0.001	0.2	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0022	< 0.001		0.03	< 0.01
X10	14-Mar-05	< 0.00025	< 0.005	< 0.001	0.067	< 0.05	< 0.001	< 0.001	46.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.17		1.3		0.005	9.56	0.027	0.0005	3.77	0.001	< 0.001	< 0.15	< 0.001		< 0.001	10	< 0.001	0.2	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0023	< 0.001		0.022	< 0.01
X10	11-Apr-05	< 0.00025	< 0.005	< 0.001	0.062	< 0.05	< 0.001	< 0.001	44	< 0.0002	< 0.001	< 0.001	< 0.001	0.07		1		0.006	10.2	0.012	0.0006	3.16	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	11.9	< 0.001	0.2	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0023	< 0.001		0.012	< 0.01
X10	09-May-05	< 0.00025	0.055	< 0.001	0.023	< 0.05	< 0.001	< 0.001	10.9	< 0.0002	< 0.001	< 0.001	0.002	0.17		1		< 0.001	2.27	0.018	< 0.0005	0.77	0.001	< 0.001	< 0.15	< 0.001		< 0.001	4.1	< 0.001	0.046	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.017	< 0.01
X10	21-Jun-05	< 0.00025	0.017	< 0.001	0.034	< 0.05	< 0.001	< 0.001	19.8	< 0.0002	< 0.001	< 0.001	< 0.001	0.16		0.4		0.002	4.63	0.037	< 0.0005	1.43	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	7.9	< 0.001	0.082	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0007	< 0.001		0.014	< 0.01
X10	25-Jul-05	< 0.00025	0.009	< 0.001	0.045	< 0.05	< 0.001	< 0.001	26.3	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.5		0.003	6.29	0.019	< 0.0005	1.81	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	10.7	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001		0.016	< 0.01
X10	23-Aug-05	< 0.00025	0.006	< 0.001	0.051	< 0.05	< 0.001	< 0.001	34.3	< 0.0002	< 0.001	< 0.001	< 0.001	0.05		0.7		0.003	8.38	0.068	< 0.0005	2.34	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	9.3	< 0.001	0.15	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0013	< 0.001		0.026	< 0.01
X10	06-Sep-05	< 0.00025	< 0.005	< 0.001	0.043	< 0.05	< 0.001	< 0.001	28.6	< 0.0002	< 0.001	< 0.001	< 0.001	0.09		0.7		0.003	6.92	0.041	< 0.0005	1.99	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	8.2	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001		0.021	< 0.01
X10	11-Oct-05	< 0.00025	< 0.005	< 0.001	0.043	< 0.05	< 0.001	< 0.001	29.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.6		0.003	7.21	0.049	< 0.0005	1.77	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	9.1	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001		0.022	< 0.01
X10	02-Nov-05	< 0.00025	< 0.005	< 0.001	0.053	< 0.05	< 0.001	< 0.001	34.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.8		0.004	8.32	0.082	< 0.0005	1.81	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	10.1	< 0.001	0.13	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001		0.028	< 0.01
X10	15-Dec-05	< 0.00025	< 0.005	< 0.001	0.066	< 0.05	< 0.001	< 0.001	44.8	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1		0.006	10.5	0.066	0.0006	2.96	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	5.8	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0019	< 0.001		0.049	< 0.01
	average	0.00025	0.011	0.001	0.051	0.05	0.001	0.001	34.11	0.0002	0.001	0.001	0.001	0.10		0.84		0.004	7.88	0.043	0.0005	2.31	0.001	0.001	0.15	0.001		0.001	9.21	0.001	0.144	0.001	0.0005	0.001	0.0001	0.0015	0.001		0.024	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.023	< 0.05	< 0.001	< 0.001	10.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.4		< 0.001	2.27	0.012	< 0.0005	0.77

Appendix 3
2005 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	HG-D mg/L	K-D mg/L	LA-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	S-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	W-D mg/L	ZN-D mg/L	ZR-D mg/L
	median	0.00025	0.005	0.001	0.052	0.05	0.001	0.001	34.60	0.0002	0.001	0.001	0.001	0.08		0.90		0.004	8.35	0.041	0.0005	2.17	0.001	0.001	0.15	0.001		0.001	9.65	0.001	0.140	0.001	0.0005	0.001	0.0001	0.0014	0.001		0.022	0.010
X11	29-Mar-05	< 0.00025	< 0.005	0.001	0.056	< 0.05	< 0.001	< 0.001	293	0.0003	0.022	< 0.001	0.001	0.12		7		0.014	82.3	15.2	0.0005	43.3	0.025	< 0.001	< 0.15	< 0.001		< 0.001	18.9	< 0.001	1.02	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0052	< 0.001		< 0.005	< 0.01
X11	17-Aug-05	< 0.00025	< 0.005	0.002	0.046	< 0.05	< 0.001	< 0.001	292	< 0.0002	0.015	< 0.001	< 0.001	< 0.05		5.2		0.011	61.8	13.9	0.0006	29.8	0.017	< 0.001	< 0.15	< 0.001		0.001	13.5	< 0.001	0.75	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0046	< 0.001		0.005	< 0.01
X12	18-Aug-05	< 0.00025	< 0.005	< 0.001	0.043	< 0.05	< 0.001	< 0.001	123	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		3.8		0.005	27.5	0.072	< 0.0005	15.1	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	10.2	< 0.001	0.38	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0065	< 0.001		< 0.005	< 0.01
X13	21-Jan-05	< 0.00025	0.007	< 0.001	0.069	< 0.05	< 0.001	< 0.001	205	< 0.0002	0.006	< 0.001	< 0.001	0.13		3.7		0.008	41.2	8.35	0.0012	27.4	0.013	< 0.001	< 0.15	< 0.001		< 0.001	15.1	< 0.001	0.52	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0046	< 0.001		< 0.005	< 0.01
X13	08-Feb-05	< 0.00025	< 0.005	0.002	0.069	< 0.05	< 0.001	< 0.001	223	< 0.0002	0.007	< 0.001	0.001	1.86		4.3		0.008	45.7	9.25	0.001	29.4	0.015	< 0.001	< 0.15	< 0.001		< 0.001	14.2	< 0.001	0.59	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0049	< 0.001		0.006	< 0.01
X13	14-Mar-05	< 0.00025	< 0.005	< 0.001	0.092	< 0.05	< 0.001	< 0.001	186	< 0.0002	0.003	< 0.001	< 0.001	0.17		3.6		0.006	35.6	6.74	0.0016	27.4	0.013	< 0.001	< 0.15	< 0.001		< 0.001	12.3	< 0.001	0.49	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0054	< 0.001		0.005	< 0.01
X13	11-Apr-05	< 0.00025	< 0.005	< 0.001	0.074	< 0.05	< 0.001	< 0.001	200	< 0.0002	0.004	< 0.001	< 0.001	0.08		3.8		0.007	39.2	8.25	0.001	28.8	0.013	< 0.001	< 0.15	< 0.001		< 0.001	15.2	< 0.001	0.53	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0052	< 0.001		< 0.005	< 0.01
X13	09-May-05	< 0.00025	0.009	0.001	0.055	< 0.05	< 0.001	< 0.001	217	< 0.0002	0.009	< 0.001	< 0.001	0.05		4.2		0.008	41.4	10.5	0.0006	26.2	0.014	< 0.001	< 0.15	< 0.001		< 0.001	13.1	< 0.001	0.56	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0038	< 0.001		0.006	< 0.01
X13	21-Jun-05	< 0.00025	0.012	0.002	0.054	< 0.05	< 0.001	< 0.001	202	< 0.0002	0.006	< 0.001	< 0.001	0.12		4		0.009	40.6	8.51	0.0008	25.2	0.012	< 0.001	< 0.15	< 0.001		< 0.001	13.1	< 0.001	0.55	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0036	< 0.001		< 0.005	< 0.01
X13	25-Jul-05	< 0.00025	< 0.005	< 0.001	0.067	< 0.05	< 0.001	< 0.001	208	< 0.0002	0.006	< 0.001	< 0.001	< 0.05		4		0.01	43	8.71	0.001	26.2	0.011	< 0.001	< 0.15	< 0.001		< 0.001	14.2	< 0.001	0.56	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0047	< 0.001		< 0.005	< 0.01
X13	23-Aug-05	< 0.00025	< 0.005	< 0.001	0.075	< 0.05	< 0.001	< 0.001	226	0.0005	0.005	< 0.001	< 0.001	< 0.05		4.4		0.009	46.9	8.56	0.0013	31.6	0.013	< 0.001	< 0.15	< 0.001		< 0.001	14.8	< 0.001	0.6	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0057	< 0.001		0.006	< 0.01
X13	06-Sep-05	< 0.00025	< 0.005	< 0.001	0.065	< 0.05	< 0.001	< 0.001	200	< 0.0002	0.004	< 0.001	< 0.001	< 0.05		4.1		0.008	39.9	7.93	0.001	27.3	0.012	< 0.001	< 0.15	< 0.001		< 0.001	12.8	< 0.001	0.54	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0046	< 0.001		0.006	< 0.01
X13	11-Oct-05	< 0.00025	< 0.005	0.001	0.068	< 0.05	< 0.001	< 0.001	224	< 0.0002	0.004	< 0.001	< 0.001	< 0.05		4.2		0.01	45.4	8.13	0.0012	29.8	0.013	< 0.001	< 0.15	< 0.001		< 0.001	15	< 0.001	0.62	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0047	< 0.001		< 0.005	< 0.01
X13	02-Nov-05	< 0.00025	< 0.005	< 0.001	0.072	< 0.05	< 0.001	< 0.001	148	< 0.0002	0.002	< 0.001	< 0.001	< 0.05		3.2		0.007	30.2	5.06	0.0016	21.8	0.01	< 0.001	< 0.15	< 0.001		< 0.001	11.9	< 0.001	0.39	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0043	< 0.001		< 0.005	< 0.01
X13	15-Dec-05	< 0.00025	< 0.005	0.001	0.074	< 0.05	< 0.001	< 0.001	222	< 0.0002	0.006	< 0.001	< 0.001	< 0.05		4.7		0.01	44.4	10.3	0.0011	32.7	0.013	< 0.001	< 0.15	< 0.001		< 0.001	7.4	< 0.001	0.6	< 0.001	< 0.0005	< 0.001	< 0.0001	0.005	< 0.001		0.008	< 0.01
	average	0.00025	0.006	0.001	0.070	0.05	0.001	0.001	205.1	0.0002	0.005	0.001	0.001	0.226		4.02		0.008	41.13	8.36	0.0011	27.82	0.013	0.001	0.15	0.001		0.001	13.26	0.001	0.546	0.001	0.0005	0.001	0.0001	0.005	0.001		0.006	0.01
	minimum	< 0.00025	< 0.005	< 0.001	0.054	< 0.05	< 0.001	< 0.001	148	< 0.0002	0.002	< 0.001	< 0.001	< 0.05		3.2		0.006	30.2	5.06	0.0006	21.8	0.010	< 0.001	< 0.15	< 0.001		< 0.001	7.4	< 0.001	0.39	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0036	< 0.001		< 0.005	< 0.01
	maximum	< 0.00025	0.012	0.002	0.092	< 0.05	< 0.001	< 0.001	226	0.0005	0.009	< 0.001	0.0010	1.860		4.7		0.010	46.9	10.50	0.0016	32.7	0.015	< 0.001	< 0.15	< 0.001		< 0.001	15.2	< 0.001	0.62	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0057	< 0.001		0.008	< 0.01
	N > DL	0	3	5	12	0	0	0	12	1	12	0	1	6		12		12	12	12	12	12	12	0	0	0		0	12	0	12	0	0	0	0	12	0		6	0
	median	0.00025	0.005	0.001	0.069	0.05	0.001	0.001	206.5	0.0002	0.006	0.001	0.001	0.05		4.05		0.008	41.30	8.43	0.0011	27.40	0.013	0.001	0.15	0.001		0.001	13.65	0.001	0.555	0.001	0.0005	0.001	0.0001	0.005	0.001		0.005	0.01
X14	21-Jan-05	< 0.00025	< 0.005	< 0.001	0.064	< 0.05	< 0.001	< 0.001	81.6	< 0.0002	0.001	< 0.001	< 0.001	0.1		1.7		0.006	17.5	1.67	0.0006	8.13	0.003	< 0.001	< 0.15	< 0.001		< 0.001	11.2	< 0.001	0.27	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0023	< 0.001		0.02	< 0.01
X14	08-Feb-05	< 0.00025	< 0.005	< 0.001	0.065	< 0.05	< 0.001	< 0.001	84.3	< 0.0002	0.001	< 0.001	< 0.001	0.31		1.9		0.006	18.3	1.76	0.0006	8.78	0.004	< 0.001	< 0.15	< 0.001		< 0.001	11.5	< 0.001	0.28	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0025	< 0.001		0.023	< 0.01
X14	08-Mar-05	< 0.00025	< 0.005	< 0.001	0.049	< 0.05	< 0.001	< 0.001	147	< 0.0002	0.005	< 0.001	< 0.001	0.14		3.6		0.01	32.9	5.19	0.0009	18.3	0.012	< 0.001	< 0.15	< 0.001		< 0.001	13.5	< 0.001	0.43	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0031	< 0.001		0.12	< 0.01
X14	14-Mar-05	< 0.00025	< 0.005	< 0.001	0.048	< 0.05	< 0.001	< 0.001	208	< 0.0002	0.011	< 0.001	< 0.001	0.24		4.3		0.01	42.2	9.45	0.0007	24.7	0.022	< 0.001		< 0.001		< 0.001	14.4	< 0.001	0.56	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0033	< 0.001		0.15	< 0.01
X14	22-Mar-05	< 0.00025	< 0.005	< 0.001	0.038	< 0.05	< 0.001	< 0.001	213	< 0.0002	0.01	< 0.001	< 0.001	0.09		4		0.011	45.8	9.4	0.0008	24.6	0.02	< 0.001	< 0.15	< 0.001		< 0.001	14.4	< 0.001	0.56	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0036	< 0.001		0.15	< 0.01
X14	11-Apr-05	< 0.00025	< 0.005	< 0.001	0.063	< 0.05	< 0.001	< 0.001	79.9	< 0.0002	< 0.001	< 0.001	< 0.001	0.05		1.6		0.006	17.4	1.4	0.0007	8.29	0.003	< 0.001	< 0.15	< 0.001		< 0.001	11.9	< 0.001	0.28	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0026	< 0.001		0.021	< 0.01
X14	10-May-05	< 0.00025	0.054	< 0.001	0.023	< 0.05	< 0.001	< 0.001	19.7	< 0.0002	< 0.001	< 0.001	0.002	0.2		1.1		0.002	4.18	0.3	< 0.0005	1.73	0.002	< 0.001	< 0.15	< 0.001		< 0.001	4.5	< 0.001	0.07	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.021	< 0.01
X14	31-May-05	< 0.00025	0.022	< 0.001	0.023	< 0.05	< 0.001	< 0.001	20.3	< 0.0002	< 0.001	< 0.001	< 0.001	0.09		0.7		0.002	5.03	0.17	< 0.0005	1.92	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	7.1	< 0.001	0.08	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0006	< 0.001		0.014	< 0.01
X14	11-Jun-05	< 0.00025	0.014	< 0.001	0.025	< 0.05	< 0.001	< 0.001	25.4	< 0.0002	< 0.001	< 0.001	< 0.001	0.08		0.7		0.003	5.88	0.19	< 0.0005	2.7	0.001	< 0.001	< 0.15	< 0.001		< 0.001	7.9	< 0.001	0.094	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0006	< 0.001		0.008	< 0.01
X14	19-Jun-05	< 0.00025	0.007	< 0.001	0.032	< 0.05	< 0.001	< 0.001	33.1	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.9		0.004	7.29	0.25	< 0.0005	2.95	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	7.2	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0008	< 0.001		0.015	< 0.01
X14	21-Jun-05	< 0.00025	0.014	< 0.001	0.032	< 0.05	< 0.001	< 0.001	34.6	< 0.0002	< 0.001	< 0.001	< 0.001	0.19		0.9		0.004	7.6	0.34	< 0.0005	3.08	0.001	< 0.001	< 0.15	< 0.001		< 0.001	7.7	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0007	< 0.001		0.019	< 0.01
X14	02-Jul-05	< 0.00025	0.008	< 0.001	0.031	< 0.05	< 0.001	< 0.001	38.5	< 0.0002	< 0.001	< 0.001	< 0.001	0.08		1.2		0.005	10.2	0.27	0.0005	4.05	0.001	< 0.001	< 0.15	< 0.001		< 0.001	10.3	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0008	< 0.001		0.014	< 0.01
X14	10-Jul-05	< 0.00025	0.009	< 0.001	0.034	< 0.05	< 0.001	< 0.001	40.5	< 0.0002	< 0.001	< 0.001	< 0.001	0.12		1.1		0.005	9.38	0.4	0.0005	3.71	0.002	< 0.001	< 0.15	< 0.001		< 0.001	8.4	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001		0.016	< 0.01
X14	17-Jul-05	< 0.00025	0.01	< 0.001	0.041	< 0.05	< 0.001	< 0.001	42.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.07		1.2		0.005	10	0.45	< 0.0005	4.19	0.002	< 0.001	< 0.15	< 0.001		< 0.001	8.8	< 0.001	0.15	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001		0.025	< 0.01
X14	24-Jul-05	< 0.00025	0.007	< 0.001	0.041	< 0.05	< 0.001	< 0.001	43.1	< 0.0002	< 0.001	< 0.001	< 0.001	0.13		1.1		0.005	10.3	0.44	< 0.0005	4.02	0.002	< 0.001	< 0.15	< 0.001		< 0.001	9	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001		0.017	< 0.01
X14	25-Jul-05	< 0.00025	0.006	< 0.001	0.039	< 0.05	< 0.001	< 0.001	37.7	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.9		0.005	8.7	0.2	< 0.0005	3.22	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	9.5	< 0.001	0.15	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001		0.007	< 0.01
X14	31-Jul-05	< 0.00025	0.009	< 0.001	0.04	< 0.05	< 0.001	< 0.001	37.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.11		0.9		0.004	8.58	0.36	< 0.0005	3.42	0.001	< 0.001	< 0.15	< 0.001		< 0.001	10.5	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0008	< 0.001		0.012	< 0.01
X14	06-Aug-05	< 0.00025	< 0.005	< 0.001	0.046	< 0.05	< 0.001	< 0.001	48.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1.3		0.006	11.1	0.57	0.0006	4.33	0.002	< 0.001	< 0.15	< 0.001		< 0.001	9.5	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001		0.02	< 0.01
X14	13-Aug-05	< 0.00025	0.005	< 0.001	0.043	< 0.05	< 0.001	< 0.001	50.3	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1.3		0.006	12.5	0.78	0.0005	4.92	0.002	< 0.001	< 0.15	< 0.001		< 0.001	8.7	< 0.001	0.19	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001		0.021	< 0.01
X14	20-Aug-05	< 0.00025	< 0.005	< 0.001	0.039	< 0.05	< 0.001	< 0.001	47.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1.1		0.005	11.2	0.75	0.0005	3.98	0.001	< 0.001	< 0.15	< 0.001		0.001	7.6	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001		0.027	< 0.01
X14	23-Aug-05	< 0.00025	< 0.005	< 0.001	0.043	< 0.05	< 0.001	< 0.001	53	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1.4		0.007	13.1	0.71	0.0005	5.12	0.002	< 0.001	< 0.15	< 0.001		< 0.001	7.8	< 0.001	0.21	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0013	< 0.001		0.028	< 0.01
X14	27-Aug-05	< 0.00025	< 0.005	< 0.001	0.041	< 0.05	< 0.001	< 0.001	47	< 0.0002	< 0.001	< 0.001	0.002	< 0.05		1.3		0.005	11	0.77	0.0005	4.44	0.002	< 0.001	< 0.15	< 0.001		0.002	7.5	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	< 0.0001	0.001	< 0.001		0.024	< 0.01
X14	05-Sep-05	< 0.00025	< 0.005	< 0.001	0.042	< 0.05	< 0.001	< 0.001	54.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1.5		0.007	12.8	0.78	< 0.0005	5.29	0.002	< 0.001	< 0.15	< 0.001		< 0.001	8	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001		0.045	< 0.01
X14	06-Sep-05	< 0.00025	< 0.005	< 0.001	0.043	< 0.05	< 0.001	< 0.001	56	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1.5		0.007	12.8	0.72	< 0.0005	5.19	0.002	< 0.001	< 0.15	< 0.001		< 0.001	8	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001		0.034	< 0.01
X14	11-Sep-05	< 0.00025	< 0.005	< 0.001	0.047	< 0.05	< 0.001	< 0.001	61.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.07		1.7		0.007	13.5	0.87	0.0006	5.81	0.002	< 0.001	< 0.15	< 0.001		< 0.001	10.1	< 0.001	0.23	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001		0.046	< 0.01
X14	18-Sep-05	< 0.00025	< 0.005	< 0.001	0.039	< 0.05	< 0.001	< 0.001	50.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1.3		0.006	10.6	0.51	< 0.0005	4.67	0.002	< 0.001	< 0.15	< 0.001		< 0.001	8.2	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001		0.014	< 0.01
X14	24-Sep-05	< 0.00025	< 0.005	< 0.001	0.044	< 0.05	< 0.001	< 0.001	48.8	< 0.0002	< 0.001	< 0.001	< 0.001	0.11		1.3		0.005	10.6	0.57	< 0.0005	4.85	0.002	< 0.001	< 0.15	< 0.001		< 0.001	8.2	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001		0.021	< 0.01
X14	01-Oct-05	< 0.00025	< 0.005	< 0.001	0.046	< 0.05	< 0.001	< 0.001	57.6	< 0.0002	0.001	< 0.001	< 0.001	0.1		1.3		0.005	12.6	1.09	< 0.0005	5.64	0.003	< 0.001	< 0.15	< 0.001		< 0.001	9.6	< 0.001	0.2	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001		0.057	< 0.01
X14	11-Oct-05	< 0.00025	< 0.005	< 0.001	0.044	< 0.05	< 0.001	< 0.001	36.3	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.8		0.003	8.63	0.28	< 0.0005	2.69	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	9.6	< 0.001	0.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001		0.018	< 0.01
X14	02-Nov-05	< 0.00025	< 0.005	< 0.001	0.056	< 0.05	< 0.001	< 0.001	48.5	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1.1		0.004	11.1	0.56	< 0.0005	3.61	0.001	< 0.001	< 0.15	< 0.001		< 0.001	10.5	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	< 0.001		0.029	< 0.01
X14	15-Dec-05	< 0.00025	< 0.005	< 0.001	0.063	< 0.05	< 0.001	< 0.001	67	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1.5		0.006	14.9	1.11	0.0006	6.1	0.001	< 0.001	< 0.15	< 0.001		< 0.001	5.6	< 0.001	0.22	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0021	< 0.001		0.049	< 0.01
	average	0.00025	0.008	0.001	0.043	0.050	0.001	0.001	61.7	0.0002	0.002	0.001	0.001	0.095		1.5		0.006	13.80	1.36	0.0006	6.27	0.003	0.001	0.15	0.001		0.001	9.25	0.001	0.205	0.001	0.0005	0.001	0.0001	0.0014	0.001		0.035	0.01
	minimum	< 0.00025	< 0.005	< 0.001	0.023	< 0.05	< 0.001	< 0.001	19.7	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.7		0.002	4.18	0.17	< 0.0005	1.73	< 0.001	< 0.001	< 0.15	< 0.001		< 0.001	4.5	< 0.001	0.07	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001		0.007	< 0.01
	maximum	< 0.00025	0.054	< 0.001	0.065	< 0.05	< 0.001	< 0.001	213.0	< 0.0002	0.0110	< 0.001	0.002	0.310		4.3		0.011	45.8	9.45	0.0009	24.70	0.0220	< 0.001	< 0.15	< 0.001		0.002	14.4	< 0.001	0.56	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0036	< 0.001		0.150	< 0.01
	N > DL	0	12	0	31	0	0	0	31	0	6	0	2	18		31		31	31	31	15	31	27	0	0	0		2	31	0	31	0	0	0	0	30	0		31	0
	median	0.00025	0.005	0.001	0.042	0.050	0.001	0.001	48.5	0.0002	0.001	0.001	0.001	0.070		1.3		0.005	11.10	0.57	0.0005	4.44	0.002	0.001	0.15	0.001		0.001	8.80	0.001	0.180	0.001	0.0005	0.001	0.0001	0.0011	0.001		0.021	0.01
X22B	21-Jan-05	< 0.00025	< 0.005	< 0.001	0.014	< 0.05	< 0.001	< 0.001	130	0.011	0.038	< 0.001	0.011	0.09		8		0.049	54.3	2.31	0.0025	19.3	0.086	< 0.001	< 0.15	0.001		< 0.001	6.9	< 0.001	0.45	< 0.001	< 0.0005	< 0.001	0.0005	0.0022	< 0.001		11	< 0.01
X22B	08-Feb-05	< 0.00025	0.008	< 0.001	0.016	< 0.05	< 0.001	< 0.001	148	0.012	0.041	< 0.001	0.01	0.07		9.1		0.05	61.1	2.59	0.0028	22.2	0.097	< 0.001	< 0.15	0.002		< 0.001	7.2	< 0.001	0.51	< 0.001	< 0.0005	< 0.001	0.0006	0.0028	< 0.001		11.2	< 0.01
X22B	14-Mar-05	< 0.00025	0.009	< 0.001	0.016	< 0.05	< 0.001	< 0.001	135	0.012	0.041	< 0.001	0.019	0.21		7.3		0.041	53	2.45	0.0023	19.4	0.096	< 0.001	< 0.15	0.001		< 0.001	7	< 0.001	0.51	< 0.001	< 0.0005	< 0.001	0.0006	0.0022	< 0.001		13	< 0.01
X22B	11-Apr-05	< 0.00025	0.01	< 0.001	0.014	< 0.05	< 0.001	< 0.001	118	0.014	0.034	< 0.001	0.034	< 0.05		6.5		0.042	54.7	1.84	0.0014	16.3	0.083	< 0.001	< 0.15	< 0.001		< 0.001	9	< 0.001	0.46	< 0.001	< 0.0005	< 0.001	0.0005	0.0015	< 0.001		14.4	< 0.01
X22B	09-May-05	< 0.00025	0.02	< 0.001	0.014	< 0.05	< 0.001	< 0.001	120	0.0099	0.035	< 0.001	0.007	< 0.05		7.3		0.04	49.2	2.32	0.0024	17.8	0.082	< 0.001	< 0.15	0.001		< 0.001	5.7	< 0.001	0.43	< 0.001	< 0.0005	< 0.001	0.0005	0.0024	< 0.001		10.3	< 0.01
X22B	21-Jun-05	< 0.00025	0.011	< 0.001	0.014	< 0.05	< 0.001	< 0.001	119	0.012	0.036	< 0.001	0.007	0.12		7.2		0.

Appendix 3
2005 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	HG-D mg/L	K-D mg/L	LA-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	S-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	W-D mg/L	ZN-D mg/L	ZR-D mg/L
X22B	11-Oct-05	< 0.00025	< 0.005	< 0.001	0.015	< 0.05	< 0.001	< 0.001	128	0.0024	0.039	< 0.001	< 0.001	< 0.05		7.7		0.053	56.2	2.41	0.0022	18.6	0.095	< 0.001	< 0.15	0.001		< 0.001	7	< 0.001	0.5	< 0.001	< 0.0005	< 0.001	0.0005	0.0018	< 0.001		12.2	< 0.01
X22B	01-Nov-05	< 0.00025	< 0.005	< 0.001	0.016	< 0.05	< 0.001	< 0.001	142	0.0006	0.044	< 0.001	< 0.001	< 0.05		9.2		0.056	59.8	2.73	0.0019	21	0.11	< 0.001	< 0.15	0.001		< 0.001	7.1	< 0.001	0.51	< 0.001	< 0.0005	< 0.001	0.0006	0.0019	< 0.001		12.9	< 0.01
X22B	14-Dec-05	< 0.00025	< 0.005	< 0.001	0.016	< 0.05	< 0.001	< 0.001	146	< 0.0002	0.044	< 0.001	< 0.001	< 0.05		9.6		0.057	63.4	2.81	0.0021	22.1	0.1	< 0.001	< 0.15	0.001		< 0.001	3.3	< 0.001	0.53	< 0.001	< 0.0005	< 0.001	0.0006	0.0019	< 0.001		14	< 0.01
	average	0.00025	0.008	0.001	0.015	0.05	0.001	0.001	130.6	0.0069	0.039	0.001	0.008	0.07		7.88		0.049	56.23	2.41	0.0022	19.28	0.092	0.001	0.15	0.001		0.001	6.65	0.001	0.49	0.001	0.0005	0.001	0.0005	0.0019	0.001		12.07	0.01
	minimum	< 0.00025	< 0.005	< 0.001	0.014	< 0.05	< 0.001	< 0.001	118	< 0.0002	0.034	< 0.001	< 0.001	< 0.05		6.5		0.040	49.2	1.84	0.0014	16.3	0.082	< 0.001	< 0.15	< 0.001		< 0.001	3.3	< 0.001	0.43	< 0.001	< 0.0005	< 0.001	0.0005	0.0008	< 0.001		9.55	< 0.01
	maximum	< 0.00025	0.020	< 0.001	0.016	< 0.05	< 0.001	< 0.001	148	0.014	0.044	< 0.001	0.0340	0.2100		9.6		0.057	63.8	2.81	0.0028	22.2	0.110	0.0020	< 0.15	0.0020		0.001	9.0	< 0.001	0.53	< 0.001	< 0.0005	< 0.001	0.0006	0.0028	< 0.001		14.4	< 0.01
	N > DL	0	5	0	12	0	0	0	12	11	12	0	8	4		12		12	12	12	12	12	12	1	0	11		1	12	0	12	0	0	0	12	12	0		12	0
	median	0.00025	0.005	0.001	0.016	0.05	0.001	0.001	129.0	0.0068	0.039	0.001	0.006	0.05		7.70		0.050	55.10	2.39	0.0022	18.95	0.094	0.001	0.15	0.001		0.001	6.95	0.001	0.50	0.001	0.0005	0.001	0.0005	0.0019	0.001		12.20	0.01
X23	22-Jan-05	< 0.00025	< 0.005	0.003	0.013	< 0.05	< 0.001	< 0.001	455	0.028	0.55	< 0.001	0.004	22.5		12.7		0.13	646	59.8	< 0.0005	50	0.66	< 0.001	< 0.15	< 0.001		0.009	11.1	< 0.001	3.05	< 0.001	< 0.0005	< 0.001	0.0009	0.0079	< 0.001		276	< 0.01
X23	09-Feb-05	< 0.00025	< 0.005	0.002	0.014	< 0.05	< 0.001	< 0.001	474	0.028	0.56	< 0.001	0.014	45.2		13.3		0.14	694	60.7	< 0.0005	52.6	0.67	0.002	< 0.15	< 0.001		0.006	13.5	< 0.001	3.18	< 0.001	< 0.0005	0.001	0.001	0.011	< 0.001		279	< 0.01
X23	15-Mar-05	< 0.00025	< 0.005	0.002	0.018	< 0.05	< 0.001	< 0.001	512	0.03	0.7	< 0.001	0.005	3.34		14.6		0.11	684	68.9	< 0.0005	56.4	0.87	< 0.001	< 0.15	< 0.001		0.008	12.1	< 0.001	3.77	< 0.001	< 0.0005	0.002	0.0011	0.0069	< 0.001		265	< 0.01
X23	11-Apr-05	< 0.00025	< 0.005	0.002	0.012	< 0.05	< 0.001	< 0.001	465	0.023	0.53	< 0.001	0.004	17.7		13.1		0.12	671	60.4	< 0.0005	52.7	0.64	< 0.001	< 0.15	< 0.001		0.007	12.3	< 0.001	3.35	< 0.001	< 0.0005	< 0.001	0.001	0.01	< 0.001		222	< 0.01
X23	09-May-05	< 0.00025	0.58	0.005	0.018	< 0.05	0.001	< 0.001	397	0.734	1.06	< 0.001	4.08	28.9		11.4		0.16	572	64.5	< 0.0005	33.7	1.34	0.003	< 0.15	< 0.001		0.023	15	< 0.001	2.36	< 0.001	< 0.0005	< 0.001	0.0016	0.0084	< 0.001		732	< 0.01
X23	20-Jun-05	< 0.00025	0.006	0.003	0.014	< 0.05	< 0.001	< 0.001	433	0.177	0.91	< 0.001	0.027	69.9		11.5		0.17	692	70.1	< 0.0005	42.3	1.1	< 0.001	< 0.15	< 0.001		0.015	12.3	< 0.001	3.02	< 0.001	< 0.0005	< 0.001	0.0012	0.0014	< 0.001		562	< 0.01
X23	25-Jul-05	< 0.00025	< 0.005	0.002	0.015	< 0.05	< 0.001	< 0.001	434	0.121	0.8	< 0.001	0.034	9.02		12		0.16	689	64.3	< 0.0005	43	0.96	< 0.001	< 0.15	< 0.001		0.009	12.8	< 0.001	3.11	< 0.001	< 0.0005	< 0.001	0.0012	0.0039	< 0.001		440	< 0.01
X23	22-Aug-05	< 0.00025	< 0.005	0.004	0.012	< 0.05	< 0.001	< 0.001	458	0.104	0.85	< 0.001	0.012	25.2		13.1		0.18	687	69.2	< 0.0005	47.8	0.95	< 0.001	< 0.15	< 0.001		0.016	10.2	< 0.001	3.25	< 0.001	< 0.0005	< 0.001	0.0013	0.0014	< 0.001		391	< 0.01
X23	06-Sep-05	< 0.00025	< 0.005	0.001	0.012	< 0.05	< 0.001	< 0.001	420	0.09	0.78	< 0.001	0.011	30.2		12.1		0.14	704	62.6	< 0.0005	44.4	0.9	< 0.001	< 0.15	< 0.001		0.004	10.3	< 0.001	2.86	< 0.001	< 0.0005	< 0.001	0.001	0.001	< 0.001		453	< 0.01
X23	10-Oct-05	< 0.00025	< 0.005	0.002	0.014	< 0.05	< 0.001	< 0.001	423	0.09	0.9	< 0.001	0.005	73.2		14.3		0.16	742	69.8	< 0.0005	51.8	1.1	< 0.001	< 0.15	< 0.001		0.007	13.4	< 0.001	2.96	< 0.001	< 0.0005	< 0.001	0.0013	0.0043	< 0.001		459	< 0.01
X23	02-Nov-05	< 0.00025	< 0.005	0.001	0.014	< 0.05	< 0.001	< 0.001	434	0.088	1.06	< 0.001	0.006	52.8		15.1		0.16	742	75.2	< 0.0005	52.4	1.25	< 0.001	< 0.15	< 0.001		0.003	12.1	< 0.001	2.9	< 0.001	< 0.0005	< 0.001	0.0013	0.0023	< 0.001		453	< 0.01
X23	13-Dec-05	< 0.00025	< 0.005	0.002	0.014	< 0.05	< 0.001	< 0.001	449	0.07	0.91	< 0.001	0.005	44		15.1		0.16	763	76.3	< 0.0005	57.8	1	< 0.001	< 0.15	< 0.001		0.007	5.4	< 0.001	2.99	< 0.001	< 0.0005	< 0.001	0.0013	0.002	< 0.001		436	< 0.01
	average	0.00025	0.053	0.002	0.014	0.050	0.001	0.001	446.17	0.132	0.801	0.001	0.3506	35.16		13.19		0.149	690.5	66.8	0.0005	48.74	0.95	0.001	0.15	0.001		0.010	11.7	0.001	3.07	0.001	0.0005	0.001	0.0012	0.005	0.001		414.0	0.01
	minimum	< 0.00025	< 0.005	0.001	0.012	< 0.05	< 0.001	< 0.001	397	0.023	0.530	< 0.001	0.004	3.34		11.4		0.11	572	59.8	< 0.0005	33.7	0.64	< 0.001	< 0.15	< 0.001		0.003	5.4	< 0.001	2.36	< 0.001	< 0.0005	< 0.001	0.0009	0.0010	< 0.001		222	< 0.01
	maximum	< 0.00025	0.5800	0.005	0.018	< 0.05	0.0010	< 0.001	512	0.734	1.060	< 0.001	4.080	73.2		15.1		0.18	763	76.3	< 0.0005	57.8	1.34	0.0030	< 0.15	< 0.001		0.023	15.0	< 0.001	3.77	< 0.001	< 0.0005	0.0020	0.0016	0.0110	< 0.001		732	< 0.01
	N > DL	0	2	12	12	0	1	0	12	12	12	0	12	12		12		12	12	12	0	12	12	2	0	0		12	12	0	12	0	0	2	12	12	0		12	0
	median	0.00025	0.005	0.002	0.014	0.050	0.001	0.001	441.50	0.089	0.825	0.001	0.0085	29.55		13.10		0.160	690.5	66.7	0.0005	50.90	0.96	0.001	0.15	0.001		0.008	12.2	0.001	3.04	0.001	0.0005	0.001	0.0012	0.004	0.001		438.0	0.01
X26	25-Jul-05	< 0.00025	< 0.005	< 0.001	0.006	< 0.05	< 0.001	< 0.001	428	0.024	0.62	< 0.001	0.001	2.03		12.9		0.25	310	17.8	< 0.0005	57.8	1.36	< 0.001	< 0.15	< 0.001		0.003	9.3	< 0.001	2.7	< 0.001	< 0.0005	< 0.001	0.0014	0.0023	< 0.001		103	< 0.01
X26	22-Aug-05	< 0.00025	< 0.005	0.002	0.007	< 0.05	< 0.001	< 0.001	438	0.032	0.85	< 0.001	0.003	73.1		16.1		0.31	331	21.1	< 0.0005	75.4	1.7	< 0.001	< 0.15	< 0.001		0.007	9.9	< 0.001	2.69	< 0.001	< 0.0005	< 0.001	0.0017	0.0028	< 0.001		128	< 0.01
X26	06-Sep-05	< 0.00025	< 0.005	0.002	0.006	< 0.05	< 0.001	< 0.001	457	0.024	0.5	< 0.001	0.002	18.1		12.4		0.21	259	13.8	< 0.0005	49.5	1.21	< 0.001	< 0.15	< 0.001		0.003	10.5	< 0.001	2.64	< 0.001	< 0.0005	< 0.001	0.001	0.008	< 0.001		80.2	< 0.01
	average	0.00025	0.005	0.002	0.006	0.05	0.001	0.001	441.0	0.027	0.657	0.001	0.002	31.1		13.8		0.257	300.0	17.57	0.0005	60.9	1.42	0.001	0.15	0.001		0.004	9.9	0.001	2.68	0.001	0.0005	0.001	0.001	0.004	0.001		103.7	0.01
	minimum	< 0.00025	< 0.005	< 0.001	0.006	< 0.05	< 0.001	< 0.001	428	0.024	0.50	< 0.001	0.001	2.03		12.4		0.21	259.0	13.8	< 0.0005	49.5	1.21	< 0.001	< 0.15	< 0.001		0.003	9.3	< 0.001	2.64	< 0.001	< 0.0005	< 0.001	0.0010	0.0023	< 0.001		80.2	< 0.01
	maximum	< 0.00025	< 0.005	0.002	0.007	< 0.05	< 0.001	< 0.001	457	0.032	0.85	< 0.001	0.003	73.1		16.1		0.31	331.0	21.1	< 0.0005	75.4	1.70	< 0.001	< 0.15	< 0.001		0.007	10.5	< 0.001	2.70	< 0.001	< 0.0005	< 0.001	0.0017	0.0080	< 0.001		128.0	< 0.01
	N > DL	0	0	2	3	0	0	0	3	3	3	0	3	3		3		3	3	3	0	3	3	0	0	0		3	3	0	3	0	0	0	3	3	0		3	0
	median	0.00025	0.005	0.002	0.006	0.05	0.001	0.001	438.0	0.024	0.620	0.001	0.002	18.1		12.9		0.250	310.0	17.80	0.0005	57.8	1.36	0.001	0.15	0.001		0.003	9.9	0.001	2.69	0.001	0.0005	0.001	0.001	0.003	0.001		103.0	0.01

Appendix 4

2005 Ground Water Quality Data

Rose Creek Drainage

Table 1 Ground Water Routine Parameters

STATION	DATE	ALK-T mg/L	COND-L µS/cm	HARD mg/L	SO4-D mg/L	TEMP °C	PH-F	PH-L	WL (m below casing)
BH1	05-May-05	147		225	54.9	4		7.02	3.42
BH1	11-Sep-05	164	509	292	110	5.7	6.4	6.99	3.67
BH2	05-May-05	101		270	171	3	5.69	6.9	4.75
BH2	11-Sep-05	100	506	269	159			6.79	4.86
BH4	05-May-05	21.7		268	240	3.5	5.05	6.03	2.34
BH4	11-Sep-05	125	474	295	121	5	6.17	7.11	2.49
BH12A	06-May-05	200	1290	742	475	1.3	6.47	7.94	2.6
BH12A	06-May-05	67.3	1290	737	469	1.3	6.47	8.03	2.6
BH12A	11-Sep-05	183	919	520	298	5.1	7.02	7.82	2.53
BH12B	06-May-05	201	1250	705	451	2.3	6.2	7.96	2.65
BH12B	11-Sep-05	180	938	475	315	4	6.93	7.73	2.58
BH13A	06-May-05	124	1000	511	406	2	6.11	7.89	4.18
BH13A	11-Sep-05	188	756	362	234	2.7	7.59	7.98	3
BH13B	11-Sep-05	101	1030	601	437	2.4	7.26	7.47	3.23
BH14A	05-May-05	341		2320	1550	2	6.16	7.75	3.32
BH14A	11-Sep-05	358	3740	2460	2040	6.2	6.67	7.25	3.51
BH14B	05-May-05	341		2230	1570	2.5	6.5	7.79	3.97
BH14B	11-Sep-05	312	3220	2060	1570	6.31	6.2	7.46	4.24
P01-01A	20-Jul-05	233	1310	689	538	6.5	7.52	7.71	3.6
P01-01A	10-Sep-05	254	1410	633	559	3.24	7.12	7.63	4.02
P01-01B	04-May-05	249	1080	651	399	3.9	7.17	8.1	3.75
P01-01B	10-Sep-05	255	1100	515	377	6.07	6.85	7.15	3.81
P01-02A	11-May-05	208	646	354	141	4.8		8.09	2.286
P01-02A	21-Jul-05	208	621	322	135	6.3	7.66	8.07	1.72
P01-02A	09-Sep-05	217	647	348	127	4.89	7.59	5.83	2.25
P01-02B	10-May-05	66.8	182		19			8.11	
P01-02B	21-Jul-05	175	509	266	103	6.4	7.54	8.1	1.52
P01-02B	09-Sep-05	193	510	273	92.3	7.62	8.1	6.34	0.66
P01-03	04-May-05	315	2340	1760	1360	3.2	6.63	7.69	3.89
P01-03	09-Sep-05	324	2420	1600	1230	4.36	6.78	7.35	4.08
P01-04A	21-Jul-05	743	1280	615	31.8	6.4	6.48	7.46	2.48
P01-04A	10-Sep-05	746	1290	481	26	3.99	6.61	7.28	2.83
P01-04B	21-Jul-05	295	1340	695	494	4.8	7.23	7.74	3
P01-04B	10-Sep-05	300	1350	808	463	3.66	7.29	7.7	3.33
P01-05A	10-May-05	27.3	1330	263	570	4		7.72	3.5
P01-05A	10-May-05	26	1500	315	682	4		7.46	3.5
P01-05A	11-Sep-05	30.1	1240	294	528	6.1	7.02	7.46	3.35
P01-05A	11-Sep-05	24.1	1270	292	538	6.1	7.02	7.45	3.35
P01-05B	10-May-05	221	1710	919	758	3.9		7.94	4.06
P01-05B	10-May-05	222	1740	794	794	3.9		7.89	4.06

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Rose Creek Drainage

Table 1 Ground Water Routine Parameters

STATION	DATE	ALK-T mg/L	COND-L µS/cm	HARD mg/L	SO4-D mg/L	TEMP °C	PH-F	PH-L	WL (m below casing)
P01-05B	11-Sep-05	242	1770	914	783	5.3	6.88	7.43	3.75
P01-05B	11-Sep-05	237	1810	935	813	5.3	6.88	7.3	3.75
P01-07C	10-May-05	194	1440	746	605	3.6		7.85	11.5
P01-07C	10-May-05	209	1520	641	619	3.6		8.02	11.5
P01-07C	11-Sep-05	230	1530	822	647	4.9	6.88	7.35	11.39
P01-07C	11-Sep-05	218	1480	923	641	4.9	6.88	7.45	11.39
P01-07D	10-May-05	148	1910	1090	1020	3.5		7.3	11.88
P01-07D	10-May-05	141	1820	1010	941	3.5		7.53	11.88
P01-07D	11-Sep-05	146	1830	968	950	3.9	6.61	7.1	11.77
P01-07D	11-Sep-05	147	1860	985	961	3.9	6.61	7.25	11.77
P01-08A	11-May-05	109	602	21.9	165			7.37	12
P01-10B	11-May-05	213	719	290	168			7.4	
P01-11	10-May-05	285	1940	1170	914	3.8		7.97	0.74
P01-11	09-Sep-05	316	1970	1110	904	5.37	7.1	7.52	1.07
P01-52A	03-May-05	469	1320	791	338	5.8	6.55	8.07	5.1
P01-52A	08-Sep-05	432	1300	769	314	5.4	7.08	7.82	4.76
P03-01-01	03-May-05	221	402	212	11	4.1	7.62	8.1	6.36
P03-01-01	08-Sep-05	224	444	212	18.3	5.2	7.52	7.46	6.02615
P03-01-02	03-May-05	151	367	190	49.2	3.9	7.67	8.14	6.35
P03-01-02	08-Sep-05	191	432	221	46.3	4.4	7.55	7.73	6.096
P03-01-03	03-May-05	128	348	177	65.8	5.7	6.91	7.88	6.34
P03-01-03	08-Sep-05	137	354	159	53.5	4.4	7.23	7.38	6.07695
P03-01-04	03-May-05	57.9	567	328	246	5	6.81	7.27	6.36
P03-01-04	08-Sep-05	57	543	271	215	4.6	6.2	6.75	6.096
P03-01-05	03-May-05	72.8	724	441	327	4.9	6.68	7.33	6.37
P03-01-05	08-Sep-05	79.8	434	208	134	4.5	6.53	7.02	6.10235
P03-01-06	03-May-05	50.1	963	237	530	3.8	6.27	6.23	6.36
P03-01-06	08-Sep-05	11.3	750	169	343	4.6	6.38	5.96	6.0833
P03-01-07	03-May-05	< 1	11800	1150	13600	4.4	6.41	4.47	6.34
P03-01-07	08-Sep-05	9.7	6120	783	4820	5.2	6.76	4.13	6.0198
P03-01-08	08-Sep-05	< 2	20400	3230	25200	5	6.05	3.47	5.7658
P03-01-09	03-May-05	< 1	31200	3540	54400			3.07	6.385
P03-01-09	08-Sep-05	< 2	23800	4390	30600			3.36	5.842
P03-02-01	11-May-05	148	363	199	36	5.2		8.05	5.855
P03-02-01	08-Sep-05	143	416	222	62.8	4.5	7.4	6.2	6.17855
P03-02-02	11-May-05	92.9	262	138	32.7	4.3		7.73	5.855
P03-02-02	08-Sep-05	101	336	158	66.3	4.1	7.05	6.81	6.1722
P03-02-03	11-May-05	92.5	263	136	33.2	4.7		7.47	5.842
P03-02-03	08-Sep-05	91	317	144	67.9	4.3	6.83	6.98	6.17855
P03-02-04	11-May-05	64	515	235	192	4.5		7.15	5.842

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Rose Creek Drainage

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STATION	DATE	ALK-T mg/L	COND-L µS/cm	HARD mg/L	SO4-D mg/L	TEMP °C	PH-F	PH-L	WL (m below casing)
P03-02-04	08-Sep-05	57.3	542	250	212	4.5	6.29	6.76	6.1722
P03-02-05	11-May-05	47.6	6150	2310	4860	6.1		5.2	5.861
P03-02-05	08-Sep-05	42.4	6290	2160	4730	4.8	6.82	4.97	6.1849
P03-02-06	11-May-05	43.7	7860	2580	6670	5.5		4	5.893
P03-02-06	08-Sep-05	3.4	7890	2310	6760	5.2	6.53	3.88	6.10235
P03-02-07	11-May-05	46.8	9620	3050	8980			3.75	5.74
P03-02-07	08-Sep-05	< 2	9310	2860	8570	6	6.35	3.63	5.5245
P03-02-08	11-May-05	< 2	10900	2510	11000	5.6		3.53	5.69
P03-02-08	08-Sep-05	55.6	15000	2770	16600	6.9	5.45	3.81	5.3467
P03-02-09	11-May-05	< 2	18800	2180	23600	5.2		3.31	5.613
P03-02-09	08-Sep-05	46.2	18500	2120	21900			3.5	5.2705
P03-03-01	05-May-05	265		331	3.8	4.3	7.06	8.01	7.53
P03-03-01	22-Jul-05	< 2	2190	422	1560	6.1	6.73	4.79	6.97
P03-03-01	08-Sep-05	290	509	293	3.2	4.3	7.15	7.93	7.2898
P03-03-02	11-May-05	4.5	2390	524	1630	4.3		4.61	5.855
P03-03-02	22-Jul-05	277	508	274	3.9	5.8	4.87	7.81	7.045
P03-03-02	08-Sep-05	< 2	1730	378	1060	5.2	4.94	4.91	7.3787
P03-03-03	11-May-05	8.8	591	249	20.2	7.2		6.03	7.615
P03-03-03	22-Jul-05	4	794	323	406	4.9	5.3	6.04	7.05
P03-03-03	08-Sep-05	4.2	926	487	463	7.2	5.11	5.08	7.3406
P03-03-04	05-May-05	23.1		310	320	4.2	5.43	6.44	7.57
P03-03-04	22-Jul-05	13.5	772	324	396	4.7	6.11	6.25	7.08
P03-03-04	08-Sep-05	20.5	1000	525	484	4.2	5.87	6.38	7.3533
P03-03-05	05-May-05	100		451	437	4.8	6.21	7.01	7.58
P03-03-05	22-Jul-05	87.9	961	423	450	5.9	6.46	6.75	7.09
P03-03-05	08-Sep-05	75.1	1090	518	499	4.8	6.58	6.96	7.3406
P03-03-06	05-May-05	101		905	1680	5	6.84	6.14	7.57
P03-03-06	22-Jul-05	9.2	1850	690	1060	10	6.92	6.29	7.11
P03-03-06	08-Sep-05	18.6	1800	667	998	5	7.11	6.03	7.3152
P03-03-07	05-May-05	< 1		2990	13700	7	5.65	3.72	7.575
P03-03-08	05-May-05	< 1		4660	25100	7	5.28	3.18	7.52
P03-03-08	08-Sep-05	46.8	23300	5140	28300			3.36	7.1374
P03-03-09	08-Sep-05	69.4	26900	5330	34000			3.32	7.0358
P03-04-01	03-May-05	261	1860	924	950	4.5	6.84	7.92	12.64
P03-04-01	10-Sep-05	259	1880	1110	838	6	7.15	7.84	12.3571
P03-04-01	01-Nov-05								12.45
P03-04-02	03-May-05	111	1380	725	745	4.5	6.07	7.22	12.605
P03-04-02	03-May-05	107	1370	681	693	4.5	6.07	7.23	12.605
P03-04-02	22-Jul-05	120	1500	748	726	5.1	6.69	6.81	12.09
P03-04-02	10-Sep-05	110	1520	1100	776	6.4	6.24	6.97	12.319

Appendix 4

2005 Ground Water Quality Data

Rose Creek Drainage

Table 1 Ground Water Routine Parameters

STATION	DATE	ALK-T mg/L	COND-L µS/cm	HARD mg/L	SO4-D mg/L	TEMP °C	PH-F	PH-L	WL (m below casing)
P03-04-02	31-Oct-05	111	1450	748	679	2.5	5.91	6.6	12.45
P03-04-03	03-May-05	88	1350	647	729	4.6	6.53	6.97	12.53
P03-04-03	10-Sep-05	93.9	1410	653	715	5.7	6.19	6.92	12.26185
P03-04-03	10-Sep-05	90.6	1410	694	711	5.7	6.19	6.9	12.26185
P03-04-03	01-Nov-05								12.37
P03-04-04	03-May-05	208	1080	393	409	4	7.04	8.06	12.96
P03-04-04	22-Jul-05	193	1170	448	422	6.5	7.06	7.64	12.38
P03-04-04	10-Sep-05	92.8	1410	794	702	5.5	6.01	6.85	12.6238
P03-04-04	31-Oct-05	216	1120	407	361	3.9	6.93	7.58	12.75
P03-04-05	03-May-05	141	1420	709	710	4.2	6.67	7.11	12.97
P03-04-05	10-Sep-05	121	1360	709	604	5.6	6.64	7.18	12.6238
P03-04-05	01-Nov-05								12.75
P03-04-06	03-May-05	57.9	7470	1360	8060	4.8	6.32	4.01	12.92
P03-04-06	22-Jul-05	50.8	5180	1640	4400	4.7	6	5.63	12.44
P03-04-06	10-Sep-05	< 2	11600	1800	12200	7.1	6.12	3.9	12.4968
P03-04-06	31-Oct-05	50.5	12000	1730	11700	3.5	6.11	3.68	12.63
P03-04-07	03-May-05	69	5410	1550	4960	4.4	6.29	5.06	12.95
P03-04-07	10-Sep-05	51.5	10400	1700	10700	5.7	6.14	5.54	12.4968
P03-04-07	01-Nov-05								12.63
P03-04-08	03-May-05	< 1	8230	1190	8350	7.7	6.1	3.35	12.95
P03-04-08	22-Jul-05	47.4	8860	1340	9350	11.6	6.03	4.14	12.52
P03-04-08	10-Sep-05	51	9960	1490	10100	7.9	5.79	3.85	12.4714
P03-04-08	01-Nov-05								12.61
P03-04-09	03-May-05	< 1	6800		< 10			3.56	12.95
P03-04-09	10-Sep-05	2.8	7890	1470	7500	8.6	5.79	3.81	12.4714
P03-04-09	01-Nov-05								12.61
P03-05-01	04-May-05	182	1450	808	713	3.9	6.86	7.87	8.91
P03-05-01	10-Sep-05	187	1510	887	744	5.1	2.13	7.81	8.68045
P03-05-02	04-May-05	136	979	516	437	4.4	6.32	7.66	8.91
P03-05-02	10-Sep-05	123	1040	561	454	5	6.73	7.42	8.66775
P03-05-03	04-May-05	140	875	469	360	4	6.94	7.77	8.94
P03-05-03	10-Sep-05	145	863	442	336	5.3	7.04	7.66	8.6995
P03-05-04	04-May-05	141	881	466	365	3.8	7.1	7.8	9.075
P03-05-04	10-Sep-05	154	868	497	334	5.3	6.97	7.22	8.80745
P03-05-05	04-May-05	48.3	1560	690	993	4	6.69	6.25	9.085
P03-05-05	04-May-05	58.2	1570	747	916	4	6.69	6.18	9.085
P03-05-05	10-Sep-05	29.1	1780	762	1030	5.9	6.86	6.48	8.8011
P03-05-05	10-Sep-05	23.9	1780	832	1030	5.9	6.86	6.46	8.8011
P03-05-06	04-May-05	108	2700	1030	1560	5.2	7.19	7.49	8.94
P03-05-06	10-Sep-05	124	2550	739	1300	5.1	7.78	7.72	8.61695

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2005 Ground Water Quality Data

Rose Creek Drainage

Table 1 Ground Water Routine Parameters

STATION	DATE	ALK-T mg/L	COND-L µS/cm	HARD mg/L	SO4-D mg/L	TEMP °C	PH-F	PH-L	WL (m below casing)
P03-05-07	04-May-05	46.9	7140	2380	4060	4.8	6.2	4	8.96
P03-05-07	10-Sep-05	45.3	7570	2790	6600	5.5	6.26	4.42	8.65505
P03-05-08	04-May-05	43.9	6170	1990	4470	4.9	6.01	4.14	8.805
P03-05-08	10-Sep-05	45.7	6610	2340	5550	4.8	5.96	4.52	8.50265
P03-06-01	03-May-05	184	1600	866	775		6.45	7.64	12.72
P03-06-01	10-Sep-05	194	1620	799	804	5.2	6.61	7.32	12.319
P03-06-02	03-May-05	185	1650	919	810		6.87	7.65	12.7
P03-06-02	10-Sep-05	159	1490	815	734	4.4	6.72	7.07	12.319
P03-06-03	03-May-05	153	1390	730	643		6.75	7.33	12.72
P03-06-03	10-Sep-05	122	2010	1160	1170	4	6.44	6.8	12.319
P03-06-04	03-May-05	45.3	1310	594	685		6.67	6.36	12.725
P03-06-04	10-Sep-05	136	1070	558	451	4.1	6.89	7.07	12.33805
P03-06-05	03-May-05	< 1	3730	2110	1560		6.62	5.1	12.71
P03-06-05	10-Sep-05	32.4	1180	452	613	4.3	6.78	6.09	12.2936
P03-06-06	10-Sep-05	46.3	5880	3910	5080	8.8	6.12	5.49	12.26185
P03-08-01	05-May-05	250		316	36.1	4.5	6.93	8.15	8.85
P03-08-01	09-Sep-05	261	490	307	21	5	7.68	8.08	8.4582
P03-08-01	31-Oct-05								8.56
P03-08-02	05-May-05	265		409	138	6.2	6.35	7.99	8.86
P03-08-02	23-Jul-05	220	601	320	94.2	8.6	6.98	7.36	7.56
P03-08-02	09-Sep-05	280	576	346	75.1	4.8	7.23	7.75	8.14705
P03-08-02	01-Nov-05	259	613	318	83.2	3.2	6.91	7.79	8.56
P03-08-03	05-May-05	257		395	130	4.8	7.04	8.01	8.65
P03-08-03	23-Jul-05	255	769	416	144	5.4	6.8	7.76	7.38
P03-08-03	09-Sep-05	282	764	462	142	4.7	7.35	7.87	7.9502
P03-08-03	01-Nov-05	292	758	393	136	3.7	7.18	7.89	8.33
P03-08-04	05-May-05	309		770	532	6.6	6.82	7.82	8.66
P03-08-04	23-Jul-05	282	1570	825	620	8.4	7.13	7.32	7.39
P03-08-04	09-Sep-05	316	1490	889	538	8.2	7.28	7.46	7.9248
P03-08-04	01-Nov-05	312	1400	691	461	4.5	7.17	7.58	8.33
P03-08-04	01-Nov-05	310	1410	726	477	4.5	7.17	7.73	8.33
P03-08-05	05-May-05	168		1260	1360	5.7	7.06	7.59	8.49
P03-08-05	23-Jul-05	176	2410	1020	1330	6.5	7.03	7.24	7.19
P03-08-05	09-Sep-05	246	2360	1240	1160	10	7.21	7.35	7.71525
P03-08-05	09-Sep-05	249	2360	1150	1220	10	7.21	7.32	7.71525
P03-08-05	01-Nov-05	247	2370	1120	1150			7.4	8.11
P03-08-06	05-May-05	44.1		850	1490	4.9	7.11	7.39	8.06
P03-08-06	05-May-05			1030		4.9	7.11		8.06
P03-08-06	09-Sep-05	20.3	2340	1170	1340	11	7.2	7.14	7.3279
P03-08-06	01-Nov-05			1040		4.5	7.16		5.89

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Rose Creek Drainage

Table 1 Ground Water Routine Parameters

STATION	DATE	ALK-T mg/L	COND-L µS/cm	HARD mg/L	SO4-D mg/L	TEMP °C	PH-F	PH-L	WL (m below casing)
P03-08-07	05-May-05	54.2		779	1410	5.7	7.35	7.55	5.85
P03-08-07	09-Sep-05	56.4	2400	1300	1390			7.44	5.39115
P03-08-07	31-Oct-05								5.89
P03-08-08	05-May-05	128		100	143	7.5	8.1	8.35	5.72
P03-08-08	10-Sep-05	123	582	90.8	150	8.5	8.84	7.99	5.2578
P03-08-08	31-Oct-05								5.74
P03-09-01	04-May-05	344	1280	698	385	5.2	6.64	7.92	2.64
P03-09-01	09-Sep-05	341	1210	761	352	4.4	7.16	7.73	2.87
P03-09-01	31-Oct-05								2.78
P03-09-02	04-May-05	333	1250	689	378	3.8	6.9	7.91	2.89
P03-09-02	22-Jul-05	307	1230	590	372	6.2	6.47	7.77	2.6
P03-09-02	09-Sep-05	354	1200	665	344	4.4	7.12	7.66	3.11
P03-09-02	01-Nov-05	344	1200	594	324	3.6	6.68	7.49	2.78
P03-09-03	04-May-05	250	995	571	309	4.7	7.17	8.01	3.01
P03-09-03	09-Sep-05	284	1140	685	375	4.5	7.27	7.76	3.33
P03-09-03	31-Oct-05								3.15
P03-09-04	04-May-05	253	1010	570	319	4.5	7.22	8.01	3.33
P03-09-04	22-Jul-05	234	1100	532	370	4.8	7.01	7.86	3.095
P03-09-04	09-Sep-05	271	1180	636	393	4.4	7.27	7.81	3.48
P03-09-04	01-Nov-05	263	1180	601	374	3.3	7.06	7.45	3.45
P03-09-05	04-May-05	250	989	553	311	4	7.31	8.02	3.375
P03-09-05	09-Sep-05	280	1180	954	391	4.4	7.24	7.82	3.525
P03-09-05	31-Oct-05								3.49
P03-09-06	04-May-05	269	1120	612	372	4	7.2	7.99	3.4
P03-09-06	22-Jul-05	249	1110	544	362	4.9	7.09	7.86	3.18
P03-09-06	09-Sep-05	273	1160	704	368	4.2	7.15	7.84	3.53
P03-09-06	01-Nov-05	274	1200	586	385	2.3	7.13	7.62	3.51
P03-09-07	04-May-05	264	1180	686	415	4	7.14	7.96	3.535
P03-09-07	22-Jul-05	246	1200	584	412	5.6	7.16	7.9	3.35
P03-09-07	09-Sep-05	281	1290	944	437	4.7	7.24	7.81	3.66
P03-09-07	01-Nov-05	263	1290	654	437	3.2	7.11	7.7	3.66
P03-09-07	01-Nov-05	274	1280	620	427	3.2	7.11	7.71	3.66
P03-09-08	04-May-05	267	1180	663	412	4.9	7.14	8.04	3.575
P03-09-08	09-Sep-05	281	1250	904	418	6.5	7.25	7.78	3.71
P03-09-08	31-Oct-05								3.66
P03-09-09	04-May-05	267	1170	684	417	4.1	7.19	8.01	3.75
P03-09-09	22-Jul-05	245	1190	594	435	6	7.08	7.89	3.6
P03-09-09	09-Sep-05	284	1240	814	429	4.4	7.25	7.78	4.08
P03-09-09	01-Nov-05	276	1280	656	425	3.5	7.12	7.71	4.07
P96-6	05-May-05	341		640	286	2	5.24	6.71	9.7

Appendix 4

2005 Ground Water Quality Data

Rose Creek Drainage

Table 1 Ground Water Routine Parameters

STATION	DATE	ALK-T mg/L	COND-L µS/cm	HARD mg/L	SO4-D mg/L	TEMP °C	PH-F	PH-L	WL (m below casing)
P96-6	11-Sep-05	295	2010	1220	1030	2.69	6.09	6.87	12.61
P96-7	05-May-05	258		1740	1500	2.7	5.94	7.81	8.51
P96-7	10-Sep-05	172	2940	2080	1910	5.72	7.39	7.8	4.36
P96-8A	03-May-05	12.4	197	94.4	71.2	2.2	7.14	6.76	2.11
P96-8A	10-Sep-05	106	6390	4440	4920	8.85	5.83	6.46	2.63
P96-8B	03-May-05	214	5540	3770	4520	3.4	6.21	7.01	2.19
P96-8B	10-Sep-05	131	6620	4080	4980			6.35	2.54
P96-9A	03-May-05	421	2210	1480	987	1.7	6.5	7.89	5.285
P96-9A	03-May-05	412	2210	1480	994	1.7	6.5	7.85	5.285
P96-9A	08-Sep-05	469	3070	1810	1600			7.41	5.69
S1A	05-May-05	205		4440	4550	3.6	5.6	6.9	2.33
S1A	12-Sep-05	196	5600	4430	4070	5.2	6.33	6.78	4.16
S1B	05-May-05	25.7		447	403	4.1	6.94	7.22	4.18
S1B	12-Sep-05	68.6	1430	856	703	5.1	6.95	7.13	2.92
S2A	05-May-05	213		3760	1860	4.8	5.92	6.98	4.53
S2A	12-Sep-05	191	5440	4100	3910	4.4	6.05	6.84	4.46
S2B	05-May-05	55		1880	1760	2.8	6.33	6.37	4.7
S2B	12-Sep-05	124	3660	2090	2510	4	6.45	6.78	4.642
S3	05-May-05	173		4700	4610	2	5.92	6.72	2.62
S3	12-Sep-05	171	5850	4340	4360	6.5	5.98	6.65	2.56
TH86-17	22-Jul-05	74.4	171	91.2	16.6	7.9	5.81	7.87	7.18
TH86-17	10-Sep-05	88.1	2060	105	15.8	7.58	7.9	7.74	8.25
V34	03-May-05	436	796	528	42.5	3.9	6.72	8.31	6.87
V34	08-Sep-05	421	843	476	48.1	5.16	7.12	8.23	6.38
V35	03-May-05	383	1410	1040	495	3.9	6.47	8.15	8.78
V35	08-Sep-05	377	1510	966	496	4.48	6.49	7.92	7.74
V36	03-May-05	440	1580	1140	509	5.1	6.32	8.13	9.82
V36	08-Sep-05	407	1630	970	553	3.93	7.11	7.91	9.4
V37	03-May-05	420	829	495	77.9	3.9	6.28	8.4	9
V37	08-Sep-05	428	850	389	74.6	4.49	7.7	8.29	8.77
X16A	04-May-05	155	315	181	24.8	4	7.47	8.19	3.61
X16A	09-Sep-05	172	338	183	24.1			7.18	3.65
X16B	04-May-05	202	389	238	27	4.8	7.35	8.32	4.3
X16B	04-May-05	210	391	236	27.5	4.8	7.35	8.29	4.3
X16B	09-Sep-05	206	411	245	26.3	4.63	7.88	8.03	3.94
X17A	21-Jul-05	225	462	252	35.7	4.3	7.82	8.1	2.05
X17A	10-Sep-05	230	448	298	20.1	3.65	7.72	8.12	2.18
X17B	04-May-05	427	1120	564	245		6.91	7.96	2.8
X17B	04-May-05	428	1100	577	215		6.91	7.93	2.8
X17B	10-Sep-05	271	530	359	39.5	3.77	7.37	8.01	2.73

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2005 Ground Water Quality Data

Rose Creek Drainage

Table 1 Ground Water Routine Parameters

STATION	DATE	ALK-T mg/L	COND-L µS/cm	HARD mg/L	SO4-D mg/L	TEMP °C	PH-F	PH-L	WL (m below casing)
X18A	21-Jul-05	244	1320	728	528	5.4	7.35	7.93	4.13
X18A	10-Sep-05	255	1170	821	408	3.94	7.72	7.8	4.44
X18B	04-May-05	251	1360	831	566	4	7.2	8.05	3.91
X18B	10-Sep-05	270	826	580	203	3.44	7.55	7.92	4.13
X21A-96	10-May-05	17.4	2830	977	1760	3.1		5.74	
X21A-96	11-Sep-05	54.3	11700	4830	11900	4.4	6.31	4.42	
X21B-96	10-May-05	165	1280	602	520	2.9		7.63	5.02
X21B-96	10-May-05	161	1290	606	544	2.9		7.85	5.02
X21B-96	11-Sep-05	75.1	1800	849	931	4.2	6.44	6.69	4.72
X21C-96	10-May-05	177	349	190	9.34	3.1		8.29	5.75
X21C-96	11-Sep-05	190	358	196	8.4	4.1	7.52	8.2	4.76
X24A-96	21-Jul-05	293	2400	1440	1260	5.2	6.54	7.54	4.93
X24A-96	09-Sep-05	317	2310	1410	1170	7.1	6.78	7.1	5.26
X24A-96	31-Oct-05	326	2090	1250	929	2.5	6.6	7.34	5.9
X24C-96	04-May-05	338	2420	1600	1410	4.8	6.72	7.68	4.95
X24C-96	21-Jul-05	297	2570	1470	1410	5.6	6.44	7.41	4.855
X24C-96	09-Sep-05	325	2340	1570	1180	5.02	6.7	7.1	3.18
X24C-96	31-Oct-05	325	2210	1310	981	1.5	6.53	7.27	5.767
X24D-96	04-May-05	354	2500	1760	1450	4	6.9	7.71	4.83
X24D-96	21-Jul-05	318	2700	1540	1490	7	6.7	7.45	4.73
X24D-96	09-Sep-05	358	2670	1890	1390	4.93	6.68	7.14	5.05
X24D-96	31-Oct-05	366	2710	1650	1340	2.2	6.53	7.28	5.38
X25A-96	21-Jul-05	229	950	508	292	5	7.1	7.88	4.19
X25A-96	09-Sep-05	250	970	503	295	4.26	7.15	7.67	4.53
X25A-96	31-Oct-05	253	942	474	287	1.5	6.6	7.74	4.85
X25A-96	31-Oct-05	248	943	481	288	2.5	6.6	7.73	4.85
X25B-96	21-Jul-05	247	1110	547	347	5.8	7.44	8.02	4.02
X25B-96	09-Sep-05	267	1100	542	335	4	7.24	8.01	4.35
X25B-96	31-Oct-05	272	1110	542	331	1.9	7.33	7.92	4.65

Appendix 4
2005 Ground Water Quality Data
Rose Creek Drainage

Table 2 Ground 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	BR-T 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	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
BH1	05-May-05	< 0.00005	0.043	< 0.001	0.057	< 0.2	< 0.01			66.4	0.00237	0.00087	< 0.0005	0.004	< 0.06	< 0.0002		< 0.1	14.4	0.217	< 0.001	5.6	< 0.005	0.0027		< 0.0005	< 0.001				< 0.1	< 0.0002	0.00138	< 0.06	0.615
BH1	11-Sep-05	< 0.00005	0.09	< 0.001	0.038	< 0.1	< 0.005			85.6	0.0036	0.00098	< 0.0005	0.0041	< 0.03	< 0.0002		< 0.05	19	0.36	< 0.001	6.4	0.0069	0.0024		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00162	< 0.03	0.951
BH2	05-May-05	< 0.00025	0.089	< 0.005	0.058	< 0.2	< 0.01			75.8	0.019	< 0.0025	< 0.0025	< 0.005	0.071	< 0.0002		< 0.1	19.5	0.023	< 0.005	5	0.052	< 0.005		< 0.0025	< 0.005				< 0.1	< 0.001	< 0.001	< 0.06	13.5
BH2	11-Sep-05	< 0.00025	0.224	< 0.005	0.052	< 0.1	< 0.005			70	0.0271	< 0.0025	< 0.0025	< 0.005	0.07	< 0.0002		< 0.05	22.9	0.021	< 0.005	5.6	0.069	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	< 0.001	< 0.03	17.3
BH4	05-May-05	< 0.0001	9.22	< 0.002	< 0.04	< 0.2	< 0.01			76.5	0.0131	0.0603	< 0.001	0.182	< 0.06	< 0.0002		< 0.1	18.7	0.747	< 0.002	5.8	0.068	0.0025		< 0.001	< 0.002				< 0.1	< 0.0004	0.00051	< 0.06	7.66
BH4	11-Sep-05	< 0.00005	0.085	< 0.001	0.028	< 0.1	< 0.005			85.9	0.00356	0.00887	< 0.0005	0.0052	< 0.03	< 0.0002		< 0.05	19.7	0.149	< 0.001	6.3	0.0186	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	< 0.0002	< 0.03	1.91
BH12A	06-May-05	< 0.0001	< 0.02	< 0.002	0.044	< 0.1	< 0.005			160	0.00029	< 0.001	< 0.001	< 0.004	< 0.03	< 0.0002		< 0.05	83.1	< 0.01	< 0.002	6.6	0.011	< 0.002		< 0.001	0.0027				< 0.05	< 0.0004	0.00643	< 0.03	0.171
BH12A	06-May-05	< 0.0001	< 0.02	< 0.002	0.045	< 0.1	< 0.005			160	0.00029	< 0.001	< 0.001	< 0.004	< 0.03	< 0.0002		< 0.05	82.3	< 0.01	< 0.002	7	0.011	< 0.002		< 0.001	0.0029				< 0.05	< 0.0004	0.00624	< 0.03	0.175
BH12A	11-Sep-05	< 0.0001	< 0.02	< 0.002	0.033	< 0.1	< 0.005			111	0.00023	< 0.001	< 0.001	0.0022	< 0.03	< 0.0002		< 0.05	58.8	< 0.01	< 0.002	5	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00532	< 0.03	0.201
BH12B	06-May-05	< 0.0001	< 0.02	< 0.002	0.043	< 0.1	< 0.005			148	0.00027	< 0.001	< 0.001	< 0.004	< 0.03	< 0.0002		< 0.05	81.4	< 0.01	< 0.002	6.7	0.011	< 0.002		< 0.001	0.0022				< 0.05	< 0.0004	0.00661	< 0.03	0.187
BH12B	11-Sep-05	< 0.0001	< 0.02	< 0.002	0.031	< 0.1	< 0.005			105	0.00023	< 0.001	< 0.001	0.0023	< 0.03	< 0.0002		< 0.05	52	< 0.01	< 0.002	4.4	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00515	< 0.03	0.167
BH13A	06-May-05	< 0.0001	< 0.02	< 0.002	0.025	< 0.1	< 0.005			136	< 0.0001	< 0.001	< 0.001	0.0069	< 0.03	< 0.0002		< 0.05	41.8	< 0.01	0.0049	14.3	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.0014	< 0.03	0.0091
BH13A	11-Sep-05	< 0.0001	< 0.02	< 0.002	0.039	< 0.1	< 0.005			100	< 0.0001	0.0012	< 0.001	< 0.002	2.24	< 0.0002		< 0.05	27.2	0.43	0.0054	37.2	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00136	< 0.03	0.0191
BH13B	11-Sep-05	< 0.0001	< 0.02	< 0.002	0.025	< 0.1	< 0.005			164	< 0.0001	< 0.001	< 0.001	0.005	< 0.03	< 0.0002		< 0.05	46.3	< 0.01	0.004	4.9	< 0.01	< 0.002		< 0.001	0.0053				< 0.05	< 0.0004	0.00119	< 0.03	0.008
BH14A	05-May-05	< 0.0005	< 0.1	< 0.01	< 0.04	< 0.2	< 0.01			612	< 0.0005	< 0.005	< 0.005	< 0.01	< 0.06	< 0.0002		< 0.1	192	< 0.02	< 0.01	21.6	< 0.05	< 0.01		< 0.005	< 0.01				< 0.1	< 0.002	0.117	< 0.06	0.019
BH14A	11-Sep-05	< 0.00025	< 0.05	< 0.005	0.023	< 0.1	< 0.005			600	< 0.00025	< 0.0025	< 0.0025	< 0.005	< 0.03	< 0.0002		0.069	233	< 0.01	< 0.005	15.4	< 0.025	0.0056		< 0.0025	< 0.005				< 0.05	< 0.001	0.129	0.037	0.164
BH14B	05-May-05	< 0.0005	< 0.1	< 0.01	< 0.04	< 0.2	< 0.01			571	< 0.0005	< 0.005	< 0.005	< 0.01	< 0.06	< 0.0002		< 0.1	196	< 0.02	< 0.01	16.1	< 0.05	< 0.01		< 0.005	< 0.01				< 0.1	< 0.002	0.137	< 0.06	0.042
BH14B	11-Sep-05	< 0.00025	< 0.05	< 0.005	< 0.02	< 0.1	< 0.005			506	< 0.00025	< 0.0025	< 0.0025	< 0.005	< 0.03	< 0.0002		0.057	194	< 0.01	< 0.005	12.5	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.122	0.041	0.0763
P01-01A	20-Jul-05	< 0.0001	< 0.02	< 0.002	0.094	< 0.1	< 0.005			199	< 0.0001	0.0011	< 0.001	< 0.002	< 0.03	< 0.0002		< 0.05	46.5	2.6	< 0.002	32	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00664	< 0.03	0.0979
P01-01A	10-Sep-05	< 0.0001	< 0.02	< 0.002	0.069	< 0.1	< 0.005			203	0.00034	< 0.001	< 0.001	< 0.002	0.04	< 0.0002		< 0.05	30.6	2.57	< 0.002	15.9	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00688	< 0.03	0.0097
P01-01B	04-May-05	< 0.0001	< 0.02	0.0038	0.081	< 0.1	< 0.005			196	< 0.0001	< 0.001	< 0.001	< 0.002	0.756	< 0.0002		< 0.05	39.2	0.118	< 0.002	26.8	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00588	< 0.03	0.0065
P01-01B	10-Sep-05	< 0.0001	< 0.02	0.0033	0.064	< 0.1	< 0.005			162	< 0.0001	< 0.001	< 0.001	< 0.002	0.572	< 0.0002		< 0.05	26.8	0.089	< 0.002	19	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00606	< 0.03	0.0113
P01-02A	11-May-05	< 0.00005	< 0.01	< 0.001	0.06	< 0.3	< 0.015			102	0.00006	0.00051	< 0.0005	< 0.001	< 0.09	< 0.0002		< 0.15	24.4	1.04	0.0016	11	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.15	< 0.0002	0.0022	< 0.09	< 0.015
P01-02A	21-Jul-05	< 0.00005	< 0.01	< 0.001	0.062	< 0.1	< 0.005			90	0.00007	0.00062	< 0.0005	< 0.001	< 0.03	< 0.0002		< 0.05	23.6	0.724	0.002	11.9	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00228	< 0.03	< 0.005
P01-02A	09-Sep-05	< 0.00005	< 0.01	< 0.001	0.059	< 0.1	< 0.005			100	0.000085	< 0.0005	< 0.0005	< 0.001	< 0.03	< 0.0002		< 0.05	23.7	1	0.0019	12.2	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00231	< 0.03	0.0081
P01-02B	21-Jul-05	< 0.00005	< 0.01	0.0034	0.033	< 0.1	< 0.005			63.9	< 0.00005	< 0.0005	< 0.0005	< 0.001	0.507	< 0.0002		< 0.05	25.8	0.148	< 0.001	12.4	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00229	< 0.03	< 0.005
P01-02B	09-Sep-05	< 0.00005	< 0.01	0.0035	0.032	< 0.1	< 0.005			67.6	< 0.00005	< 0.0005	< 0.0005	< 0.001	0.493	< 0.0002		< 0.05	25.3	0.141	< 0.001	12.3	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00232	< 0.03	0.0087
P01-03	04-May-05	< 0.0005	< 0.1	< 0.01	< 0.02	< 0.1	< 0.005			516	0.00113	0.0587	< 0.005	< 0.01	0.27	< 0.0002		< 0.05	113	39.1	< 0.01	47.7	0.091	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	0.0072	0.099	0.0188
P01-03	09-Sep-05	< 0.0005	< 0.1	< 0.01	< 0.02	< 0.1	< 0.005			473	0.00176	0.0518	< 0.005	< 0.01	0.149	< 0.0002		< 0.05	103	37.7	< 0.01	45.3	0.093	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	0.0059	< 0.03	0.0172
P01-04A	21-Jul-05	0.00044	< 0.02	< 0.002	0.505	< 0.1	< 0.005			152	< 0.0001	< 0.001	< 0.001	< 0.002	0.815	< 0.0002		0.17	57.3	0.27	< 0.002	76.5	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00044	< 0.03	< 0.005
P01-04A	10-Sep-05	0.00036	< 0.02	< 0.002	0.475	< 0.1	< 0.005			114	< 0.0001	< 0.001	< 0.001	< 0.002	0.721	< 0.0002		0.175	47.7	0.248	< 0.002	68.6	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	< 0.0004	< 0.03	< 0.005
P01-04B	21-Jul-05	< 0.00025	< 0.05	< 0.005	0.032	< 0.1	< 0.005			218	< 0.00025	< 0.0025	< 0.0025	< 0.005	4.81	< 0.0002		< 0.05	36.7	1.15	< 0.005	46.3	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0033	< 0.03	< 0.005
P01-04B	10-Sep-05	< 0.0001	< 0.02	< 0.002	0.033	< 0.1	< 0.005			263	< 0.0001	< 0.001	< 0.001	< 0.002	5.29	< 0.0002		< 0.05	36.9	1.39	< 0.002	49.6	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00324	< 0.03	0.0056
P01-05A	10-May-05	< 0.0001	< 0.02	< 0.002	< 0.06	< 0.3	< 0.015			79.3	< 0.0001	0.0018	< 0.001	< 0.002	0.783	< 0.0002		< 0.15	15.8	0.098	0.0155	174	< 0.01	< 0.002		< 0.001	< 0.002				< 0.15	< 0.0004	< 0.0004	< 0.09	0.187
P01-05A	10-May-05	< 0.0001	< 0.02	0.0044	< 0.06	< 0.3	< 0.015			94.6	< 0.0001	0.0021	< 0.001	< 0.002	< 0.09	< 0.0002		< 0.15	19.2	0.125	0.0088	146	< 0.01	0.0257		0.0456	< 0.002				< 0.15	< 0.0004	< 0.0004	< 0.09	< 0.015
P01-05A	11-Sep-05	< 0.0001	< 0.02	0.0045	< 0.02	< 0.1	< 0.005			84.5	< 0.0001	0.002	< 0.001	< 0.002	0.057	< 0.0002		< 0.05	20.1	0.302	0.0096	176	< 0.01	0.029		0.0351	< 0.002				< 0.05	< 0.0004	< 0.0004	< 0.03	0.0262
P01-05A	11-Sep-05	< 0.0001	< 0.02	< 0.002	< 0.02	< 0.1	< 0.005			87.9	< 0.0001	0.0019	< 0.001	< 0.004	0.137	< 0.0002		< 0.05	17.7	0.188	0.0116	183	< 0.01	< 0.002		0.0019	< 0.002				< 0.05	< 0.0004	< 0.0004	< 0.03	0.0108
P01-05B	10-May-05	< 0.0001	< 0.02	0.0058	< 0.06	< 0.3	< 0.015			285	< 0.0001	0.0064	< 0.001	< 0.002	11.2	< 0.0002		< 0.15	50.4	17.7	< 0.002	66.3	< 0.01	< 0.002		< 0.001	< 0.002				< 0.15	< 0.0004	0.00556	< 0.09	0.037
P01-05B	10-May-05	< 0.00025	< 0.05	0.0118	< 0.06	< 0.3	< 0.015			246	< 0.00025	0.0088	< 0.0025	< 0.005	4.91	< 0.0002		< 0.15	43.6	15.5	< 0.005	52.4	< 0.025	0.0264		0.0095	< 0.005				< 0.15	< 0.001	0.0058	< 0.09	0.052
P01-05B	11-Sep-05	< 0.00025	< 0.05	0.0124	0.035	< 0.1	< 0.005			281	< 0.00025	0.0082	< 0.0025	< 0.005	7.1	< 0.0002		< 0.05	51.5	17.7	< 0.005	71	< 0.025	< 0.005		0.0045	< 0.005				< 0.05	< 0.001	0.0061	< 0.03	0.0465
P01-05B	11-Sep-05	< 0.00025	< 0.05	0.0226	0.028	< 0.1	< 0.005			292	< 0.00025	0.0083	< 0.0025	< 0.005	4.98	< 0.0002		< 0.05	49.9	17.3	< 0.005	59.6	< 0.025	0.0348		0.0163	< 0.005				< 0.05	< 0.001	0.0058	0.033	0.0718
P01-07C	10-May-05	< 0.0005	< 0.1	0.016	0.115	< 0.3	< 0.015			225	< 0.0005	0.0115	< 0.005	< 0.01	21.8	< 0.0002		< 0.15	44.7	29.1	< 0.01	31.1	< 0.05	< 0.01		< 0.005	< 0.01				< 0.15	< 0.002	0.0075	< 0.09	< 0.015
P01-07C	10-May-05	< 0.0005	< 0.1	0.017	0.116	< 0.3	< 0.015			188	< 0.0005	< 0.005	< 0.005	< 0.01	16.7	< 0.0002		< 0.15	41.8	23	< 0.01	75.3	< 0.05	< 0.01		< 0.005	< 0.01				< 0.15	< 0.002	0.0069	< 0.09	< 0.015
P01-07C	11-Sep-05	< 0.0005	< 0.1	< 0.01	0.142	< 0.1	< 0.005			249	< 0.0005	< 0.005	< 0.005	< 0.01	18.7	< 0.0002		< 0.05	48.4	30.8	< 0.01	84.6	< 0.05	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	0.0068	0.061	0.0098
P01-07C	11-Sep-05	< 0.0005	< 0.1	0.014	0.144	< 0.1	< 0.005			284	< 0.0005	0.0112	< 0.005	< 0.01	23.6	< 0.0002		< 0.05	51.7	38.6	< 0.01	51.9	< 0.05	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	0.0074	0.06	0.009
P01-07D	10-May-05	< 0.001	< 0.2	< 0.02	0.075	< 0.3	< 0.015			319	< 0.001	0.048	< 0.01	< 0.02	21.2	< 0.0002		< 0.15	71.1	60.6	< 0.02	26.3	< 0.1	< 0.02		< 0.01	< 0.02				< 0.15	< 0.004	0.0047	< 0.09	0.018
P01-07D	10-May-05	< 0.001	< 0.2	< 0.02	0.074	< 0.3	< 0.015			294	< 0.001	0.038	< 0.01	< 0.02	19.9	< 0.0002		< 0.15	65.9	52.3	< 0.02	32.4	< 0.1	< 0.02		< 0.01	< 0.02				< 0.15	< 0.004	0.0048	< 0.09	0.023
P01-07D	11-Sep-05	< 0.001	< 0.2	< 0.02	0.068	< 0.1	< 0.005			283	< 0.001	0.042	< 0.01	< 0.02	16.1	< 0.0002		< 0.05	63.6	45.6	< 0.02	33.5	< 0.1	< 0.02		< 0.01	< 0.02				< 0.05	< 0.004	0.0054	< 0.07	0.0148
P01-07D	11-Sep-05	< 0.0005	< 0.1	< 0.01	0.07	< 0.1	< 0.005			290	< 0.0005	0.0472	< 0.005	< 0.01	17.4	< 0.0002		< 0.05	63.5	47.4	< 0.01	32.5	< 0.05	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	0.0047	< 0.09	0.0149
P01-08A	11-May-05	0.00014	0.208	0.0042	2.77	< 0.3	< 0.015			6.03	0.00113	0.0012	0.0018	0.0217	6.03	0.00038		< 0.15	1.67	0.163	0.0301	122	< 0.01	0.768		0.0162	< 0.002				< 0.15	< 0.0004	< 0.0004	< 0.09	0.929
P01-10B	11-May-05	< 0.0001	< 0.02	0.0067	0.195	< 0.3	< 0.015			88.1	< 0.0001	< 0.001	< 0.001	< 0.002	25.6	< 0.0002		< 0.15	17.1	4.65	0.0082	42.4	< 0.01	< 0.002		< 0.001	< 0.002				< 0.15	< 0.0004	0.0169	< 0.09	1.36
P01-11	10-May-05	< 0.0001	< 0.02	0.0207	< 0.06	< 0.3	< 0.015			357	< 0.0001	0.0015	< 0.001	< 0.002	24.7	< 0.0002		< 0.15	66.9	13.4	< 0.002	46.6	< 0.01	< 0.002		< 0.001	< 0.002				< 0.15	< 0.0004	0.00315	< 0.09	< 0.015
P01-11	09-Sep-05	< 0.00025	< 0.05	0.0292	0.048	< 0.1	< 0.005			347	< 0.00025	< 0.0025	< 0.0025	< 0.005	22.6	< 0.0002		< 0.05	60.1	12.3	< 0.005	47.8	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0043	< 0.03	0.0074
P01-52A	03-May-05	< 0.00025	< 0.05	0.0206	0.028	< 0.1	< 0.005			173	< 0.00025	< 0.0025	< 0.0025	< 0.005	1.7	< 0.0002		< 0.05	87.5	0.127	< 0.005	7.8	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0216	< 0.03	0.0088
P01-52A	08-Sep-05	< 0.0001	< 0.02	0.0514	0.022	< 0.1	< 0.005			171	< 0.0001	< 0.001	< 0.001	< 0.002	0.795	< 0.0002		< 0.05	82.9	0.142	0.0053	6.9	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.0202	< 0.03	0.0067
P03-01-01	03-May-05	< 0.00005	< 0.01	0.0018	0.111	< 0.1	< 0.005			62.3	< 0.00005	< 0.0005	< 0.0005	< 0.001	4.23	< 0.0002		< 0.05	13.8	0.195	0.0046	7.8	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	< 0.0002	< 0.03	0.0065
P03-01-01	08-Sep-05	< 0.00005	< 0.01	0.0047	0.098	< 0.1	< 0.005			64.6	< 0.00005	< 0.0005	< 0.0005	< 0.001	4.12	< 0.0002		< 0.05	12.2	0.156	0.0032	6.3	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00027	< 0.03	< 0.005
P03-01-02	03-May-05	< 0.00005	< 0.01	0.0027	0.11	< 0.1	< 0.005			58	< 0.00005	0.00323	< 0.0005	< 0.001	0.282	< 0.0002		< 0.05	11	1.09	0.0046	3.6	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00216	< 0.03	0.0052
P03-01-02	08-Sep-05	< 0.00005	< 0.01	0.0021	0.125	< 0.1	< 0.005			69.9	< 0.00005	0.00638	< 0.0005	< 0.001	0.432	< 0.0002		< 0.05	11.3	1.42	0.0042	4.1	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00206	< 0.03	< 0.005
P03-01-03	03-May-05	< 0.00005	< 0.01	0.0022	0.099	< 0.1	< 0.005			54.4	< 0.00005	0.00062	< 0.0005	< 0.001	0.535	< 0.0002		< 0.05	9.99	0.162	< 0.001	3.1	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00354	< 0.03	0.0079
P03-01-03	08-Sep-05	< 0.00005	< 0.01	< 0.001	0.073	< 0.1	< 0.005			49.2	< 0.00005	< 0.0005	< 0.0005	< 0.001	< 0.03	< 0.0002		< 0.05	8.68	0.037	< 0.001	2.2	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.0043	< 0.03	< 0.005
P03-01-04	03-May-05	< 0.0001	< 0.02	< 0.002	0.059	< 0.1	< 0.005			102	0.00029	< 0.001	< 0.001	< 0.002	0.3	< 0.0002		< 0.05	18.2	0.075	< 0.002	5.5	0.013	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	< 0.0004	< 0.03	0.0271
P03-01-04	08-Sep-05	< 0.00005	< 0.01	< 0.001	0.083	< 0.1	< 0.005			86.7	0.000703	< 0.0005	< 0.0005	< 0.001	< 0.03	< 0.0002		< 0.05	13.3	0.168	< 0.001	3.5	0.0528	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	< 0.0002	< 0.03	0.19
P03-01-05	03-May-05	< 0.0001	< 0.02	< 0.002	0.085	< 0.1	< 0.005			135	0.0004	0.0018	< 0.001	< 0.002	0.444	< 0.0002		< 0.05	25.1	0.458	< 0.002	6.6	0.015	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	< 0.0004	< 0.03	0.0306
P03-01-05	08-Sep-05	< 0.00005	0.013	< 0.001	0.046	< 0.1	< 0.005			65.4	0.000113	0.0009	< 0.0005	< 0.001	0.166	< 0.0002		< 0.05	10.9	0.29	< 0.001	3.6	0.008	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	< 0.0002	< 0.03	0.0146

Appendix 4
2005 Ground Water Quality Data
Rose Creek Drainage

Table 2 Ground 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	BR-T 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	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
P03-01-06	03-May-05	< 0.00025	< 0.05	0.0092	0.104	< 0.1	< 0.005			56.7	< 0.00025	0.0558	< 0.0025	< 0.005	148	< 0.0002		< 0.05	23.2	6.21	< 0.005	45.3	0.053	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	< 0.001	0.06	5.13
P03-01-06	08-Sep-05	< 0.0001	0.027	0.0096	0.07	< 0.1	< 0.005			46.3	< 0.0001	0.0636	< 0.001	< 0.002	114	< 0.0002		< 0.05	13.1	6.02	< 0.002	18.4	0.054	0.0047		< 0.001	< 0.002				< 0.05	< 0.0004	< 0.0004	0.059	4.71
P03-01-07	03-May-05	< 0.005	< 1	< 0.1	< 0.2	< 1	< 0.05			142	< 0.005	< 0.05	< 0.05	< 0.1	3550	< 0.0002		< 0.5	194	24.9	< 0.1	408	< 0.5	< 0.1		< 0.05	< 0.1				< 0.5	< 0.02	< 0.02	< 0.3	279
P03-01-07	08-Sep-05	< 0.0025	< 0.5	< 0.05	< 0.1	< 0.5	< 0.025			109	< 0.0025	< 0.025	< 0.025	< 0.05	3220	< 0.0002		< 0.25	124	22	0.149	415	< 0.25	< 0.05		< 0.025	< 0.05				< 0.25	< 0.01	< 0.01	< 0.15	315
P03-01-08	08-Sep-05	< 0.005	< 1	< 0.1	< 0.4	< 2	< 0.1			409	< 0.005	< 0.05	< 0.05	< 0.1	14300	< 0.0002		< 1	536	88.7	< 0.1	603	< 0.5	< 0.1		< 0.05	< 0.1				< 1	< 0.02	< 0.02	< 7	1420
P03-01-09	03-May-05	< 0.05	< 10	< 1	< 1	< 5	< 0.25			421	< 0.05	< 0.5	< 0.5	< 1	23700	0.00022		< 2.5	604	148	< 1	310	< 5	5.9		< 0.5	< 1				< 2.5	< 0.2	< 0.2	< 1.5	2450
P03-01-09	08-Sep-05	< 0.025	< 5	< 0.5	< 0.4	2.4	< 0.1			475	< 0.025	< 0.25	< 0.25	< 0.5	17600	< 0.0002		< 1	777	109	< 0.5	766	< 2.5	4.19		< 0.25	< 0.5				< 1	< 0.1	< 0.1	< 10	1950
P03-02-01	11-May-05	< 0.00005	< 0.01	< 0.001	0.085	< 0.3	< 0.015			63	< 0.00005	< 0.0005	< 0.0005	< 0.001	0.136	< 0.0002		< 0.15	10.1	0.611	0.0023	< 6	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.15	< 0.0002	0.00126	< 0.09	< 0.015
P03-02-01	08-Sep-05	< 0.00005	< 0.01	< 0.001	0.097	< 0.1	< 0.005			70.2	< 0.00005	0.00051	< 0.0005	< 0.001	0.152	< 0.0002		< 0.05	11.3	0.573	0.0018	2.9	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00157	< 0.03	< 0.005
P03-02-02	11-May-05	< 0.00005	< 0.01	< 0.001	0.083	< 0.3	< 0.015			42.4	< 0.00005	< 0.0005	< 0.0005	< 0.001	< 0.09	< 0.0002		< 0.15	7.71	< 0.03	< 0.001	< 6	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.15	< 0.0002	0.00069	< 0.09	< 0.015
P03-02-02	08-Sep-05	< 0.00005	< 0.01	< 0.001	0.098	< 0.1	< 0.005			48.5	< 0.00005	< 0.0005	< 0.0005	< 0.001	0.04	< 0.0002		< 0.05	8.93	< 0.01	< 0.001	2.3	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00092	< 0.03	0.0066
P03-02-03	11-May-05	< 0.00005	< 0.01	< 0.001	0.083	< 0.3	< 0.015			41.8	< 0.00005	< 0.0005	< 0.0005	< 0.001	0.514	< 0.0002		< 0.15	7.63	< 0.03	< 0.001	< 6	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.15	< 0.0002	0.00075	< 0.09	0.086
P03-02-03	08-Sep-05	< 0.00005	< 0.01	< 0.001	0.097	< 0.1	< 0.005			44.1	< 0.00005	< 0.0005	< 0.0005	< 0.001	0.129	< 0.0002		< 0.05	8.08	0.014	< 0.001	2.3	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00044	< 0.03	0.0074
P03-02-04	11-May-05	< 0.0001	< 0.02	< 0.002	< 0.06	< 0.3	< 0.015			74.1	0.00014	0.0053	< 0.001	< 0.002	0.621	< 0.0002		< 0.15	12.1	8.88	< 0.002	8.7	0.055	< 0.002		< 0.001	< 0.002				< 0.15	< 0.0004	< 0.0004	< 0.09	0.096
P03-02-04	08-Sep-05	< 0.00025	< 0.05	< 0.005	0.049	< 0.1	< 0.005			79.2	< 0.00025	0.0038	< 0.0025	< 0.005	0.574	< 0.0002		0.064	12.7	9.1	< 0.005	7.2	0.091	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	< 0.001	< 0.03	0.246
P03-02-05	11-May-05	< 0.001	< 0.2	< 0.02	< 0.06	< 0.3	< 0.015			401	< 0.001	< 0.01	< 0.01	< 0.02	1180	< 0.0002		0.15	318	21.7	< 0.02	333	< 0.1	< 0.02		< 0.01	< 0.02				< 0.15	< 0.004	0.004	< 0.09	< 0.015
P03-02-05	08-Sep-05	< 0.0005	< 0.1	< 0.01	< 0.04	< 0.2	< 0.01			356	< 0.0005	< 0.005	< 0.005	< 0.01	1220	< 0.0002		0.18	309	21.3	0.011	353	< 0.05	< 0.01		< 0.005	< 0.01				< 0.1	< 0.002	0.0041	0.668	< 0.01
P03-02-06	11-May-05	< 0.001	< 0.2	< 0.02	< 0.06	< 0.3	< 0.015			411	< 0.001	< 0.01	< 0.01	< 0.02	1860	< 0.0002		0.2	378	19.9	< 0.02	368	< 0.1	< 0.02		< 0.01	< 0.02				< 0.15	< 0.004	< 0.004	0.107	< 0.015
P03-02-06	08-Sep-05	< 0.001	< 0.2	< 0.02	< 0.04	< 0.2	< 0.01			338	< 0.001	< 0.01	< 0.01	< 0.02	1900	< 0.0002		0.27	357	18.6	< 0.02	346	< 0.1	< 0.02		< 0.01	< 0.02				< 0.1	< 0.004	< 0.004	1.11	< 0.01
P03-02-07	11-May-05	< 0.001	< 0.2	< 0.02	< 0.1	< 0.5	< 0.025			443	< 0.001	< 0.01	< 0.01	< 0.02	3030	< 0.0002		< 0.25	471	23.3	< 0.02	322	< 0.1	0.02		< 0.01	< 0.02				< 0.25	< 0.004	< 0.004	< 0.15	< 0.025
P03-02-07	08-Sep-05	< 0.0025	< 0.5	< 0.05	< 0.1	< 0.5	< 0.025			407	< 0.0025	< 0.025	< 0.025	< 0.05	2710	< 0.0002		0.32	447	23.7	< 0.05	340	< 0.25	< 0.05		< 0.025	< 0.05				< 0.25	< 0.01	< 0.01	1.36	< 0.025
P03-02-08	11-May-05	0.0012	0.92	0.051	0.24	< 0.5	< 0.025			363	0.0061	< 0.01	< 0.01	0.067	4110	0.00076		< 0.25	390	30.5	< 0.02	223	< 0.1	2.74		< 0.01	< 0.02				< 0.25	< 0.004	< 0.004	< 0.15	15.9
P03-02-08	08-Sep-05	< 0.005	< 1	< 0.1	< 0.2	< 1	< 0.05			389	< 0.005	< 0.05	< 0.05	< 0.1	8350	< 0.0002		< 0.5	437	49.9	< 0.1	220	< 0.5	1.53		< 0.05	< 0.1				< 0.5	< 0.02	< 0.02	3.98	21.7
P03-02-09	11-May-05	< 0.005	< 1	< 0.1	< 0.4	< 2	< 0.1			419	< 0.005	< 0.05	< 0.05	< 0.1	12700	< 0.0002		< 1	275	70.5	< 0.1	54	< 0.5	0.3		< 0.05	< 0.1				< 1	< 0.02	< 0.02	< 0.6	436
P03-02-09	08-Sep-05	< 0.005	< 1	< 0.1	< 0.4	< 2	< 0.1			410	< 0.005	< 0.05	< 0.05	< 0.1	12400	< 0.0002		< 1	266	69.9	< 0.1	< 40	< 0.5	1.14		< 0.05	< 0.1				< 1	< 0.02	< 0.02	5.91	477
P03-03-01	05-May-05	< 0.00005	< 0.01	0.0045	0.289	< 0.1	< 0.005		< 0.05	97.5	< 0.00005	0.00255	< 0.0005	< 0.001	4.45	< 0.0002		< 0.05	21.2	0.191	0.0023	13.4	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00041	< 0.03	0.007
P03-03-01	22-Jul-05	< 0.0025	2.01	< 0.05	< 0.02	< 0.1	< 0.005		< 1	100	0.0134	0.158	< 0.025	< 0.05	482	< 0.0002		< 0.05	41.6	14.4	< 0.05	13.5	< 0.25	< 0.05		0.043	< 0.05				< 0.05	< 0.01	< 0.01	< 0.03	109
P03-03-01	08-Sep-05	< 0.00005	< 0.01	0.0069	0.265	< 0.1	< 0.005		< 0.01	87.4	< 0.00005	0.0014	< 0.0005	< 0.001	3.72	< 0.0002		< 0.05	18.1	0.147	0.0021	10.3	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00043	< 0.03	0.009
P03-03-02	11-May-05	< 0.001	2.87	< 0.02	< 0.06	< 0.3	< 0.015		< 5	126	0.0174	0.21	< 0.01	0.06	520	< 0.0002		< 0.15	50.7	17.4	< 0.02	12.9	0.27	< 0.02		< 0.01	< 0.02				< 0.15	< 0.004	< 0.004	< 0.09	132
P03-03-02	22-Jul-05	< 0.00005	< 0.01	0.0076	0.263	< 0.1	< 0.005		< 0.01	80.4	< 0.00005	0.00162	< 0.0005	< 0.001	3.69	< 0.0002		< 0.05	17.9	0.146	0.0024	10.2	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00045	< 0.03	0.0091
P03-03-02	08-Sep-05	< 0.001	1.29	< 0.02	< 0.02	< 0.1	< 0.005		< 0.01	93.9	0.0089	0.115	< 0.01	0.028	439	< 0.0002		< 0.05	34.8	12.4	< 0.02	12	0.15	< 0.02		< 0.01	< 0.02				< 0.05	< 0.004	< 0.004	< 0.24	102
P03-03-03	11-May-05	< 0.0005	< 0.1	< 0.01	< 0.06	< 0.3	< 0.015		0.5	73.5	0.00612	0.177	< 0.005	< 0.01	14.6	< 0.0002		< 0.15	15.9	10.9	< 0.01	< 6	0.199	< 0.01		< 0.005	< 0.01				< 0.15	< 0.002	< 0.002	< 0.09	8.34
P03-03-03	22-Jul-05	< 0.00025	0.152	< 0.005	< 0.02	< 0.1	< 0.005		< 0.01	94	0.00966	0.225	< 0.0025	< 0.005	29.7	< 0.0002		< 0.05	21.5	14.6	< 0.005	8	0.269	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	< 0.001	< 0.03	12.5
P03-03-03	08-Sep-05	< 0.00025	0.188	< 0.005	0.022	< 0.1	< 0.005		< 0.01	147	0.011	0.268	< 0.0025	< 0.005	50	< 0.0002		0.055	29	20.7	< 0.005	9.7	0.317	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	< 0.001	< 0.06	18.9
P03-03-04	05-May-05	< 0.00025	< 0.05	< 0.005	0.06	< 0.1	< 0.005		< 0.05	92.2	0.00215	0.153	< 0.0025	< 0.005	21.9	< 0.0002		< 0.05	19.3	15.3	< 0.005	12.2	0.146	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	< 0.001	< 0.03	3.52
P03-03-04	22-Jul-05	< 0.00025	< 0.05	< 0.005	0.064	< 0.1	< 0.005		< 0.01	95.2	0.00212	0.146	< 0.0025	< 0.005	24.6	< 0.0002		< 0.05	21	19.2	< 0.005	14.4	0.141	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	< 0.001	< 0.03	3.69
P03-03-04	08-Sep-05	< 0.0005	< 0.1	< 0.01	0.094	< 0.1	< 0.005		< 0.01	160	0.00247	0.171	< 0.005	< 0.01	40.5	< 0.0002		< 0.05	30.4	31	< 0.01	18.5	0.16	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	< 0.002	< 0.06	5.31
P03-03-05	05-May-05	< 0.0005	< 0.1	0.011	0.141	< 0.1	< 0.005		< 0.05	136	< 0.0005	0.0331	< 0.005	< 0.01	21.1	< 0.0002		< 0.05	26.7	31.5	< 0.01	36.2	< 0.05	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	< 0.002	< 0.03	0.0778
P03-03-05	22-Jul-05	< 0.0005	< 0.1	0.01	0.129	< 0.1	< 0.005		< 0.01	127	< 0.0005	0.0293	< 0.005	< 0.01	19.2	< 0.0002		< 0.05	25.6	34.2	< 0.01	26.3	< 0.05	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	< 0.002	< 0.03	0.0724
P03-03-05	08-Sep-05	< 0.0005	< 0.1	< 0.01	0.153	< 0.1	< 0.005		< 0.01	161	< 0.0005	0.0323	< 0.005	< 0.01	24.5	< 0.0002		< 0.05	28.3	39.9	< 0.01	27.1	< 0.05	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	< 0.002	< 0.06	0.093
P03-03-06	05-May-05	< 0.00025	< 0.05	< 0.005	< 0.02	< 0.1	< 0.005		< 1	246	< 0.00025	< 0.0025	< 0.0025	< 0.005	132	< 0.0002		< 0.05	70.8	8.2	0.0067	162	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	< 0.001	< 0.03	0.0085
P03-03-06	22-Jul-05	< 0.00025	< 0.05	< 0.005	< 0.02	< 0.1	< 0.005		< 0.1	189	< 0.00025	< 0.0025	< 0.0025	< 0.005	114	< 0.0002		< 0.05	52.9	9.71	0.0058	126	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	< 0.001	< 0.03	0.008
P03-03-06	08-Sep-05	< 0.0001	< 0.02	< 0.002	< 0.02	< 0.1	< 0.005			190	< 0.0001	< 0.001	< 0.001	< 0.002	110	< 0.0002		< 0.05	47	9.02	0.0046	99.2	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	< 0.0004	< 0.08	0.0099
P03-03-07	05-May-05	< 0.005	< 1	< 0.1	< 0.2	< 1	< 0.05		< 50	428	< 0.005	< 0.05	< 0.05	< 0.1	5300	< 0.0002		< 0.5	466	64.9	< 0.1	494	< 0.5	< 0.1		< 0.05	< 0.1				< 0.5	< 0.02	< 0.02	3.35	56.5
P03-03-08	05-May-05	< 0.025	< 5	< 0.5	< 0.4	< 2	< 0.1		< 50	457	< 0.025	< 0.25	< 0.25	< 0.5	16300	< 0.0002		< 1	854	206	< 0.5	502	< 2.5	1.01		< 0.25	< 0.5				< 1	< 0.1	< 0.1	9.65	703
P03-03-08	08-Sep-05	< 0.01	< 2	< 0.2	< 0.4	< 2	< 0.1			495	< 0.01	< 0.1	< 0.1	< 0.2	15800	< 0.0002		< 1	948	204	< 0.2	504	< 1	< 0.2		< 0.1	< 0.2				< 1	< 0.04	< 0.04	< 8	897
P03-03-09	08-Sep-05	< 0.01	< 2	< 0.2	< 0.4	< 3	< 0.1			478	< 0.01	< 0.1	< 0.1	< 0.2	20500	0.00039		< 1	1000	242	< 0.2	524	< 1	2.48		< 0.1	< 0.2				< 1	< 0.04	< 0.04	< 11	1100
P03-04-01	03-May-05	< 0.00025	< 0.05	< 0.005	< 0.02	< 0.1	< 0.005			294	< 0.00025	< 0.0025	< 0.0025	< 0.005	5	< 0.0002		< 0.05	46.2	1.43	< 0.005	94.4	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0067	< 0.03	0.0491
P03-04-01	10-Sep-05	< 0.00025	< 0.05	< 0.005	< 0.02	< 0.1	< 0.005			363	< 0.00025	< 0.0025	< 0.0025	< 0.005	5.01	< 0.0002		< 0.05	49.4	1.44	< 0.005	94.8	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0066	< 0.03	0.0082
P03-04-02	03-May-05	< 0.0005	< 0.1	< 0.01	< 0.02	< 0.1	< 0.005			209	0.0006	0.0808	< 0.005	< 0.01	0.205	< 0.0002		< 0.05	49.6	26.4	< 0.01	36.1	0.12	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	< 0.002	0.047	0.0459
P03-04-02	03-May-05	< 0.0005	< 0.1	< 0.01	< 0.02	< 0.1	< 0.005			195	0.00065	0.0843	< 0.005	< 0.01	0.206	< 0.0002		< 0.05	46.9	25.2	< 0.01	32	0.127	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	< 0.002	0.057	0.0424
P03-04-02	22-Jul-05	< 0.0005	< 0.1	< 0.01	< 0.02	< 0.1	< 0.005			216	0.00222	0.0734	< 0.005	< 0.01	0.123	< 0.0002		< 0.05	50.8	29.4	< 0.01	33.9	0.119	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	< 0.002	< 0.03	0.0459
P03-04-02	10-Sep-05	< 0.00025	< 0.05	< 0.005	0.022	< 0.1	< 0.005			325	0.00246	0.0803	< 0.0025	< 0.005	0.156	< 0.0002		< 0.05	70.5	35.6	< 0.005	33.3	0.132	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	< 0.001	< 0.06	0.0817
P03-04-02	31-Oct-05	< 0.01	< 0.2	< 0.2	0.017	< 0.1	< 0.005	< 0.2		216	< 0.01	0.078	< 0.01	< 0.01	0.127		3.8	0.026	50.9	29.5	< 0.03	34	0.12	< 0.05	< 0.3	< 0.2	< 0.2	12	< 0.03	0.534	< 0.01	< 0.2		< 0.03	0.0503
P03-04-03	03-May-05	< 0.0005	< 0.1	< 0.01	< 0.02	< 0.1	< 0.005			185	0.00064	0.0667	< 0.005	< 0.01	0.411	< 0.0002		< 0.05	45.2	24.7	< 0.01	32.9	0.104	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	< 0.002	0.068	0.046
P03-04-03	10-Sep-05	< 0.00025	< 0.05	< 0.005	< 0.02	< 0.1	< 0.005			194	0.00055	0.0636	< 0.0025	< 0.005	0.371	< 0.0002		< 0.05	41.1	25.7	< 0.005	23.3	0.103	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	< 0.001	< 0.04	0.0487
P03-04-03	10-Sep-05	< 0.00025	< 0.05	< 0.005	< 0.02	< 0.1	< 0.005			204	0.00063	0.0632	< 0.0025	< 0.005	0.393	< 0.0002		< 0.05	45	28	< 0.005	25.8	0.102	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	< 0.001	< 0.03	0.0528
P03-04-04	03-May-05	< 0.0001	< 0.02	0.0049	0.051	< 0.1	< 0.005			127	< 0.0001	0.0025	< 0.001	< 0.002	3.53	< 0.0002		< 0.05	18.3	2.84	0.0025	86.9	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00228	< 0.03	0.0059
P03-04-04	22-Jul-05	< 0.0001	< 0.02	0.006	0.064	< 0.1	< 0.005			144	< 0.0001	0.0044	< 0.001	< 0.002	4.32	< 0.0002		< 0.05	21.4	4.15	0.0028	87.4	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00326	< 0.03	0.0054
P03-04-04	10-Sep-05	< 0.00025	< 0.05	< 0.005	0.02	< 0.1	< 0.005			234	0.00056	0.0659	< 0.0025	< 0.005	0.494	< 0.0002		< 0.05	51.1	30.5	< 0.005	29.4	0.107	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	< 0.001	< 0.08	0.0569
P03-04-04	31-Oct-05	< 0.01	< 0.2	< 0.2	0.052	< 0.1	< 0.005	< 0.2		135	< 0.01	< 0.01	< 0.01	< 0.01	3.57		2.9	0.014	16.8	2.55	< 0.03	92	< 0.05	< 0.05	< 0.3	< 0.2	< 0.2	5.74	< 0.03	0.319	< 0.01	< 0.2		< 0.03	0.0078
P03-04-05	03-May-05	< 0.0005	< 0.1	< 0.01	0.06	< 0.1	< 0.005			208	< 0.0005	0.0273	< 0.005	< 0.01	24.7	< 0.0002		< 0.05	45.9	29.6	< 0.01	29.6	< 0.05	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	< 0.002	0.059	0.0742
P03-04-05	10-Sep-05	< 0.00025	< 0.05	0.0064	0.052	< 0.1	< 0.005			215	< 0.00025	0.0206	< 0.0025	< 0.005	21.7	< 0.0002		< 0.05	42	28.8	< 0.005	23.9	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0016	< 0.07	0.0699
P03-04-06	03-May-05	< 0.005	< 1	< 0.1	< 0.2	< 1	< 0.05			398	< 0.005	< 0.05	< 0.05	< 0.1	3770	< 0.0002		< 0.5	89.9	25.1	< 0.1	44	< 0.5	< 0.1		< 0.05	< 0.1				< 0.5	< 0.02	< 0.02	< 0.3	5.08
P03-04-06	22-Jul-05	< 0.001	< 0.2	< 0.02	< 0.04	< 0.2	< 0.01			472	< 0.001	0.039	< 0.01	< 0.02	1380	< 0.0002		< 0.1	112	16.3	< 0.02	113	< 0.1	< 0.02		< 0.01	< 0.02				< 0.1	< 0.004	< 0.004	< 0.06	5.11

Appendix 4
2005 Ground Water Quality Data
Rose Creek Drainage

Table 2 Ground 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	BR-T 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	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
P03-04-06	10-Sep-05	< 0.0025	< 0.5	< 0.05	< 0.2	< 1	< 0.05			441	< 0.0025	< 0.025	< 0.025	< 0.05	6010	< 0.0002		< 0.5	170	48.2	< 0.05	31	< 0.25	< 0.05		< 0.025	< 0.05				< 0.5	< 0.01	< 0.01	< 3	12
P03-04-06	31-Oct-05	< 0.1	< 2	< 2	< 0.1	< 1	< 0.05	< 2		440	< 0.1	< 0.3	< 0.1	< 0.5	6690		< 20	< 0.1	154	60.5	< 0.3	37	< 0.5	< 0.5	< 3	< 2	< 2	9.99	< 0.3	1.26	< 0.1	< 2		< 0.5	7.92
P03-04-07	03-May-05	< 0.0025	< 0.5	< 0.05	< 0.2	< 1	< 0.05			442	< 0.0025	0.036	< 0.025	< 0.05	1960	< 0.0002		< 0.5	107	14.3	< 0.05	85	< 0.25	< 0.05		< 0.025	< 0.05				< 0.5	< 0.01	< 0.01	< 0.3	1.8
P03-04-07	10-Sep-05	< 0.0025	< 0.5	< 0.05	< 0.2	< 1	< 0.05			448	< 0.0025	< 0.025	< 0.025	< 0.05	5320	< 0.0002		< 0.5	141	39.2	< 0.05	37	< 0.25	< 0.05		< 0.025	< 0.05				< 0.5	< 0.01	< 0.01	< 2.5	5.54
P03-04-08	03-May-05	< 0.005	< 1	< 0.1	< 0.2	< 1	< 0.05			389	< 0.005	< 0.05	< 0.05	< 0.1	3830	< 0.0002		< 0.5	53.9	21	< 0.1	< 20	< 0.5	< 0.1		< 0.05	< 0.1				< 0.5	< 0.02	< 0.02	< 0.3	2.76
P03-04-08	22-Jul-05	< 0.0025	< 0.5	< 0.05	< 0.1	< 0.5	< 0.025			429	< 0.0025	< 0.025	< 0.025	< 0.05	4290	< 0.0002		< 0.25	65.5	26	< 0.05	11	< 0.25	< 0.05		< 0.025	< 0.05				< 0.25	< 0.01	< 0.01	< 0.15	2.68
P03-04-08	10-Sep-05	< 0.0025	< 0.5	< 0.05	< 0.2	< 1	< 0.05			449	< 0.0025	< 0.025	< 0.025	< 0.05	5180	< 0.0002		< 0.5	88.8	30.8	< 0.05	< 20	< 0.25	< 0.05		< 0.025	< 0.05				< 0.5	< 0.01	< 0.01	< 2.5	3.08
P03-04-09	10-Sep-05	< 0.0025	< 0.5	< 0.05	< 0.2	< 1	< 0.05			489	< 0.0025	< 0.025	< 0.025	< 0.05	3700	< 0.0002		< 0.5	61.3	19.1	< 0.05	< 20	< 0.25	0.346		< 0.025	< 0.05				< 0.5	< 0.01	< 0.01	< 2	7.24
P03-05-01	04-May-05	< 0.00025	< 0.05	< 0.005	0.035	< 0.1	< 0.005		< 0.05	248	< 0.00025	< 0.0025	< 0.0025	< 0.005	5.75	< 0.0002		< 0.05	46	0.692	< 0.005	27.8	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	< 0.001	< 0.03	0.0225
P03-05-01	10-Sep-05	< 0.00025	< 0.05	< 0.005	0.037	< 0.1	< 0.005		< 0.01	276	< 0.00025	< 0.0025	< 0.0025	< 0.005	5.88	< 0.0002		< 0.05	48.2	0.712	< 0.005	28.8	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.001	< 0.03	0.0062
P03-05-02	04-May-05	< 0.00025	< 0.05	0.0054	0.125	< 0.1	< 0.005		< 0.05	156	< 0.00025	0.0086	< 0.0025	< 0.005	6.15	< 0.0002		< 0.05	30.7	11	< 0.005	11.4	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0044	0.044	0.0079
P03-05-02	10-Sep-05	< 0.00025	< 0.05	0.0052	0.137	< 0.1	< 0.005		< 0.01	172	< 0.00025	0.0091	< 0.0025	< 0.005	6.52	< 0.0002		< 0.05	32.2	12	< 0.005	10.5	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0038	< 0.03	0.0074
P03-05-03	04-May-05	< 0.00025	< 0.05	< 0.005	0.166	< 0.1	< 0.005		< 0.05	143	< 0.00025	0.0041	< 0.0025	< 0.005	0.896	< 0.0002		< 0.05	26.9	10.5	< 0.005	11.7	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0041	0.039	0.0073
P03-05-03	10-Sep-05	< 0.00025	< 0.05	< 0.005	0.155	< 0.1	< 0.005		< 0.01	137	< 0.00025	0.0044	< 0.0025	< 0.005	1.14	< 0.0002		< 0.05	24.3	9.59	< 0.005	10	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0043	< 0.03	0.0062
P03-05-04	04-May-05	< 0.00025	< 0.05	< 0.005	0.177	< 0.1	< 0.005		< 0.05	143	< 0.00025	0.0049	< 0.0025	< 0.005	0.094	< 0.0002		< 0.05	26.7	11.4	< 0.005	11.8	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0051	< 0.03	0.0076
P03-05-04	10-Sep-05	< 0.00025	< 0.05	< 0.005	0.186	< 0.1	< 0.005		< 0.01	155	< 0.00025	0.0046	< 0.0025	< 0.005	0.094	< 0.0002		< 0.05	27.1	10.9	< 0.005	11.3	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0047	< 0.03	0.0066
P03-05-05	04-May-05	< 0.00025	< 0.05	0.0092	0.031	< 0.1	< 0.005		< 0.5	172	< 0.00025	0.008	< 0.0025	< 0.005	191	< 0.0002		< 0.05	63.2	17.3	< 0.005	46	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0013	0.1	0.0081
P03-05-05	04-May-05	< 0.00025	< 0.05	0.0101	0.034	< 0.1	< 0.005		< 0.5	187	< 0.00025	0.0088	< 0.0025	< 0.005	210	< 0.0002		< 0.05	68.1	19	< 0.005	47.3	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0014	0.115	< 0.005
P03-05-05	10-Sep-05	< 0.00025	< 0.05	0.0097	0.037	< 0.1	< 0.005		< 0.01	198	< 0.00025	0.0098	< 0.0025	< 0.005	194	< 0.0002		< 0.05	65.1	19	< 0.005	41	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0015	< 0.15	0.0081
P03-05-05	10-Sep-05	< 0.00025	< 0.05	0.01	0.038	< 0.1	< 0.005		< 0.01	214	< 0.00025	0.0098	< 0.0025	< 0.005	195	< 0.0002		< 0.05	72.2	19.4	< 0.005	43.6	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0015	< 0.15	0.0064
P03-05-06	04-May-05	< 0.00025	0.617	0.0086	0.123	< 0.1	< 0.005		< 0.5	164	0.00117	< 0.0025	0.0039	0.0298	23.1	< 0.0002		< 0.05	150	0.328	< 0.005	296	< 0.025	1.94		0.005	< 0.005				< 0.05	< 0.001	< 0.001	< 0.03	0.725
P03-05-06	10-Sep-05	< 0.0001	< 0.02	0.002	< 0.02	< 0.1	< 0.005			119	< 0.0001	< 0.001	< 0.001	< 0.004	8.28	< 0.0002		< 0.05	107	0.097	0.0055	235	< 0.01	< 0.002		0.0033	< 0.002				< 0.05	< 0.0004	< 0.0004	< 0.03	0.0054
P03-05-07	04-May-05	< 0.0025	< 0.5	< 0.05	< 0.2	< 1	< 0.05		< 5	285	< 0.0025	< 0.025	< 0.025	< 0.05	2160	< 0.0002		< 0.5	405	31.5	< 0.05	271	< 0.25	< 0.05		< 0.025	< 0.05				< 0.5	< 0.01	< 0.01	< 0.3	< 0.05
P03-05-07	10-Sep-05	< 0.0001	< 0.02	< 0.002	< 0.1	< 0.5	< 0.025			325	< 0.0001	< 0.001	< 0.001	< 0.002	2190	< 0.0002		< 0.25	480	30.8	< 0.002	290	< 0.01	0.0099		< 0.001	< 0.002				< 0.25	< 0.0004	< 0.0004	< 1.5	0.389
P03-05-08	04-May-05	< 0.0025	< 0.5	< 0.05	< 0.2	< 1	< 0.05		< 5	263	< 0.0025	< 0.025	< 0.025	< 0.05	1540	< 0.0002		< 0.5	324	22.4	< 0.05	282	< 0.25	0.077		< 0.025	< 0.05				< 0.5	< 0.01	< 0.01	< 0.3	0.136
P03-05-08	10-Sep-05	< 0.001	< 0.2	0.021	< 0.1	< 0.5	< 0.025			297	< 0.001	< 0.01	< 0.01	< 0.02	1680	< 0.0002		< 0.25	388	23.3	< 0.02	284	< 0.1	0.102		0.012	< 0.02				< 0.25	< 0.004	< 0.004	< 1	0.289
P03-06-01	03-May-05	< 0.0005	< 0.1	< 0.01	< 0.2	< 1	< 0.05			238	< 0.0005	0.0227	< 0.005	< 0.01	0.51	< 0.0002		< 0.5	66.3	18.8	< 0.01	33	< 0.05	< 0.01		< 0.005	< 0.01				< 0.5	< 0.002	0.015	< 0.3	0.176
P03-06-01	10-Sep-05	< 0.00025	< 0.05	< 0.005	0.077	< 0.1	< 0.005			223	< 0.00025	0.021	< 0.0025	< 0.005	0.12	< 0.0002		< 0.05	59	14	< 0.005	36.2	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0146	< 0.03	0.199
P03-06-02	03-May-05	< 0.0005	< 0.1	< 0.01	0.097	< 0.1	< 0.005			254	< 0.0005	0.0222	< 0.005	< 0.01	0.583	< 0.0002		< 0.05	69	17.7	< 0.01	36.3	< 0.05	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	0.0148	0.048	0.239
P03-06-02	10-Sep-05	< 0.00025	< 0.05	< 0.005	0.072	< 0.1	< 0.005			225	0.00071	0.0343	< 0.0025	< 0.005	8.49	< 0.0002		< 0.05	61.5	15.2	< 0.005	35.9	0.036	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0097	0.035	0.288
P03-06-03	03-May-05	< 0.0005	< 0.1	< 0.01	0.032	< 0.1	< 0.005			200	< 0.0005	0.133	< 0.005	< 0.01	22	< 0.0002		< 0.05	56.2	18.2	< 0.01	32.4	0.204	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	0.007	0.04	0.348
P03-06-03	10-Sep-05	< 0.0005	< 0.1	< 0.01	0.036	< 0.1	< 0.005			312	0.0112	0.298	< 0.005	< 0.01	71.5	< 0.0002		< 0.05	93.3	32.1	< 0.01	21.6	0.449	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	0.003	< 0.09	1.41
P03-06-04	03-May-05	< 0.00025	< 0.05	< 0.005	0.075	< 0.1	< 0.005			167	< 0.00025	0.0279	< 0.0025	< 0.005	153	< 0.0002		< 0.05	43.2	14.5	< 0.005	22.6	0.048	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0276	0.085	6.66
P03-06-04	10-Sep-05	< 0.0001	< 0.02	< 0.002	0.056	< 0.1	< 0.005			161	0.00011	0.0123	< 0.001	< 0.002	26	< 0.0002		< 0.05	37.9	11.1	0.0035	20.8	0.018	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.0273	< 0.03	1.77
P03-06-05	03-May-05	< 0.005	< 1	< 0.1	< 0.02	< 0.1	< 0.005			159	< 0.005	0.078	< 0.05	< 0.1	353	< 0.0002		0.092	415	82.2	< 0.1	43	0.54	< 0.1		< 0.05	< 0.1				< 0.05	< 0.02	< 0.02	0.303	242
P03-06-05	10-Sep-05	< 0.0001	< 0.02	0.0066	0.021	< 0.1	< 0.005			121	< 0.0001	0.0019	< 0.001	< 0.002	214	< 0.0002		< 0.05	36.6	8.46	0.0047	27.8	< 0.01	0.0182		0.0016	< 0.002				< 0.05	< 0.0004	0.00375	< 0.09	4.49
P03-06-06	10-Sep-05	< 0.0025	< 0.5	< 0.05	< 0.04	< 0.2	< 0.01			310	< 0.0025	0.117	< 0.025	< 0.05	238	< 0.0002		0.19	762	152	< 0.05	76.7	0.49	0.172		< 0.025	< 0.05				< 0.1	< 0.01	< 0.01	0.141	370
P03-08-01	05-May-05	< 0.00005	< 0.01	< 0.001	0.087	< 0.2	< 0.01			81.6	< 0.00005	< 0.0005	< 0.0005	< 0.001	0.073	< 0.0002		< 0.1	27.4	0.112	< 0.001	< 4	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.1	< 0.0002	0.00348	< 0.06	< 0.01
P03-08-01	09-Sep-05	< 0.00005	< 0.01	< 0.001	0.089	< 0.1	< 0.005			77.3	< 0.00005	< 0.0005	< 0.0005	< 0.001	0.066	< 0.0002		< 0.05	27.7	0.062	< 0.001	3.9	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00317	< 0.03	0.0057
P03-08-02	05-May-05	< 0.00005	< 0.01	< 0.001	0.257	< 0.2	< 0.01			117	0.000155	0.00067	< 0.0005	0.0028	< 0.06	< 0.0002		< 0.1	28.7	5.09	< 0.001	14.4	0.0256	< 0.001		< 0.0005	< 0.001				< 0.1	< 0.0002	0.00303	< 0.06	< 0.01
P03-08-02	23-Jul-05	< 0.00005	< 0.01	< 0.001	0.216	< 0.1	< 0.005			89.2	0.000105	0.00054	< 0.0005	0.0028	< 0.03	< 0.0002		< 0.05	23.6	4.46	< 0.001	10.2	0.0212	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00262	< 0.03	< 0.005
P03-08-02	09-Sep-05	< 0.00005	< 0.01	< 0.001	0.216	< 0.1	< 0.005			98.3	0.000206	0.00052	< 0.0005	0.0033	0.037	< 0.0002		< 0.05	24.3	4.44	0.001	10.6	0.0201	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00254	< 0.03	0.0072
P03-08-02	01-Nov-05	< 0.01	< 0.2	< 0.2	0.208	< 0.1	< 0.005	< 0.2		90.3	< 0.01	< 0.01	< 0.01	< 0.01	< 0.03		< 2	< 0.01	22.6	4.35	< 0.03	9.2	< 0.05	< 0.05	< 0.3	< 0.2	< 0.2	4.08	< 0.03	0.281	< 0.01	< 0.2		< 0.03	0.0053
P03-08-03	05-May-05	< 0.00005	< 0.01	< 0.001	0.116	< 0.2	< 0.01			113	0.00009	< 0.0005	< 0.0005	0.0022	0.064	< 0.0002		< 0.1	27.3	5.87	0.0043	11.9	0.0201	< 0.001		< 0.0005	< 0.001				< 0.1	< 0.0002	0.00387	< 0.06	< 0.01
P03-08-03	23-Jul-05	< 0.0001	0.036	< 0.002	0.141	< 0.1	< 0.005			117	0.0005	< 0.001	< 0.001	0.0042	0.055	< 0.0002		< 0.05	30.2	7.52	0.0053	13.4	0.028	0.0094		< 0.001	< 0.002				< 0.05	< 0.0004	0.00442	< 0.03	< 0.005
P03-08-03	09-Sep-05	< 0.0001	< 0.02	< 0.002	0.146	< 0.1	< 0.005			132	0.00027	< 0.001	< 0.001	0.0037	0.087	< 0.0002		< 0.05	32.5	7.44	0.0047	15	0.025	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00435	< 0.03	0.0073
P03-08-03	01-Nov-05	< 0.01	< 0.2	< 0.2	0.124	< 0.1	< 0.005	< 0.2		112	< 0.01	< 0.01	< 0.01	< 0.01	0.056		< 2	< 0.01	27.4	6.17	< 0.03	11.5	< 0.05	< 0.05	< 0.3	< 0.2	< 0.2	5.09	< 0.03	0.369	< 0.01	< 0.2		< 0.03	0.0072
P03-08-04	05-May-05	< 0.00025	< 0.05	< 0.005	< 0.04	< 0.2	< 0.01			221	< 0.00025	< 0.0025	< 0.0025	< 0.005	19.9	< 0.0002		< 0.1	52.8	2.99	0.0133	46.8	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.1	< 0.001	0.0041	< 0.06	0.013
P03-08-04	23-Jul-05	< 0.00025	< 0.05	0.0067	0.025	< 0.1	< 0.005			234	< 0.00025	< 0.0025	< 0.0025	< 0.005	25.3	< 0.0002		< 0.05	58.4	3.57	0.012	55.5	< 0.025	< 0.005		0.006	< 0.005				< 0.05	< 0.001	0.0062	< 0.03	0.0195
P03-08-04	09-Sep-05	< 0.00025	< 0.05	0.0053	0.035	< 0.1	< 0.005			253	< 0.00025	< 0.0025	< 0.0025	< 0.005	33.3	< 0.0002		< 0.05	62.4	3.23	0.0142	52	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.007	< 0.03	0.0143
P03-08-04	01-Nov-05	< 0.01	< 0.2	< 0.2	0.029	< 0.1	< 0.005	< 0.2		200	< 0.01	< 0.01	< 0.01	< 0.01	31.7		3.8	0.015	46.7	2.79	< 0.03	41.8	< 0.05	< 0.05	< 0.3	< 0.2	< 0.2	5.68	< 0.03	0.47	< 0.01	< 0.2		< 0.03	0.0123
P03-08-04	01-Nov-05	< 0.01	< 0.2	< 0.2	0.031	< 0.1	< 0.005	< 0.2		211	< 0.01	< 0.01	< 0.01	< 0.01	31.3		3.9	0.019	48.7	2.91	< 0.03	43.9	< 0.05	< 0.05	< 0.3	< 0.2	< 0.2	5.89	< 0.03	0.488	< 0.01	< 0.2		< 0.03	0.0164
P03-08-05	05-May-05	< 0.00025	< 0.05	0.0076	< 0.04	< 0.2	< 0.01			410	< 0.00025	< 0.0025	< 0.0025	< 0.005	29.9	< 0.0002		< 0.1	56.6	4.87	0.0065	169	< 0.025	0.0052		0.0057	< 0.005				< 0.1	< 0.001	0.0013	< 0.06	0.015
P03-08-05	23-Jul-05	< 0.00025	< 0.05	0.0059	< 0.02	< 0.1	< 0.005			321	< 0.00025	< 0.0025	< 0.0025	< 0.005	26.9	< 0.0002		< 0.05	52.8	4.61	0.0058	135	< 0.025	< 0.005		0.0055	< 0.005				< 0.05	< 0.001	0.0013	< 0.03	0.015
P03-08-05	09-Sep-05	< 0.00025	0.071	< 0.005	< 0.02	< 0.1	< 0.005			357	< 0.00025	< 0.0025	0.0028	< 0.005	60.4	< 0.0002		< 0.05	84.2	7.07	< 0.005	158	< 0.025	0.0104		< 0.0025	< 0.005				< 0.05	< 0.001	0.0017	< 0.05	0.0224
P03-08-05	09-Sep-05	< 0.00025	< 0.05	< 0.005	< 0.02	< 0.1	< 0.005			326	< 0.00025	< 0.0025	< 0.0025	< 0.005	57.6	< 0.0002		< 0.05	82.2	6.44	< 0.005	132	< 0.025	0.0069		< 0.0025	< 0.005				< 0.05	< 0.001	0.002	0.053	0.0119
P03-08-05	01-Nov-05	< 0.01	< 0.2	< 0.2	0.013	< 0.1	< 0.005	< 0.2		314	< 0.01	< 0.01	< 0.01	< 0.01	51.1		13.8	0.03	81.6	6.87	< 0.03	130	< 0.05	< 0.05	< 0.3	< 0.2	< 0.2	8.3	< 0.03	0.674	< 0.01	< 0.2		< 0.03	0.0149
P03-08-06	05-May-05	< 0.00025	< 0.05	< 0.005	< 0.02	< 0.1	< 0.005			324	< 0.00025	0.0035	< 0.0025	< 0.005	0.346	< 0.0002		< 0.05	10.1	0.597	0.0067	91.5	< 0.025	0.0227		0.0108	< 0.005				< 0.05	< 0.001	< 0.001	< 0.03	0.0244
P03-08-06	05-May-05	< 0.00025	< 0.05	< 0.005	< 0.02	< 0.1	< 0.005			390	< 0.00025	0.0032	< 0.0025	< 0.005	0.513	< 0.0002		< 0.05	13.5	0.709	0.007	125	< 0.025	0.0098		0.0071	< 0.005				< 0.05	< 0.001	< 0.001	< 0.03	0.0236
P03-08-06	09-Sep-05	< 0.0005	< 0.1	< 0.01	< 0.02	< 0.1	< 0.005			445	< 0.0005	< 0.005	< 0.005	< 0.01	2.16	< 0.0002		0.054	13.4	0.679	< 0.01	146	< 0.05	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	< 0.002	< 0.03	0.0089
P03-08-06	01-Nov-05	< 0.01	< 0.2	< 0.2	< 0.01	< 0.1	< 0.005	< 0.2		398	< 0.01	< 0.01	< 0.01	< 0.01	2.27		12	0.072	11.9	0.573	< 0.03	156	< 0.05	< 0.05	< 0.3	< 0.2	< 0.2	1.11	< 0.03	0.121	< 0.01	< 0.2		< 0.03	0.0056
P03-08-07	05-May-05	< 0.00025	< 0.05	< 0.005	< 0.02	< 0.1	< 0.005			291	< 0.00025	0.005	< 0.0025	< 0.005	< 0.03	< 0.0002		< 0.05	12.5	0.677	0.0444	138	< 0.025	0.0103		0.0163	< 0.005				< 0.05	< 0.001	< 0.001	< 0.03	0.0094
P03-08-07	09-Sep-05	< 0.0005	< 0.1	< 0.01	< 0.02	< 0.1	< 0.005			497	< 0.0005	< 0.005	< 0.005	< 0.01	1.28	< 0.0002		< 0.05	14	1.08	0.042	165	< 0.05	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	< 0.002	< 0.03	0.0104
P03-08-08	05-May-05	< 0.0001	< 0.02	< 0.002	0.023	< 0.1	< 0.005			21.5	< 0.0001	0.002	< 0.001	< 0.002	0.046	< 0.0002		< 0.05	11.3	0.036	0.0429	103	< 0.01	0.0036		< 0.001	< 0.002				< 0.05	< 0.0004	< 0.0004	< 0.03	0.0084
P03-08-08	10-Sep-05	< 0.0001	< 0.02	0.0034	0.038	< 0.1	< 0.005			20.9	< 0.0001	0.0019	< 0.001	< 0.002	0.045	< 0.0002		< 0.05	9.39	0.048	0.0425	89.2	< 0.01	0.0074		0.0064	< 0.002				< 0.05	< 0.0004	< 0.0004	< 0.03	0.0395

Appendix 4
2005 Ground Water Quality Data
Rose Creek Drainage

Table 2 Ground 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	BR-T 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	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
P03-09-01	04-May-05	< 0.00025	< 0.05	< 0.005	0.041	< 0.1	< 0.005			185	< 0.00025	< 0.0025	< 0.0025	< 0.005	7.17	< 0.0002		< 0.05	57.2	0.419	< 0.005	48.7	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0015	< 0.03	< 0.005
P03-09-01	09-Sep-05	< 0.0001	< 0.02	< 0.002	0.039	< 0.1	< 0.005			198	< 0.0001	< 0.001	< 0.001	< 0.002	0.401	< 0.0002		0.054	64.8	0.428	< 0.002	60.4	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.0015	< 0.03	< 0.005
P03-09-02	04-May-05	< 0.0001	< 0.02	< 0.002	0.042	< 0.1	< 0.005			182	< 0.0001	< 0.001	< 0.001	< 0.002	7.2	< 0.0002		< 0.05	57.1	0.417	< 0.002	48	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00153	< 0.03	0.0055
P03-09-02	22-Jul-05	< 0.0001	< 0.02	< 0.002	0.035	< 0.1	< 0.005			158	< 0.0001	< 0.001	< 0.001	< 0.002	5.92	< 0.0002		< 0.05	47.7	0.359	< 0.002	42.9	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00147	< 0.03	< 0.005
P03-09-02	09-Sep-05	< 0.0001	< 0.02	< 0.002	0.038	< 0.1	< 0.005			175	< 0.0001	< 0.001	< 0.001	< 0.002	6.4	< 0.0002		0.053	55.7	0.375	< 0.002	48.5	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00146	< 0.03	0.0054
P03-09-02	01-Nov-05	< 0.01	< 0.2	< 0.2	0.036	< 0.1	< 0.005	< 0.2		158	< 0.01	< 0.01	< 0.01	< 0.01	6.09		3.5	0.043	48.7	0.346	< 0.03	43	< 0.05	< 0.05	< 0.3	< 0.2	< 0.2	6.5	< 0.03	0.767	< 0.01	< 0.2		< 0.03	< 0.005
P03-09-03	04-May-05	< 0.0001	< 0.02	< 0.002	0.045	< 0.1	< 0.005			171	< 0.0001	0.0049	< 0.001	< 0.002	0.09	< 0.0002		< 0.05	34.6	6.61	< 0.002	31.2	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00601	< 0.03	0.0058
P03-09-03	09-Sep-05	< 0.0001	< 0.02	< 0.002	0.052	< 0.1	< 0.005			208	< 0.0001	0.0051	< 0.001	0.0025	0.085	< 0.0002		< 0.05	40.4	7.48	< 0.002	34.7	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00665	< 0.03	0.0071
P03-09-04	04-May-05	< 0.0001	< 0.02	< 0.002	0.042	< 0.1	< 0.005			172	0.00016	0.0034	< 0.001	< 0.002	0.034	< 0.0002		< 0.05	34.3	6.14	< 0.002	30.3	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00583	< 0.03	0.0071
P03-09-04	22-Jul-05	< 0.0001	< 0.02	< 0.002	0.038	< 0.1	< 0.005			161	0.00011	0.003	< 0.001	< 0.002	< 0.03	< 0.0002		< 0.05	31.4	5.26	< 0.002	27.1	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00602	< 0.03	< 0.005
P03-09-04	09-Sep-05	< 0.0001	< 0.02	< 0.002	0.042	< 0.1	< 0.005			198	0.0003	0.0033	< 0.001	< 0.002	0.052	< 0.0002		< 0.05	34.3	6.04	< 0.002	30.1	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.0065	< 0.03	0.0065
P03-09-04	01-Nov-05	< 0.01	< 0.2	< 0.2	0.044	< 0.1	< 0.005	< 0.2		183	< 0.01	< 0.01	< 0.01	< 0.01	0.092		4	0.02	35	5.87	< 0.03	30.3	< 0.05	< 0.05	< 0.3	< 0.2	< 0.2	6.24	< 0.03	0.468	< 0.01	< 0.2		< 0.03	< 0.005
P03-09-05	04-May-05	< 0.0001	< 0.02	< 0.002	0.042	< 0.1	< 0.005			168	< 0.0001	0.0044	< 0.001	< 0.002	0.037	< 0.0002		< 0.05	32.7	6.17	< 0.002	27.7	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.0061	< 0.03	0.006
P03-09-05	09-Sep-05	< 0.00025	< 0.05	< 0.005	0.069	< 0.1	< 0.005			287	< 0.00025	0.0044	< 0.0025	< 0.005	0.06	< 0.0002		< 0.05	57.7	10.2	< 0.005	49.8	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0066	< 0.03	0.0098
P03-09-06	04-May-05	< 0.00025	< 0.05	< 0.005	0.063	< 0.1	< 0.005			184	< 0.00025	< 0.0025	< 0.0025	< 0.005	0.1	< 0.0002		< 0.05	37.1	5.92	< 0.005	33.6	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.005	< 0.03	< 0.005
P03-09-06	22-Jul-05	< 0.0001	< 0.02	< 0.002	0.057	< 0.1	< 0.005			160	< 0.0001	0.001	< 0.001	< 0.002	< 0.03	< 0.0002		< 0.05	35.2	4.9	< 0.002	31.7	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00442	< 0.03	< 0.005
P03-09-06	09-Sep-05	< 0.00025	< 0.05	< 0.005	0.075	< 0.1	< 0.005			203	0.00051	< 0.0025	< 0.0025	< 0.005	0.034	< 0.0002		< 0.05	47.5	6	< 0.005	44.5	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0047	< 0.03	< 0.005
P03-09-06	01-Nov-05	< 0.01	< 0.2	< 0.2	0.06	< 0.1	< 0.005	< 0.2		174	< 0.01	< 0.01	< 0.01	< 0.01	0.062		3.9	0.025	36.7	5.55	< 0.03	31.5	< 0.05	< 0.05	< 0.3	< 0.2	< 0.2	6.08	< 0.03	0.539	< 0.01	< 0.2		< 0.03	< 0.005
P03-09-07	04-May-05	< 0.00025	< 0.05	< 0.005	0.066	< 0.1	< 0.005			210	< 0.00025	< 0.0025	< 0.0025	< 0.005	0.066	< 0.0002		< 0.05	39.6	7.32	< 0.005	34.8	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.006	< 0.03	0.0065
P03-09-07	22-Jul-05	< 0.0001	< 0.02	< 0.002	0.057	< 0.1	< 0.005			176	< 0.0001	0.0013	< 0.001	< 0.002	< 0.03	< 0.0002		< 0.05	35	5.83	< 0.002	31.7	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00563	< 0.03	< 0.005
P03-09-07	09-Sep-05	< 0.00025	< 0.05	< 0.005	0.084	< 0.1	< 0.005			286	< 0.00025	< 0.0025	< 0.0025	< 0.005	0.056	< 0.0002		< 0.05	55.7	9.49	< 0.005	48.7	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0058	< 0.03	0.008
P03-09-07	01-Nov-05	< 0.01	< 0.2	< 0.2	0.062	< 0.1	< 0.005	< 0.2		200	< 0.01	< 0.01	< 0.01	< 0.01	0.439		4.1	0.021	37.7	6.75	< 0.03	31.8	< 0.05	< 0.05	< 0.3	< 0.2	< 0.2	6.25	< 0.03	0.52	< 0.01	< 0.2		< 0.03	< 0.005
P03-09-07	01-Nov-05	< 0.01	< 0.2	< 0.2	0.06	< 0.1	< 0.005	< 0.2		189	< 0.01	< 0.01	< 0.01	< 0.01	0.133		4	0.024	36.2	6.31	< 0.03	31.3	< 0.05	< 0.05	< 0.3	< 0.2	< 0.2	6.26	< 0.03	0.502	< 0.01	< 0.2		< 0.03	< 0.005
P03-09-08	04-May-05	< 0.00025	< 0.05	< 0.005	0.072	< 0.1	< 0.005			203	< 0.00025	0.0027	< 0.0025	< 0.005	0.943	< 0.0002		< 0.05	37.7	7.33	< 0.005	34.3	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0059	< 0.03	0.0055
P03-09-08	09-Sep-05	< 0.00025	< 0.05	< 0.005	0.094	< 0.1	< 0.005			277	< 0.00025	< 0.0025	< 0.0025	< 0.005	1.08	< 0.0002		< 0.05	51.8	9.66	< 0.005	49	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0058	< 0.03	0.0088
P03-09-09	04-May-05	< 0.00025	< 0.05	< 0.005	0.079	< 0.1	< 0.005			210	< 0.00025	0.0027	< 0.0025	< 0.005	0.107	< 0.0002		< 0.05	38.4	7.05	< 0.005	35.9	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.006	< 0.03	0.0051
P03-09-09	22-Jul-05	< 0.0001	< 0.02	< 0.002	0.071	< 0.1	< 0.005			180	0.00015	0.0027	< 0.001	0.0343	0.08	< 0.0002		< 0.05	35.3	5.8	< 0.002	32.1	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00565	< 0.03	< 0.005
P03-09-09	09-Sep-05	< 0.00025	< 0.05	< 0.005	0.081	< 0.1	< 0.005			250	0.00026	< 0.0025	< 0.0025	< 0.005	0.078	< 0.0002		< 0.05	46.3	8.26	< 0.005	43.7	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0059	< 0.03	0.0085
P03-09-09	01-Nov-05	< 0.01	< 0.2	< 0.2	0.068	< 0.1	< 0.005	< 0.2		201	< 0.01	< 0.01	< 0.01	< 0.01	0.146		4.2	0.022	37.5	6.9	< 0.03	32	< 0.05	< 0.05	< 0.3	< 0.2	< 0.2	6.34	< 0.03	0.514	< 0.01	< 0.2		< 0.03	< 0.005
P96-6	05-May-05	< 0.0001	< 0.02	< 0.002	< 0.04	< 0.2	< 0.01			169	0.00022	< 0.001	< 0.001	< 0.002	0.068	< 0.0002		< 0.1	53.2	0.068	< 0.002	9.2	0.018	< 0.002		< 0.001	< 0.002				< 0.1	< 0.0004	0.012	< 0.06	0.727
P96-6	11-Sep-05	< 0.00025	< 0.05	< 0.005	0.035	< 0.1	< 0.005			328	0.00028	< 0.0025	< 0.0025	< 0.005	< 0.03	< 0.0002		< 0.05	96.9	< 0.01	< 0.005	7.2	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0557	< 0.03	0.555
P96-7	05-May-05	< 0.00025	< 0.05	< 0.005	< 0.04	< 0.2	< 0.01			494	< 0.00025	< 0.0025	< 0.0025	< 0.005	< 0.06	< 0.0002		< 0.1	124	< 0.02	< 0.005	14.9	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.1	< 0.001	0.0222	< 0.06	0.028
P96-7	10-Sep-05	< 0.0005	< 0.1	< 0.01	< 0.02	< 0.1	< 0.005			605	< 0.0005	< 0.005	< 0.005	< 0.01	< 0.03	< 0.0002		< 0.05	138	< 0.01	< 0.01	20.5	< 0.05	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	0.0266	< 0.04	0.0078
P96-8A	03-May-05	< 0.00005	0.029	< 0.001	0.042	< 0.1	< 0.005			25.6	0.000901	< 0.0005	< 0.0005	0.0044	0.064	< 0.0002		< 0.05	7.39	0.014	< 0.001	< 2	0.0108	< 0.001		0.0011	< 0.001				< 0.05	< 0.0002	< 0.0002	< 0.03	1.67
P96-8A	10-Sep-05	< 0.005	< 1	< 0.1	< 0.04	< 0.2	< 0.01			477	0.233	0.313	< 0.05	< 0.1	0.082	< 0.0002		0.28	788	101	< 0.1	56.8	1.67	< 0.1		< 0.05	< 0.1				< 0.1	< 0.02	< 0.02	0.077	618
P96-8B	03-May-05	< 0.0025	< 0.5	< 0.05	< 0.1	< 0.5	< 0.025			424	0.041	0.395	< 0.025	< 0.05	0.22	< 0.0002		< 0.25	659	49	< 0.05	53	0.69	< 0.05		< 0.025	< 0.05				< 0.25	< 0.01	< 0.01	0.17	173
P96-8B	10-Sep-05	< 0.005	< 1	< 0.1	< 0.04	< 0.2	< 0.01			431	0.097	1.69	< 0.05	< 0.1	9.85	< 0.0002		0.2	730	90.7	< 0.1	58.6	1.4	< 0.1		< 0.05	< 0.1				< 0.1	< 0.02	< 0.02	< 0.2	368
P96-9A	03-May-05	< 0.00025	< 0.05	< 0.005	0.061	< 0.1	< 0.005			300	0.00076	0.0036	< 0.0025	< 0.005	0.096	< 0.0002		< 0.05	177	0.88	< 0.005	12	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0226	0.043	0.0242
P96-9A	03-May-05	< 0.00025	< 0.05	< 0.005	0.063	< 0.1	< 0.005			297	0.00077	0.0036	< 0.0025	< 0.005	0.071	< 0.0002		< 0.05	180	0.885	< 0.005	12.2	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0232	< 0.03	0.0192
P96-9A	08-Sep-05	< 0.00025	< 0.05	< 0.005	0.055	< 0.1	< 0.005			347	0.00101	< 0.0025	< 0.0025	< 0.005	< 0.03	< 0.0002		< 0.05	228	0.077	< 0.005	9.8	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0316	< 0.05	0.016
S1A	05-May-05	< 0.0025	< 0.5	< 0.05	< 0.04	< 0.2	< 0.01			609	0.0111	< 0.025	< 0.025	< 0.05	< 0.06	< 0.0002		0.13	710	45.2	< 0.05	39.8	1.17	< 0.05		< 0.025	< 0.05				< 0.1	< 0.01	< 0.01	0.067	113
S1A	12-Sep-05	< 0.0025	< 0.5	< 0.05	< 0.1	< 0.5	< 0.025			599	0.0104	< 0.025	< 0.025	< 0.05	< 0.15	< 0.0002		< 0.25	712	51	< 0.05	36	1.08	< 0.05		< 0.025	< 0.05				< 0.25	< 0.01	< 0.01	< 0.15	118
S1B	05-May-05	< 0.00025	< 0.05	< 0.005	< 0.04	< 0.2	< 0.01			123	< 0.00025	< 0.0025	< 0.0025	< 0.005	0.093	< 0.0002		< 0.1	33.8	0.035	< 0.005	25.1	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.1	< 0.001	< 0.001	< 0.06	0.067
S1B	12-Sep-05	< 0.00025	< 0.05	< 0.005	< 0.04	< 0.2	< 0.01			238	0.00037	< 0.0025	< 0.0025	< 0.005	0.116	< 0.0002		< 0.1	63.4	0.051	< 0.005	41.5	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.1	< 0.001	< 0.001	< 0.06	0.051
S2A	05-May-05	< 0.0025	< 0.5	< 0.05	< 0.04	< 0.2	< 0.01			502	0.0149	< 0.025	< 0.025	< 0.05	1.16	< 0.0002		0.12	609	50.8	< 0.05	30.5	1.17	< 0.05		< 0.025	< 0.05				< 0.1	< 0.01	< 0.01	< 0.06	127
S2A	12-Sep-05	< 0.0025	< 0.5	< 0.05	< 0.1	< 0.5	< 0.025			498	0.0188	< 0.025	< 0.025	< 0.05	1.19	< 0.0002		< 0.25	694	67.5	< 0.05	34	1.61	< 0.05		< 0.025	< 0.05				< 0.25	< 0.01	< 0.01	< 0.15	178
S2B	05-May-05	< 0.0005	< 0.1	< 0.01	< 0.04	< 0.2	< 0.01			501	0.00079	0.0053	< 0.005	< 0.01	99	< 0.0002		< 0.1	152	11.6	< 0.01	13.9	0.073	< 0.01		< 0.005	< 0.01				< 0.1	< 0.002	< 0.002	0.079	8.65
S2B	12-Sep-05	< 0.0005	< 0.1	< 0.01	< 0.06	< 0.3	< 0.015			569	< 0.0005	0.0058	< 0.005	< 0.01	71	< 0.0002		< 0.15	162	8.55	< 0.01	9.9	< 0.05	< 0.01		< 0.005	< 0.01				< 0.15	< 0.002	< 0.002	< 0.09	1.19
S3	05-May-05	< 0.0025	< 0.5	< 0.05	< 0.04	< 0.2	< 0.01			589	< 0.0025	0.04	< 0.025	< 0.05	5.59	< 0.0002		0.14	784	72.5	< 0.05	26.2	1.05	< 0.05		< 0.025	< 0.05				< 0.1	< 0.01	< 0.01	0.106	158
S3	12-Sep-05	< 0.0025	< 0.5	< 0.05	< 0.1	< 0.5	< 0.025			500	< 0.0025	0.035	< 0.025	< 0.05	4.69	< 0.0002		< 0.25	750	70.3	< 0.05	33	1	< 0.05		< 0.025	< 0.05				< 0.25	< 0.01	< 0.01	< 0.15	165
TH86-17	22-Jul-05	< 0.00005	< 0.01	< 0.001	0.054	< 0.1	< 0.005			26.6	< 0.00005	< 0.0005	< 0.0005	0.001	0.07	< 0.0002		< 0.05	6.05	< 0.01	< 0.001	2	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.0005	< 0.03	0.0136
TH86-17	10-Sep-05	< 0.00005	< 0.01	< 0.001	0.063	< 0.1	< 0.005			30.6	< 0.00005	< 0.0005	< 0.0005	< 0.001	0.477	< 0.0002		< 0.05	7.02	< 0.01	0.0013	< 2	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00075	< 0.03	0.0135
V34	03-May-05	< 0.00005	< 0.01	0.0014	0.116	< 0.1	< 0.005			74.9	< 0.00005	< 0.0005	< 0.0005	< 0.001	0.551	< 0.0002		< 0.05	82.7	0.104	0.0051	5.7	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00568	< 0.03	0.0086
V34	08-Sep-05	< 0.00005	< 0.01	< 0.001	0.096	< 0.1	< 0.005			71.2	< 0.00005	< 0.0005	< 0.0005	< 0.001	0.081	< 0.0002		< 0.05	72.4	0.079	0.0034	4.5	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00551	< 0.03	0.0084
V35	03-May-05	< 0.00025	< 0.05	< 0.005	0.023	< 0.1	< 0.005			227	< 0.00025	< 0.0025	< 0.0025	< 0.005	0.046	< 0.0002		< 0.05	115	< 0.01	< 0.005	6.6	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0424	< 0.03	0.0104
V35	08-Sep-05	< 0.0001	< 0.02	< 0.002	< 0.02	< 0.1	< 0.005			214	< 0.0001	< 0.001	0.0014	< 0.002	< 0.03	< 0.0002		< 0.05	105	0.012	< 0.002	5.2	< 0.01	< 0.002		< 0.001	0.0024				< 0.05	< 0.0004	0.0367	< 0.03	0.0141
V36	03-May-05	< 0.00025	0.103	0.0818	0.024	< 0.1	< 0.005			225	< 0.00025	< 0.0025	< 0.0025	< 0.005	0.82	< 0.0002		< 0.05	141	0.197	< 0.005	8.4	< 0.025	0.0081		< 0.0025	< 0.005				< 0.05	< 0.001	0.0313	< 0.03	0.0168
V36	08-Sep-05	< 0.0001	< 0.02	0.0089	< 0.02	< 0.1	< 0.005			202	0.00028	0.0017	< 0.001	< 0.002	< 0.03	< 0.0002		< 0.05	113	0.12	< 0.002	5.6	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.0248	< 0.03	0.0243
V37	03-May-05	< 0.00005	0.065	0.0022	0.18	< 0.1	< 0.005			66.3	< 0.00005	< 0.0005	< 0.0005	< 0.001	1.15	< 0.0002		< 0.05	79.9	0.101	0.0234	24.4	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00043	< 0.03	0.0066
V37	08-Sep-05	< 0.00005	< 0.01	0.0012	0.138	< 0.1	< 0.005			49.6	< 0.00005	< 0.0005	< 0.0005	< 0.001	0.863	< 0.0002		< 0.05	64.4	0.072	0.0202	18.4	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00037	< 0.03	0.0054
X16A	04-May-05	< 0.00005	< 0.01	< 0.001	0.091	< 0.1	< 0.005			50.8	< 0.00005	< 0.0005	< 0.0005	< 0.001	< 0.03	< 0.0002		< 0.05	13.2	< 0.01	0.0025	< 2	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00179	< 0.03	0.0077
X16A	09-Sep-05	< 0.00005	< 0.01	< 0.001	0.097	< 0.1	< 0.005			52	0.000072	< 0.0005	< 0.0005	< 0.001	< 0.03	< 0.0002		< 0.05	12.8	< 0.01	0.0026	< 2	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00185	< 0.03	0.0108
X16B	04-May-05	< 0.00005	< 0.01	< 0.001	0.145	< 0.1	< 0.005			65.5	< 0.00005	< 0.0005	< 0.0005	< 0.001	< 0.03	< 0.0002		< 0.05	18.1	< 0.01	0.0019	< 2	< 0.005	< 0.001		< 0.0005	0.002				< 0.05	< 0.0002	0.00207	< 0.03	< 0.005
X16B	04-May-05	< 0.00005	< 0.01	< 0.001	0.144	< 0.1	< 0.005			64.7	< 0.00005	< 0.0005	< 0.0005	< 0.001	< 0.03	< 0.0002		< 0.05	18.1	< 0.01	0.0018	< 2	< 0.005	< 0.001		< 0.0005	0.002				< 0.05	< 0.0002	0.00211	< 0.03	0.0051
X16B	09-Sep-05	< 0.00005	< 0.01	< 0.001	0.142	< 0.1	< 0.005			68.5	< 0.00005	< 0.0005	< 0.0005	< 0.001	< 0.03	< 0.0002		< 0.05	17.9	< 0.01	0.0019	< 2	< 0.005	< 0.001		< 0.0005	0.0021				< 0.05	< 0.0002	0.00218	< 0.03	< 0.005

Appendix 4
2005 Ground Water Quality Data
Rose Creek Drainage

Table 2 Ground 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	BR-T 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	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
X17A	21-Jul-05	< 0.00005	< 0.01	< 0.001	0.152	< 0.1	< 0.005			67.9	< 0.00005	< 0.0005	< 0.0005	< 0.001	< 0.03	< 0.0002		< 0.05	19.9	< 0.01	< 0.001	2.6	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00252	< 0.03	0.0062
X17A	10-Sep-05	< 0.00005	< 0.01	< 0.001	0.17	< 0.1	< 0.005			83.5	< 0.00005	< 0.0005	< 0.0005	< 0.001	0.047	< 0.0002		< 0.05	21.7	< 0.01	< 0.001	3	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00241	< 0.03	0.0091
X17B	04-May-05	< 0.0001	< 0.02	< 0.002	0.233	< 0.1	< 0.005			157	< 0.0001	< 0.001	< 0.001	< 0.002	3.43	< 0.0002		< 0.05	41.9	0.558	< 0.002	36	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00169	< 0.03	0.0109
X17B	04-May-05	< 0.0001	< 0.02	< 0.002	0.241	< 0.1	< 0.005			161	< 0.0001	< 0.001	< 0.001	< 0.002	3.48	< 0.0002		< 0.05	42.6	0.567	< 0.002	37.4	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00176	< 0.03	0.0102
X17B	10-Sep-05	< 0.00005	< 0.01	< 0.001	0.243	< 0.1	< 0.005			101	< 0.00005	< 0.0005	< 0.0005	< 0.001	0.956	< 0.0002		< 0.05	25.9	0.271	< 0.001	7.4	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00179	< 0.03	0.0058
X18A	21-Jul-05	< 0.0001	< 0.02	0.0102	0.188	< 0.1	< 0.005			204	< 0.0001	< 0.001	< 0.001	< 0.002	1.89	< 0.0002		< 0.05	53.2	0.812	< 0.002	26.5	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.0064	< 0.03	< 0.005
X18A	10-Sep-05	< 0.00025	< 0.05	< 0.005	0.241	< 0.1	< 0.005			244	< 0.00025	< 0.0025	< 0.0025	< 0.005	2.42	< 0.0002		< 0.05	51.2	0.83	< 0.005	21.2	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0078	< 0.03	0.012
X18B	04-May-05	< 0.00025	< 0.05	< 0.005	0.156	< 0.1	< 0.005			238	0.00039	< 0.0025	< 0.0025	< 0.005	0.115	< 0.0002		< 0.05	57.4	3.02	< 0.005	24.2	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0105	< 0.03	0.008
X18B	10-Sep-05	< 0.00005	< 0.01	< 0.001	0.094	< 0.1	< 0.005			172	0.000278	< 0.0005	< 0.0005	< 0.001	< 0.03	< 0.0002		< 0.05	36.3	1.91	0.0015	13.1	0.0071	< 0.001		< 0.0005	< 0.001				< 0.05	< 0.0002	0.00646	< 0.03	0.0075
X21A-96	10-May-05	< 0.0005	< 0.1	< 0.01	< 0.06	< 0.3	< 0.015			134	< 0.0005	0.0336	< 0.005	< 0.01	502	< 0.0002		< 0.15	156	30.4	< 0.01	94.2	< 0.05	0.014		< 0.005	< 0.01				< 0.15	< 0.002	< 0.002	< 0.09	0.837
X21A-96	11-Sep-05	< 0.0025	< 0.5	< 0.05	< 0.1	< 0.5	< 0.025			367	< 0.0025	< 0.025	< 0.025	< 0.05	3390	< 0.0002		< 0.25	950	324	< 0.05	20	< 0.25	< 0.05		< 0.025	< 0.05				< 0.25	< 0.01	< 0.01	< 2.5	104
X21B-96	10-May-05	< 0.00025	< 0.05	< 0.005	< 0.06	< 0.3	< 0.015			179	< 0.00025	0.0074	< 0.0025	< 0.005	31.9	< 0.0002		< 0.15	37.6	13.4	< 0.005	65	< 0.025	< 0.005		< 0.0025	< 0.005				< 0.15	< 0.001	0.0029	< 0.09	0.164
X21B-96	10-May-05	< 0.0001	< 0.02	0.0049	< 0.06	< 0.3	< 0.015			180	< 0.0001	0.0073	< 0.001	< 0.002	31.4	< 0.0002		< 0.15	37.6	13.6	< 0.002	64.2	< 0.01	< 0.002		< 0.001	< 0.002				< 0.15	< 0.0004	0.00305	< 0.09	0.166
X21B-96	11-Sep-05	< 0.00025	0.077	< 0.005	0.03	< 0.1	< 0.005			253	< 0.00025	0.0342	< 0.0025	< 0.005	165	< 0.0002		< 0.05	52.6	20.9	< 0.005	60.1	0.026	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0037	< 0.15	4.12
X21C-96	10-May-05	< 0.00005	< 0.01	0.0248	0.178	< 0.3	< 0.015			59.8	< 0.00005	< 0.0005	< 0.0005	< 0.001	0.292	< 0.0002		< 0.15	9.94	0.262	0.004	< 6	< 0.005	< 0.001		< 0.0005	< 0.001				< 0.15	< 0.0002	0.00024	< 0.09	< 0.015
X21C-96	11-Sep-05	< 0.0001	< 0.02	0.0226	0.176	< 0.1	< 0.005			62.3	< 0.0001	< 0.001	< 0.001	< 0.002	0.26	< 0.0002		< 0.05	9.77	0.248	0.0037	2.4	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	< 0.0004	< 0.03	0.0058
X24A-96	21-Jul-05	< 0.0005	< 0.1	< 0.01	0.025	< 0.1	< 0.005			414	0.00134	0.0437	< 0.005	< 0.01	0.449	< 0.0002		< 0.05	98.4	32.7	< 0.01	36.2	0.16	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	0.0089	0.038	0.0102
X24A-96	09-Sep-05	< 0.00025	< 0.05	< 0.005	0.021	< 0.1	< 0.005			414	0.00089	0.0386	< 0.0025	< 0.005	0.438	< 0.0002		< 0.05	90.6	30.8	< 0.005	35.9	0.111	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0067	< 0.03	0.0118
X24A-96	31-Oct-05	< 0.01	< 0.2	< 0.2	0.018	< 0.1	< 0.005	< 0.2		367	< 0.01	0.037	< 0.01	< 0.01	0.706		5.5	0.03	82.2	29.2	< 0.03	32.1	0.067	< 0.05	< 0.3	< 0.2	< 0.2	8.25	< 0.03	0.934	< 0.01	< 0.2		< 0.03	0.011
X24C-96	04-May-05	< 0.001	< 0.2	< 0.02	0.02	< 0.1	< 0.005			468	< 0.001	0.062	< 0.01	< 0.02	0.165	< 0.0002		< 0.05	104	39	< 0.02	39.9	0.11	< 0.02		< 0.01	< 0.02				< 0.05	< 0.004	0.0069	0.104	0.0187
X24C-96	21-Jul-05	< 0.0006	< 0.1	< 0.01	< 0.02	< 0.1	< 0.005			423	< 0.0005	0.0573	< 0.005	< 0.01	0.164	< 0.0002		< 0.05	100	40.6	< 0.01	40.2	0.12	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	0.007	0.039	0.0148
X24C-96	09-Sep-05	< 0.0005	< 0.1	< 0.01	< 0.02	< 0.1	< 0.005			462	< 0.0005	0.0565	< 0.005	< 0.01	0.164	< 0.0002		< 0.05	102	38.5	< 0.01	40.3	0.12	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	0.0067	< 0.03	0.0175
X24C-96	31-Oct-05	< 0.01	< 0.2	< 0.2	0.015	< 0.1	< 0.005	< 0.2		382	< 0.01	0.047	< 0.01	< 0.01	0.137		5.6	0.03	87	34.9	< 0.03	32.6	0.096	< 0.05	< 0.3	< 0.2	< 0.2	8.46	< 0.03	0.952	< 0.01	< 0.2		< 0.03	0.0147
X24D-96	04-May-05	< 0.0005	< 0.1	< 0.01	0.025	< 0.1	< 0.005			522	0.00257	0.0325	< 0.005	< 0.01	0.034	< 0.0002		< 0.05	110	35.7	< 0.01	50.6	0.157	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	0.005	0.071	0.0517
X24D-96	21-Jul-05	< 0.00025	< 0.05	< 0.005	0.023	< 0.1	< 0.005			450	0.00194	0.0282	< 0.0025	< 0.005	< 0.03	< 0.0002		< 0.05	102	37.9	< 0.005	47.7	0.136	< 0.005		< 0.0025	< 0.005				< 0.05	< 0.001	0.0046	0.031	0.0488
X24D-96	09-Sep-05	< 0.0005	< 0.1	< 0.01	0.021	< 0.1	< 0.005			566	0.0024	0.0331	< 0.005	< 0.01	< 0.03	< 0.0002		0.053	116	37.7	< 0.01	51	0.153	< 0.01		< 0.005	< 0.01				< 0.05	< 0.002	0.0047	< 0.03	0.0569
X24D-96	31-Oct-05	< 0.01	< 0.2	< 0.2	0.021	< 0.1	< 0.005	< 0.2		488	< 0.01	0.031	< 0.01	< 0.01	< 0.03		7	0.048	105	40.2	< 0.03	45	0.133	< 0.05	< 0.3	< 0.2	< 0.2	9.07	< 0.03	1.29	< 0.01	< 0.2		< 0.03	0.0482
X25A-96	21-Jul-05	< 0.0001	< 0.02	< 0.002	0.044	< 0.1	< 0.005			144	0.00035	0.0076	< 0.001	0.0024	< 0.03	< 0.0002		< 0.05	35.7	5.44	< 0.002	30	0.011	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00877	< 0.03	0.0067
X25A-96	09-Sep-05	< 0.0001	< 0.02	< 0.002	0.04	< 0.1	< 0.005			146	0.00043	0.0084	< 0.001	0.0027	0.038	< 0.0002		< 0.05	33.4	5.58	< 0.002	27.2	0.012	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00866	< 0.03	0.0057
X25A-96	31-Oct-05	< 0.01	< 0.2	< 0.2	0.036	< 0.1	< 0.005	< 0.2		138	< 0.01	< 0.01	< 0.01	< 0.01	< 0.03		3.9	< 0.01	31.4	4.35	< 0.03	25	< 0.05	< 0.05	< 0.3	< 0.2	< 0.2	6.12	< 0.03	0.353	< 0.01	< 0.2		< 0.03	0.015
X25A-96	31-Oct-05	< 0.01	< 0.2	< 0.2	0.036	< 0.1	< 0.005	< 0.2		140	< 0.01	< 0.01	< 0.01	< 0.01	< 0.03		4	< 0.01	31.6	4.33	< 0.03	25.2	< 0.05	< 0.05	< 0.3	< 0.2	< 0.2	6.18	< 0.03	0.355	< 0.01	< 0.2		< 0.03	0.016
X25B-96	21-Jul-05	< 0.0001	< 0.02	< 0.002	0.027	< 0.1	< 0.005			170	< 0.0001	< 0.001	< 0.001	< 0.002	0.672	< 0.0002		< 0.05	29.8	0.182	< 0.002	53.5	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00508	< 0.03	< 0.005
X25B-96	09-Sep-05	< 0.0001	< 0.02	< 0.002	0.025	< 0.1	< 0.005			170	< 0.0001	< 0.001	< 0.001	< 0.002	0.62	< 0.0002		< 0.05	28.6	0.16	< 0.002	50.5	< 0.01	< 0.002		< 0.001	< 0.002				< 0.05	< 0.0004	0.00522	< 0.03	< 0.005
X25B-96	31-Oct-05	< 0.01	< 0.2	< 0.2	0.025	< 0.1	< 0.005	< 0.2		170	< 0.01	< 0.01	< 0.01	< 0.01	0.585		3.2	0.016	28.5	0.157	< 0.03	47.7	< 0.05	< 0.05	< 0.3	< 0.2	< 0.2	5.05	< 0.03	0.394	< 0.01	< 0.2		< 0.03	< 0.005

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Cantest Ltd.
501250025 - Grab

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

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3650 Wesbrook Mall
Vancouver, BC
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Vizon Sample # : 050125R-01 — Report # : 2-11-200-040-05-005

Sample Taken:	Jan. 22, 2005	Sample pH:	7.5
Sample Collected By:	C. McKinnon	Sample Dissolved Oxygen:	9.8 mg/L
Sample Received:	Jan. 25, 2005	Sample Temperature:	14.0 °C
Start Date/Time:	Jan. 26, 2005 10:15 AM	Sample Conductance:	1642 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	45	14.4	16.0	7.2	7.3	10.2	8.9	0	0	0	0	0
10	249	14.2	15.9	7.2	7.7	10.2	8.5	0	0	0	0	0
18	419	14.3	15.9	7.3	7.9	10.2	8.9	0	0	0	0	0
32	663	14.2	15.7	7.3	8.0	10.2	8.8	0	0	0	0	0
56	1022	14.2	15.7	7.3	8.2	9.8	8.5	0	0	0	0	0
100	1641	14.0	15.7	7.4	8.4	9.6	8.8	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:	0.42 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

Weight (Mean + SD):	0.76 ± 0.14 g	Length (Mean + SD):	4.3 ± 0.2 cm
Weight (Range):	0.54– 0.99 g	Length (Range):	3.9– 4.7 cm

Reference Toxicant: Phenol
Test was conducted on: 01/12/2005
Test gave a 96-h LC50 of 12.24 (10, 22) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 19 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.

Analyst **Verified By**

Pamela Sinclair

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

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Vizon Sample # : 050311H-01 Report # : 2-11-200-040-05-013

Sample Taken:	Mar. 10, 2005	Sample pH:	7.7
Sample Collected By:		Sample Dissolved Oxygen:	9.1 mg/L
Sample Received:	Mar. 11, 2005	Sample Temperature:	10.3 °C
Start Date/Time:	Mar. 11, 2005 3:28 PM	Sample Conductance:	1602 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	55	14.0	14.6	7.3	7.2	9.8	8.5	0	0	0	0	0
10	254	14.1	14.5	7.5	7.2	9.8	8.4	0	0	0	0	0
18	407	14.5	14.5	7.4	7.4	9.8	8.5	0	0	0	0	0
32	620	14.5	15.1	7.4	8.1	9.8	9.3	0	0	0	0	0
56	1007	14.0	15.3	7.4	8.1	9.7	9.2	0	0	0	0	0
100	1615	14.1	15.3	7.3	8.2	9.6	8.3	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:	15 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.51 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

Weight (Mean + SD):	0.76 ± 0.19 g	Length (Mean + SD):	4.3 ± 0.3 cm
Weight (Range):	0.28– 1.24 g	Length (Range):	3.2– 5 cm

Reference Toxicant: Phenol
Test was conducted on: 03/01/2005
Test gave a 96-h LC50 of 11.09 (10, 13) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 17 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.

Analyst **Verified By**

VIZON SCITEC
Digitally signed by Janet Pickard
Toxicology Group

Cantest Ltd.
503100064 - grab

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

X13

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Vizon Sample # : 050311H-02 Report # : 2-11-200-040-05-014

Sample Taken:	Mar. 10, 2005	Sample pH:	7.5
Sample Collected By:		Sample Dissolved Oxygen:	9.4 mg/L
Sample Received:	Mar. 11, 2005	Sample Temperature:	10.8 °C
Start Date/Time:	Mar. 11, 2005 3:40 PM	Sample Conductance:	1606 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	55	14.0	16.0	7.3	7.3	9.8	7.8	0	0	0	0	0
10	266	15.8	15.9	7.5	7.8	9.7	9.0	0	0	0	0	0
18	403	14.0	15.9	7.5	7.8	9.7	8.7	0	0	0	0	0
32	629	14.2	15.8	7.4	7.9	9.8	8.6	0	0	0	0	0
56	1006	14.0	15.8	7.3	8.2	9.7	8.3	0	0	0	0	0
100	1627	14.0	16.0	7.3	8.4	9.6	8.6	0	0	0	40	4

Comments:
At the end of the test two fish in the 100% concentration were stressed i.e., swimming at the surface. All other surviving 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:	0.51 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

Weight (Mean + SD):	0.76 ± 0.19 g	Length (Mean + SD):	4.3 ± 0.3 cm
Weight (Range):	0.28– 1.24 g	Length (Range):	3.2– 5 cm

Reference Toxicant: Phenol
Test was conducted on: 03/01/2005
Test gave a 96-h LC50 of 11.09 (10, 13) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 17 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.

Analyst **Verified By**

VIZON SCITEC
Digitally signed by Janet Pickard
Toxicology Group

Cantest Ltd.
506080382

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

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Vizon Sample # : 050609J-01			Report # : 2-11-200-040-05-048
Sample Taken:	Jun. 7, 2005	Sample pH:	8.4
Sample Collected By:	C. Kinnon/R. Meers	Sample Dissolved Oxygen:	10.3 mg/L
Sample Received:	Jun. 9, 2005	Sample Temperature:	14.3 °C
Start Date/Time:	Jun. 10, 2005 1:20 PM	Sample Conductance:	1131 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	46	14.4	14.1	7.2	7.1	10.2	9.8	0	0	0	0	0
4.6	116	14.2	14.2	7.2	7.2	10.2	8.9	0	0	0	0	0
10	222	14.1	14.2	7.2	7.2	10.2	9.1	0	0	0	0	0
22	348	14.1	14.1	7.4	7.3	10.2	9.2	0	0	0	0	0
46	620	14.1	14.1	8.0	7.6	10.2	9.4	0	0	0	0	0
100	1134	14.2	14.2	8.4	7.7	10.3	8.3	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:	22 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.59 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

Weight (Mean + SD):	1.29 ± 0.48 g	Length (Mean + SD):	5 ± 0.6 cm
Weight (Range):	0.55– 2.38 g	Length (Range):	3.9– 6.3 cm

Reference Toxicant: Phenol
Test was conducted on: 05/27/2005
Test gave a 96-h LC50 of 10.86 (7, 13) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 19 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.

Analyst J. Pickard

Verified By P. Sinclair

Cantest Ltd.
506080383

X 13

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

Vizon SciTec Inc.
3650 Wesbrook Mall
Vancouver, BC
Canada V6S 2L2
tel: (604) 224-4331
fax: (604) 224-0540
web: http://vizonscitec.com

Vizon Sample # : 050609J-02 Report # : 2-11-200-040-05-049

Sample Taken:	Jun. 7, 2005	Sample pH:	7.2
Sample Collected By:	C. Kinnon/R. Meers	Sample Dissolved Oxygen:	9.5 mg/L
Sample Received:	Jun. 9, 2005	Sample Temperature:	14.2 °C
Start Date/Time:	Jun. 10, 2005 1:45 PM	Sample Conductance:	1394 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	46	14.2	14.1	7.2	7.1	10.1	9.8	0	0	0	0	0
4.6	152	14.1	14.2	7.3	7.3	10.1	8.8	0	0	0	0	0
10	270	14.1	14.3	7.3	7.4	10.1	8.8	0	0	0	0	0
22	411	14.1	14.2	7.3	7.5	10.0	8.6	0	0	0	0	0
46	772	14.0	14.3	7.2	7.8	9.9	8.3	0	0	0	0	0
100	1389	14.0	14.3	7.3	8.2	9.7	9.1	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:	22 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.59 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

Weight (Mean + SD):	1.29 ± 0.48 g	Length (Mean + SD):	5 ± 0.6 cm
Weight (Range):	0.55– 2.38 g	Length (Range):	3.9– 6.3 cm

Reference Toxicant: Phenol
Test was conducted on: 05/27/2005
Test gave a 96-h LC50 of 10.86 (7, 13) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 19 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.

Analyst J. Pickard **Verified By** P. Sinclair

Integrated Resource Consultants Inc.

Suite 160, 14480 River Road
Richmond, BC, Canada V6V 1L4
Tel. 604-278-7714 • Fax 604-278-7741
www.ircintegratedresource.com
FILE:CANTEST/0509078.RTL

DATE: 29 September 2005

REPORT TO: Vijay Jain
Cantest Ltd.
4606 Canada Way
Burnaby, B.C. V5G 1K5

REPORT ON: RAINBOW TROUT BIOASSAY RESULTS

SAMPLE DESCRIPTION: X5 Ps. 1

IRC Sample ID No.:	0509078
Sample Name:	**509160307; PO# 12304**
Date collected:	13 September 2005
Date, time received:	17 September 2005; 0940 hours.
Collection Method:	Grab
Amount, Container:	2 x 22L plastic containers
Physical description:	Clear colourless liquid
Date, time tested:	17 September 2005; 1530 hrs.

RAINBOW TROUT 96 HR RESULTS:
The 96 hour (static) LC_{50} was greater than 100% (v/v sample).
10% trout mortality in 100% concentration.

The LC_{50} is defined as the median lethal concentration or the concentration at which there is 50% fish mortality. Results are calculated using the method described by Stephan (Methods for calculating an LC_{50} in: Aquatic Toxicology and Hazard Evaluation, American Society for Testing and Materials, 1977).

The method used for this test was as per the IRC laboratory "Standard Operating Procedure for Rainbow Trout Holding and Testing" RTver5. This procedure follows the "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout" EPS 1/RM/13, Second Edition – December 2000. Test volume was 15 litres with 10 fish in each test vessel. Aeration was by forced air through glass pipettes at a rate of approximately 6.5 ±1 ml/L/min. The sample was not pH adjusted or filtered prior to testing. **NOTE: Test fish stock pre-testing holding temperature was exceeded by 1°C. The protocol required holding temperature range is 13°C to 17°C while the actual holding temperature range was 17.0°C to 17.5°C.**

The initial dissolved oxygen level was 11.2 mg/L at 8.5°C, the conductivity was 1404 µS/cm and the initial pH was 8.5. After pre-aerating the sample for 120 minutes and warming to 14.5°C, the dissolved oxygen level was 11.1 mg/L. Although the dissolved oxygen level was greater than 100% saturation the maximum pre-aeration time had been reached so the test was initiated at this time. The test set up technician was AC.

Please call should you have any questions.

IRC Integrated Resource Consultants Inc.

Marian Zazzi
Laboratory Supervisor
enclosure

X5 Pg. 2

IRC
FILE:CANTEST/0509078.RTL

RAW DATA:

TEST CONCENTRATION		HOURS 0	24	48	72	96
100%	Percent Survival	100%	100%	90%	90%	90%
	Dissolved Oxygen (mg/L)	11.1	9.5	9.2	9.3	9.4
	Temperature (°C)	14.5	14.5	14.5	15.0	15.0
	pH	8.4	7.9	7.9	7.9	7.9
	Conductivity (µS/cm)	1400				1429
	Symptoms	1	1,2	1,2	1,2	1,2
	Loading Density (g/L)	0.53	0.53	0.48	0.48	0.48
50%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.7	9.0	8.9	9.0	8.9
	Temperature (°C)	14.0	14.5	14.5	15.0	15.0
	PH	8.7	7.6	7.7	7.7	7.7
	Conductivity (µS/cm)	804				822
	Symptoms	1	1,2	1,2	1,2	1,2
	Loading Density (g/L)	0.53	0.53	0.53	0.53	0.53
25%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.3	8.6	8.7	9.0	9.0
	Temperature (°C)	14.0	14.5	15.0	15.0	15.0
	PH	7.8	7.4	7.6	7.6	7.6
	Conductivity (µS/cm)	468				479
	Symptoms	1	1,2	1,2	1,2	1
	Loading Density (g/L)	0.53	0.53	0.53	0.53	0.53
12.5%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.3	9.5	9.4	9.3	9.4
	Temperature (°C)	14.0	14.5	15.0	15.0	15.0
	PH	7.6	7.5	7.6	7.6	7.6
	Conductivity (µS/cm)	278				287
	Symptoms	1	1,2	1,2	1	1
	Loading Density (g/L)	0.53	0.53	0.53	0.53	0.53
6.2%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.5	10.0	9.4	9.2	9.0
	Temperature (°C)	14.5	14.5	15.0	15.0	15.0
	pH	7.5	7.6	7.6	7.6	7.6
	Conductivity (µS/cm)	169				177
	Symptoms	1	1	1	1	1
	Loading Density (g/L)	0.53	0.53	0.53	0.53	0.53
CONTROL	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.1	9.2	9.1	9.0	9.0
	Temperature (°C)	14.5	15.0	15.0	15.0	15.0
	PH	7.7	7.4	7.3	7.4	7.4
	Conductivity (µS/cm)	56				65
	Symptoms	1	1	1	1	1
	Loading Density (g/L)	0.53	0.53	0.53	0.53	0.53
	Technician	AC	AC	AH	AH	AH

KEY TO SYMPTOMS:

1 = no apparent effect
2 = fish showing signs of stress
3 = loss of equilibrium

X5 P5.3

TEST FISH STOCK INFORMATION

Date received:	16 August 2005	
Source:	Sun Valley Trout Farm	
Species:	*Oncorhynchus mykiss* (Rainbow Trout)	
Fork Length:	Mean:	4.32cm ± 0.23cm
	Range:	4.00cm – 4.70cm
Wet weight:	Mean:	0.79 g ± 0.16 g
	Range:	0.60 g – 1.08g
Condition Factor (100xWt/length^{3}cm):	0.98	

Acclimation History	
Acclimation temperature:	17.0 to 17.5 °CELSIUS
Treatments:	None
Water:	Dechlorinated tap water
Feeding:	Moore Clark Fry Feed
Mortality:	< 2%

RAINBOW TROUT REFERENCE TOXICANT DATA

Stock Arrival Date (y/m/d)	Test Date (y/m/d)	Toxicant	Log LC_{50} (mg/L)
05.01.25	05.02.28	Phenol	1.04
05.02.23	05.03.09	"	1.12
05.02.23	05.03.29	"	1.08
05.03.16	05.04.08	"	1.04
05.04.06	05.04.16	"	1.03
05.04.06	05.05.04	"	1.03
05.04.13	05.05.04	"	1.04
05.05.05	05.05.20	"	1.01
05.05.11	05.06.03	"	1.04
05.06.01	05.06.14	"	1.10
05.06.01	05.07.05	"	0.99
05.06.15	05.07.05	"	0.99
05.07.05	05.07.19	"	1.04
05.07.05	05.08.02	"	1.00
05.07.05	05.08.18	"	1.08
05.08.16	05.09.06	"	1.01
LAB GEOMETRIC MEAN (LOG) ± 2 standard deviations:			1.04 mg/L ± 0.08
Warning Limits (Log Values):			0.96 mg/L to 1.12 mg/L

CONTROL/DILUTION WATER QUALITY:

Hardness: 17mg/L

Total Residual Chlorine: 12 µg/L

IRC
Integrated Resource Consultants Inc.

Suite 160, 14480 River Road
Richmond, BC, Canada V6V 1L4
Tel. 604-278-7714 • Fax 604-278-7741
www.ircintegratedresource.com
FILE:CANTEST/0509079.RTL

DATE: 29 September 2005

REPORT TO: Vijay Jain
Cantest Ltd.
4606 Canada Way
Burnaby, B.C. V5G 1K5

REPORT ON: RAINBOW TROUT BIOASSAY RESULTS X13 Rs. 1

SAMPLE DESCRIPTION:

IRC Sample ID No.:	0509079
Sample Name:	**509160308; PO# 12304**
Date collected:	13 September 2005
Date, time received:	17 September 2005; 0940 hours.
Collection Method:	Grab
Amount, Container:	2 x 22L plastic containers
Physical description:	Clear pale yellow liquid
Date, time tested:	17 September 2005; 1430 hrs.

RAINBOW TROUT 96 HR RESULTS:
The 96 hour (static) LC_{50} was greater than 100% (v/v sample).
10% trout mortality in 100% concentration

The LC_{50} is defined as the median lethal concentration or the concentration at which there is 50% fish mortality. Results are calculated using the method described by Stephan (Methods for calculating an LC_{50} in: Aquatic Toxicology and Hazard Evaluation, American Society for Testing and Materials, 1977).

The method used for this test was as per the IRC laboratory "Standard Operating Procedure for Rainbow Trout Holding and Testing" RTver5. This procedure follows the "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout" EPS 1/RM/13, Second Edition – December 2000. Test volume was 15 litres with 10 fish in each test vessel. Aeration was by forced air through glass pipettes at a rate of approximately 6.5 ±1 ml/L/min. The sample was not pH adjusted or filtered prior to testing. **NOTE: Test fish stock pre-testing holding temperature was exceeded by 1°C. The protocol required holding temperature range is 13°C to 17°C while the actual holding temperature range was 17.0°C to 17.5°C.**

The initial dissolved oxygen level was 10.3 mg/L at 8.5°C, the conductivity was 1149 µS/cm and the initial pH was 7.5. After pre-aerating the sample for 60 minutes and warming to 14.5°C, the dissolved oxygen level was 10.1 mg/L. As the dissolved oxygen level was greater than 70% saturation and less than 100% saturation, the test was initiated at this time. The test set up technician was AC.

Please call should you have any questions.

IRC Integrated Resource Consultants Inc.

Marian Zazzi
Laboratory Supervisor
enclosure

X13 pg. 2

IRC
FILE:CANTEST/0509079.RTL

RAW DATA:

TEST CONCENTRATION		HOURS 0	24	48	72	96
100%	Percent Survival	100%	100%	100%	100%	90%
	Dissolved Oxygen (mg/L)	10.1	9.1	9.0	9.0	8.8
	Temperature (°C)	14.5	15.0	15.0	15.0	15.0
	pH	7.6	8.2	8.3	8.3	8.3
	Conductivity (µS/cm)	1164				1170
	Symptoms	1	1,2	1,2	1,2	1,2
	Loading Density (g/L)	0.53	0.53	0.53	0.53	0.48
50%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	9.8	7.8	8.6	8.8	8.9
	Temperature (°C)	15.0	15.0	15.0	15.0	15.0
	PH	7.6	7.7	7.9	8.0	8.1
	Conductivity (µS/cm)	667				676
	Symptoms	1	1,2	1,2	1,2	1,2
	Loading Density (g/L)	0.53	0.53	0.53	0.53	0.53
25%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	9.3	8.8	9.0	9.1	9.0
	Temperature (°C)	14.5	15.0	15.0	15.0	15.0
	PH	7.5	7.6	7.8	7.8	7.8
	Conductivity (µS/cm)	389				396
	Symptoms	1	1	1	1	1
	Loading Density (g/L)	0.53	0.53	0.53	0.53	0.53
12.5%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	9.2	9.0	8.8	8.8	8.8
	Temperature (°C)	14.5	15.0	15.0	15.0	15.0
	PH	7.6	7.5	7.7	7.7	7.7
	Conductivity (µS/cm)	234				242
	Symptoms	1	1	1	1	1
	Loading Density (g/L)	0.53	0.53	0.53	0.53	0.53
6.2%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	9.2	8.8	8.7	8.7	8.9
	Temperature (°C)	14.5	15.0	15.0	15.0	15.0
	pH	7.6	7.5	7.6	7.6	7.6
	Conductivity (µS/cm)	149				159
	Symptoms	1	1	1	1	1
	Loading Density (g/L)	0.53	0.53	0.53	0.53	0.53
CONTROL	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	9.1	9.1	9.0	9.1	8.9
	Temperature (°C)	15.0	15.0	15.0	15.0	15.0
	PH	7.7	7.4	7.3	7.4	7.4
	Conductivity (µS/cm)	57				65
	Symptoms	1	1	1	1	1
	Loading Density (g/L)	0.53	0.53	0.53	0.53	0.53
	Technician	AC	AC	AH	AH	AH

KEY TO SYMPTOMS:

1 = no apparent effect
2 = fish showing signs of stress
3 = loss of equilibrium

X 13 Pg. 3

TEST FISH STOCK INFORMATION

Date received:	16 August 2005	
Source:	Sun Valley Trout Farm	
Species:	*Oncorhynchus mykiss* (Rainbow Trout)	
Fork Length:	Mean:	4.38cm ± 0.29cm
	Range:	4.00cm – 4.80cm
Wet weight:	Mean:	0.80 g ± 0.17 g
	Range:	0.62 g – 1.04g
Condition Factor (100xWt/length^{3}cm):	0.95	

Acclimation History	
Acclimation temperature:	17.0 to 17.5 °CELSIUS
Treatments:	None
Water:	Dechlorinated tap water
Feeding:	Moore Clark Fry Feed
Mortality:	< 2%

RAINBOW TROUT REFERENCE TOXICANT DATA

Stock Arrival Date (y/m/d)	**Test Date (y/m/d)**	**Toxicant**	**Log LC_{50} (mg/L)**
05.01.25	05.02.28	Phenol	1.04
05.02.23	05.03.09	"	1.12
05.02.23	05.03.29	"	1.08
05.03.16	05.04.08	"	1.04
05.04.06	05.04.16	"	1.03
05.04.06	05.05.04	"	1.03
05.04.13	05.05.04	"	1.04
05.05.05	05.05.20	"	1.01
05.05.11	05.06.03	"	1.04
05.06.01	05.06.14	"	1.10
05.06.01	05.07.05	"	0.99
05.06.15	05.07.05	"	0.99
05.07.05	05.07.19	"	1.04
05.07.05	05.08.02	"	1.00
05.07.05	05.08.18	"	1.08
05.08.16	05.09.06	"	1.01
LAB GEOMETRIC MEAN (LOG) ± 2 standard deviations:			1.04 mg/L ± 0.08
Warning Limits (Log Values):			0.96 mg/L to 1.12 mg/L

CONTROL/DILUTION WATER QUALITY:
Hardness: 17mg/L
Total Residual Chlorine: 12 µg/L

Cantest Ltd.
X5P (512210067) - Grab

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

Vizon SciTec Inc.
3650 Wesbrook Mall
Vancouver, BC
Canada V6S 2L2
tel: (604) 224-4331
fax: (604) 224-0540
web: http://vizonscitec.com

Vizon Sample # : 051221Q-02 Report # : 2-11-200-040-05-136

Sample Taken:	Dec. 17, 2005	Sample pH:	7.2
Sample Collected By:	Dana Haggar	Sample Dissolved Oxygen:	10.1 mg/L
Sample Received:	Dec. 21, 2005	Sample Temperature:	17.0 °C
Start Date/Time:	Dec. 22, 2005 6:00 PM	Sample Conductance:	1746 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	56	15.8	15.8	7.7	7.6	9.8	9.7	0	0	0	0	0
10	280	15.9	15.8	7.7	7.8	9.9	9.7	0	0	0	0	0
18	410	14.6	15.8	7.7	8.0	9.8	9.7	0	0	0	0	0
32	688	14.8	15.8	7.7	8.2	10.1	9.8	0	0	0	0	0
56	1118	14.3	15.8	7.6	8.4	10.0	9.8	0	0	0	0	0
100	1730	15.2	15.7	7.5	8.6	10.1	9.8	0	0	0	0	0

Comments:
All fish appeared and behaved normally during the test. PO#: 13426

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	30 min.
Test Volume:	12 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.40 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

Weight (Mean + SD):	0.48 ± 0.11 g	Length (Mean + SD):	3.6 ± 0.6 cm
Weight (Range):	0.21– 0.7 g	Length (Range):	0.38– 4.1 cm

Reference Toxicant: Phenol
Test was conducted on: 11/30/2005
Test gave a 96-h LC50 of 11.85 (10.26, 14.43) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 22 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.

Analyst **Verified By**

VIZON SCITEC
Digitally signed by Christie MacKinlay
Toxicology Group

Cantest Ltd.
X13 (512210070) - Grab

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

Vizon SciTec Inc.
3650 Wesbrook Mall
Vancouver, BC
Canada V6S 2L2
tel: (604) 224-4331
fax: (604) 224-0540
web: http://vizonscitec.com

Vizon Sample # : 051221Q-03 Report # : 2-11-200-040-05-137

Sample Taken:	Dec. 17, 2005	Sample pH:	7.2
Sample Collected By:	Dana Haggar	Sample Dissolved Oxygen:	9.7 mg/L
Sample Received:	Dec. 21, 2005	Sample Temperature:	16.0 °C
Start Date/Time:	Dec. 22, 2005 6:20 PM	Sample Conductance:	1407 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	57	15.8	16.0	7.7	7.6	9.9	9.5	0	0	0	0	0
10	240	15.8	16.1	7.6	8.0	9.9	9.5	0	0	0	0	0
18	360	15.9	16.0	7.6	8.1	9.9	9.6	0	0	0	0	0
32	530	15.8	16.0	7.5	8.3	9.8	9.7	0	0	0	0	0
56	817	15.1	15.9	7.5	8.5	9.8	9.9	0	0	0	0	0
100	1412	15.5	16.1	7.3	8.3	9.7	9.6	0	0	0	0	0

Comments:
All fish appeared and behaved normally during the test. PO#: 13426.

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	30 min.
Test Volume:	12 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.40 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

Weight (Mean + SD):	0.48 ± 0.11 g	Length (Mean + SD):	3.6 ± 0.6 cm
Weight (Range):	0.21– 0.7 g	Length (Range):	0.38– 4.1 cm

Reference Toxicant: Phenol
Test was conducted on: 11/30/2005
Test gave a 96-h LC50 of 11.85 (10.26, 14.43) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 22 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.

Analyst **Verified By**

VIZON SCITEC
Digitally signed by Christie MacKinlay
Toxicology Group

Appendix 6
2005 Surface Water Quality Data
Vangorda Creek Drainage

Table 1 Surface Water Routine Parameters

STATION	DATE	ALK-T mg/L	COND µS/cm	HARD mg/L	NH3 mg/L	SO4-D mg/L	TSS mg/L	TEMP °C	PH-F	FLOW L/sec
LCD	22-Jun-05		5570	2050	0.98	3480	9	13.3	6.7	
LCD	19-Sep-05		8230	3230	1.56	5450	3	8.8	4.1	
MOOSESP	06-Sep-05		1240	946	< 0.01	764	< 1	6.5	7.7	
MOOSESP	21-Sep-05		1310	1010	0.02	743	< 1	6.3	7.6	
MOOSESP	11-Oct-05		1560	1070	0.02	799	< 1	4.1	7.9	
MOOSESP	25-Oct-05	280	1540	993	< 0.01	801	< 1	4.1	7.8	
MOOSESP	01-Nov-05	279	1150	1060		814		4	7.9	
MOOSESP	15-Nov-05	278	1840			798				
	average	279	1440	1015.8	0.015	786.5	1	5	7.78	
	minimum	278	1150	946	< 0.01	743	< 1	4	7.6	
	maximum	280	1840	1070	0.02	814	< 1	6.5	7.9	
	N > DL	3	6	5	2	6	0	5	5	
	median	279	1425	1010	0.015	798.5	1	4.1	7.8	
V1	07-Mar-05			56	< 0.01	10.7	< 1			
V1	07-Jun-05	18.8	42	18	0.03	4.6	1	4	7	
V1	12-Sep-05		67	29	< 0.01	10.5	< 1	7.1	8	
V1	01-Dec-05	35.5	104	47	< 0.01	10.8	< 1	-0.6	8.1	
	average			37.5	0.015	9.15	1	3.5	7.7	
	minimum			18	< 0.01	4.6	< 1	-0.6	7	
	maximum			56	0.03	10.8	1	7.1	8.1	
	N > DL	2	3	4	1	4	1	3	3	
	median			38	0.01	10.6	1	4	8	
V2	21-Jan-05	333	1850	1230	< 0.01	941	18	-0.3	7.6	
V2	08-Feb-05	350	1960	1330	0.01	816	7	0	8.2	
V2	14-Mar-05	321	1990	1230	0.03	909	2	1.1	7.9	
V2	11-Apr-05	315	1840	1070	< 0.01	788	< 1	2	7.9	
V2	09-May-05	257	1580	892	< 0.01	718	2	1.8	7.9	
V2	07-Jun-05							4.6	8.1	
V2	21-Jun-05	332	2140	1220	0.03	1000	< 1	4.5	8.1	
V2	25-Jul-05	343	1780	1160	0.02	1010	< 1	6.2	8	
V2	22-Aug-05	331	1660	1440	< 0.01	1000	< 1	6.4	7.9	
V2	06-Sep-05	313	1420	1180	< 0.01	1020	< 1	6	8.1	
V2	21-Sep-05	310	1480	1220	0.03	974	5	4.8	8	
V2	11-Oct-05	307	1720	1240	0.03	918	< 1	2.9	8.3	
V2	25-Oct-05	306	1770	1270	< 0.01	1010	2	2.1	8.2	
V2	01-Nov-05	311	1650	1240	< 0.01	1000	< 1	2.1	8.3	
V2	15-Nov-05	309	2250	1230		1020	< 1			
V2	14-Dec-05	334	2410	1460	< 0.01	1160	1	0.9	8.1	
	average	318.1	1833.33	1227.47	0.016	952.3	3.0	3.0	8.0	
	minimum	257	1420	892	< 0.01	718	< 1	-0.3	7.6	
	maximum	350	2410	1460	0.03	1160	18	6.4	8.3	
	N > DL	15	15	15	6	15	7	15	15	
	median	315	1780	1230	0.01	1000	1	2.1	8.1	

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STATION	DATE	ALK-T mg/L	COND µS/cm	HARD mg/L	NH3 mg/L	SO4-D mg/L	TSS mg/L	TEMP °C	PH-F	FLOW L/sec
V2A	21-Jan-05		1440	866	< 0.01	572	< 1	1.1	7.7	
V2A	14-Mar-05		937	638	0.02	380	< 1	0.7	7.7	
V2A	11-Apr-05		900	568	< 0.01	325	3	1.6	7.6	
V2A	09-May-05		1340	765	0.02	575	12	1.6	8.1	
V2A	21-Jun-05		2020	1120	0.1	851	< 1	5	8.4	
V2A	25-Jul-05		1710	1180	0.02	886	< 1	9.4	8.3	
V2A	22-Aug-05		1600	1300	< 0.01	868	< 1	8.8	8.3	
V2A	06-Sep-05		1370	1080	< 0.01	862	< 1	6.2	8.5	
V2A	21-Sep-05		1370	1110	< 0.01	867	1	5.2	8.4	
V2A	11-Oct-05		1600	1180	0.02	816	< 1	1.8	8.4	
V2A	25-Oct-05	323	1610	1180	< 0.01	845	< 1	2.1	8.4	
V2A	01-Nov-05	327	1500	1160	< 0.01	823	< 1	1.4	8.3	
V2A	15-Nov-05	310	1820	974		758	< 1			
V2A	14-Dec-05	287	1250	732	< 0.01	468	< 1	0.7	8.2	
	average	311.8	1461.9	989.5	0.02	706.9	1.9	3.5	8.2	
	minimum	287	900	568	< 0.01	325	< 1	0.7	7.6	
	maximum	327	2020	1300	0.1	886	12	9.4	8.5	
	N > DL	4	14	14	5	14	3	13	13	
	median	316.5	1470	1095	0.01	819.5	1	1.8	8.3	
V4	26-May-05		281	211	0.01	29.1	13			
V4	21-Sep-05	46	372	300	< 0.01		< 1			
V5	21-Jan-05	270	676	410	< 0.01	148	3	-0.2	7.5	
V5	11-Apr-05	271	706	404	< 0.01	167	2	0.7	8	
V5	09-May-05	83.7	172	126	0.02	28	126	2.5	7.9	
V5	20-Jun-05	153	347	203	0.11	53.1	7	7.8	8.3	
V5	25-Jul-05	187	372	228	0.02	69.5	55	7.3	8.1	
V5	22-Aug-05	199	373	270	< 0.01	75.3	9	6.9	8.2	
V5	05-Sep-05	184	286	248	< 0.01	78	4	6.2	8.4	
V5	10-Oct-05	178	256	272	0.02	73.9	5	3.8	8.4	
V5	01-Nov-05	202	306	292	< 0.01	87.5	4	1.2	8.4	
	average	192.0	388.2	272.6	0.0	86.7	23.9	4.0	8.1	
	minimum	83.7	172	126	0.02	28	2	-0.2	7.5	
	maximum	271	706	410	0.11	167	126	7.8	8.4	
	N > DL	9	9	9	4	9	9	9	9	
	median	187	347	270	0.01	75.3	5	3.8	8.2	
V6A	07-Mar-05			182	< 0.01	52.1	< 1			
V6A	07-Jun-05	49.5	140	77	0.04	21.3	< 1	6	7.9	
V6A	12-Sep-05		164	93	0.01	27.3	< 1	6.6	8.1	
V6A	01-Dec-05	96.8	315	158	0.02	53.5	1	-0.5	8.3	
	average	73.2	206.3	127.5	0.02	38.6	1.0	4.0	8.1	
	minimum	49.5	140	77	< 0.01	21.3	< 1	-0.5	7.9	
	maximum	96.8	315	182	0.04	53.5	1	6.6	8.3	
	N > DL	2	3	4	3	4	1	3	3	
	median	73.15	164	125.5	0.02	39.7	1	6	8.1	

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STATION	DATE	ALK-T mg/L	COND µS/cm	HARD mg/L	NH3 mg/L	SO4-D mg/L	TSS mg/L	TEMP °C	PH-F	FLOW L/sec
V8	21-Jan-05	225	628	373	< 0.01	159	2	1.3	7.3	
V8	08-Feb-05	241	632	374	0.01	155	< 1	0.6	8.3	
V8	15-Mar-05	231	661	395	0.04	176	< 1	1.8	8.3	
V8	11-Apr-05	236	662	382	< 0.01	175	< 1	1	8	
V8	09-May-05	78.6	174	116	0.04	33.3	67	2.7	8.1	
V8	20-Jun-05	96.7	390	214	0.13	133	2	8.9	8.1	
V8	25-Jul-05	121	581	321	0.03	238	10	8.3	8	
V8	22-Aug-05	133	716	449	< 0.01	312	1	8.4	8.1	
V8	05-Sep-05	134	267	210	< 0.01	102	< 1	6.8	8.3	
V8	10-Oct-05	137	237	237	0.06	82.1	< 1	4.1	8.5	
V8	01-Nov-05	168	302	275	< 0.01	112	< 1	2.3	8.3	
V8	14-Dec-05	192	614	328	< 0.01	139	< 1	0.8	8.1	
	average	166.11	488.67	306.17	0.03	151.37	7.42	3.92	8.12	
	minimum	78.6	174	116	< 0.01	33.3	< 1	0.6	7.3	
	maximum	241	716	449	0.13	312	67	8.9	8.5	
	N > DL	12	12	12	6	12	5	12	12	
	median	152.5	597.5	324.5	0.01	147	1	2.5	8.1	
V14	22-Jun-05		1190	744	0.02	554	11	7.4	8.2	
V15	21-Jan-05	389	2580	1550	0.02	1270	1	-0.2	7.5	
V15	08-Feb-05	405	2360	1510	< 0.01	1080	< 1	0.7	7.9	
V15	14-Mar-05	428	3470	1770	0.05	2990	< 1	1.2	7.5	
V15	11-Apr-05	450	4230	2030	< 0.01	1580	3	0.8	7.4	
V15	09-May-05	301	2050	1380	0.02	1200	2	3.8	7.6	
V15	21-Jun-05	479	3940	1990	0.09	1700	< 1	5.1	7.5	
V15	25-Jul-05	493	2610	2030	0.02	2060	< 1	7.7	7.5	
V15	22-Aug-05	471	2810	2080	< 0.01	1750	< 1	7.5	7.6	
V15	06-Sep-05	452	2740	2050	< 0.01	1800	< 1	6.4	7.7	
V15	21-Sep-05	450	2670	2240	0.01	1800	< 1	5.8	7.6	
V15	11-Oct-05	461	2920	2260	0.03	1860	< 1	3.4	7.9	
V15	25-Oct-05	451	3030	2270	< 0.01	1910	< 1	2.8	7.7	
V15	01-Nov-05	455	2820	2230	< 0.01	1890	< 1	2.2	7.8	
V15	15-Nov-05	450	3860	1990		1920	< 1			
V15	14-Dec-05	443	3820	2360	< 0.01	1900	< 1	0.8	7.7	
	average	438.5	3060.7	1982.7	0.02	1780.7	1.2	3.4	7.6	
	minimum	301	2050	1380	< 0.01	1080	< 1	-0.2	7.4	
	maximum	493	4230	2360	0.09	2990	3	7.7	7.9	
	N > DL	15	15	15	7	15	3	14	14	
	median	450	2820	2030	0.01	1800	1	3.1	7.6	
V16	22-Jun-05		3760	2530	0.02	2620	1	7.7	6.9	
V16	19-Sep-05		3920	2700	< 0.01	2830	3	7.3	7.3	
V17A	22-Jun-05	35.2	86	42	< 0.01	10.1	< 1	5.9	7.5	
V17A	19-Sep-05		113	68	0.01	26.8	8	6.1	8	
V19	22-Jun-05		181	98	< 0.01	2.2	< 1	7.9	7.8	
V20	22-Jun-05		184	96	< 0.01	6.4	< 1	6.8	8	

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STATION	DATE	ALK-T mg/L	COND µS/cm	HARD mg/L	NH3 mg/L	SO4-D mg/L	TSS mg/L	TEMP °C	PH-F	FLOW L/sec
V22	07-Mar-05			889	0.5	932	< 1			
V22	07-Jun-05		1310	671	0.33	777	3	11.9	6.7	
V22	12-Sep-05		1830	958	0.58	1300	6	9.6	7.1	
V22	01-Dec-05		2020	1020	0.56	1100	4	-0.8	7.3	
	average		1720	884.5	0.4925	1027.25	3.5	6.9	7.0	
	minimum		1310	671	0.33	777	< 1	-0.8	6.7	
	maximum		2020	1020	0.58	1300	6	11.9	7.3	
	N > DL	0	3	4	4	4	3	3	3	
	median		1830	923.5	0.53	1016	3.5	9.6	7.1	
V23	07-Mar-05			455	0.2	252	< 1			
V23	07-Jun-05		980	560	0.04	433	4	12.1	7.9	
V23	12-Sep-05		841	487	0.44	417	5	10.2	8.7	
V23	01-Dec-05		1040	537	0.21	441	< 1	-0.4	8.3	
	average		953.7	509.8	0.22	385.8	2.75	7.3	8.3	
	minimum		841	455	0.04	252	< 1	-0.4	7.9	
	maximum		1040	560	0.44	441	5	12.1	8.7	
	N > DL	0	3	4	4	4	2	3	3	
	median		980	512	0.205	425	2.5	10.2	8.3	
V24	19-Jun-05		93	49	< 0.01	3.8	< 1			
V24	02-Jul-05		103	157	< 0.01	4.2	2	16.4	7.5	
V24	10-Jul-05	50.3	107	51	0.02	3.9	< 1	15.3	8	
V24	16-Jul-05		112	58	< 0.01	3.8	11	15.4	7.6	
V24	24-Jul-05		106	56	0.03	3.6	< 1	13.8	8.2	
V24	31-Jul-05		110	56	0.02	3.8	< 1	13.4	8	
V24	06-Aug-05		115	58	< 0.01	3.7	< 1	14.5	8	
V24	13-Aug-05		122	59	0.01	3.7	< 1	17	8	
V24	20-Aug-05		117	58	< 0.01	3.7	< 1	14.5	7.9	
	average		109.4	66.9	0.01	3.8	2.2	15.0	7.9	
	minimum		93	49	< 0.01	3.6	< 1	13.4	7.5	
	maximum		122	157	0.03	4.2	11	17	8.2	
	N > DL	1	9	9	4	9	2	8	8	
	median		110	58	0.01	3.8	1	14.9	8	
V25	19-Jun-05		1570	1020	0.31	976	3			
V25	02-Jul-05		2020	1560	0.52	1320	5	11.8	9	
V25	10-Jul-05	66.2	2200	1170	0.58	1360	7	11.1	9.1	
V25	16-Jul-05		2220	1250	0.59	1340	< 1	10.3	8.9	
V25	24-Jul-05		1810	1320	0.66	1340	2	11	8.6	
V25	31-Jul-05		1890	1320	0.62	1380	5	9.3	9	
V25	06-Aug-05		1950	1300	0.57	1360	2	11	8.9	
V25	13-Aug-05		2270	1350	0.59	1320	2	13	8.9	
V25	20-Aug-05		1850	1280	0.59	1400	< 1	9.9	8.7	
	average		1975.56	1285.56	0.559	1310.67	3.1	10.9	8.9	
	minimum		1570	1020	0.31	976	< 1	9.3	8.6	
	maximum		2270	1560	0.66	1400	7	13	9.1	
	N > DL	1	9	9	9	9	7	8	8	
	median		1950	1300	0.59	1340	2	11	8.9	

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V25BSP	21-Jan-05	44.6	749	439	< 0.01	413	< 1	-0.3	7.5	
V25BSP	08-Feb-05	46.3	718	395	< 0.01	345	< 1	0.9	8	
V25BSP	14-Mar-05	42.9	721	452	0.04	387	< 1	1.6	7	
V25BSP	11-Apr-05	38.6	701	373	< 0.01	74.5	< 1	2.8	7.4	
V25BSP	10-May-05	35.1	119	63	0.03	27.8	34	3.2	7.6	
V25BSP	07-Jun-05							11.2	7.9	
V25BSP	19-Jun-05		1310	830	0.12	749	1			
V25BSP	20-Jun-05	54.5	1350	873	0.25	735	< 1	12.3	7.8	
V25BSP	02-Jul-05		1810	1290	0.21	1160	< 1	14.4	7.9	
V25BSP	10-Jul-05	63.7	2150	1130	0.3	1220	< 1	13.7	8	
V25BSP	16-Jul-05	70.6	2040	1170	0.37	1260	< 1	13.6	7.9	
V25BSP	24-Jul-05		1690	1180	0.41	1180	< 1	13.7	8.1	
V25BSP	25-Jul-05	73.5	1690	1130	0.43	1340	< 1	12.1	7.8	
V25BSP	31-Jul-05	71.4	1800	1240	0.44	1280	< 1	11	8	
V25BSP	06-Aug-05		1870	1220	0.41	1290	< 1	12.1	8	
V25BSP	13-Aug-05		2190	1280	0.42	1270	< 1	15.2	8.1	
V25BSP	20-Aug-05		1780	1220	0.41	1270	< 1	12.4	8	
V25BSP	22-Aug-05	78.8	1670	1300	0.46	1340	< 1	12.2	8	
V25BSP	06-Sep-05	50.4	1190	891	< 0.01	976	< 1	8.7	7.8	
V25BSP	11-Oct-05	62.1	1120	969	0.04	903	< 1	2.5	8.3	
V25BSP	01-Nov-05	55.9	904	700	< 0.01	692	< 1	2.4	7.5	
	average	56.3	1378.6	907.3	0.22	895.6	2.7	8.8	7.8	
	minimum	35.1	119	63	< 0.01	27.8	< 1	-0.3	7	
	maximum	78.8	2190	1300	0.46	1340	34	15.2	8.3	
	N > DL	14	20	20	15	20	2	20	20	
	median	55.2	1510	1049.5	0.23	1068	17.5	1	7.9	
V27	26-May-05		185	57	< 0.01	28.5	3			
V27	21-Sep-05	48.5	152	84	< 0.01		2			
V29	22-Jun-05				0.32	679	9530	4	6.6	
V30	22-Jun-05		7670		4.67	5240	64	8.5	6.1	
V30	19-Sep-05		8060		7.78	5340	104	7.2	6.3	
V31	22-Jun-05		14700		9.3	14000	144	9.1	5.7	
V31	19-Sep-05		25800		9.85	20600	193	5.7	5.7	
V32	22-Jun-05		72400		3.53	59900	11	10	3.2	
V32	19-Sep-05		85000		3.34	59300	28	6.7	3.3	
V33	22-Jun-05		81900		8.98	63700	275	8	3.2	
V33	19-Sep-05		92600		10	66600	574	8.2	5.5	

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STATION	DATE	ALK-T mg/L	COND µS/cm	HARD mg/L	NH3 mg/L	SO4-D mg/L	TSS mg/L	TEMP °C	PH-F	FLOW L/sec
VGMAIN	21-Jan-05	188	580	323	< 0.01	158	< 1	0.2	7.5	
VGMAIN	08-Feb-05	203	583	402	0.02	142	< 1	0.2	8.3	
VGMAIN	15-Mar-05	205	612	336	0.02	174	< 1	1.7	8.3	
VGMAIN	11-Apr-05	201	618	348	< 0.01	175	3	0.9	7.9	
VGMAIN	09-May-05	73.2	170	107	0.01	36	23	2.9	7.8	
VGMAIN	20-Jun-05	78.9	401	241	0.11	157	1	19.1	8	
VGMAIN	25-Jul-05	93.4	631	357	0.05	296	< 1	8.2	8	
VGMAIN	22-Aug-05	102	804	526	< 0.01	399	< 1	8.2	8.1	
VGMAIN	06-Sep-05	103	251	190	< 0.01	108	< 1	6.7	8.3	
VGMAIN	10-Oct-05	108	222	206	0.04	83.8	< 1	4.3	8.3	
VGMAIN	01-Nov-05	139	280	249	< 0.01	119	< 1	1.8	8.4	
VGMAIN	14-Dec-05	161	575	348	< 0.01	152	< 1	0.3	8.2	
	average	138.0	477.3	302.8	0.03	166.7	3.0	4.5	8.1	
	minimum	73.2	170	107	< 0.01	36	< 1	0.2	7.5	
	maximum	205	804	526	0.11	399	23	19.1	8.4	
	N > DL	12	12	12	6	12	3	12	12	
	median	123.5	577.5	329.5	0.01	154.5	1	2.35	8.15	

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Vangorda Creek Drainage

Table 2 Surface Water Total Metal 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	CN-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
LCD	22-Jun-05	< 0.00025	0.044	0.004	0.025	< 0.001	< 0.001	< 0.05	263	0.23		1.68	< 0.001	0.004	9.46	< 0.00002	4.4	0.036	338	147	< 0.0005	5.71	1.21	< 0.001	< 0.15	< 0.001	0.016	11.9	< 0.001	0.93	< 0.001	< 0.0005	0.001	0.0006	< 0.0005	< 0.001	385	< 0.01
LCD	19-Sep-05	< 0.00025	1.2	0.006	0.023	< 0.001	< 0.001	< 0.05	289	0.44		2.48	< 0.001	0.051	58.6	< 0.00002	4.8	0.078	609	289	< 0.0005	6.23	1.81	0.013	< 0.15	< 0.001	0.025	13.6	0.003	0.81	< 0.001	< 0.0005	< 0.001	0.0008	0.0076	< 0.001	807	< 0.01
MOOSESP	06-Sep-05	< 0.00025	0.013	0.001	0.058	< 0.001	< 0.001	< 0.05	206	< 0.0002		< 0.001	< 0.001	0.001	0.36	< 0.00002	2.2	0.005	105	0.001	0.0017	7.37	0.001	< 0.001	< 0.15	< 0.001	0.001	12.3	< 0.001	0.61	< 0.001	0.0013	< 0.001	< 0.0001	0.019	< 0.001	0.011	< 0.01
MOOSESP	21-Sep-05	< 0.00025	< 0.005	0.001	0.067	< 0.001	< 0.001	< 0.05	228	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	2.4	0.005	106	0.002	0.0017	7.66	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.6	0.005	0.68	< 0.001	< 0.0005	< 0.001	< 0.0001	0.018	< 0.001	0.013	< 0.01
MOOSESP	11-Oct-05	< 0.00025	< 0.005	0.001	0.066	< 0.001	< 0.001	< 0.05	238	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	2.6	0.006	116	0.005	0.0017	8.01	0.002	< 0.001	< 0.15	< 0.001	< 0.001	13	< 0.001	0.7	< 0.001	< 0.0005	< 0.001	< 0.0001	0.018	< 0.001	0.007	< 0.01
MOOSESP	25-Oct-05	< 0.00025	0.015	< 0.001	0.042	< 0.001	< 0.001	< 0.05	222	0.0003		< 0.001	< 0.001	0.002	< 0.05	< 0.00002	2.5	0.006	107	< 0.001	0.0017	7.65	< 0.001	0.001	< 0.15	< 0.001	< 0.001	11	< 0.001	0.64	< 0.001	< 0.0005	< 0.001	< 0.0001	0.018	< 0.001	0.008	< 0.01
MOOSESP	01-Nov-05	< 0.00025	0.34	< 0.001	0.067	< 0.001	< 0.001	< 0.05	243	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	2.6	0.006	110	0.003	0.0018	7.57	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12	< 0.001	0.73	< 0.001	< 0.0005	0.001	< 0.0001	0.022	< 0.001	0.008	< 0.01
MOOSESP	15-Nov-05	< 0.01	0.08	< 0.03	0.032	< 0.003		< 0.01	242	< 0.01		< 0.02	< 0.01	< 0.02	0.02	< 0.00002	2.7		112	< 0.003	< 0.02	9	< 0.02	< 0.03	< 0.15	< 0.05		5.46	< 0.03	0.64			< 0.005			< 0.01	0.006	< 0.02
	average	0.00188	0.076	0.006	0.055	0.001	0.001	0.043	229.8	0.002		0.004	0.003	0.004	0.097	0.00002	2.50	0.006	109.3	0.003	0.0048	7.88	0.004	0.006	0.15	0.009	0.001	11.06	0.007	0.667	0.001	0.0007	0.002	0.000	0.019	0.003	0.009	0.012
	minimum	< 0.00025	< 0.005	< 0.001	0.032	< 0.001	< 0.001	< 0.01	206	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	2.2	0.005	105	< 0.001	< 0.02	7.37	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.46	< 0.001	0.61	< 0.001	< 0.0005	< 0.001	< 0.0001	0.018	< 0.001	0.006	< 0.01
	maximum	< 0.01	0.34	0.001	0.067	< 0.003	< 0.001	< 0.05	243	0.0003		< 0.02	< 0.001	0.002	0.36	< 0.00002	2.7	0.006	116	0.005	0.0018	9	0.002	0.001	< 0.15	< 0.05	0.001	13	0.005	0.73	< 0.001	0.0013	0.001	< 0.0001	0.022	< 0.01	0.013	< 0.02
	N > DL	0	4	3	6	0	0	0	6	1		0	0	2	2	0	6	5	6	4	5	6	2	1	0	0	1	6	1	6	0	1	1	0	5	0	6	0
	median	0.00025	0.014	0.001	0.062	0.001	0.001	0.050	233.0	0.000		0.001	0.001	0.001	0.050	0.00002	2.55	0.006	108.5	0.003	0.0017	7.66	0.001	0.001	0.15	0.001	0.001	12.15	0.001	0.660	0.001	0.0005	0.001	0.000	0.018	0.001	0.008	0.010
V1	07-Mar-05	< 0.00025	0.012	< 0.001	0.037	< 0.001	< 0.001	< 0.05	17.9	< 0.0002		< 0.001	< 0.001	< 0.001	0.08	< 0.00002	1.4	0.001	2.87	< 0.001	0.0006	2.71	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.7	< 0.001	0.08	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001	0.011	< 0.01
V1	07-Jun-05	< 0.00025	0.043	0.002	0.016	< 0.001	< 0.001	0.07	6.03	< 0.0002		< 0.001	0.001	0.002	0.09	< 0.00002	0.8	< 0.001	0.75	0.002	< 0.0005	1.61	< 0.001	< 0.001	< 0.15	< 0.001	0.011	8.2	< 0.001	0.03	< 0.001	< 0.0005	0.001	< 0.0001	< 0.0005	< 0.001	0.006	< 0.01
V1	12-Sep-05	< 0.00025	0.013	< 0.001	0.025	< 0.001	< 0.001	< 0.05	9.61	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.3	< 0.001	1.3	0.001	< 0.0005	1.7	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	7	0.002	0.044	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
V1	01-Dec-05	< 0.00025	0.006	< 0.001	0.037	< 0.001	< 0.001	< 0.05	14.7	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.6	< 0.001	2.46	< 0.001	0.0005	1.89	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.8	< 0.001	0.068	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0006	< 0.001	< 0.005	< 0.01
	average	0.00025	0.019	0.001	0.029	0.001	0.001	0.055	12.06	0.0002		0.001	0.001	0.001	0.068	0.00002	0.775	0.001	1.845	0.0013	0.0005	1.978	0.001	0.001	0.15	0.001	0.0035	7.68	0.0013	0.056	0.001	0.0005	0.001	0.0001	0.00075	0.001	0.0068	0.01
	minimum	< 0.00025	0.006	< 0.001	0.016	< 0.001	< 0.001	< 0.05	6.03	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.3	< 0.001	0.75	< 0.001	< 0.0005	1.61	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.8	< 0.001	0.03	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
	maximum	< 0.00025	0.043	0.002	0.037	< 0.001	< 0.001	0.07	17.9	< 0.0002		< 0.001	0.001	0.002	0.09	< 0.00002	1.4	0.001	2.87	0.002	0.0006	2.71	< 0.001	< 0.001	< 0.15	< 0.001	0.011	10.7	0.002	0.08	< 0.001	< 0.0005	0.001	< 0.0001	0.0014	< 0.001	0.011	< 0.01
	N > DL	0	4	1	4	0	0	1	4	0		0	1	1	2	0	4	1	4	2	2	4	0	0	0	0	1	4	1	4	0	0	1	0	2	0	2	0
	median	0.00025	0.013	0.001	0.031	0.001	0.001	0.05	12.155	0.0002		0.001	0.001	0.001	0.065	0.00002	0.7	0.001	1.88	0.001	0.0005	1.795	0.001	0.001	0.15	0.001	0.001	7.6	0.001	0.056	0.001	0.0005	0.001	0.0001	0.00055	0.001	0.0055	0.01
V2	21-Jan-05	0.0007	0.13	0.001	0.099	< 0.001	< 0.001	< 0.05	276	< 0.0002	<0.0050	< 0.001	< 0.001	0.002	0.38	< 0.00002	2.7	0.005	132	0.011	0.0014	9.92	0.003	0.005	< 0.15	< 0.001	< 0.001	13.3	< 0.001	0.87	< 0.001	< 0.0005	0.004	< 0.0001	0.022	< 0.001	0.022	< 0.01
V2	08-Feb-05	< 0.00025	0.057	0.001	0.1	< 0.001	< 0.001	< 0.05	270	< 0.0002		< 0.001	< 0.001	0.002	0.1	< 0.00002	2.9	0.005	159	0.008	0.0015	11.6	0.003	0.003	< 0.15	< 0.001	< 0.001	14.6	< 0.001	1.04	< 0.001	< 0.0005	0.003	< 0.0001	0.027	< 0.001	0.024	< 0.01
V2	14-Mar-05	< 0.00025	0.028	< 0.001	0.089	< 0.001	< 0.001	< 0.05	284	< 0.0002	<0.0050	< 0.001	< 0.001	0.003	0.25	< 0.00002	2.5	0.004	126	0.003	0.0014	10.1	0.003	0.001	< 0.15	< 0.001	< 0.001	12.2	< 0.001	0.92	< 0.001	< 0.0005	0.001	< 0.0001	0.024	< 0.001	0.011	< 0.01
V2	11-Apr-05	< 0.00025	0.022	< 0.001	0.091	< 0.001	< 0.001	< 0.05	243	< 0.0002	<0.0050	< 0.001	< 0.001	0.001	0.15	< 0.00002	2.2	0.004	112	0.001	0.0013	9.41	0.002	< 0.001	< 0.15	< 0.001	< 0.001	12.4	< 0.001	0.79	< 0.001	< 0.0005	0.001	< 0.0001	0.021	< 0.001	0.01	< 0.01
V2	09-May-05	< 0.00025	0.053	0.001	0.067	< 0.001	< 0.001	< 0.05	199	< 0.0002	<0.0050	< 0.001	< 0.001	0.002	0.11	< 0.00002	2.3	0.004	96.2	0.006	0.0012	6.95	0.003	0.001	< 0.15	< 0.001	0.002	10.3	< 0.001	0.64	< 0.001	< 0.0005	0.001	< 0.0001	0.013	< 0.001	0.048	< 0.01
V2	21-Jun-05	< 0.00025	0.014	< 0.001	0.085	< 0.001	< 0.001	< 0.05	263	< 0.0002	<0.0050	< 0.001	< 0.001	0.001	0.1	< 0.00002	2.6	0.008	137	< 0.001	0.0012	9.52	0.003	< 0.001	< 0.15	< 0.001	< 0.001	13.2	< 0.001	0.82	< 0.001	< 0.0005	< 0.001	< 0.0001	0.02	< 0.001	0.008	< 0.01
V2	25-Jul-05	< 0.00025	0.012	< 0.001	0.096	< 0.001	< 0.001	< 0.05	242	< 0.0002	<0.0050	< 0.001	< 0.001	0.004	< 0.05	< 0.00002	2.5	0.007	135	0.006	0.0012	8.89	0.004	< 0.001	< 0.15	< 0.001	< 0.001	12.4	< 0.001	0.83	< 0.001	< 0.0005	< 0.001	< 0.0001	0.021	< 0.001	0.036	< 0.01
V2	22-Aug-05	< 0.00025	0.015	0.001	0.093	< 0.001	< 0.001	< 0.05	307	< 0.0002	<0.0050	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	3	0.008	163	0.005	0.0013	10.7	0.003	< 0.001	< 0.15	< 0.001	0.002	12.7	< 0.001	1.01	< 0.001	< 0.0005	< 0.001	< 0.0001	0.026	< 0.001	0.031	< 0.01
V2	06-Sep-05	< 0.00025	0.01	0.001	0.085	< 0.001	< 0.001	< 0.05	240	< 0.0002	<0.0050	0.001	< 0.001	0.002	0.63	< 0.00002	2.5	0.006	141	0.036	< 0.0005	9.41	0.005	< 0.001	< 0.15	< 0.001	0.002	13.2	< 0.001	0.81	< 0.001	0.0009	< 0.001	< 0.0001	0.022	< 0.001	0.01	< 0.01
V2	21-Sep-05	< 0.00025	0.022	< 0.001	0.11	< 0.001	< 0.001	< 0.05	270	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	2.6	0.005	132	0.001	0.0013	9.65	0.003	< 0.001	< 0.15	< 0.001	< 0.001	13.4	0.006	0.88	< 0.001	< 0.0005	< 0.001	< 0.0001	0.02	< 0.001	0.014	< 0.01
V2	11-Oct-05	< 0.00025	< 0.005	< 0.001	0.11	< 0.001	< 0.001	< 0.05	265	< 0.0002	<0.0050	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	2.6	0.005	140	0.009	0.0013	9.93	0.003	< 0.001	< 0.15	< 0.001	< 0.001	13.4	< 0.001	0.89	< 0.001	< 0.0005	< 0.001	< 0.0001	0.019	< 0.001	0.036	< 0.01
V2	25-Oct-05	< 0.00025	0.018	0.001	0.11	< 0.001	< 0.001	< 0.05	262	< 0.0002		< 0.001	< 0.001	0.001	0.05	< 0.00002	2.7	0.006	148	0.002	0.0014	10.6	0.001	< 0.001	< 0.15	< 0.001	0.001	12.8	< 0.001	0.92	< 0.001	< 0.0005	< 0.001	< 0.0001	0.022	< 0.001	0.009	< 0.01
V2	01-Nov-05	< 0.00025	0.01	< 0.001	0.11	< 0.001	< 0.001	< 0.05	260	< 0.0002	<0.0050	< 0.001	< 0.001	0.001	< 0.05	< 0.00002	2.6	0.006	143	0.004	0.0013	9.82	0.004	< 0.001	< 0.15	< 0.001	< 0.001	13	< 0.001	0.9	< 0.001	< 0.0005	< 0.001	< 0.0001	0.022	< 0.001	0.028	< 0.01
V2	15-Nov-05	< 0.01	0.11	< 0.03	0.095	< 0.003		< 0.01	219	< 0.01		< 0.02	< 0.01	< 0.02	0.04	< 0.00002	2.7		149	< 0.003	< 0.02	10.9	< 0.02	< 0.03	< 0.15	< 0.05		5.98	< 0.03	0.88			< 0.005			< 0.01	0.009	< 0.02
V2	14-Dec-05	< 0.00025	0.064	0.001	0.097	< 0.001	< 0.001	< 0.05	311	< 0.0002	<0.0050	< 0.001	< 0.001	0.001	0.2	< 0.00002	2.7	0.007	165	0.011	0.0014	10.7	0.002	0.004	< 0.15	< 0.001	< 0.001	6.2	< 0.001	0.97	< 0.001	< 0.0005	0.003	< 0.0001	0.022	< 0.001	0.033	< 0.01
	average	0.00093	0.038	0.003	0.096	0.001	0.001	0.047	260.7	0.0009	0.0050	0.002	0.002	0.003	0.151	0.00002	2.61	0.006	138.5	0.0071	0.0025	9.87	0.004	0.004	0.15	0.004	0.001	11.94	0.003	0.878	0.0010	0.0005	0.002	0.0001	0.022	0.002	0.022	0.011
	minimum	< 0.00025	< 0.005	< 0.001	0.067	< 0.001	< 0.001	< 0.01	199	< 0.0002	< 0.005	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	2.2	0.004	96.2	< 0.001	< 0.0005	6.95	< 0.02	< 0.001	< 0.15	< 0.001	< 0.001	5.98	< 0.001	0.64	< 0.001	< 0.0005	< 0.001	< 0.0001	0.013	< 0.001	0.008	< 0.02
	maximum	0.0007	0.13	0.001	0.11	< 0.003	< 0.001	< 0.05	311	< 0.01	< 0.005	0.001	< 0.001	0.004	0.63	< 0.00002	3	0.008	165	0.036	0.0015	11.6	0.005	0.005	< 0.15	< 0.05	0.002	14.6	0.006	1.04	< 0.001	0.0009	0.004	< 0.0001	0.027	< 0.01	0.048	< 0.01
	N > DL	1	14	7	15	0	0	0	15	0	0	1	0	12	10	0	15	14	15	13	13	15	14	5	0	0	4	15	1	15	0	1	6	0	14	0	15	0
	median	0.00025	0.022	0.001	0.096	0.001	0.001	0.05	263.0	0.0002	0.0050	0.001	0.001	0.001	0.100	0.00002	2.60	0.006	140.0	0.0050	0.0013	9.92	0.003	0.001	0.15	0.001	0.001	12.80	0.001	0.880	0.0010	0.0005	0.001	0.0001	0.022	0.001	0.022	0.010
V2A	21-Jan-05	< 0.00025	0.01	< 0.001	0.067	< 0.001	< 0.001	< 0.05	197	< 0.0002		< 0.001	< 0.001	0.001	0.15	< 0.00002	2.8	0.006	90.9	0.002	0.0028	8.22	0.02	< 0.001	< 0.15	< 0.001	< 0.001	10.5	< 0.001	0.65	< 0.001	< 0.0005	< 0.001	< 0.0001	0.017	< 0.001	0.31	< 0.01
V2A	14-Mar-05	0.0004	0.006	< 0.001	0.12	< 0.001	< 0.001	< 0.05	173	< 0.0002		< 0.001	< 0.001	0.001	0.22	< 0.00002	1.9	0.002	49.8	0.001	0.0017	8.53	0.007	< 0.001	< 0.15	< 0.001	< 0.001	10	< 0.001	0.58	< 0.001	< 0.0005	< 0.001	< 0.0001	0.017	< 0.001	0.091	< 0.01
V2A	11-Apr-05	< 0.00025	0.11	0.001	0.087	< 0.001	< 0.001	< 0.05	144	< 0.0002		< 0.001	< 0.001	0.002	0.22	< 0.00002	2.4	0.003	50.9	0.023	0.0021	7.02	0.007	0.003	< 0.15	< 0.001	< 0.001	9.6	< 0.001	0.5	< 0.001	< 0.0005	0.003	< 0.0001	0.013	< 0.001	0.11	< 0.01
V2A	09-May-05	< 0.00025	0.17	0.005	0.076	< 0.001	< 0.001	< 0.05	160	< 0.0002		0.002	< 0.001	0.006	0.67	< 0.00002	3	0.009	88.5	0.049	0.0012	6.1	0.049	0.027	< 0.15	< 0.001	< 0.001	9.2	< 0.001	0.56	< 0.001	< 0.0005	0.005	< 0.0001	0.016	< 0.001	0.59	< 0.01
V2A	21-Jun-05	< 0.00025	0.014	0.001	0.063	< 0.001	< 0.001	< 0.05	231	0.0006		< 0.001	< 0.001	0.001	0.19	< 0.00002	3.8	0.014	133	0.003	0.0017	7.52	0.089	< 0.001	< 0.15	< 0.001	< 0.001	9.9	< 0.001	0.79	< 0.001	< 0.0005	< 0.001	< 0.0001	0.024	< 0.001	1.52	< 0.01
V2A	25-Jul-05	< 0.00025	0.008	0.001	0.079	< 0.001	< 0.001	< 0.05	239	0.0003		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	3.9	0.014	142	0.007	0.0019	8.17	0.081	< 0.001	< 0.15	< 0.001	< 0.001	10.5	< 0.001	0.84	< 0.001	< 0.0005	< 0.001	< 0.0001	0.031	< 0.001	1.04	< 0.01
V2A	22-Aug-05	< 0.00025	0.005	0.002	0.076	< 0.001	< 0.001	< 0.05	242	0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	4.6	0.016	167	0.004	0.002	9.47	0.075	< 0.001	< 0.15	< 0.001	0.003	10.2	< 0.001	1.01	< 0.001	< 0.0005	< 0.001	< 0.0001	0.035	< 0.001	0.78	< 0.01
V2A	06-Sep-05	< 0.00025	< 0.005	0.001	0.064	< 0.001	< 0.001	< 0.05	214	< 0.0002		< 0.001	< 0.001	0.001	0.43	< 0.00002	3.5	0.01	132	0.01	0.0014	7.87	0.067	< 0.001	< 0.15	< 0.001	0.002	10.2	< 0.001	0.78	< 0.001	0.0008	< 0.001	< 0.0001	0.028	< 0.001	0.62	< 0.01
V2A	21-Sep-05	< 0.00025	0.02	0.001	0.083	< 0.001	< 0.001	< 0.05	232	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	3.7	0.01	129	0.001	0.0016	8.77	0.056	< 0.001	< 0.15	< 0.001	< 0.001	11.1	0.01	0.82	< 0.001	< 0.0005	0.001	< 0.0001	0.026	< 0.001	0.49	< 0.01
V2A	11-Oct-05	< 0.00025	< 0.005	0.001	0.094	< 0.001	< 0.001	< 0.05	245	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	3.5	0.01	138	0.002	0.0017	9.59	0.052	< 0.001	< 0.15	< 0.001	< 0.001	11.5	0.001	0.87	< 0.001	< 0.0005	< 0.001	< 0.0001	0.025	< 0.001	0.45	< 0.01
V2A	25-Oct-05	< 0.00025	0.009	0.001	0.093	< 0.001	< 0.001	< 0.05	248	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	3.5	0.01	135	< 0.001	0.0018	9.85	0.047	< 0.001	< 0.15	< 0.001	0.001	10.8	< 0.001	0.86	< 0.001	< 0.0005	< 0.001	< 0.0001	0.027	< 0.001	0.38	< 0.01
V2A	01-Nov-05	< 0.00025	0.014	0.001	0.095	< 0.001	< 0.001	< 0.05	249	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	3.5	0.009	130	0.002	0.0017	9.49	0.053	< 0.001	< 0.15	< 0.001	< 0.001	11.1	< 0.001	0.85	< 0.001	< 0.0005	< 0.001	< 0.0001	0.03	< 0.001	0.41	< 0.01
V2A	15-Nov-05	< 0.01	0.08	< 0.03	0.081	< 0.003		< 0.01	236	< 0.01		< 0.02	< 0.01	< 0.02	0.02	< 0.00002	3.2		117	< 0.003	< 0.02	10.4	0.04	< 0.03	< 0.15	< 0.05		4.86	< 0.03	0.74			< 0.005			< 0.01	0.37	< 0.02
V2A	14-Dec-05	< 0.00025	0.007	< 0.001	0.12	< 0.001	< 0.001	< 0.05	191	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	1.9	0.003	61.9	0.005	0.0011	9.62	0.007	< 0.001	< 0.15	< 0.001	< 0.001	5.2	< 0.001	0.61	< 0.001	< 0.0005	< 0.001	< 0.0001	0.019	< 0.001	0.12	< 0.01
	average	0.00096	0.033	0.003	0.086	0.001	0.001	0.047	214.4	0.0009		0.002	0.002	0.003	0.161	0.00002	3.229	0.009	111.79	0.0081	0.0031	8.62	0.046	0.005	0.15	0.005	0.001	9.62	0.004	0.747	0.001	0.0005	0.002	0.0001	0.024	0.002	0.520	0.011
	minimum	< 0.00025	< 0.005	< 0.001	0.063	< 0.001	< 0.001	< 0.05	144	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	1.9	0.002	49.8	< 0.001	< 0.02	6.1	0.007	< 0.001	< 0.15	< 0.001	< 0.001	4.86	< 0.001	0.5	< 0.001	< 0.0005	< 0.001	< 0.0001	0.013	< 0.001	0.091	< 0.02
	maximum	0.0004	0.17	0.005	0.12	< 0.003	< 0.001	< 0.05	249	0.0006		0.002	< 0.001	0.006	0.67	< 0.00002	4.6	0.016	167	0.049	0.0028	10.4	0.089	0.027	< 0.15	< 0.05	0.003	11.5	0.01	1.01	< 0.001	0.0008	0.005	< 0.0001	0.035	< 0.01	1.52	< 0.01
	N > DL	1	12	10	14	0	0	0	14	3		1	0	6	7	0	14	13	14	12	13	14	14	2	0	0	3	14	2	14	0	1	3	0	13	0	14	0
	median	0.00025	0.010	0.001	0.082	0.001	0.001	0.050	231.5	0.0002		0.001	0.001	0.001	0.05	0.00002	3.500	0.010	129.50	0.0030	0.0017	8.65	0.051	0.001	0.15	0.001	0.001	10.20	0.001	0.785	0.001	0.0005	0.001	0.0001	0.025	0.001	0.430	0.010
V4	26-May-05	< 0.00025	0.22	< 0.001	0.051	< 0.001	< 0.001	< 0.05	51.8	< 0.0002		< 0.001	< 0.001	0.002	0.53	< 0.00002	1	0.004	19.8	0.026	0.0006	2.05	0.002	< 0.001	< 0.15	< 0.001	< 0.001	11.4	< 0.001	0.2	< 0.001	< 0.0005	0.005	< 0.0001	0.0048	< 0.001	0.006	< 0.01
V4	21-Sep-05	< 0.00025	0.014	< 0.001	0.071	< 0.001	< 0.001	< 0.05	73.4	< 0.0002		< 0.001	< 0.001	< 0.001	0.13	< 0.00002	1	0.004	28.4	0.041	0.0009	2.97	0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.1	0.006	0.31	< 0.001	< 0.0005	0.001	< 0.0001	0.0063	< 0.001	0.007	< 0.01

Appendix 6
2005 Surface Water Quality Data
Vangorda Creek Drainage

Table 2 Surface Water Total Metal 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	CN-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
V5	21-Jan-05	< 0.00025	0.029	< 0.001	0.082	< 0.001	< 0.001	< 0.05	95.7	< 0.0002		< 0.001	0.002	0.001	0.22	< 0.00002	1.4	0.005	41.5	0.011	0.0018	4.92	0.002	< 0.001	< 0.15	< 0.001	0.003	10.8	< 0.001	0.37	< 0.001	< 0.0005	0.001	< 0.0001	0.0054	< 0.001	< 0.005	< 0.01
V5	11-Apr-05	0.0004	0.025	< 0.001	0.072	< 0.001	< 0.001	< 0.05	92.8	< 0.0002		< 0.001	< 0.001	0.001	0.11	< 0.00002	1.4	0.005	41.6	0.007	0.0022	5.37	0.002	< 0.001	< 0.15	< 0.001	0.003	11	< 0.001	0.36	< 0.001	< 0.0005	0.001	< 0.0001	0.0054	< 0.001	0.011	< 0.01
V5	09-May-05	< 0.00025	2.05	0.003	0.096	< 0.001	< 0.001	< 0.05	30.8	0.0002		0.002	0.006	0.008	3.54	< 0.00002	1.4	0.004	11.8	0.15	0.0006	1.53	0.012	0.005	0.6	< 0.001	< 0.001	13.5	< 0.001	0.12	< 0.001	< 0.0005	0.048	< 0.0001	0.0011	0.005	0.03	< 0.01
V5	20-Jun-05	< 0.00025	0.13	< 0.001	0.059	< 0.001	< 0.001	< 0.05	49.1	< 0.0002		< 0.001	< 0.001	0.001	0.37	< 0.00002	0.9	0.004	19.6	0.019	0.0009	3.24	0.002	< 0.001	< 0.15	< 0.001	< 0.001	11.1	< 0.001	0.21	< 0.001	< 0.0005	0.009	< 0.0001	0.0024	< 0.001	< 0.005	< 0.01
V5	25-Jul-05	< 0.00025	1.27	0.002	0.1	< 0.001	< 0.001	< 0.05	54.3	< 0.0002		< 0.001	0.004	0.004	1.9	< 0.00002	1.1	0.006	22.4	0.058	0.0011	3.19	0.005	0.002	0.2	< 0.001	< 0.001	15	0.001	0.23	< 0.001	< 0.0005	0.032	< 0.0001	0.0028	0.003	0.011	< 0.01
V5	22-Aug-05	< 0.00025	0.14	0.001	0.067	< 0.001	< 0.001	< 0.05	65.1	< 0.0002		< 0.001	< 0.001	< 0.001	0.2	< 0.00002	1	0.005	26.2	0.028	0.0011	3.54	0.002	< 0.001	< 0.15	< 0.001	0.003	9.6	< 0.001	0.27	< 0.001	< 0.0005	0.003	< 0.0001	0.0034	< 0.001	< 0.005	< 0.01
V5	05-Sep-05	< 0.00025	0.093	< 0.001	0.064	< 0.001	< 0.001	< 0.05	59.3	< 0.0002		< 0.001	0.002	0.002	0.33	< 0.00002	1.1	0.004	24.3	0.031	0.0024	3.35	0.002	< 0.001	< 0.15	< 0.001	0.001	11.3	< 0.001	0.25	< 0.001	< 0.0005	0.002	< 0.0001	0.0032	< 0.001	0.014	< 0.01
V5	10-Oct-05	< 0.00025	0.11	< 0.001	0.067	< 0.001	< 0.001	< 0.05	63.5	< 0.0002		< 0.001	< 0.001	< 0.001	0.19	< 0.00002	1	0.004	27.5	0.026	0.0011	3.62	0.002	< 0.001	< 0.15	< 0.001	< 0.001	12	< 0.001	0.25	< 0.001	< 0.0005	0.002	< 0.0001	0.0026	< 0.001	< 0.005	< 0.01
V5	01-Nov-05	< 0.00025	0.059	< 0.001	0.07	< 0.001	< 0.001	< 0.05	69.6	< 0.0002		< 0.001	< 0.001	< 0.001	0.15	< 0.00002	1	0.004	28.7	0.016	0.0012	3.42	0.002	< 0.001	< 0.15	< 0.001	< 0.001	11	< 0.001	0.29	< 0.001	< 0.0005	0.002	< 0.0001	0.0039	< 0.001	< 0.005	< 0.01
	average	0.00027	0.434	0.001	0.075	0.001	0.001	0.05	64.5	0.0002		0.001	0.002	0.002	0.779	0.00002	1.1	0.005	27.1	0.038	0.0014	3.58	0.003	0.002	0.21	0.001	0.002	11.7	0.001	0.261	0.001	0.0005	0.011	0.0001	0.0034	0.002	0.010	0.010
	minimum	< 0.00025	0.025	< 0.001	0.059	< 0.001	< 0.001	< 0.05	30.8	< 0.0002		< 0.001	< 0.001	< 0.001	0.11	< 0.00002	0.9	0.004	11.8	0.007	0.0006	1.53	0.002	< 0.001	< 0.15	< 0.001	< 0.001	9.6	< 0.001	0.12	< 0.001	< 0.0005	0.001	< 0.0001	0.0011	< 0.001	< 0.005	< 0.01
	maximum	0.0004	2.05	0.003	0.1	< 0.001	< 0.001	< 0.05	95.7	0.0002		0.002	0.006	0.008	3.54	< 0.00002	1.4	0.006	41.6	0.15	0.0024	5.37	0.012	0.005	0.6	< 0.001	0.003	15	0.001	0.37	< 0.001	< 0.0005	0.048	< 0.0001	0.0054	0.005	0.03	< 0.01
	N > DL	1	9	3	9	0	0	0	9	1		1	4	6	9	0	9	9	9	9	9	9	9	2	2	0	4	9	1	9	0	0	9	0	9	2	4	0
	median	0.00025	0.110	0.001	0.070	0.001	0.001	0.05	63.5	0.0002		0.001	0.001	0.001	0.220	0.00002	1.1	0.004	26.2	0.026	0.0011	3.42	0.002	0.001	0.15	0.001	0.001	11.1	0.001	0.25	0.001	0.0005	0.002	0.0001	0.0032	0.001	0.005	0.010
V6A	07-Mar-05	< 0.00025	0.021	0.001	0.046	< 0.001	< 0.001	< 0.05	54.4	< 0.0002		< 0.001	< 0.001	< 0.001	0.08	< 0.00002	0.8	0.001	11.2	0.004	< 0.0005	2.41	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	11.4	0.004	0.24	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0051	< 0.001	0.022	< 0.01
V6A	07-Jun-05	< 0.00025	0.046	0.003	0.029	< 0.001	< 0.001	0.05	23.3	< 0.0002		< 0.001	0.001	0.002	0.16	< 0.00002	0.9	< 0.001	4.47	0.007	< 0.0005	1.98	< 0.001	< 0.001	< 0.15	< 0.001	0.015	11.4	< 0.001	0.098	< 0.001	< 0.0005	0.002	< 0.0001	0.0012	< 0.001	0.029	< 0.01
V6A	12-Sep-05	< 0.00025	0.1	0.001	0.029	< 0.001	< 0.001	< 0.05	27.2	< 0.0002		< 0.001	< 0.001	< 0.001	0.19	< 0.00002	0.4	< 0.001	6.12	0.008	< 0.0005	1.73	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	8.2	< 0.001	0.1	< 0.001	< 0.0005	0.009	< 0.0001	0.0013	< 0.001	0.014	< 0.01
V6A	01-Dec-05	< 0.00025	0.03	0.001	0.043	< 0.001	< 0.001	< 0.05	45	< 0.0002		< 0.001	< 0.001	< 0.001	0.1	< 0.00002	0.5	0.002	11.1	0.027	< 0.0005	2.05	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.18	< 0.001	< 0.0005	0.002	< 0.0001	0.0026	< 0.001	0.031	< 0.01
	average	0.00025	0.049	0.002	0.037	0.001	0.001	0.05	37.475	0.0002		0.001	0.001	0.001	0.133	0.00002	0.650	0.001	8.223	0.012	0.0005	2.04	0.001	0.001	0.150	0.001	0.005	9.15	0.002	0.155	0.0010	0.0005	0.004	0.0001	0.003	0.001	0.024	0.010
	minimum	< 0.00025	0.021	0.001	0.029	< 0.001	< 0.001	< 0.05	23.3	< 0.0002		< 0.001	< 0.001	< 0.001	0.08	< 0.00002	0.4	< 0.001	4.47	0.004	< 0.0005	1.73	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.098	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001	0.014	< 0.01
	maximum	< 0.00025	0.1	0.003	0.046	< 0.001	< 0.001	0.05	54.4	< 0.0002		< 0.001	0.001	0.002	0.19	< 0.00002	0.9	0.002	11.2	0.027	< 0.0005	2.41	< 0.001	< 0.001	< 0.15	< 0.001	0.015	11.4	0.004	0.24	< 0.001	< 0.0005	0.009	< 0.0001	0.0051	< 0.001	0.031	< 0.01
	N > DL	0	4	4	4	0	0	1	4	0		0	1	1	4	0	4	2	4	4	0	4	0	0	0	0	1	4	1	4	0	0	3	0	4	0	4	0
	median	0.00025	0.038	0.001	0.036	0.001	0.001	0.05	36.100	0.0002		0.001	0.001	0.001	0.130	0.00002	0.650	0.001	8.610	0.008	0.0005	2.02	0.001	0.001	0.150	0.001	0.001	9.80	0.001	0.140	0.0010	0.0005	0.002	0.0002	0.001	0.002	0.026	0.010
V8	21-Jan-05	< 0.00025	0.012	< 0.001	0.077	< 0.001	< 0.001	< 0.05	87.5	< 0.0002	<0.0050	< 0.001	< 0.001	< 0.001	0.18	< 0.00002	1.3	0.005	37.5	0.035	0.0011	4.55	0.002	< 0.001	< 0.15	< 0.001	0.002	10.3	< 0.001	0.36	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0071	< 0.001	0.012	< 0.01
V8	08-Feb-05	< 0.00025	0.009	< 0.001	0.073	< 0.001	< 0.001	< 0.05	87.1	< 0.0002	<0.0050	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	1.3	0.005	37.8	0.034	0.0011	4.71	0.002	< 0.001	< 0.15	< 0.001	< 0.001	9.5	< 0.001	0.35	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0074	< 0.001	0.014	< 0.01
V8	15-Mar-05	< 0.00025	0.007	< 0.001	0.081	< 0.001	< 0.001	< 0.05	97	< 0.0002	<0.0050	< 0.001	< 0.001	< 0.001	0.26	< 0.00002	1.3	0.005	36.9	0.037	0.0013	5.31	0.003	< 0.001	< 0.15	< 0.001	< 0.001	9.5	< 0.001	0.39	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0082	< 0.001	0.009	< 0.01
V8	11-Apr-05	< 0.00025	0.011	< 0.001	0.072	< 0.001	< 0.001	< 0.05	88.1	< 0.0002	<0.0050	< 0.001	< 0.001	0.001	0.13	< 0.00002	1.4	0.006	39.4	0.033	0.0013	5.04	0.002	< 0.001	< 0.15	< 0.001	< 0.001	10.1	< 0.001	0.37	< 0.001	< 0.0005	< 0.001	< 0.0001	0.008	< 0.001	0.011	< 0.01
V8	09-May-05	< 0.00025	1.05	0.002	0.065	< 0.001	< 0.001	< 0.05	28.8	< 0.0002	0.0150	0.001	0.003	0.006	1.92	< 0.00002	1.2	0.003	10.7	0.094	< 0.0005	1.5	0.007	0.007	0.3	< 0.001	< 0.001	10.6	< 0.001	0.11	< 0.001	< 0.0005	0.025	< 0.0001	0.0014	0.002	0.037	< 0.01
V8	20-Jun-05	< 0.00025	0.078	< 0.001	0.056	< 0.001	< 0.001	< 0.05	55.4	< 0.0002	<0.0050	< 0.001	< 0.001	0.002	0.27	< 0.00002	0.9	0.005	18.4	0.047	< 0.0005	2.64	0.001	< 0.001	< 0.15	< 0.001	< 0.001	9.4	< 0.001	0.24	< 0.001	< 0.0005	0.001	< 0.0001	0.0021	< 0.001	0.022	< 0.01
V8	25-Jul-05	< 0.00025	0.28	< 0.001	0.083	< 0.001	< 0.001	< 0.05	84.4	< 0.0002	<0.0050	< 0.001	0.003	0.002	0.44	< 0.00002	1.1	0.008	26.8	0.32	0.0005	3.2	0.002	< 0.001	< 0.15	< 0.001	< 0.001	10.4	< 0.001	0.36	< 0.001	< 0.0005	0.007	< 0.0001	0.0028	< 0.001	0.024	< 0.01
V8	22-Aug-05	< 0.00025	0.048	< 0.001	0.074	< 0.001	< 0.001	< 0.05	120	< 0.0002	<0.0050	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	1.3	0.01	36.3	0.38	0.0005	3.73	< 0.001	< 0.001	< 0.15	< 0.001	0.002	7.9	< 0.001	0.48	< 0.001	< 0.0005	0.001	< 0.0001	0.0034	< 0.001	0.015	< 0.01
V8	05-Sep-05	< 0.00025	0.04	< 0.001	0.044	< 0.001	< 0.001	< 0.05	51.8	< 0.0002	<0.0050	< 0.001	0.002	0.001	0.19	< 0.00002	0.9	0.004	19.6	0.016	0.0015	2.87	0.002	< 0.001	< 0.15	< 0.001	0.002	9.6	< 0.001	0.21	< 0.001	< 0.0005	0.002	< 0.0001	0.0031	< 0.001	0.026	< 0.01
V8	10-Oct-05	< 0.00025	0.024	< 0.001	0.053	< 0.001	< 0.001	< 0.05	55.8	< 0.0002	<0.0050	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.9	0.004	23.7	0.015	0.0007	3.25	0.001	< 0.001	< 0.15	< 0.001	< 0.001	11.1	< 0.001	0.23	< 0.001	< 0.0005	< 0.001	< 0.0001	0.003	< 0.001	0.007	< 0.01
V8	01-Nov-05	< 0.00025	0.018	< 0.001	0.058	< 0.001	< 0.001	< 0.05	65.4	< 0.0002	<0.0050	< 0.001	< 0.001	0.045	0.05	< 0.00002	0.9	0.005	27	0.015	0.0008	3.2	0.001	0.007	< 0.15	< 0.001	< 0.001	10.2	< 0.001	0.28	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0047	< 0.001	0.031	< 0.01
V8	14-Dec-05	< 0.00025	0.019	< 0.001	0.07	< 0.001	< 0.001	< 0.05	77.4	< 0.0002	<0.0050	< 0.001	< 0.001	< 0.001	0.13	< 0.00002	1.1	0.005	32.6	0.028	0.0009	4.15	< 0.001	< 0.001	< 0.15	< 0.001	0.001	4.9	< 0.001	0.28	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0052	< 0.001	0.022	< 0.01
	average	0.00025	0.133	0.001	0.067	0.001	0.001	0.05	74.9	0.0002	0.0058	0.001	0.001	0.005	0.31	0.00002	1.13	0.005	28.89	0.088	0.0009	3.68	0.002	0.002	0.16	0.001	0.001	9.46	0.001	0.305	0.001	0.0005	0.004	0.0001	0.005	0.001	0.019	0.010
	minimum	< 0.00025	0.007	< 0.001	0.044	< 0.001	< 0.001	< 0.05	28.8	< 0.0002	< 0.005	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.9	0.003	10.7	0.015	< 0.0005	1.5	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.9	< 0.001	0.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0014	< 0.001	0.007	< 0.01
	maximum	< 0.00025	1.05	0.002	0.083	< 0.001	< 0.001	< 0.05	120	< 0.0002	0.0150	0.001	0.003	0.045	1.92	< 0.00002	1.4	0.01	39.4	0.38	0.0015	5.31	0.007	0.007	0.3	< 0.001	0.002	11.1	< 0.001	0.48	< 0.001	< 0.0005	0.025	< 0.0001	0.0082	0.002	0.037	< 0.01
	N > DL	0	12	1	12	0	0	0	12	0	1	1	3	6	9	0	12	12	12	12	10	12	10	2	1	0	4	12	0	12	0	0	5	0	12	1	12	0
	median	0.00025	0.022	0.001	0.071	0.001	0.001	0.05	80.9	0.0002	0.0050	0.001	0.001	0.001	0.16	0.00002	1.15	0.005	29.80	0.035	0.0009	3.49	0.002	0.001	0.15	0.001	0.001	9.85	0.001	0.315	0.001	0.0005	0.001	0.0001	0.004	0.001	0.019	0.010
V14	22-Jun-05	< 0.00025	0.2	< 0.001	0.053	< 0.001	< 0.001	< 0.05	200	< 0.0002		< 0.001	< 0.001	0.002	0.74	< 0.00002	1.4	0.003	59.3	0.026	0.0017	8.45	0.001	0.003	0.2	< 0.001	< 0.001	13.8	< 0.001	0.63	< 0.001	< 0.0005	0.011	< 0.0001	0.01	< 0.001	< 0.005	< 0.01
V15	21-Jan-05	0.0014	0.013	< 0.001	0.081	< 0.001	< 0.001	< 0.05	285	< 0.0002		< 0.001	< 0.001	0.002	0.22	< 0.00002	4.3	0.01	204	0.007	0.0012	11.8	0.009	< 0.001	< 0.15	< 0.001	< 0.001	15.1	< 0.001	1.13	< 0.001	< 0.0005	0.001	< 0.0001	0.028	< 0.001	0.046	< 0.01
V15	08-Feb-05	< 0.00025	0.007	< 0.001	0.07	< 0.001	< 0.001	< 0.05	297	0.0002		< 0.001	< 0.001	0.001	< 0.05	< 0.00002	3.6	0.008	187	0.005	0.0012	10.4	0.007	< 0.001	< 0.15	< 0.001	< 0.001	12.4	< 0.001	0.97	< 0.001	< 0.0005	< 0.001	< 0.0001	0.026	< 0.001	0.043	< 0.01
V15	14-Mar-05	0.0005	0.016	< 0.001	0.064	< 0.001	< 0.001	< 0.05	339	< 0.0002		< 0.001	< 0.001	0.003	0.37	< 0.00002	4	0.008	224	0.007	0.001	10.7	0.008	< 0.001	< 0.15	< 0.001	< 0.001	12.9	< 0.001	1.19	< 0.001	< 0.0005	0.001	< 0.0001	0.028	< 0.001	0.008	< 0.01
V15	11-Apr-05	< 0.00025	0.066	< 0.001	0.059	< 0.001	< 0.001	< 0.05	379	< 0.0002		< 0.001	< 0.001	0.002	0.33	< 0.00002	4.8	0.012	263	0.008	0.0007	12.8	0.009	0.003	< 0.15	< 0.001	< 0.001	15.9	< 0.001	1.3	< 0.001	< 0.0005	0.003	< 0.0001	0.033	< 0.001	0.011	< 0.01
V15	09-May-05	< 0.00025	0.031	< 0.001	0.045	< 0.001	< 0.001	< 0.05	273	< 0.0002		< 0.001	< 0.001	0.002	0.11	< 0.00002	3.5	0.01	169	0.009	< 0.0005	7.98	0.005	0.001	< 0.15	< 0.001	0.003	11.6	< 0.001	0.85	< 0.001	< 0.0005	0.001	< 0.0001	0.014	< 0.001	0.02	< 0.01
V15	21-Jun-05	< 0.00025	0.02	< 0.001	0.061	< 0.001	< 0.001	< 0.05	365	0.0003		< 0.001	< 0.001	0.002	0.18	< 0.00002	4.5	0.018	260	0.001	0.0005	12.4	0.01	< 0.001	< 0.15	< 0.001	0.003	15.7	< 0.001	1.25	< 0.001	< 0.0005	< 0.001	< 0.0001	0.029	< 0.001	0.021	< 0.01
V15	25-Jul-05	< 0.00025	0.01	< 0.001	0.067	< 0.001	< 0.001	< 0.05	362	0.0003		< 0.001	< 0.001	0.002	< 0.05	< 0.00002	5	0.018	274	0.005	0.0006	12.6	0.012	< 0.001	< 0.15	< 0.001	0.001	15.9	< 0.001	1.3	< 0.001	< 0.0005	< 0.001	< 0.0001	0.037	< 0.001	0.029	< 0.01
V15	22-Aug-05	< 0.00025	0.006	0.001	0.058	< 0.001	< 0.001	< 0.05	376	0.0003		< 0.001	< 0.001	0.002	< 0.05	< 0.00002	5.2	0.018	277	0.003	0.0006	13.4	0.011	< 0.001	< 0.15	< 0.001	0.003	14.3	< 0.001	1.43	< 0.001	< 0.0005	< 0.001	< 0.0001	0.039	< 0.001	0.026	< 0.01
V15	06-Sep-05	< 0.00025	0.011	< 0.001	0.051	< 0.001	< 0.001	< 0.05	368	< 0.0002		< 0.001	< 0.001	0.002	0.64	< 0.00002	4.6	0.014	274	0.004	0.0009	11.3	0.012	< 0.001	< 0.15	< 0.001	0.002	14.6	< 0.001	1.25	< 0.001	0.0009	< 0.001	< 0.0001	0.033	0.001	0.046	< 0.01
V15	21-Sep-05	< 0.00025	0.014	< 0.001	0.057	< 0.001	< 0.001	< 0.05	400	0.0003		< 0.001	< 0.001	0.001	< 0.05	< 0.00002	4.8	0.015	302	< 0.001	0.0005	10.9	0.012	< 0.001	< 0.15	< 0.001	< 0.001	15.2	0.005	1.3	< 0.001	< 0.0005	< 0.001	< 0.0001	0.031	< 0.001	0.018	< 0.01
V15	11-Oct-05	< 0.00025	< 0.005	< 0.001	0.059	< 0.001	< 0.001	< 0.05	394	0.0003		< 0.001	< 0.001	0.001	< 0.05	< 0.00002	4.9	0.016	310	< 0.001	0.0005	12.2	0.013	< 0.001	< 0.15	< 0.001	< 0.001	14.9	0.002	1.32	< 0.001	< 0.0005	< 0.001	< 0.0001	0.029	< 0.001	0.012	< 0.01
V15	25-Oct-05	< 0.00025	0.013	< 0.001	0.06	< 0.001	< 0.001	< 0.05	402	0.0003		< 0.001	< 0.001	0.002	< 0.05	< 0.00002	5.3	0.019	307	< 0.001	0.0005	13	0.015	< 0.001	< 0.15	< 0.001	< 0.001	14.8	< 0.001	1.38	< 0.001	< 0.0005	< 0.001	< 0.0001	0.031	< 0.001	0.011	< 0.01
V15	01-Nov-05	< 0.00025	0.012	< 0.001	0.06	< 0.001	< 0.001	< 0.05	400	0.0004		< 0.001	< 0.001	0.002	< 0.05	< 0.00002	5.4	0.02	298	0.001	< 0.0005	12.5	0.019	< 0.001	< 0.15	< 0.001	< 0.001	15.2	< 0.001	1.39	< 0.001	< 0.0005	< 0.001	< 0.0001	0.037	< 0.001	0.014	< 0.01
V15	15-Nov-05	< 0.01	0.14	< 0.03	0.047	< 0.003		< 0.01	321	< 0.01		< 0.02	< 0.01	< 0.02	0.03	< 0.00002	5.9		274	< 0.003	< 0.02	15	0.05	< 0.03	< 0.15	< 0.05		7.27	< 0.03	1.32			< 0.005			< 0.01	0.016	< 0.02
V15	14-Dec-05	< 0.00025	< 0.005	< 0.001	0.054	< 0.001	< 0.001	< 0.05	418	0.0004		< 0.001	< 0.001	0.002	< 0.05	< 0.00002	4.9	0.019	319	0.006	< 0.0005	12.1	0.019	< 0.001	< 0.15	< 0.001	0.001	6.6	< 0.001	1.3	< 0.001	< 0.0005	< 0.001	< 0.0001	0.03	< 0.001	0.048	< 0.01
	average	0.00099	0.025	0.003	0.060	0.001	0.001	0.047	358.6	0.0009		0.002	0.002	0.003	0.152	0.00002	4.7	0.015	262.8	0.004	0.0020	11.9	0.014	0.003	0.15	0.004	0.002	13.49	0.003	1.25	0.001	0.0005	0.001	0.0001	0.030	0.002	0.025	0.011
	minimum	< 0.00025	< 0.005	< 0.001	0.045	< 0.001	< 0.001	< 0.05	273	< 0.0002		< 0.001	< 0.001	< 0.02	< 0.05	< 0.00002	3.5	0.008	169	< 0.001	< 0.0005	7.98	0.005	< 0.001	< 0.15	< 0.001	< 0.001	6.6	< 0.001	0.85	< 0.001	< 0.0005	< 0.001	< 0.0001	0.014	< 0.001	0.008	< 0.02
	maximum	0.0014	0.14	0.001	0.081	< 0.003	< 0.001	< 0.05	418	0.0004		< 0.02	< 0.01	0.003	0.64	< 0.00002	5.9	0.02	319	0.009	0.0012	15	0.05	0.003	< 0.15	< 0.001	0.003	15.9	0.005	1.43	< 0.001	0.0009	0.003	< 0.0001	0.039	0.001	0.048	< 0.01
	N > DL	2	13	1	15	0	0	0	15	9		0	0	14	7	0	15	14	15	11	11	15	15	2	0	0	6	15	2	15	0	1	4	0	14	1	15	0
	median	0.00025	0.013	0.001	0.059	0.001	0.001	0.050	368.0	0.0003		0.001	0.001	0.002	0.050	0.00002	4.8	0.016	274.0	0.004	0.0006	12.2	0.012	0.001	0.15	0.001	0.001	14.80	0.001	1.30	0.001	0.0005	0.001	0.0001	0.031	0.001	0.020	0.010
V16	22-Jun-05	< 0.00025	0.023	< 0.001	0.058	< 0.001	< 0.001	< 0.05	390	< 0.0002		< 0.001	< 0.001	0.002	0.18	< 0.00002	6.5	0.01	379	0.007	0.0006	14.4	0.004	0.003	< 0.15	< 0.001	< 0.001	10.7	< 0.001	1.4	< 0.001	< 0.0005	< 0.001	< 0.0001	0.034	< 0.001	0.011	< 0.01

Appendix 6
2005 Surface Water Quality Data
Vangorda Creek Drainage

Table 2 Surface Water Total Metal 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	CN-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
V16	19-Sep-05	< 0.00025	< 0.005	< 0.001	0.047	< 0.001	< 0.001	< 0.05	415	0.0002		< 0.001	< 0.001	0.002	0.1	< 0.00002	6.4	0.01	403	0.008	0.0006	15.7	0.004	0.002	< 0.15	< 0.001	0.002	10.3	< 0.001	1.32	< 0.001	< 0.0005	< 0.001	< 0.0001	0.05	< 0.001	0.031	< 0.01
V17A	22-Jun-05	< 0.00025	0.09	0.001	0.016	< 0.001	< 0.001	< 0.05	12.5	< 0.0002		< 0.001	< 0.001	< 0.001	0.16	< 0.00002	0.2	< 0.001	2.52	0.01	< 0.0005	1.45	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.7	< 0.001	0.053	< 0.001	< 0.0005	0.002	< 0.0001	0.0005	< 0.001	0.006	< 0.01
V17A	19-Sep-05	< 0.00025	0.033	0.001	0.023	< 0.001	< 0.001	< 0.05	19.7	0.0004		< 0.001	< 0.001	< 0.001	0.32	< 0.00002	0.4	< 0.001	4.5	0.097	< 0.0005	1.86	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.3	< 0.001	0.082	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0006	< 0.001	0.29	< 0.01
V19	22-Jun-05	0.0006	0.02	< 0.001	0.054	< 0.001	< 0.001	< 0.05	25.3	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.3	0.001	8.38	< 0.001	< 0.0005	2.09	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	16.7	< 0.001	0.13	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
V20	22-Jun-05	< 0.00025	0.062	< 0.001	0.039	< 0.001	< 0.001	< 0.05	25.8	< 0.0002		< 0.001	< 0.001	0.002	0.07	< 0.00002	0.4	0.002	7.6	0.009	< 0.0005	1.97	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	13.8	< 0.001	0.13	< 0.001	< 0.0005	0.001	< 0.0001	< 0.0005	< 0.001	0.008	< 0.01
V22	07-Mar-05	0.0006	0.011	0.001	0.022	< 0.001	< 0.001	< 0.05	227	0.058		0.37	< 0.001	0.049	0.16	< 0.00002	3.6	0.038	78.3	22.6	0.0007	7.09	0.4	0.004	< 0.15	0.001	0.002	9.1	< 0.001	1.4	< 0.001	< 0.0005	< 0.001	0.0024	0.0023	< 0.001	69.4	< 0.01
V22	07-Jun-05	< 0.00025	0.053	0.005	0.051	< 0.001	< 0.001	< 0.05	162	0.068		0.33	< 0.001	0.072	0.68	< 0.00002	3.1	0.024	64.8	19.8	< 0.0005	3.99	0.33	0.018	< 0.15	< 0.001	0.013	7	< 0.001	0.79	< 0.001	< 0.0005	0.001	0.0011	< 0.0005	< 0.001	64.9	< 0.01
V22	12-Sep-05	< 0.00025	0.012	0.001	0.016	< 0.001	< 0.001	< 0.05	236	0.075		0.46	< 0.001	0.005	3.27	< 0.00002	3.2	0.039	89.4	31.2	< 0.0005	5.52	0.35	0.008	< 0.15	< 0.001	0.003	4.4	< 0.001	1.17	< 0.001	< 0.0005	< 0.001	0.0017	< 0.0005	< 0.001	98.1	< 0.01
V22	01-Dec-05	0.0003	< 0.005	0.003	0.013	< 0.001	< 0.001	< 0.05	277	0.058		0.42	< 0.001	0.03	1.71	< 0.00002	3.6	0.041	80.7	25.4	< 0.0005	11.3	0.44	0.012	< 0.15	< 0.001	0.002	3.8	< 0.001	1.85	< 0.001	< 0.0005	< 0.001	0.0016	0.0024	< 0.001	80.8	< 0.01
	average	0.00035	0.020	0.003	0.026	0.001	0.001	0.050	225.5	0.065		0.395	0.001	0.039	1.46	0.00002	3.4	0.036	78.3	24.8	0.0006	6.98	0.380	0.011	0.15	0.001	0.005	6.1	0.001	1.30	0.001	0.0005	0.001	0.0017	0.0014	0.001	78.300	0.010
	minimum	< 0.00025	< 0.005	0.001	0.013	< 0.001	< 0.001	< 0.05	162	0.058		0.33	< 0.001	0.005	0.16	< 0.00002	3.1	0.024	64.8	19.8	< 0.0005	3.99	0.33	0.004	< 0.15	< 0.001	0.002	3.8	< 0.001	0.79	< 0.001	< 0.0005	< 0.001	0.0011	< 0.0005	< 0.001	64.9	< 0.01
	maximum	0.0006	0.053	0.005	0.051	< 0.001	< 0.001	< 0.05	277	0.075		0.46	< 0.001	0.072	3.27	< 0.00002	3.6	0.041	89.4	31.2	0.0007	11.3	0.44	0.018	< 0.15	0.001	0.013	9.1	< 0.001	1.85	< 0.001	< 0.0005	0.001	0.0024	0.0024	< 0.001	98.1	< 0.01
	N > DL	2	3	4	4	0	0	0	4	4		4	0	4	4	0	4	4	4	4	1	4	4	4	0	1	4	4	0	4	0	0	1	4	2	0	4	0
	median	0.00028	0.012	0.002	0.019	0.001	0.001	0.050	231.5	0.063		0.395	0.001	0.040	1.20	0.00002	3.4	0.039	79.5	24.0	0.0005	6.31	0.375	0.010	0.15	0.001	0.003	5.7	0.001	1.29	0.001	0.0005	0.001	0.0017	0.0014	0.001	75.100	0.010
V23	07-Mar-05	0.0006	0.011	0.005	0.099	< 0.001	< 0.001	< 0.05	105	0.001		0.01	< 0.001	0.002	0.12	< 0.00002	3.2	0.015	46.8	0.23	0.0032	13.5	0.074	< 0.001	0.2	0.003	0.004	16.2	< 0.001	0.68	< 0.001	< 0.0005	0.001	0.0005	0.014	< 0.001	2.05	< 0.01
V23	07-Jun-05	< 0.00025	0.032	0.002	0.048	< 0.001	< 0.001	< 0.05	120	0.0054		0.021	< 0.001	0.002	0.24	< 0.00002	3.8	0.02	63.4	0.44	0.0035	10.3	0.18	0.002	< 0.15	0.007	0.014	7.5	< 0.001	0.81	< 0.001	< 0.0005	0.002	0.0009	0.0044	< 0.001	5.76	< 0.01
V23	12-Sep-05	< 0.00025	0.081	< 0.001	0.031	< 0.001	< 0.001	< 0.05	90.5	0.0009		0.011	< 0.001	0.001	0.16	< 0.00002	2.9	0.021	63.3	0.21	0.0026	9.82	0.093	0.004	0.2	0.004	< 0.001	4.6	0.011	0.58	< 0.001	< 0.0005	0.003	0.0009	0.0032	< 0.001	1.34	< 0.01
V23	01-Dec-05	< 0.00025	0.012	0.001	0.049	< 0.001	< 0.001	< 0.05	108	0.0021		0.018	< 0.001	0.002	< 0.05	< 0.00002	3.3	0.029	64.8	0.39	0.0031	10.5	0.15	0.002	< 0.15	0.006	0.003	3.5	< 0.001	0.73	< 0.001	< 0.0005	< 0.001	0.001	0.0055	< 0.001	6.1	< 0.01
	average	0.00034	0.034	0.002	0.057	0.001	0.001	0.05	105.9	0.0024		0.015	0.001	0.002	0.143	0.00002	3.30	0.021	59.6	0.318	0.0031	11.03	0.124	0.002	0.175	0.005	0.006	7.95	0.004	0.70	0.001	0.0005	0.002	0.0008	0.0068	0.001	3.81	0.010
	minimum	< 0.00025	0.011	< 0.001	0.031	< 0.001	< 0.001	< 0.05	90.5	0.0009		0.01	< 0.001	0.001	< 0.05	< 0.00002	2.9	0.015	46.8	0.21	0.0026	9.82	0.074	< 0.001	< 0.15	0.003	< 0.001	3.5	< 0.001	0.58	< 0.001	< 0.0005	< 0.001	0.0005	0.0032	< 0.001	1.34	< 0.01
	maximum	0.0006	0.081	0.005	0.099	< 0.001	< 0.001	< 0.05	120	0.0054		0.021	< 0.001	0.002	0.24	< 0.00002	3.8	0.029	64.8	0.44	0.0035	13.5	0.18	0.004	0.2	0.007	0.014	16.2	0.011	0.81	< 0.001	< 0.0005	0.003	0.001	0.014	< 0.001	6.1	< 0.01
	N > DL	1	4	3	4	0	0	0	4	4		4	0	4	3	0	4	4	4	4	4	4	4	3	2	4	3	4	1	4	0	0	3	4	4	0	4	0
	median	0.00025	0.022	0.002	0.049	0.001	0.001	0.05	106.5	0.0016		0.015	0.001	0.002	0.140	0.00002	3.25	0.021	63.4	0.310	0.0032	10.40	0.122	0.002	0.175	0.005	0.004	6.05	0.001	0.705	0.001	0.0005	0.002	0.0009	0.0050	0.001	3.91	0.010
V24	19-Jun-05	< 0.00025	0.045	< 0.001	0.025	< 0.001	< 0.001	< 0.05	15.4	< 0.0002		< 0.001	< 0.001	0.001	0.09	< 0.00002	0.3	0.001	2.46	0.01	< 0.0005	1.91	0.001	< 0.001	< 0.15	< 0.001	< 0.001	15.2	< 0.001	0.075	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.044	< 0.01
V24	02-Jul-05	< 0.00025	0.063	< 0.001	0.034	< 0.001	< 0.001	< 0.05	43.4	< 0.0002		< 0.001	< 0.001	0.001	0.28	< 0.00002	1.5	0.007	11.9	0.35	< 0.0005	5.54	0.002	< 0.001	< 0.15	< 0.001	< 0.001	11.1	< 0.001	0.15	< 0.001	< 0.0005	0.001	< 0.0001	0.001	< 0.001	0.018	< 0.01
V24	10-Jul-05	< 0.00025	0.047	< 0.001	0.027	< 0.001	< 0.001	< 0.05	16.4	< 0.0002		< 0.001	< 0.001	0.001	0.12	< 0.00002	0.4	0.001	2.5	0.013	< 0.0005	1.82	0.001	< 0.001	< 0.15	< 0.001	< 0.001	13.2	< 0.001	0.078	< 0.001	< 0.0005	0.001	< 0.0001	< 0.0005	< 0.001	0.046	< 0.01
V24	16-Jul-05	< 0.00025	0.055	< 0.001	0.033	< 0.001	< 0.001	< 0.05	18.6	< 0.0002		< 0.001	< 0.001	0.002	0.09	< 0.00002	0.4	0.001	2.74	0.012	< 0.0005	1.99	0.002	< 0.001	< 0.15	< 0.001	< 0.001	14.7	< 0.001	0.087	< 0.001	< 0.0005	0.001	< 0.0001	< 0.0005	< 0.001	0.1	< 0.01
V24	24-Jul-05	< 0.00025	0.027	< 0.001	0.029	< 0.001	< 0.001	< 0.05	17.8	< 0.0002		< 0.001	< 0.001	< 0.001	0.09	< 0.00002	0.4	0.001	2.84	0.009	< 0.0005	1.98	0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.7	< 0.001	0.084	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.044	< 0.01
V24	31-Jul-05	< 0.00025	0.033	< 0.001	0.029	< 0.001	< 0.001	< 0.05	18	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	0.00002	0.4	0.001	2.67	0.008	< 0.0005	1.95	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	13.3	< 0.001	0.088	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.045	< 0.01
V24	06-Aug-05	0.0003	0.032	< 0.001	0.032	< 0.001	< 0.001	< 0.05	18.6	< 0.0002		< 0.001	< 0.001	0.001	0.05	< 0.00002	0.4	0.001	2.82	0.008	< 0.0005	2.14	0.002	< 0.001	< 0.15	< 0.001	< 0.001	12.8	< 0.001	0.092	< 0.001	< 0.0005	0.001	< 0.0001	< 0.0005	< 0.001	0.049	< 0.01
V24	13-Aug-05	< 0.00025	0.036	< 0.001	0.033	< 0.001	< 0.001	< 0.05	18.8	< 0.0002		< 0.001	< 0.001	0.002	< 0.05	< 0.00002	0.4	0.001	2.88	0.01	< 0.0005	2.09	0.001	< 0.001	< 0.15	< 0.001	< 0.001	13	< 0.001	0.093	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.048	< 0.01
V24	20-Aug-05	< 0.00025	0.027	< 0.001	0.031	< 0.001	< 0.001	< 0.05	18.6	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.3	< 0.001	2.8	0.006	< 0.0005	1.52	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.5	< 0.001	0.092	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.045	< 0.01
	average	0.00026	0.041	0.001	0.030	0.001	0.001	0.05	20.6	0.0002		0.001	0.001	0.001	0.097	0.00002	0.5	0.002	3.73	0.047	0.0005	2.33	0.001	0.001	0.15	0.001	0.001	12.94	0.001	0.093	0.001	0.0005	0.001	0.0001	0.0006	0.001	0.049	0.010
	minimum	< 0.00025	0.027	< 0.001	0.025	< 0.001	< 0.001	< 0.05	15.4	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.3	< 0.001	2.46	0.006	< 0.0005	1.52	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.5	< 0.001	0.075	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.018	< 0.01
	maximum	0.0003	0.063	< 0.001	0.034	< 0.001	< 0.001	< 0.05	43.4	< 0.0002		< 0.001	< 0.001	0.002	0.28	0.00002	1.5	0.007	11.9	0.35	< 0.0005	5.54	0.002	< 0.001	< 0.15	< 0.001	< 0.001	15.2	< 0.001	0.15	< 0.001	< 0.0005	0.001	< 0.0001	0.001	< 0.001	0.1	< 0.01
	N > DL	1	9	0	9	0	0	0	9	0		0	0	6	6	1	9	8	9	9	0	9	7	0	0	0	0	9	0	9	0	0	4	0	1	0	9	0
	median	0.00025	0.036	0.001	0.031	0.001	0.001	0.05	18.6	0.0002		0.001	0.001	0.001	0.090	0.00002	0.4	0.001	2.80	0.010	0.0005	1.98	0.001	0.001	0.15	0.001	0.001	13.0	0.001	0.088	0.001	0.0005	0.001	0.0001	0.0005	0.001	0.045	0.010
V25	19-Jun-05	< 0.00025	< 0.005	< 0.001	0.035	< 0.001	< 0.001	< 0.05	298	0.0047		0.01	< 0.001	< 0.001	0.07	< 0.00002	2.9	0.031	66.2	7.17	< 0.0005	4.39	0.006	< 0.001	< 0.15	< 0.001	< 0.001	0.5	< 0.001	1.19	< 0.001	< 0.0005	< 0.001	0.0011	< 0.0005	< 0.001	0.57	< 0.01
V25	02-Jul-05	< 0.00025	< 0.005	< 0.001	0.027	< 0.001	< 0.001	< 0.05	459	0.0007		0.003	< 0.001	< 0.001	0.1	< 0.00002	4.19	0.049	100	14.3	< 0.0005	6.78	< 0.001	< 0.001	< 0.15	< 0.001	0.002	0.79	< 0.001	1.82	< 0.001	< 0.0005	< 0.001	0.0021	< 0.0005	< 0.001	0.02	< 0.01
V25	10-Jul-05	< 0.00025	0.005	< 0.001	0.022	< 0.001	< 0.001	< 0.05	331	0.0046		0.006	< 0.001	0.001	0.11	< 0.00002	3.7	0.046	83.7	11.6	< 0.0005	5.64	0.002	< 0.001	< 0.15	< 0.001	< 0.001	0.7	< 0.001	1.52	< 0.001	< 0.0005	< 0.001	0.0017	< 0.0005	< 0.001	0.32	< 0.01
V25	16-Jul-05	< 0.00025	0.021	< 0.001	0.026	< 0.001	< 0.001	< 0.05	351	0.008		0.009	< 0.001	< 0.001	0.08	< 0.00002	3.8	0.045	91	16	< 0.0005	5.74	0.003	< 0.001	< 0.15	< 0.001	0.001	0.8	< 0.001	1.56	< 0.001	< 0.0005	< 0.001	0.0021	< 0.0005	< 0.001	0.47	< 0.01
V25	24-Jul-05	< 0.00025	< 0.005	< 0.001	0.022	< 0.001	< 0.001	< 0.05	386	0.0058		0.006	< 0.001	< 0.001	0.08	< 0.00002	3.3	0.047	85	14.8	< 0.0005	5.41	0.002	< 0.001	< 0.15	< 0.001	0.002	0.7	< 0.001	1.52	< 0.001	< 0.0005	< 0.001	0.0019	< 0.0005	< 0.001	0.29	< 0.01
V25	31-Jul-05	< 0.00025	< 0.005	< 0.001	0.02	< 0.001	< 0.001	< 0.05	387	0.0072		0.007	< 0.001	< 0.001	< 0.05	< 0.00002	3.4	0.044	84.5	15.5	< 0.0005	5.35	0.002	< 0.001	< 0.15	< 0.001	< 0.001	0.8	< 0.001	1.49	< 0.001	< 0.0005	< 0.001	0.002	< 0.0005	< 0.001	0.4	< 0.01
V25	06-Aug-05	< 0.00025	< 0.005	< 0.001	0.02	< 0.001	< 0.001	< 0.05	380	0.0077		0.007	< 0.001	< 0.001	< 0.05	< 0.00002	3.4	0.046	86	16.1	< 0.0005	5.53	0.002	< 0.001	< 0.15	< 0.001	0.002	1.1	< 0.001	1.53	< 0.001	< 0.0005	< 0.001	0.002	< 0.0005	< 0.001	0.35	< 0.01
V25	13-Aug-05	< 0.00025	0.008	< 0.001	0.02	< 0.001	< 0.001	< 0.05	389	0.0084		0.008	< 0.001	< 0.001	0.05	< 0.00002	3.7	0.044	92.4	17.8	< 0.0005	5.84	0.002	< 0.001	< 0.15	< 0.001	< 0.001	1.1	< 0.001	1.65	< 0.001	< 0.0005	< 0.001	0.0021	< 0.0005	< 0.001	0.34	< 0.01
V25	20-Aug-05	< 0.00025	< 0.005	< 0.001	0.016	< 0.001	< 0.001	< 0.05	367	0.0087		0.009	< 0.001	< 0.001	< 0.05	< 0.00002	3.5	0.048	88	17.3	< 0.0005	5.01	0.001	< 0.001	< 0.15	< 0.001	0.002	0.6	< 0.001	1.46	< 0.001	< 0.0005	< 0.001	0.002	< 0.0005	< 0.001	0.38	< 0.01
	average	0.00025	0.007	0.001	0.023	0.001	0.001	0.05	372.0	0.0062		0.007	0.001	0.001	0.071	0.00002	3.5	0.044	86.3	14.5	0.0005	5.52	0.002	0.001	0.15	0.001	0.001	0.79	0.001	1.53	0.001	0.0005	0.001	0.0019	0.0005	0.001	0.349	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.016	< 0.001	< 0.001	< 0.05	298	0.0007		0.003	< 0.001	< 0.001	< 0.05	< 0.00002	2.9	0.031	66.2	7.17	< 0.0005	4.39	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.5	< 0.001	1.19	< 0.001	< 0.0005	< 0.001	0.0011	< 0.0005	< 0.001	0.02	< 0.01
	maximum	< 0.00025	0.021	< 0.001	0.035	< 0.001	< 0.001	< 0.05	459	0.0087		0.01	< 0.001	0.001	0.11	< 0.00002	4.19	0.049	100	17.8	< 0.0005	6.78	0.006	< 0.001	< 0.15	< 0.001	0.002	1.1	< 0.001	1.82	< 0.001	< 0.0005	< 0.001	0.0021	< 0.0005	< 0.001	0.57	< 0.01
	N > DL	0	3	0	9	0	0	0	9	9		9	0	1	6	0	9	9	9	9	0	9	8	0	0	0	5	9	0	9	0	0	0	9	0	0	9	0
	median	0.00025	0.005	0.001	0.022	0.001	0.001	0.05	380	0.0072		0.007	0.001	0.001	0.070	0.00002	3.5	0.046	86.0	15.5	0.0005	5.53	0.002	0.001	0.15	0.001	0.001	0.79	0.001	1.52	0.001	0.0005	0.001	0.0020	0.0005	0.001	0.350	0.010
V25BSP	21-Jan-05	< 0.00025	0.017	< 0.001	0.03	< 0.001	< 0.001	< 0.05	133	0.0004	<0.0050	< 0.001	< 0.001	0.001	0.05	0.1	< 0.00002	1.6	0.008	26.2	< 0.001	< 0.0005	5.26	0.003	< 0.001	< 0.15	< 0.001	< 0.001	12.4	0.003	0.47	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0005	< 0.001	0.18	< 0.01
V25BSP	08-Feb-05	< 0.00025	< 0.005	< 0.001	0.025	< 0.001	< 0.001	< 0.05	119	0.0005	<0.0050	< 0.001	< 0.001	0.002	< 0.05	< 0.00002	1.5	0.007	23.6	0.001	< 0.0005	5.2	0.002	< 0.001	< 0.15	< 0.001	< 0.001	11.3	< 0.001	0.43	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0005	< 0.001	0.17	< 0.01
V25BSP	14-Mar-05	0.0005	0.008	< 0.001	0.032	< 0.001	< 0.001	< 0.05	140	0.0006	<0.0050	< 0.001	< 0.001	0.004	0.17	< 0.00002	1.7	0.007	24.8	0.001	< 0.0005	5.43	0.004	< 0.001	< 0.15	< 0.001	< 0.001	12.1	< 0.001	0.49	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0005	< 0.001	0.24	< 0.01
V25BSP	11-Apr-05	< 0.00025	0.031	< 0.001	0.03	< 0.001	< 0.001	< 0.05	112	0.0008	<0.0050	< 0.001	< 0.001	0.005	0.09	< 0.00002	1.7	0.006	22.4	0.01	< 0.0005	4.97	0.004	0.004	< 0.15	< 0.001	< 0.001	11.9	< 0.001	0.41	< 0.001	< 0.0005	0.008	< 0.0001	< 0.0005	< 0.001	0.26	< 0.01
V25BSP	10-May-05	< 0.00025	1.55	0.002	0.036	< 0.001	< 0.001	< 0.05	18.6	0.0004	0.0087	0.003	0.002	0.008	2.12	< 0.00002	1.2	0.003	4.08	0.26	< 0.0005	1.27	0.005	0.008	0.2	< 0.001	< 0.001	11.2	< 0.001	0.074	< 0.001	0.0005	0.038	< 0.0001	0.0006	0.003	0.14	< 0.01
V25BSP	19-Jun-05	< 0.00025	0.024	< 0.001	0.054	< 0.001	< 0.001	< 0.05	245	0.0013	<0.0050	0.003	< 0.001	0.002	0.11	< 0.00002	2.5	0.023	52.5	1.98	< 0.0005	5.56	0.004	< 0.001	< 0.15	< 0.001	< 0.001	3	< 0.001	0.99	< 0.001	< 0.0005	< 0.001	0.0007	< 0.0005	< 0.001	0.077	< 0.01
V25BSP	20-Jun-05	< 0.00025	0.035	< 0.001	0.052	< 0.001	< 0.001	< 0.05	253	0.0016	<0.0050	0.003	< 0.001	0.002	0.22	< 0.00002	2.6	0.031	58	2.81	< 0.0005	4.61	0.004	0.001	< 0.15	< 0.001	< 0.001	3.2	< 0.001	1.05	< 0.001	< 0.0005	< 0.001	0.0008	< 0.0005	< 0.001	0.075	< 0.01
V25BSP	02-Jul-05	< 0.00025	0.007	< 0.001	0.02	< 0.001	< 0.001	< 0.05	357	0.0028	<0.0050	0.005	< 0.001	< 0.001	0.13	< 0.00002	3.9	0.064	95.8	11	< 0.0005	7.49	0.003	< 0.001	< 0.15	< 0.001	< 0.001	1	< 0.001	1.38	< 0.001	< 0.0005	< 0.001	0.0012	< 0.0005	< 0.001	0.2	< 0.01
V25BSP	10-Jul-05	< 0.00025	0.024	< 0.001	0.029	< 0.001	< 0.001	< 0.05	332	0.0012	<0.0050	0.003	< 0.001	0.002	0.11	< 0.00002	3.2	0.037	73.3	6.49	< 0.0005	5.12	0.003	< 0.001	< 0.15	< 0.001	0.002	1.9	< 0.001	1.29	< 0.001	< 0.0005	< 0.001	0.0012	< 0.0005	< 0.001	0.047	< 0.01
V25BSP	16-Jul-05	< 0.00025	0.027	< 0.001	0.031	< 0.001	< 0.001	< 0.05	340	0.0017	<0.0050	0.004	< 0.001	0.003	< 0.05	< 0.00002	3.3	0.037	76.9	8.32	< 0.0005	5.34	0.002	< 0.001	< 0.15	< 0.001	< 0.001	1.7	< 0.001	1.42	< 0.001	< 0.0005	< 0.001	0.0013	< 0.0005	< 0.001	0.046	< 0.01
V25BSP	24-Jul-05	< 0.00025	0.015	< 0.001	0.028	< 0.001	< 0.001	< 0.05	348	0.0022	<0.0050	0.004	< 0.001	0.002	0.14	< 0.00002	3.1	0.037	74.8	8.98	< 0.0005	5.27	0.003	< 0.001	< 0.15	< 0.001	0.002	2	< 0.001	1.31	< 0.001	< 0.0005	< 0.001	0.001	< 0.0005	< 0.001	0.049	< 0.01

Appendix 6
2005 Surface Water Quality Data
Vangorda Creek Drainage

Table 2 Surface Water Total Metal 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	CN-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
V25BSP	25-Jul-05	< 0.00025	0.023	< 0.001	0.029	< 0.001	< 0.001	< 0.05	329	0.0022	<0.0050	0.004	< 0.001	0.001	< 0.05	< 0.00002	3	0.042	74.3	8.59	< 0.0005	5.08	0.002	< 0.001	< 0.15	< 0.001	< 0.001	2	0.001	1.3	< 0.001	< 0.0005	< 0.001	0.0013	< 0.0005	< 0.001	0.044	< 0.01
V25BSP	31-Jul-05	< 0.00025	0.022	< 0.001	0.025	< 0.001	< 0.001	< 0.05	366	0.0026	<0.0050	0.005	< 0.001	0.001	0.07	0.00002	3.2	0.039	79.1	9.3	< 0.0005	5.34	0.002	< 0.001	< 0.15	< 0.001	< 0.001	1.9	< 0.001	1.37	< 0.001	< 0.0005	0.001	0.0012	< 0.0005	< 0.001	0.049	< 0.01
V25BSP	06-Aug-05	< 0.00025	0.019	< 0.001	0.026	< 0.001	< 0.001	< 0.05	345	0.0038	<0.0050	0.006	< 0.001	0.001	0.07	< 0.00002	3.5	0.044	87.2	11.1	< 0.0005	5.79	0.003	< 0.001	< 0.15	< 0.001	0.002	2	0.001	1.53	< 0.001	< 0.0005	< 0.001	0.0014	< 0.0005	< 0.001	0.057	< 0.01
V25BSP	13-Aug-05	< 0.00025	0.011	< 0.001	0.027	< 0.001	< 0.001	< 0.05	352	0.0048	<0.0050	0.006	< 0.001	0.001	< 0.05	< 0.00002	3.7	0.045	96.6	11.8	< 0.0005	6.39	0.002	< 0.001	< 0.15	< 0.001	< 0.001	1.9	< 0.001	1.71	< 0.001	< 0.0005	< 0.001	0.0016	< 0.0005	< 0.001	0.06	< 0.01
V25BSP	20-Aug-05	< 0.00025	0.014	< 0.001	0.019	< 0.001	< 0.001	< 0.05	360	0.0037	<0.0050	0.005	< 0.001	< 0.001	< 0.05	< 0.00002	3.2	0.043	78.7	11.4	< 0.0005	4.78	0.001	< 0.001	< 0.15	< 0.001	0.002	1	< 0.001	1.36	< 0.001	< 0.0005	< 0.001	0.0013	< 0.0005	< 0.001	0.05	< 0.01
V25BSP	22-Aug-05	< 0.00025	< 0.005	0.001	0.018	< 0.001	< 0.001	< 0.05	384	0.0042	<0.0050	0.006	< 0.001	< 0.001	< 0.05	< 0.00002	3.2	0.047	83.6	13.1	< 0.0005	5.38	0.002	< 0.001	< 0.15	< 0.001	0.003	1.3	< 0.001	1.46	< 0.001	< 0.0005	< 0.001	0.0015	< 0.0005	< 0.001	0.05	< 0.01
V25BSP	06-Sep-05	< 0.00025	0.064	< 0.001	0.019	< 0.001	< 0.001	< 0.05	263	0.0011	<0.0050	0.014	< 0.001	0.008	0.48	< 0.00002	2.8	0.023	56.4	0.96	0.0024	4.98	0.005	0.001	< 0.15	< 0.001	0.001	6.9	< 0.001	1.01	0.001	0.0007	< 0.001	0.0004	0.0006	0.001	0.16	< 0.01
V25BSP	11-Oct-05	< 0.00025	0.083	< 0.001	0.023	< 0.001	< 0.001	< 0.05	280	0.0014	<0.0050	0.025	< 0.001	0.014	< 0.05	< 0.00002	2.5	0.024	65.4	1.53	< 0.0005	6.29	0.006	0.002	< 0.15	< 0.001	< 0.001	7.9	0.001	1.02	< 0.001	< 0.0005	< 0.001	0.0002	0.0007	< 0.001	0.24	< 0.01
V25BSP	01-Nov-05	< 0.00025	0.075	< 0.001	0.017	< 0.001	< 0.001	< 0.05	209	0.0009	<0.0050	0.035	< 0.001	0.018	< 0.05	< 0.00002	2.1	0.016	42.8	0.32	< 0.0005	5.76	0.005	0.001	< 0.15	< 0.001	< 0.001	11.2	< 0.001	0.73	< 0.001	< 0.0005	< 0.001	0.0001	0.0012	< 0.001	0.26	< 0.01
	average	0.00026	0.103	0.001	0.029	0.001	0.001	0.05	264.3	0.0019	0.005	0.007	0.001	0.004	0.211	0.00002	2.7	0.029	59.82	5.40	0.0006	5.27	0.003	0.002	0.153	0.001	0.001	5.4	0.001	1.04	0.001	0.0005	0.003	0.0008	0.0006	0.001	0.123	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.017	< 0.001	< 0.001	< 0.05	18.6	0.0004	< 0.005	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	1.2	0.003	4.08	0.001	< 0.0005	1.27	0.001	< 0.001	< 0.15	< 0.001	< 0.001	1	< 0.001	0.074	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.044	< 0.01
	maximum	0.0005	1.55	0.002	0.054	< 0.001	< 0.001	< 0.05	384	0.0048	< 0.005	0.035	0.002	0.018	2.12	0.00002	3.9	0.064	96.6	13.1	0.0024	7.49	0.006	0.008	0.2	< 0.001	0.003	12.4	0.003	1.71	0.001	0.0007	0.038	0.0016	0.0012	0.003	0.26	< 0.01
	N > DL	1	18	2	20	0	0	0	20	20	0	16	1	17	12	1	20	20	20	19	1	20	20	6	1	0	6	20	4	20	1	2	3	15	7	2	20	0
	median	0.00025	0.023	0.001	0.028	0.001	0.001	0.05	304.5	0.0015	0.005	0.004	0.001	0.002	0.080	0.00002	2.9	0.034	69.35	4.65	0.0005	5.31	0.003	0.001	0.15	0.001	0.001	2.5	0.001	1.17	0.001	0.0005	0.001	0.0009	0.0005	0.001	0.076	0.010
V27	26-May-05	< 0.00025	0.12	< 0.001	0.018	< 0.001	< 0.001	< 0.05	14.3	< 0.0002		< 0.001	< 0.001	0.002	0.19	< 0.00002	0.6	0.001	5.25	0.008	< 0.0005	1.39	0.001	0.002	0.2	< 0.001	< 0.001	8	< 0.001	0.054	< 0.001	< 0.0005	0.003	< 0.0001	0.001	< 0.001	0.031	< 0.01
V27	21-Sep-05	< 0.00025	0.023	< 0.001	0.026	< 0.001	< 0.001	< 0.05	22.3	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.5	0.002	6.83	0.008	< 0.0005	2.03	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	9.3	0.005	0.087	< 0.001	< 0.0005	0.001	< 0.0001	0.0009	< 0.001	0.017	< 0.01
V29	22-Jun-05													1.42						6.67		3.7		0.107													86.5	
VGMAIN	21-Jan-05	< 0.00025	0.008	< 0.001	0.072	< 0.001	< 0.001	< 0.05	78.2	< 0.0002		< 0.001	< 0.001	0.001	0.1	< 0.00002	1.1	0.004	31	0.005	0.0007	3.75	0.002	< 0.001	< 0.15	< 0.001	< 0.001	9.5	< 0.001	0.31	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0072	< 0.001	0.019	< 0.01
VGMAIN	08-Feb-05	< 0.00025	0.008	< 0.001	0.089	< 0.001	< 0.001	< 0.05	96.3	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	1.3	0.005	39.2	0.006	0.0009	4.92	0.002	< 0.001	< 0.15	< 0.001	< 0.001	11.7	< 0.001	0.39	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0094	< 0.001	0.023	< 0.01
VGMAIN	15-Mar-05	< 0.00025	0.018	< 0.001	0.076	< 0.001	< 0.001	< 0.05	85.1	< 0.0002		< 0.001	< 0.001	0.052	0.14	< 0.00002	1.1	0.004	29.9	0.004	0.0008	4.22	0.003	< 0.001	< 0.15	< 0.001	< 0.001	8.9	< 0.001	0.34	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0089	< 0.001	0.016	< 0.01
VGMAIN	11-Apr-05	< 0.00025	0.038	< 0.001	0.071	< 0.001	< 0.001	< 0.05	82.4	< 0.0002		< 0.001	< 0.001	0.001	0.14	< 0.00002	1.2	0.005	34.4	0.006	0.0009	4.37	0.003	< 0.001	< 0.15	< 0.001	< 0.001	9.9	< 0.001	0.34	< 0.001	< 0.0005	0.001	< 0.0001	0.0089	< 0.001	0.017	< 0.01
VGMAIN	09-May-05	< 0.00025	0.49	0.002	0.045	< 0.001	< 0.001	< 0.05	27.2	< 0.0002		< 0.001	0.001	0.004	0.95	< 0.00002	1.1	0.002	9.57	0.053	< 0.0005	1.44	0.003	0.008	< 0.15	< 0.001	< 0.001	8.8	< 0.001	0.1	< 0.001	< 0.0005	0.01	< 0.0001	0.0015	0.001	0.041	< 0.01
VGMAIN	20-Jun-05	< 0.00025	0.041	< 0.001	0.058	< 0.001	< 0.001	< 0.05	63.5	< 0.0002		< 0.001	< 0.001	0.001	0.22	< 0.00002	1	0.006	19.9	0.07	< 0.0005	2.66	0.001	< 0.001	< 0.15	< 0.001	< 0.001	9.9	< 0.001	0.27	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0021	< 0.001	0.032	< 0.01
VGMAIN	25-Jul-05	< 0.00025	0.018	< 0.001	0.078	< 0.001	< 0.001	< 0.05	96.3	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	1.1	0.009	28.1	0.48	< 0.0005	3.07	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	9.3	< 0.001	0.4	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0027	< 0.001	0.031	< 0.01
VGMAIN	22-Aug-05	< 0.00025	0.01	< 0.001	0.079	< 0.001	< 0.001	< 0.05	145	0.0003		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	1.4	0.013	39.6	0.61	< 0.0005	3.71	< 0.001	< 0.001	< 0.15	< 0.001	0.003	7.5	< 0.001	0.58	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0034	< 0.001	0.023	< 0.01
VGMAIN	06-Sep-05	< 0.00025	0.047	< 0.001	0.038	< 0.001	< 0.001	< 0.05	46.6	< 0.0002		< 0.001	< 0.001	< 0.001	0.1	< 0.00002	0.8	0.004	17.8	0.006	< 0.0005	2.69	0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.1	0.001	0.2	< 0.001	0.003	< 0.001	< 0.0001	0.0037	< 0.001	0.012	< 0.01
VGMAIN	10-Oct-05	< 0.00025	0.006	< 0.001	0.045	< 0.001	< 0.001	< 0.05	49.2	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.8	0.003	20.1	0.009	0.0005	2.87	0.001	< 0.001	< 0.15	< 0.001	< 0.001	11	0.001	0.19	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0031	< 0.001	0.01	< 0.01
VGMAIN	01-Nov-05	< 0.00025	0.008	< 0.001	0.049	< 0.001	< 0.001	< 0.05	60.6	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.8	0.004	23.6	0.005	0.0006	2.8	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10	< 0.001	0.23	< 0.001	< 0.0005	< 0.001	< 0.0001	0.005	< 0.001	0.01	< 0.01
VGMAIN	14-Dec-05	< 0.00025	0.014	< 0.001	0.073	< 0.001	< 0.001	< 0.05	83.9	< 0.0002		< 0.001	< 0.001	< 0.001	0.07	< 0.00002	1.1	0.005	33.6	0.012	0.0007	4.29	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.5	< 0.001	0.29	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0065	< 0.001	0.024	< 0.01
	average	0.00025	0.059	0.001	0.064	0.001	0.001	0.05	76.19	0.0002		0.001	0.001	0.006	0.164	0.00002	1.067	0.005	27.23	0.106	0.0006	3.40	0.002	0.002	0.15	0.001	0.001	9.34	0.001	0.303	0.001	0.0007	0.002	0.0001	0.0052	0.001	0.022	0.010
	minimum	< 0.00025	0.006	< 0.001	0.038	< 0.001	< 0.001	< 0.05	27.2	< 0.0002		< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.8	0.002	9.57	0.004	< 0.0005	1.44	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.5	< 0.001	0.1	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0015	< 0.001	0.01	< 0.01
	maximum	< 0.00025	0.49	0.002	0.089	< 0.001	< 0.001	< 0.05	145	0.0003		< 0.001	0.001	0.052	0.95	< 0.00002	1.4	0.013	39.6	0.61	0.0009	4.92	0.003	0.008	< 0.15	< 0.001	0.003	11.7	0.001	0.58	< 0.001	0.003	0.01	< 0.0001	0.0094	0.001	0.041	< 0.01
	N > DL	0	12	1	12	0	0	0	12	1		0	1	5	7	0	12	12	12	12	7	12	8	1	0	0	1	12	2	12	0	1	2	0	12	1	12	0
	median	0.00025	0.016	0.001	0.072	0.001	0.001	0.05	80.30	0.0002		0.001	0.001	0.001	0.085	0.00002	1.100	0.005	29.00	0.008	0.0006	3.39	0.001	0.001	0.15	0.001	0.001	9.70	0.001	0.30	0.001	0.0005	0.001	0.0001	0.0044	0.001	0.021	0.010

Appendix 6
2005 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	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	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
LCD	22-Jun-05	< 0.00025	0.044	0.004	0.023	< 0.05	< 0.001	< 0.001	222	0.252	1.59	< 0.001	0.002	3.78		4	0.035	294	134	< 0.0005	5.2	1.18	< 0.001	< 0.15	< 0.001	0.016	10.7	< 0.001	0.82	< 0.001	< 0.0005	< 0.001	0.0005	< 0.0005	< 0.001	341	< 0.01
LCD	19-Sep-05	< 0.00025	1.12	0.006	0.022	< 0.05	< 0.001	< 0.001	268	0.408	2.34	< 0.001	0.048	54		4.5	0.068	564	250	< 0.0005	5.88	1.71	0.013	< 0.15	< 0.001	0.024	12.8	< 0.001	0.78	< 0.001	< 0.0005	< 0.001	0.0008	0.0074	< 0.001	754	< 0.01
MOOSESP	06-Sep-05	< 0.00025	< 0.005	0.001	0.062	< 0.05	< 0.001	< 0.001	201	< 0.0002	< 0.001	< 0.001	0.001	< 0.05		2.2	0.005	92.9	0.001	0.001	6.76	< 0.001	< 0.001	< 0.15	< 0.001	0.001	10.3	< 0.001	0.63	< 0.001	< 0.0005	< 0.001	< 0.0001	0.016	< 0.001	0.012	< 0.01
MOOSESP	21-Sep-05	< 0.00025	< 0.005	0.001	0.07	< 0.05	< 0.001	< 0.001	210	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		2.3	0.005	96.9	0.001	0.0015	6.88	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.8	< 0.001	0.64	< 0.001	< 0.0005	< 0.001	< 0.0001	0.015	< 0.001	0.008	< 0.01
MOOSESP	11-Oct-05	< 0.00025	< 0.005	0.001	0.066	< 0.05	< 0.001	< 0.001	231	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		2.3	0.006	114	0.002	0.0018	7.71	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	13.7	< 0.001	0.7	< 0.001	< 0.0005	< 0.001	< 0.0001	0.017	< 0.001	< 0.005	< 0.01
MOOSESP	25-Oct-05	< 0.00025	0.007	< 0.001	0.039	< 0.05	< 0.001	< 0.001	208	0.0002	< 0.001	< 0.001	0.001	< 0.05		2.2	0.005	97.7	< 0.001	0.0016	6.97	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.4	< 0.001	0.6	< 0.001	< 0.0005	< 0.001	< 0.0001	0.016	< 0.001	0.01	< 0.01
MOOSESP	01-Nov-05	< 0.00025	< 0.005	< 0.001	0.058	< 0.05	< 0.001	< 0.001	219	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		2.3	0.005	101	0.002	0.0017	6.77	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	11.2	< 0.001	0.67	< 0.001	< 0.0005	< 0.001	< 0.0001	0.02	< 0.001	< 0.005	< 0.01
MOOSESP	15-Nov-05	< 0.01	0.07	< 0.03	0.029	< 0.01	< 0.003		209	< 0.01	< 0.02	< 0.01	< 0.02	< 0.01		3		112	< 0.003	< 0.02	9.3	< 0.02	< 0.03	< 0.15	< 0.05		5.34	< 0.03	0.57			< 0.005			< 0.01	0.005	< 0.02
	average	0.00188	0.016	0.006	0.054	0.043	0.001	0.001	213.0	0.0018	0.004	0.003	0.004	0.04		2.38	0.005	102.42	0.0017	0.0046	7.40	0.004	0.006	0.15	0.009	0.001	10.3	0.006	0.635	0.001	0.0005	0.002	0.0001	0.017	0.003	0.008	0.012
	minimum	< 0.00025	< 0.005	< 0.001	0.029	< 0.01	< 0.001	< 0.001	201	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.01		2.2	0.005	92.9	< 0.001	< 0.02	6.76	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.34	< 0.001	0.57	< 0.001	< 0.0005	< 0.001	< 0.0001	0.015	< 0.001	< 0.005	< 0.01
	maximum	< 0.01	0.07	0.001	0.07	< 0.05	< 0.003	< 0.001	231	0.0002	< 0.02	< 0.001	0.001	< 0.05		3	0.006	114	0.002	0.0018	9.3	< 0.001	< 0.001	< 0.15	< 0.001	0.001	13.7	< 0.001	0.7	< 0.001	< 0.0005	< 0.001	< 0.0001	0.02	< 0.001	0.012	< 0.02
	N > DL	0	2	3	6	0	0	0	6	1	0	0	2	0		6	5	6	4	5	6	0	0	0	0	1	6	0	6	0	0	0	0	5	0	4	0
	median	0.00025	0.005	0.001	0.060	0.05	0.001	0.001	209.5	0.0002	0.001	0.001	0.001	0.05		2.30	0.005	99.35	0.0015	0.0017	6.93	0.001	0.001	0.15	0.001	0.001	10.6	0.001	0.635	0.001	0.0005	0.001	0.0001	0.016	0.001	0.007	0.010
V1	07-Mar-05	< 0.00025	0.012	< 0.001	0.036	< 0.05	< 0.001	< 0.001	17.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.05		0.6	0.001	2.78	< 0.001	0.0006	2	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	9.9	< 0.001	0.077	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001	< 0.005	< 0.01
V1	07-Jun-05	< 0.00025	0.022	0.002	0.014	0.07	< 0.001	< 0.001	5.72	< 0.0002	< 0.001	< 0.001	0.002	0.06		0.8	< 0.001	0.74	0.001	< 0.0005	1.59	< 0.001	< 0.001	< 0.15	< 0.001	0.009	7.7	< 0.001	0.028	< 0.001	< 0.0005	0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
V1	12-Sep-05	< 0.00025	0.008	< 0.001	0.024	< 0.05	< 0.001	< 0.001	9.29	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.4	< 0.001	1.31	0.001	< 0.0005	1.9	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	7.1	< 0.001	0.046	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
V1	01-Dec-05	< 0.00025	< 0.005	< 0.001	0.035	< 0.05	< 0.001	< 0.001	15.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.5	< 0.001	2.14	< 0.001	< 0.0005	2.27	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.2	< 0.001	0.067	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0005	< 0.001	< 0.005	< 0.01
	average	0.00025	0.012	0.001	0.027	0.055	0.001	0.001	12.03	0.0002	0.001	0.001	0.001	0.053		0.58	0.001	1.74	0.001	0.0005	1.94	0.001	0.001	0.15	0.001	0.003	7.48	0.001	0.055	0.001	0.0005	0.001	0.0001	0.0007	0.001	0.005	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.014	< 0.05	< 0.001	< 0.001	5.72	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.4	< 0.001	0.74	< 0.001	< 0.0005	1.59	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.2	< 0.001	0.028	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
	maximum	< 0.00025	0.022	0.002	0.036	0.07	< 0.001	< 0.001	17.7	< 0.0002	< 0.001	< 0.001	0.002	0.06		0.8	0.001	2.78	0.001	0.0006	2.27	< 0.001	< 0.001	< 0.15	< 0.001	0.009	9.9	< 0.001	0.077	< 0.001	< 0.0005	0.001	< 0.0001	0.0011	< 0.001	< 0.005	< 0.01
	N > DL	0	3	1	4	1	0	0	4	0	0	0	1	2		4	1	4	2	1	4	0	0	0	0	1	4	0	4	0	0	1	0	2	0	0	0
	median	0.00025	0.010	0.001	0.030	0.05	0.001	0.001	12.35	0.0002	0.001	0.001	0.001	0.050		0.55	0.001	1.73	0.001	0.0005	1.95	0.001	0.001	0.15	0.001	0.001	7.40	0.001	0.057	0.001	0.0005	0.001	0.0001	0.0005	0.001	0.005	0.010
V2	21-Jan-05	< 0.00025	< 0.005	< 0.001	0.091	< 0.05	< 0.001	< 0.001	268	< 0.0002	< 0.001	< 0.001	< 0.001	0.09		2.4	0.005	132	0.003	0.0013	9.61	0.003	< 0.001	< 0.15	< 0.001	< 0.001	12.4	< 0.001	0.85	< 0.001	< 0.0005	< 0.001	< 0.0001	0.021	< 0.001	0.015	< 0.01
V2	08-Feb-05	< 0.00025	0.031	< 0.001	0.079	< 0.05	< 0.001	< 0.001	249	< 0.0002	< 0.001	< 0.001	0.001	0.06		2.2	0.004	121	0.007	0.0012	9.07	0.002	0.003	< 0.15	< 0.001	< 0.001	11.7	< 0.001	0.82	< 0.001	< 0.0005	0.002	< 0.0001	0.021	< 0.001	0.021	< 0.01
V2	14-Mar-05	< 0.00025	< 0.005	< 0.001	0.076	< 0.05	< 0.001	< 0.001	242	< 0.0002	< 0.001	< 0.001	0.002	0.17		2.1	0.003	108	< 0.001	0.0012	8.9	0.003	< 0.001	< 0.15	< 0.001	< 0.001	10.2	< 0.001	0.77	< 0.001	< 0.0005	< 0.001	< 0.0001	0.02	< 0.001	0.007	< 0.01
V2	11-Apr-05	< 0.00025	< 0.005	< 0.001	0.084	< 0.05	< 0.001	< 0.001	227	< 0.0002	< 0.001	< 0.001	< 0.001	0.08		2	0.003	105	< 0.001	0.0012	8.87	0.002	< 0.001	< 0.15	< 0.001	< 0.001	11.7	< 0.001	0.74	< 0.001	< 0.0005	< 0.001	< 0.0001	0.02	< 0.001	0.006	< 0.01
V2	09-May-05	< 0.00025	0.013	< 0.001	0.062	< 0.05	< 0.001	< 0.001	182	< 0.0002	< 0.001	< 0.001	0.001	< 0.05		1.9	0.004	87.2	0.006	0.0012	6.39	0.002	< 0.001	< 0.15	< 0.001	0.001	9.9	< 0.001	0.6	< 0.001	< 0.0005	< 0.001	< 0.0001	0.012	< 0.001	0.039	< 0.01
V2	21-Jun-05	< 0.00025	0.006	< 0.001	0.072	< 0.05	< 0.001	< 0.001	215	< 0.0002	< 0.001	< 0.001	< 0.001	0.06		2.1	0.007	120	< 0.001	0.0011	7.92	0.003	< 0.001	< 0.15	< 0.001	< 0.001	12.3	< 0.001	0.71	< 0.001	< 0.0005	< 0.001	< 0.0001	0.017	< 0.001	0.008	< 0.01
V2	25-Jul-05	< 0.00025	< 0.005	< 0.001	0.093	< 0.05	< 0.001	< 0.001	247	< 0.0002	< 0.001	< 0.001	0.001	< 0.05		2.5	0.007	145	0.006	0.0012	9.29	0.004	< 0.001	< 0.15	< 0.001	< 0.001	13.6	< 0.001	0.86	< 0.001	< 0.0005	< 0.001	< 0.0001	0.022	< 0.001	0.036	< 0.01
V2	22-Aug-05	< 0.00025	< 0.005	0.001	0.085	< 0.05	< 0.001	< 0.001	274	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		2.6	0.007	145	0.004	0.0012	9.42	0.003	< 0.001	< 0.15	< 0.001	0.002	11.7	< 0.001	0.92	< 0.001	< 0.0005	< 0.001	< 0.0001	0.024	< 0.001	0.015	< 0.01
V2	06-Sep-05	< 0.00025	< 0.005	0.001	0.088	< 0.05	< 0.001	< 0.001	226	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		2.3	0.005	119	0.005	< 0.0005	8.48	0.003	< 0.001	< 0.15	< 0.001	0.002	10.8	< 0.001	0.81	< 0.001	< 0.0005	< 0.001	< 0.0001	0.018	< 0.001	0.01	< 0.01
V2	21-Sep-05	< 0.00025	0.014	< 0.001	0.11	< 0.05	< 0.001	< 0.001	230	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		2.4	0.005	120	< 0.001	0.0011	8.44	0.004	< 0.001	< 0.15	< 0.001	< 0.001	10.9	< 0.001	0.83	< 0.001	< 0.0005	< 0.001	< 0.0001	0.016	< 0.001	0.01	< 0.01
V2	11-Oct-05	< 0.00025	< 0.005	< 0.001	0.095	< 0.05	< 0.001	< 0.001	225	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		2.1	0.005	120	0.004	0.0012	8.35	0.003	< 0.001	< 0.15	< 0.001	< 0.001	12	< 0.001	0.76	< 0.001	< 0.0005	< 0.001	< 0.0001	0.017	< 0.001	0.024	< 0.01
V2	25-Oct-05	< 0.00025	0.022	< 0.001	0.11	< 0.05	< 0.001	< 0.001	239	< 0.0002	< 0.001	< 0.001	0.001	0.05		2.5	0.006	143	0.001	0.0014	10	0.001	< 0.001	< 0.15	< 0.001	< 0.001	13.1	< 0.001	0.9	< 0.001	< 0.0005	< 0.001	< 0.0001	0.021	< 0.001	0.008	< 0.01
V2	01-Nov-05	< 0.00025	< 0.005	< 0.001	0.1	< 0.05	< 0.001	< 0.001	234	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		2.5	0.006	138	0.004	0.0013	9.6	0.004	< 0.001	< 0.15	< 0.001	< 0.001	12.8	< 0.001	0.88	< 0.001	< 0.0005	< 0.001	< 0.0001	0.021	< 0.001	0.018	< 0.01
V2	15-Nov-05	< 0.01	0.09	< 0.03	0.084	< 0.01	< 0.003		245	< 0.01	< 0.02	< 0.01	< 0.02	< 0.01		2.9		149	< 0.003	< 0.02	11.5	< 0.02	< 0.03	< 0.15	< 0.05		5.85	< 0.03	0.77			< 0.005			< 0.01	< 0.005	< 0.02
V2	14-Dec-05	< 0.00025	< 0.005	< 0.001	0.1	< 0.05	< 0.001	< 0.001	292	< 0.0002	< 0.001	< 0.001	0.001	< 0.05		2.9	0.006	174	0.012	0.0015	10.7	0.002	< 0.001	< 0.15	< 0.001	< 0.001	6.4	0.002	1.03	< 0.001	< 0.0005	< 0.001	< 0.0001	0.024	< 0.001	0.033	< 0.01
	average	0.00090	0.015	0.003	0.089	0.047	0.001	0.001	239.7	0.0009	0.002	0.002	0.002	0.06		2.36	0.0052	128.4	0.004	0.0024	9.10	0.004	0.003	0.150	0.004	0.001	11.02	0.003	0.817	0.001	0.0005	0.001	0.0001	0.020	0.002	0.017	0.011
	minimum	< 0.00025	< 0.005	< 0.001	0.062	< 0.01	< 0.001	< 0.001	182	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.01		1.9	0.003	87.2	< 0.001	< 0.0005	6.39	< 0.02	< 0.001	< 0.15	< 0.001	< 0.001	5.85	0.002	0.6	< 0.001	< 0.0005	< 0.001	< 0.0001	0.012	< 0.001	< 0.005	< 0.01
	maximum	< 0.01	0.09	0.001	0.11	< 0.05	< 0.003	< 0.001	292	< 0.01	< 0.02	< 0.01	0.002	0.17		2.9	0.007	174	0.012	0.0015	11.5	0.004	0.003	< 0.15	< 0.05	0.002	13.6	0.002	1.03	< 0.001	< 0.0005	0.002	< 0.0001	0.024	< 0.01	0.039	< 0.01
	N > DL	0	6	2	15	0	0	0	15	0	0	0	6	6		15	14	15	10	13	15	14	1	0	0	3	15	1	15	0	0	1	0	14	0	14	0
	median	0.00025	0.005	0.001	0.088	0.050	0.001	0.001	239.0	0.0002	0.001	0.001	0.001	0.05		2.40	0.0050	121.0	0.004	0.0012	9.07	0.003	0.001	0.150	0.001	0.001	11.70	0.001	0.820	0.001	0.0005	0.001	0.0001	0.021	0.001	0.015	0.010
V2A	21-Jan-05	< 0.00025	< 0.005	< 0.001	0.058	< 0.05	< 0.001	< 0.001	172	< 0.0002	< 0.001	< 0.001	< 0.001	0.15		2.3	0.006	80.9	0.001	0.0026	7.29	0.018	< 0.001	< 0.15	< 0.001	< 0.001	10.3	< 0.001	0.57	< 0.001	< 0.0005	< 0.001	< 0.0001	0.015	< 0.001	0.22	< 0.01
V2A	14-Mar-05	< 0.00025	< 0.005	< 0.001	0.12	< 0.05	< 0.001	< 0.001	162	< 0.0002	< 0.001	< 0.001	< 0.001	0.2		1.8	0.002	48.1	0.001	0.0016	7.85	0.006	< 0.001	< 0.15	< 0.001	< 0.001	9.4	< 0.001	0.56	< 0.001	< 0.0005	< 0.001	< 0.0001	0.017	< 0.001	0.06	< 0.01
V2A	11-Apr-05	< 0.00025	< 0.005	< 0.001	0.083	< 0.05	< 0.001	< 0.001	138	< 0.0002	< 0.001	< 0.001	0.001	0.16		2.1	0.003	48.4	0.018	0.002	6.62	0.007	< 0.001	< 0.15	< 0.001	< 0.001	9.3	< 0.001	0.49	< 0.001	< 0.0005	< 0.001	< 0.0001	0.013	< 0.001	0.062	< 0.01
V2A	09-May-05	< 0.00025	0.014	0.001	0.056	< 0.05	< 0.001	< 0.001	145	< 0.0002	0.002	< 0.001	0.001	0.05		2.6	0.007	77	0.041	0.0012	5.18	0.044	< 0.001	< 0.15	< 0.001	< 0.001	7.4	< 0.001	0.51	< 0.001	< 0.0005	< 0.001	< 0.0001	0.014	< 0.001	0.33	< 0.01
V2A	21-Jun-05	< 0.00025	0.008	0.001	0.053	< 0.05	< 0.001	< 0.001	197	0.0004	< 0.001	< 0.001	0.001	0.19		3	0.012	116	0.003	0.0015	6.41	0.077	< 0.001	< 0.15	< 0.001	< 0.001	8.7	< 0.001	0.69	< 0.001	< 0.0005	< 0.001	< 0.0001	0.02	< 0.001	1.53	< 0.01
V2A	25-Jul-05	< 0.00025	< 0.005	0.001	0.069	< 0.05	< 0.001	< 0.001	203	0.0002	< 0.001	< 0.001	< 0.001	< 0.05		3.1	0.012	124	0.005	0.0016	6.89	0.067	< 0.001	< 0.15	< 0.001	< 0.001	9.6	< 0.001	0.74	< 0.001	< 0.0005	< 0.001	< 0.0001	0.026	< 0.001	0.48	< 0.01
V2A	22-Aug-05	< 0.00025	< 0.005	0.002	0.066	< 0.05	< 0.001	< 0.001	248	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		3.8	0.014	148	0.004	0.0017	8.32	0.067	< 0.001	< 0.15	< 0.001	0.003	8.9	< 0.001	0.87	< 0.001	< 0.0005	< 0.001	< 0.0001	0.031	< 0.001	0.5	< 0.01
V2A	06-Sep-05	< 0.00025	< 0.005	0.001	0.066	< 0.05	< 0.001	< 0.001	204	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		3.3	0.01	118	0.011	0.0008	7.53	0.06	< 0.001	< 0.15	< 0.001	< 0.001	8.6	< 0.001	0.7	< 0.001	< 0.0005	< 0.001	< 0.0001	0.024	< 0.001	0.4	< 0.01
V2A	21-Sep-05	< 0.00025	< 0.005	0.001	0.085	< 0.05	< 0.001	< 0.001	212	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		3.4	0.009	118	< 0.001	0.0015	7.95	0.048	< 0.001	< 0.15	< 0.001	< 0.001	9.4	< 0.001	0.76	< 0.001	< 0.0005	< 0.001	< 0.0001	0.021	< 0.001	0.27	< 0.01
V2A	11-Oct-05	< 0.00025	< 0.005	< 0.001	0.077	< 0.05	< 0.001	< 0.001	204	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		2.8	0.009	116	0.002	0.0015	7.94	0.046	< 0.001	< 0.15	< 0.001	< 0.001	10.4	< 0.001	0.74	< 0.001	< 0.0005	< 0.001	< 0.0001	0.022	< 0.001	0.45	< 0.01
V2A	25-Oct-05	< 0.00025	0.007	0.001	0.082	< 0.05	< 0.001	< 0.001	219	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		2.9	0.009	118	< 0.001	0.0016	8.54	0.043	< 0.001	< 0.15	< 0.001	0.001	9.8	< 0.001	0.74	< 0.001	< 0.0005	< 0.001	< 0.0001	0.024	< 0.001	0.24	< 0.01
V2A	01-Nov-05	< 0.00025	< 0.005	< 0.001	0.083	< 0.05	< 0.001	< 0.001	219	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		2.9	0.008	115	0.002	0.0015	8.15	0.047	< 0.001	< 0.15	< 0.001	< 0.001	9.7	< 0.001	0.74	< 0.001	< 0.0005	< 0.001	< 0.0001	0.025	< 0.001	0.26	< 0.01
V2A	15-Nov-05	< 0.01	0.07	< 0.03	0.072	< 0.01	< 0.003		199	< 0.01	< 0.02	< 0.01	< 0.02	< 0.01		3.5		115	< 0.003	< 0.02	11	0.06	< 0.03	< 0.15	< 0.05		4.64	< 0.03	0.64			< 0.005			< 0.01	0.21	< 0.02
V2A	14-Dec-05	< 0.00025	< 0.005	0.001	0.11	< 0.05	< 0.001	< 0.001	182	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1.8	0.003	59.2	0.005	0.001	8.99	0.007	< 0.001	< 0.15	< 0.001	< 0.001	5	< 0.001	0.58	< 0.001	< 0.0005	< 0.001	< 0.0001	0.018	< 0.001	0.094	< 0.01
	average	0.00095	0.011	0.003	0.077	0.047	0.001	0.001	193.1	0.0009	0.002	0.002	0.002	0.08		2.8	0.008	100.1	0.007	0.003	7.76	0.043	0.003	0.15	0.005	0.001	8.65	0.003	0.666	0.001	0.0005	0.001	0.0001	0.021	0.002	0.365	0.011
	minimum	< 0.00025	< 0.005	< 0.001	0.053	< 0.01	< 0.001	< 0.001	138	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.01		1.8	0.002	48.1	< 0.001	0.0008	5.18	0.006	< 0.001	< 0.15	< 0.001	0.001	4.64	< 0.001	0.49	< 0.001	< 0.0005	< 0.001	< 0.0001	0.013	< 0.001	0.06	< 0.01
	maximum	< 0.01	0.07	0.002	0.12	< 0.05	< 0.003	< 0.001	248	0.0004	0.002	< 0.01	0.001	0.2		3.8	0.014	148	0.041	0.0026	11	0.077	< 0.03	< 0.15	< 0.05	0.003	10.4	< 0.03	0.87	< 0.001	< 0.0005	< 0.005	< 0.0001	0.031	< 0.01	1.53	< 0.02
	N > DL	0	4	8	14	0	0	0	14	2	1	0	3	5		14	13	14	11	13	14	14	0	0	0	3	14	0	14	0	0	0	0	13	0	14	0
	median	0.00025	0.005	0.001	0.075	0.05	0.001	0.001	201.0	0.0002	0.001	0.001	0.001	0.05		2.9	0.009	115.5	0.003	0.002	7.90	0.047	0.001	0.15	0.001	0.001	9.35	0.001	0.695	0.001	0.0005	0.001	0.0001	0.021	0.001	0.265	0.010
V4	26-May-05	< 0.00025	0.026	< 0.001	0.048	< 0.05	< 0.001	< 0.001	51.8	< 0.0002	< 0.001	< 0.001	0.001	0.14		0.8	0.004	20	0.002	0.0006	2.06	0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.2	< 0.001	0.2	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0046	< 0.001	0.006	< 0.01
V4	21-Sep-05	< 0.00025	< 0.005	< 0.001	0.065	< 0.05	< 0.001	< 0.001	64.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.8	0.004	26	0.026	0.0008	2.99	0.001	< 0.001	< 0.15	< 0.001	< 0.001	8.8	< 0.001	0.27	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0053	< 0.001	0.008	< 0.01
V5	21-Jan-05	< 0.00025	< 0.005	< 0.001	0.07	< 0.05	< 0.001	< 0.001	83.8	< 0.0002	< 0.001	< 0.001	< 0.001	0.15		1.1	0.005	36.4	0.003	0.0017	4.26	0.001	< 0.001	< 0.15	< 0.001	0.003	10.1	< 0.001	0.33	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0046	< 0.001	< 0.005	< 0.01
V5	11-Apr-05	< 0.00025	< 0.005	< 0.001	0.065	< 0.05	< 0.001	< 0.001	86	< 0.0002	< 0.001	< 0.001	< 0.001	0.07		1.2	0.005	38.8	0.008	0.002	4.88	0.002	< 0.001	< 0.15	< 0.001	0.002	10.2	< 0.001	0.34	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0052	< 0.001	0.007	< 0.01

Appendix 6
2005 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	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	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
V5	09-May-05	< 0.00025	0.052	< 0.001	0.034	< 0.05	< 0.001	< 0.001	24	< 0.0002	< 0.001	< 0.001	0.002	0.17		0.8	0.001	8.68	0.016	< 0.0005	1.25	0.002	< 0.001	< 0.15	< 0.001	< 0.001	5.5	< 0.001	0.096	< 0.001	< 0.0005	0.002	< 0.0001	0.0008	< 0.001	0.007	< 0.01
V5	20-Jun-05	< 0.00025	0.014	< 0.001	0.048	< 0.05	< 0.001	< 0.001	42.7	< 0.0002	< 0.001	< 0.001	< 0.001	0.17		0.7	0.003	16.8	0.011	0.0008	2.65	0.001	< 0.001	< 0.15	< 0.001	< 0.001	9.3	< 0.001	0.18	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0021	< 0.001	< 0.005	< 0.01
V5	25-Jul-05	< 0.00025	< 0.005	< 0.001	0.065	< 0.05	< 0.001	< 0.001	51.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.7	0.004	20.5	0.008	0.001	2.98	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	11	< 0.001	0.22	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0026	< 0.001	< 0.005	< 0.01
V5	22-Aug-05	< 0.00025	< 0.005	0.001	0.064	< 0.05	< 0.001	< 0.001	66.5	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.9	0.005	27.7	0.015	0.0012	3.63	0.001	< 0.001	< 0.15	< 0.001	0.003	9.4	< 0.001	0.28	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0035	< 0.001	< 0.005	< 0.01
V5	05-Sep-05	< 0.00025	< 0.005	< 0.001	0.06	< 0.05	< 0.001	< 0.001	57.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.9	0.004	23.7	0.016	0.001	3.27	0.002	< 0.001	< 0.15	< 0.001	0.001	9.1	< 0.001	0.22	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0028	< 0.001	< 0.005	< 0.01
V5	10-Oct-05	< 0.00025	< 0.005	< 0.001	0.054	< 0.05	< 0.001	< 0.001	53.3	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.8	0.003	23.6	0.016	0.0011	3.02	0.002	< 0.001	< 0.15	< 0.001	< 0.001	10.6	< 0.001	0.21	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0024	< 0.001	< 0.005	< 0.01
V5	01-Nov-05	< 0.00025	< 0.005	< 0.001	0.071	< 0.05	< 0.001	< 0.001	74.7	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1	0.005	29.9	0.008	0.0012	3.57	0.002	< 0.001	< 0.15	< 0.001	< 0.001	11.6	< 0.001	0.31	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0041	< 0.001	< 0.005	< 0.01
	average	0.00025	0.011	0.001	0.059	0.05	0.001	0.001	60.0	0.0002	0.001	0.001	0.001	0.09		0.9	0.004	25.120	0.011	0.0012	3.28	0.002	0.001	0.15	0.001	0.002	9.6	0.001	0.243	0.001	0.0005	0.001	0.0001	0.0031	0.001	0.005	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.034	< 0.05	< 0.001	< 0.001	24	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.7	0.001	8.68	0.003	< 0.0005	1.25	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.5	< 0.001	0.096	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0008	< 0.001	< 0.005	< 0.01
	maximum	< 0.00025	0.052	0.001	0.071	< 0.05	< 0.001	< 0.001	86	< 0.0002	< 0.001	< 0.001	0.002	0.17		1.2	0.005	38.8	0.016	0.002	4.88	0.002	< 0.001	< 0.15	< 0.001	0.003	11.6	< 0.001	0.34	< 0.001	< 0.0005	0.002	< 0.0001	0.0052	< 0.001	0.007	< 0.01
	N > DL	0	2	1	9	0	0	0	9	0	0	0	1	4		9	9	9	9	8	9	8	0	0	0	4	9	0	9	0	0	1	0	9	0	2	0
	median	0.00025	0.005	0.001	0.064	0.05	0.001	0.001	57.4	0.0002	0.001	0.001	0.001	0.05		0.9	0.004	23.700	0.011	0.0011	3.27	0.002	0.001	0.15	0.001	0.001	10.1	0.001	0.220	0.001	0.0005	0.001	0.0001	0.0028	0.001	0.005	0.010
V6A	07-Mar-05	< 0.00025	0.009	< 0.001	0.04	< 0.05	< 0.001	< 0.001	49.8	< 0.0002	< 0.001	< 0.001	< 0.001	0.07		0.5	0.001	10.8	0.001	< 0.0005	1.98	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.1	< 0.001	0.21	< 0.001	< 0.0005	< 0.001	< 0.0001	0.004	< 0.001	0.019	< 0.01
V6A	07-Jun-05	< 0.00025	0.02	0.004	0.022	0.06	< 0.001	< 0.001	19.1	< 0.0002	< 0.001	< 0.001	0.002	0.11		0.8	< 0.001	3.69	0.004	< 0.0005	1.77	< 0.001	< 0.001	< 0.15	< 0.001	0.011	9.7	< 0.001	0.08	< 0.001	< 0.0005	0.001	< 0.0001	0.0009	< 0.001	0.021	< 0.01
V6A	12-Sep-05	< 0.00025	0.006	< 0.001	0.027	< 0.05	< 0.001	< 0.001	26.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.5	< 0.001	5.87	0.002	< 0.0005	1.73	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	8	< 0.001	0.1	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0011	< 0.001	0.012	< 0.01
V6A	01-Dec-05	< 0.00025	0.005	0.001	0.045	< 0.05	< 0.001	< 0.001	48.2	< 0.0002	< 0.001	< 0.001	< 0.001	0.05		0.6	0.001	11.2	0.015	< 0.0005	1.92	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.19	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0024	< 0.001	0.018	< 0.01
	average	0.00025	0.010	0.002	0.034	0.053	0.001	0.001	35.83	0.0002	0.001	0.001	0.001	0.07		0.60	0.001	7.89	0.006	0.0005	1.85	0.001	0.001	0.15	0.001	0.004	8.35	0.001	0.145	0.001	0.0005	0.001	0.0001	0.0021	0.001	0.018	0.010
	minimum	< 0.00025	0.005	< 0.001	0.022	< 0.05	< 0.001	< 0.001	19.1	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.5	< 0.001	3.69	0.001	< 0.0005	1.73	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	5.6	< 0.001	0.08	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001	0.012	< 0.01
	maximum	< 0.00025	0.02	0.004	0.045	0.06	< 0.001	< 0.001	49.8	< 0.0002	< 0.001	< 0.001	0.002	0.11		0.8	0.001	11.2	0.015	< 0.0005	1.98	< 0.001	< 0.001	< 0.15	< 0.001	0.011	10.1	< 0.001	0.21	< 0.001	< 0.0005	0.001	< 0.0001	0.004	< 0.001	0.021	< 0.01
	N > DL	0	4	2	4	1	0	0	4	0	0	0	1	3		4	2	4	4	0	4	0	0	0	0	1	4	0	4	0	0	1	0	4	0	4	0
	median	0.00025	0.008	0.001	0.034	0.050	0.001	0.001	37.20	0.0002	0.001	0.001	0.001	0.06		0.55	0.001	8.34	0.003	0.0005	1.85	0.001	0.001	0.15	0.001	0.001	8.85	0.001	0.145	0.001	0.0005	0.001	0.0001	0.0018	0.001	0.019	0.010
V8	21-Jan-05	< 0.00025	< 0.005	< 0.001	0.07	< 0.05	< 0.001	< 0.001	78.5	< 0.0002	< 0.001	< 0.001	< 0.001	0.11		1.1	0.005	33.2	0.03	0.001	3.94	0.002	< 0.001	< 0.15	< 0.001	0.001	9.8	< 0.001	0.32	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0062	< 0.001	0.008	< 0.01
V8	08-Feb-05	< 0.00025	< 0.005	< 0.001	0.072	< 0.05	< 0.001	< 0.001	81.3	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1.1	0.005	35.6	0.032	0.0011	4.27	0.002	< 0.001	< 0.15	< 0.001	< 0.001	9.1	< 0.001	0.34	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0071	< 0.001	0.012	< 0.01
V8	15-Mar-05	< 0.00025	< 0.005	< 0.001	0.076	< 0.05	< 0.001	< 0.001	90.3	< 0.0002	< 0.001	< 0.001	< 0.001	0.23		1.3	0.004	34.9	0.028	0.0011	4.7	0.002	< 0.001	< 0.15	< 0.001	< 0.001	8.2	< 0.001	0.36	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0072	< 0.001	0.009	< 0.01
V8	11-Apr-05	< 0.00025	0.006	< 0.001	0.062	< 0.05	< 0.001	< 0.001	80.1	< 0.0002	< 0.001	< 0.001	< 0.001	0.07		1.2	0.005	36	0.033	0.0012	4.55	0.002	< 0.001	< 0.15	< 0.001	< 0.001	9.4	< 0.001	0.34	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0072	< 0.001	0.011	< 0.01
V8	09-May-05	< 0.00025	0.065	< 0.001	0.034	< 0.05	< 0.001	< 0.001	25.9	< 0.0002	< 0.001	< 0.001	0.007	0.23		0.9	0.002	9.34	0.034	< 0.0005	1.35	0.003	< 0.001	< 0.15	< 0.001	< 0.001	7	< 0.001	0.1	< 0.001	< 0.0005	0.003	< 0.0001	0.0012	< 0.001	0.037	< 0.01
V8	20-Jun-05	< 0.00025	0.016	< 0.001	0.045	< 0.05	< 0.001	< 0.001	48	< 0.0002	< 0.001	< 0.001	< 0.001	0.13		0.7	0.004	15.6	0.037	< 0.0005	2.18	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	8.5	< 0.001	0.2	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0017	< 0.001	0.024	< 0.01
V8	25-Jul-05	< 0.00025	< 0.005	< 0.001	0.06	< 0.05	< 0.001	< 0.001	71.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.8	0.007	22.6	0.062	< 0.0005	2.73	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	9	< 0.001	0.3	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0024	< 0.001	< 0.005	< 0.01
V8	22-Aug-05	< 0.00025	< 0.005	< 0.001	0.066	< 0.05	< 0.001	< 0.001	106	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1.1	0.01	33	0.37	< 0.0005	3.33	< 0.001	< 0.001	< 0.15	< 0.001	0.002	7.1	< 0.001	0.44	< 0.001	< 0.0005	< 0.001	< 0.0001	0.003	< 0.001	0.009	< 0.01
V8	05-Sep-05	< 0.00025	0.006	< 0.001	0.044	< 0.05	< 0.001	< 0.001	49.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.8	0.004	18.7	0.012	0.0006	2.85	0.001	< 0.001	< 0.15	< 0.001	< 0.001	8.4	< 0.001	0.19	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0026	< 0.001	0.009	< 0.01
V8	10-Oct-05	< 0.00025	< 0.005	< 0.001	0.05	< 0.05	< 0.001	< 0.001	53	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.8	0.004	22.7	0.017	0.0008	3.02	0.001	< 0.001	< 0.15	< 0.001	< 0.001	11.2	< 0.001	0.23	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0029	< 0.001	0.009	< 0.01
V8	01-Nov-05	< 0.00025	< 0.005	< 0.001	0.05	< 0.05	< 0.001	< 0.001	61.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.9	0.004	25	0.012	0.0008	2.95	0.001	< 0.001	< 0.15	< 0.001	< 0.001	9.6	< 0.001	0.24	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0044	< 0.001	< 0.005	< 0.01
V8	14-Dec-05	< 0.00025	< 0.005	< 0.001	0.067	< 0.05	< 0.001	< 0.001	75.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1	0.005	31.6	0.02	0.0009	4.15	0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.6	< 0.001	0.27	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0052	< 0.001	0.022	< 0.01
	average	0.00025	0.011	0.001	0.058	0.05	0.001	0.001	68.43	0.0002	0.001	0.001	0.002	0.093		0.975	0.0049	26.52	0.057	0.0008	3.34	0.002	0.001	0.15	0.001	0.001	8.49	0.001	0.278	0.001	0.0005	0.001	0.0001	0.0043	0.001	0.013	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.034	< 0.05	< 0.001	< 0.001	25.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.7	0.002	9.34	0.012	< 0.0005	1.35	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.6	< 0.001	0.1	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0012	< 0.001	< 0.005	< 0.01
	maximum	< 0.00025	0.065	< 0.001	0.076	< 0.05	< 0.001	< 0.001	106	< 0.0002	< 0.001	< 0.001	0.007	0.23		1.3	0.01	36	0.37	0.0012	4.7	0.003	< 0.001	< 0.15	< 0.001	0.002	11.2	< 0.001	0.44	< 0.001	< 0.0005	0.003	< 0.0001	0.0072	< 0.001	0.037	< 0.01
	N > DL	0	4	0	12	0	0	0	12	0	0	0	1	5		12	12	12	12	8	12	9	0	0	0	2	12	0	12	0	0	1	0	12	0	10	0
	median	0.00025	0.005	0.001	0.061	0.05	0.001	0.001	73.30	0.0002	0.001	0.001	0.001	0.050		0.950	0.005	28.30	0.031	0.0008	3.18	0.001	0.001	0.15	0.001	0.001	8.75	0.001	0.285	0.001	0.0005	0.001	0.0001	0.0037	0.001	0.009	0.010
V14	22-Jun-05	< 0.00025	0.006	< 0.001	0.043	< 0.05	< 0.001	< 0.001	178	< 0.0002	< 0.001	< 0.001	< 0.001	0.43		1.2	0.003	51.3	0.015	0.0016	7.4	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	11.6	< 0.001	0.55	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0093	< 0.001	< 0.005	< 0.01
V15	21-Jan-05	< 0.00025	< 0.005	< 0.001	0.075	< 0.05	< 0.001	< 0.001	269	< 0.0002	< 0.001	< 0.001	0.001	0.12		3.7	0.009	189	0.006	0.0012	10.8	0.009	< 0.001	< 0.15	< 0.001	< 0.001	15	< 0.001	1.03	< 0.001	< 0.0005	< 0.001	< 0.0001	0.026	< 0.001	0.034	< 0.01
V15	08-Feb-05	< 0.00025	0.005	< 0.001	0.067	< 0.05	< 0.001	< 0.001	294	< 0.0002	< 0.001	< 0.001	0.001	< 0.05		3.2	0.008	176	0.005	0.0012	9.75	0.006	< 0.001	< 0.15	< 0.001	< 0.001	11.7	< 0.001	0.95	< 0.001	< 0.0005	< 0.001	< 0.0001	0.025	< 0.001	0.042	< 0.01
V15	14-Mar-05	< 0.00025	< 0.005	< 0.001	0.061	< 0.05	< 0.001	< 0.001	331	< 0.0002	< 0.001	< 0.001	0.003	0.28		3.9	0.008	217	0.006	0.0009	11.1	0.008	< 0.001	< 0.15	< 0.001	< 0.001	12.1	< 0.001	1.17	< 0.001	< 0.0005	< 0.001	< 0.0001	0.027	< 0.001	0.005	< 0.01
V15	11-Apr-05	< 0.00025	< 0.005	< 0.001	0.05	< 0.05	< 0.001	< 0.001	367	< 0.0002	< 0.001	< 0.001	0.002	0.1		4	0.011	251	0.004	0.0006	11.1	0.007	< 0.001	< 0.15	< 0.001	< 0.001	14.1	< 0.001	1.15	< 0.001	< 0.0005	< 0.001	< 0.0001	0.03	< 0.001	0.005	< 0.01
V15	09-May-05	< 0.00025	0.011	< 0.001	0.04	< 0.05	< 0.001	< 0.001	220	< 0.0002	< 0.001	< 0.001	0.001	< 0.05		2.8	0.008	147	0.006	< 0.0005	6.93	0.004	< 0.001	< 0.15	< 0.001	0.002	10.2	< 0.001	0.73	< 0.001	< 0.0005	< 0.001	< 0.0001	0.013	< 0.001	0.014	< 0.01
V15	21-Jun-05	< 0.00025	0.012	< 0.001	0.054	< 0.05	< 0.001	< 0.001	322	0.0002	< 0.001	< 0.001	0.001	0.15		4	0.015	232	0.002	< 0.0005	10.7	0.009	< 0.001	< 0.15	< 0.001	0.003	14.2	< 0.001	1.12	< 0.001	< 0.0005	< 0.001	< 0.0001	0.025	< 0.001	0.016	< 0.01
V15	25-Jul-05	< 0.00025	< 0.005	< 0.001	0.06	< 0.05	< 0.001	< 0.001	305	0.0002	< 0.001	< 0.001	0.001	< 0.05		4.1	0.016	232	0.003	0.0006	11.1	0.011	< 0.001	< 0.15	< 0.001	0.001	14.8	< 0.001	1.18	< 0.001	< 0.0005	< 0.001	< 0.0001	0.033	< 0.001	0.029	< 0.01
V15	22-Aug-05	< 0.00025	< 0.005	0.001	0.056	< 0.05	< 0.001	< 0.001	332	0.0003	< 0.001	< 0.001	0.001	< 0.05		4.8	0.017	251	0.003	0.0006	13.1	0.01	< 0.001	< 0.15	< 0.001	0.003	14.4	< 0.001	1.43	< 0.001	< 0.0005	< 0.001	< 0.0001	0.038	< 0.001	0.025	< 0.01
V15	06-Sep-05	< 0.00025	< 0.005	< 0.001	0.051	< 0.05	< 0.001	< 0.001	335	< 0.0002	< 0.001	< 0.001	0.001	< 0.05		4.2	0.013	240	< 0.001	< 0.0005	10.6	0.009	< 0.001	< 0.15	< 0.001	0.002	12.3	< 0.001	1.14	< 0.001	< 0.0005	< 0.001	< 0.0001	0.028	< 0.001	0.012	< 0.01
V15	21-Sep-05	< 0.00025	< 0.005	< 0.001	0.059	< 0.05	< 0.001	< 0.001	342	0.0003	< 0.001	< 0.001	0.001	< 0.05		4.4	0.013	245	< 0.001	< 0.0005	10.7	0.011	< 0.001	< 0.15	< 0.001	< 0.001	13.7	< 0.001	1.11	< 0.001	< 0.0005	< 0.001	< 0.0001	0.025	< 0.001	0.012	< 0.01
V15	11-Oct-05	< 0.00025	< 0.005	< 0.001	0.053	< 0.05	< 0.001	< 0.001	324	0.0003	< 0.001	< 0.001	0.001	< 0.05		4	0.015	254	< 0.001	< 0.0005	10.5	0.012	< 0.001	< 0.15	< 0.001	< 0.001	13.9	< 0.001	1.17	< 0.001	< 0.0005	< 0.001	< 0.0001	0.026	< 0.001	0.013	< 0.01
V15	25-Oct-05	< 0.00025	0.007	< 0.001	0.058	< 0.05	< 0.001	< 0.001	365	0.0003	< 0.001	< 0.001	0.002	< 0.05		4.8	0.019	277	< 0.001	0.0005	12.4	0.014	< 0.001	< 0.15	< 0.001	< 0.001	14.7	< 0.001	1.33	< 0.001	< 0.0005	< 0.001	< 0.0001	0.031	< 0.001	0.009	< 0.01
V15	01-Nov-05	< 0.00025	< 0.005	< 0.001	0.054	< 0.05	< 0.001	< 0.001	370	0.0003	< 0.001	< 0.001	0.002	< 0.05		4.6	0.017	279	0.001	< 0.0005	10.7	0.018	< 0.001	< 0.15	< 0.001	< 0.001	13.5	< 0.001	1.21	< 0.001	< 0.0005	< 0.001	< 0.0001	0.03	< 0.001	0.013	< 0.01
V15	15-Nov-05	< 0.01	0.13	< 0.03	0.042	< 0.01	< 0.003		357	< 0.01	< 0.02	< 0.01	< 0.02	< 0.01		5.7		266	< 0.003	< 0.02	14.2	0.04	< 0.03	< 0.15	< 0.05		7	< 0.03	1.16			< 0.005			< 0.01	0.012	< 0.02
V15	14-Dec-05	< 0.00025	< 0.005	< 0.001	0.055	< 0.05	< 0.001	< 0.001	403	0.0003	< 0.001	< 0.001	0.002	< 0.05		4.8	0.019	308	0.006	< 0.0005	11.9	0.022	< 0.001	< 0.15	< 0.001	< 0.001	6.6	< 0.001	1.26	< 0.001	< 0.0005	< 0.001	< 0.0001	0.029	< 0.001	0.048	< 0.01
	average	0.00090	0.014	0.003	0.056	0.047	0.001	0.001	329.1	0.0009	0.002	0.002	0.003	0.077		4.2	0.013	237.6	0.003	0.0019	11.04	0.013	0.003	0.150	0.004	0.001	12.5	0.003	1.143	0.001	0.0005	0.001	0.0001	0.028	0.002	0.019	0.011
	minimum	< 0.00025	< 0.005	< 0.001	0.04	< 0.01	< 0.001	< 0.001	220	< 0.0002	< 0.001	< 0.001	< 0.02	< 0.01		2.8	0.008	147	< 0.001	< 0.0005	6.93	0.004	< 0.001	< 0.15	< 0.001	< 0.001	6.6	< 0.001	0.73	< 0.001	< 0.0005	< 0.001	< 0.0001	0.013	< 0.001	0.005	< 0.01
	maximum	< 0.01	0.13	0.001	0.075	< 0.05	< 0.003	< 0.001	403	0.0003	< 0.02	< 0.01	0.003	0.28		5.7	0.019	308	0.006	0.0012	14.2	0.04	< 0.001	< 0.15	< 0.05	0.003	15	< 0.03	1.43	< 0.001	< 0.0005	< 0.005	< 0.0001	0.038	< 0.01	0.048	< 0.02
	N > DL	0	5	1	15	0	0	0	15	8	0	0	14	4		15	14	15	10	7	15	15	0	0	0	5	15	0	15	0	0	0	0	14	0	15	0
	median	0.00025	0.005	0.001	0.055	0.05	0.001	0.001	332.0	0.0002	0.001	0.001	0.001	0.050		4.1	0.014	245.0	0.003	0.0005	10.80	0.010	0.001	0.150	0.001	0.001	13.7	0.001	1.160	0.001	0.0005	0.001	0.0001	0.028	0.001	0.013	0.01
V16	22-Jun-05	< 0.00025	0.009	< 0.001	0.048	< 0.05	< 0.001	< 0.001	359	< 0.0002	< 0.001	< 0.001	0.001	0.14		5.1	0.008	355	0.004	< 0.0005	11.7	0.004	0.002	< 0.15	< 0.001	< 0.001	9.2	< 0.001	1.16	< 0.001	< 0.0005	< 0.001	< 0.0001	0.029	< 0.001	0.011	< 0.01
V16	19-Sep-05	< 0.00025	< 0.005	< 0.001	0.041	< 0.05	< 0.001	< 0.001	360	< 0.0002	< 0.001	< 0.001	0.002	0.13		5.4	0.009	355	0.005	0.0005	13.6	0.004	0.001	< 0.15	< 0.001	0.001	8.8	< 0.001	1.15	< 0.001	< 0.0005	< 0.001	< 0.0001	0.044	< 0.001	0.022	< 0.01
V17A	22-Jun-05	< 0.00025	0.063	0.001	0.016	< 0.05	< 0.001	< 0.001	13.4	< 0.0002	< 0.001	< 0.001	< 0.001	0.1		0.2	< 0.001	2.81	0.006	< 0.0005	1.43	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.7	< 0.001	0.056	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0005	< 0.001	0.009	< 0.01
V17A	19-Sep-05	< 0.00025	0.038	0.001	0.02	< 0.05	< 0.001	< 0.001	17.5	0.0004	< 0.001	< 0.001	< 0.001	0.47		0.4	< 0.001	4.22	0.097	< 0.0005	1.6	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.8	< 0.001	0.073	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0005	< 0.001	0.29	< 0.01
V19	22-Jun-05	< 0.00025	0.01	< 0.001	0.047	< 0.05	< 0.001	< 0.001	23.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.2	0.001	8.63	< 0.001	< 0.0005	1.86	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	14.5	< 0.001	0.12	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	< 0.005	< 0.01
V20	22-Jun-05	< 0.00025	0.015	< 0.001	0.035	< 0.05	< 0.001	< 0.001	23.5	< 0.0002	< 0.001	< 0.001	0.002	< 0.05		0.3	0.002	6.92	0.004	< 0.0005	1.79	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.5	< 0.001	0.12	< 0.001	< 0.0005

Appendix 6
2005 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	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	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
V22	07-Mar-05	< 0.00025	0.005	< 0.001	0.021	< 0.05	< 0.001	< 0.001	214	0.053	0.34	< 0.001	0.034	0.06		3	0.034	73.5	22.5	0.0006	6.68	0.37	0.002	< 0.15	0.001	0.002	8.8	< 0.001	1.28	< 0.001	< 0.0005	< 0.001	0.002	0.0019	< 0.001	69	< 0.01
V22	07-Jun-05	< 0.00025	< 0.005	0.003	0.04	< 0.05	< 0.001	< 0.001	136	0.059	0.28	< 0.001	0.038	0.1		2.6	0.02	55.4	21.4	< 0.0005	3.48	0.28	0.001	< 0.15	< 0.001	0.013	6	< 0.001	0.67	< 0.001	< 0.0005	< 0.001	0.0009	< 0.0005	< 0.001	63	< 0.01
V22	12-Sep-05	< 0.00025	< 0.005	< 0.001	0.012	< 0.05	< 0.001	< 0.001	219	0.067	0.43	< 0.001	0.002	< 0.05		3	0.04	85.1	28.2	< 0.0005	5.31	0.35	< 0.001	< 0.15	< 0.001	0.002	4.6	< 0.001	1.07	< 0.001	< 0.0005	< 0.001	0.0016	< 0.0005	< 0.001	86.2	< 0.01
V22	01-Dec-05	< 0.00025	< 0.005	0.001	0.011	< 0.05	< 0.001	< 0.001	245	0.05	0.37	< 0.001	0.015	< 0.05		3.2	0.036	72.4	21	< 0.0005	10.2	0.39	< 0.001	< 0.15	< 0.001	0.001	3.4	< 0.001	1.62	< 0.001	< 0.0005	< 0.001	0.0015	0.002	< 0.001	71.4	< 0.01
	average	0.00025	0.005	0.002	0.021	0.05	0.001	0.001	203.5	0.057	0.355	0.001	0.022	0.065		2.95	0.033	71.60	23.28	0.0005	6.42	0.35	0.001	0.15	0.001	0.005	5.7	0.001	1.16	0.001	0.0005	0.001	0.0015	0.0012	0.001	72.4	0.01
	minimum	< 0.00025	< 0.005	< 0.001	0.011	< 0.05	< 0.001	< 0.001	136	0.05	0.28	< 0.001	0.002	< 0.05		2.6	0.02	55.4	21	< 0.0005	3.48	0.28	< 0.001	< 0.15	< 0.001	0.001	3.4	< 0.001	0.67	< 0.001	< 0.0005	< 0.001	0.0009	< 0.0005	< 0.001	63	< 0.01
	maximum	< 0.00025	0.005	0.003	0.04	< 0.05	< 0.001	< 0.001	245	0.067	0.43	< 0.001	0.038	0.1		3.2	0.04	85.1	28.2	0.0006	10.2	0.39	0.002	< 0.15	0.001	0.013	8.8	< 0.001	1.62	< 0.001	< 0.0005	< 0.001	0.002	0.002	< 0.001	86.2	< 0.01
	N > DL	0	1	2	4	0	0	0	4	4	4	0	4	2		4	4	4	4	1	4	4	2	0	1	4	4	0	4	0	0	0	4	2	0	4	0
	median	0.00025	0.005	0.001	0.017	0.05	0.001	0.001	216.5	0.056	0.355	0.001	0.025	0.055		3.00	0.035	72.95	21.95	0.0005	6.00	0.36	0.001	0.15	0.001	0.002	5.3	0.001	1.18	0.001	0.0005	0.001	0.0016	0.0012	0.001	70.2	0.01
V23	07-Mar-05	0.0004	< 0.005	0.004	0.084	< 0.05	< 0.001	< 0.001	95.7	0.0009	0.01	< 0.001	0.002	0.11		2.8	0.014	44.3	0.21	0.0028	12.7	0.069	< 0.001	0.2	0.003	0.003	14.9	< 0.001	0.61	< 0.001	< 0.0005	< 0.001	0.0003	0.012	< 0.001	1.74	< 0.01
V23	07-Jun-05	< 0.00025	< 0.005	0.003	0.037	< 0.05	< 0.001	< 0.001	99.6	0.0042	0.018	< 0.001	0.002	0.1		3.2	0.017	53.3	0.41	0.0028	8.52	0.14	< 0.001	< 0.15	0.005	0.011	6.3	< 0.001	0.65	< 0.001	< 0.0005	< 0.001	0.0006	0.0019	< 0.001	3.07	< 0.01
V23	12-Sep-05	< 0.00025	< 0.005	< 0.001	0.025	< 0.05	< 0.001	< 0.001	83.6	0.0005	0.01	< 0.001	< 0.001	< 0.05		2.7	0.02	59.9	0.17	0.0027	9.33	0.086	< 0.001	< 0.15	0.004	< 0.001	4.6	< 0.001	0.55	< 0.001	< 0.0005	< 0.001	0.0007	0.0028	< 0.001	0.59	< 0.01
V23	01-Dec-05	< 0.00025	< 0.005	< 0.001	0.041	< 0.05	< 0.001	< 0.001	122	0.0021	0.017	< 0.001	0.002	< 0.05		3.8	0.026	68.8	0.43	0.0035	10.8	0.16	0.001	< 0.15	0.005	0.002	3.3	< 0.001	0.82	< 0.001	< 0.0005	< 0.001	0.001	0.0054	< 0.001	5.39	< 0.01
	average	0.00029	0.005	0.002	0.047	0.05	0.001	0.001	100.2	0.0019	0.014	0.001	0.002	0.078		3.13	0.019	56.58	0.305	0.0030	10.34	0.114	0.001	0.163	0.004	0.004	7.28	0.001	0.658	0.001	0.0005	0.001	0.0007	0.0055	0.001	2.698	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.025	< 0.05	< 0.001	< 0.001	83.6	0.0005	0.01	< 0.001	< 0.001	< 0.05		2.7	0.014	44.3	0.17	0.0027	8.52	0.069	< 0.001	< 0.15	0.003	< 0.001	3.3	< 0.001	0.55	< 0.001	< 0.0005	< 0.001	0.0003	0.0019	< 0.001	0.59	< 0.01
	maximum	0.0004	< 0.005	0.004	0.084	< 0.05	< 0.001	< 0.001	122	0.0042	0.018	< 0.001	0.002	0.11		3.8	0.026	68.8	0.43	0.0035	12.7	0.16	0.001	0.2	0.005	0.011	14.9	< 0.001	0.82	< 0.001	< 0.0005	< 0.001	0.001	0.012	< 0.001	5.39	< 0.01
	N > DL	1	0	2	4	0	0	0	4	4	4	0	3	2		4	4	4	4	4	4	4	1	1	4	3	4	0	4	0	0	0	4	4	0	4	0
	median	0.00025	0.005	0.002	0.039	0.05	0.001	0.001	97.7	0.0015	0.014	0.001	0.002	0.075		3.00	0.019	56.60	0.310	0.0028	10.07	0.113	0.001	0.150	0.005	0.003	5.45	0.001	0.630	0.001	0.0005	0.001	0.0007	0.0041	0.001	2.405	0.010
V24	19-Jun-05	< 0.00025	0.013	< 0.001	0.02	< 0.05	< 0.001	< 0.001	14.3	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.4	< 0.001	2.25	0.011	< 0.0005	1.64	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	13.1	< 0.001	0.067	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.038	< 0.01
V24	02-Jul-05	< 0.00025	0.04	< 0.001	0.035	< 0.05	< 0.001	< 0.001	44.1	< 0.0002	< 0.001	< 0.001	0.001	0.27		1.6	0.007	12	0.35	< 0.0005	5.65	0.002	< 0.001	< 0.15	< 0.001	< 0.001	11.2	< 0.001	0.16	< 0.001	< 0.0005	0.002	< 0.0001	0.001	< 0.001	0.019	< 0.01
V24	10-Jul-05	< 0.00025	0.01	< 0.001	0.022	< 0.05	< 0.001	< 0.001	15	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.4	0.001	2.31	0.006	< 0.0005	1.65	0.001	< 0.001	< 0.15	< 0.001	< 0.001	11.8	< 0.001	0.07	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.032	< 0.01
V24	16-Jul-05	< 0.00025	0.01	< 0.001	0.028	< 0.05	< 0.001	< 0.001	16.5	< 0.0002	< 0.001	< 0.001	0.001	< 0.05		0.3	0.001	2.49	0.003	< 0.0005	1.97	0.002	< 0.001	< 0.15	< 0.001	< 0.001	13.3	< 0.001	0.08	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.085	< 0.01
V24	24-Jul-05	< 0.00025	0.008	< 0.001	0.026	< 0.05	< 0.001	< 0.001	16.2	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.3	0.001	2.62	0.002	< 0.0005	1.98	0.002	< 0.001	< 0.15	< 0.001	< 0.001	12.1	< 0.001	0.079	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.035	< 0.01
V24	31-Jul-05	< 0.00025	0.01	< 0.001	0.028	< 0.05	< 0.001	< 0.001	16.5	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05	< 0.00002	0.3	0.001	2.52	0.003	< 0.0005	1.89	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	12.4	< 0.001	0.08	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.036	< 0.01
V24	06-Aug-05	< 0.00025	< 0.005	< 0.001	0.03	< 0.05	< 0.001	< 0.001	18.7	< 0.0002	< 0.001	< 0.001	0.001	< 0.05		0.4	0.001	2.85	0.003	< 0.0005	2.15	0.002	< 0.001	< 0.15	< 0.001	0.001	13.1	< 0.001	0.091	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.027	< 0.01
V24	13-Aug-05	< 0.00025	0.006	< 0.001	0.027	< 0.05	< 0.001	< 0.001	17	< 0.0002	< 0.001	< 0.001	0.002	< 0.05		0.4	0.001	2.65	0.003	< 0.0005	1.92	0.002	< 0.001	< 0.15	< 0.001	< 0.001	11.6	< 0.001	0.086	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.026	< 0.01
V24	20-Aug-05	< 0.00025	< 0.005	< 0.001	0.03	< 0.05	< 0.001	< 0.001	18.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.2	< 0.001	2.79	0.006	< 0.0005	1.43	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.6	< 0.001	0.089	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.039	< 0.01
	average	0.00025	0.012	0.001	0.027	0.05	0.001	0.001	19.6	0.0002	0.001	0.001	0.001	0.074	0.00002	0.48	0.002	3.61	0.043	0.0005	2.25	0.002	0.001	0.15	0.001	0.001	12.13	0.001	0.089	0.001	0.0005	0.001	0.0001	0.0006	0.001	0.037	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.02	< 0.05	< 0.001	< 0.001	14.3	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.2	< 0.001	2.25	0.002	< 0.0005	1.43	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	10.6	< 0.001	0.067	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.019	< 0.01
	maximum	< 0.00025	0.04	< 0.001	0.035	< 0.05	< 0.001	< 0.001	44.1	< 0.0002	< 0.001	< 0.001	0.002	0.27		1.6	0.007	12	0.35	< 0.0005	5.65	0.002	< 0.001	< 0.15	< 0.001	0.001	13.3	< 0.001	0.16	< 0.001	< 0.0005	0.002	< 0.0001	0.001	< 0.001	0.085	< 0.01
	N > DL	0	7	0	9	0	0	0	9	0	0	0	4	1	0	9	7	9	9	0	9	6	0	0	0	1	9	0	9	0	0	1	0	1	0	9	0
	median	0.00025	0.010	0.001	0.028	0.05	0.001	0.001	16.5	0.0002	0.001	0.001	0.001	0.050	0.00002	0.40	0.001	2.62	0.003	0.0005	1.92	0.002	0.001	0.15	0.001	0.001	12.10	0.001	0.080	0.001	0.0005	0.001	0.0001	0.0005	0.001	0.035	0.010
V25	19-Jun-05	< 0.00025	< 0.005	< 0.001	0.032	< 0.05	< 0.001	< 0.001	280	0.0022	0.005	< 0.001	< 0.001	< 0.05		2.7	0.031	62.5	5.47	< 0.0005	4.18	0.004	< 0.001	< 0.15	< 0.001	< 0.001	0.5	< 0.001	1.11	< 0.001	< 0.0005	< 0.001	0.0012	< 0.0005	< 0.001	0.006	< 0.01
V25	02-Jul-05	< 0.00025	< 0.005	< 0.001	0.031	< 0.05	< 0.001	< 0.001	463	0.0005	0.003	< 0.001	< 0.001	0.08		4.11	0.047	97.6	9.03	< 0.0005	6.57	< 0.001	< 0.001	< 0.15	< 0.001	0.001	0.73	< 0.001	1.84	< 0.001	< 0.0005	< 0.001	0.0024	< 0.0005	< 0.001	0.019	< 0.01
V25	10-Jul-05	< 0.00025	< 0.005	< 0.001	0.018	< 0.05	< 0.001	< 0.001	319	0.0008	0.004	< 0.001	< 0.001	< 0.05		3.1	0.04	74.3	9.43	< 0.0005	4.89	0.002	< 0.001	< 0.15	< 0.001	< 0.001	0.6	< 0.001	1.33	< 0.001	< 0.0005	< 0.001	0.0016	< 0.0005	< 0.001	< 0.005	< 0.01
V25	16-Jul-05	< 0.00025	< 0.005	< 0.001	0.023	< 0.05	< 0.001	< 0.001	316	0.0025	0.006	< 0.001	< 0.001	< 0.05		3.1	0.041	80.3	13.2	< 0.0005	5.4	0.003	< 0.001	< 0.15	< 0.001	< 0.001	0.7	< 0.001	1.46	< 0.001	< 0.0005	< 0.001	0.0014	< 0.0005	< 0.001	< 0.005	< 0.01
V25	24-Jul-05	< 0.00025	< 0.005	< 0.001	0.019	< 0.05	< 0.001	< 0.001	343	0.0028	0.005	< 0.001	< 0.001	< 0.05		2.6	0.044	76	12.7	< 0.0005	4.99	0.002	< 0.001	< 0.15	< 0.001	0.002	0.7	< 0.001	1.34	< 0.001	< 0.0005	< 0.001	0.0014	< 0.0005	< 0.001	< 0.005	< 0.01
V25	31-Jul-05	< 0.00025	< 0.005	< 0.001	0.018	< 0.05	< 0.001	< 0.001	325	0.0025	0.005	< 0.001	< 0.001	< 0.05	< 0.00002	2.8	0.038	74.3	12.1	< 0.0005	4.79	0.002	< 0.001	< 0.15	< 0.001	< 0.001	0.8	< 0.001	1.31	< 0.001	< 0.0005	< 0.001	0.0012	< 0.0005	< 0.001	< 0.005	< 0.01
V25	06-Aug-05	< 0.00025	< 0.005	< 0.001	0.017	< 0.05	< 0.001	< 0.001	346	0.0028	0.005	< 0.001	< 0.001	< 0.05		2.9	0.04	75.4	13.9	< 0.0005	4.74	0.002	< 0.001	< 0.15	< 0.001	0.001	0.9	< 0.001	1.32	< 0.001	< 0.0005	< 0.001	0.0015	< 0.0005	< 0.001	< 0.005	< 0.01
V25	13-Aug-05	< 0.00025	< 0.005	< 0.001	0.016	< 0.05	< 0.001	< 0.001	353	0.0053	0.006	< 0.001	< 0.001	< 0.05		3	0.039	80.7	15.5	< 0.0005	5.02	0.002	< 0.001	< 0.15	< 0.001	< 0.001	0.9	< 0.001	1.37	< 0.001	< 0.0005	< 0.001	0.0015	< 0.0005	< 0.001	< 0.005	< 0.01
V25	20-Aug-05	< 0.00025	< 0.005	< 0.001	0.015	< 0.05	< 0.001	< 0.001	323	0.0064	0.007	< 0.001	< 0.001	< 0.05		2.8	0.042	77	14.9	< 0.0005	4.27	0.001	< 0.001	< 0.15	< 0.001	0.002	0.6	< 0.001	1.26	< 0.001	< 0.0005	< 0.001	0.0015	< 0.0005	< 0.001	0.031	< 0.01
	average	0.00025	0.005	0.001	0.021	0.05	0.001	0.001	340.9	0.0029	0.005	0.001	0.001	0.053	0.00002	3.01	0.040	77.6	11.803	0.0005	4.98	0.002	0.001	0.15	0.001	0.001	0.71	0.001	1.37	0.001	0.0005	0.001	0.0015	0.0005	0.001	0.010	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.015	< 0.05	< 0.001	< 0.001	280	0.0005	0.003	< 0.001	< 0.001	< 0.05		2.6	0.031	62.5	5.47	< 0.0005	4.18	0.001	< 0.001	< 0.15	< 0.001	< 0.001	0.5	< 0.001	1.11	< 0.001	< 0.0005	< 0.001	0.0012	< 0.0005	< 0.001	< 0.005	< 0.01
	maximum	< 0.00025	< 0.005	< 0.001	0.032	< 0.05	< 0.001	< 0.001	463	0.0064	0.007	< 0.001	< 0.001	0.08		4.11	0.047	97.6	15.5	< 0.0005	6.57	0.004	< 0.001	< 0.15	< 0.001	0.002	0.9	< 0.001	1.84	< 0.001	< 0.0005	< 0.001	0.0024	< 0.0005	< 0.001	0.031	< 0.01
	N > DL	0	0	0	9	0	0	0	9	9	9	0	0	1		9	9	9	9	0	9	8	0	0	0	4	9	0	9	0	0	0	9	0	0	3	0
	median	0.00025	0.005	0.001	0.018	0.05	0.001	0.001	325.0	0.0025	0.005	0.001	0.001	0.050	0.00002	2.90	0.040	76.0	12.700	0.0005	4.89	0.002	0.001	0.15	0.001	0.001	0.70	0.001	1.33	0.001	0.0005	0.001	0.0015	0.0005	0.001	0.005	0.010
V25BSP	21-Jan-05	< 0.00025	< 0.005	< 0.001	0.028	< 0.05	< 0.001	< 0.001	126	0.0004	< 0.001	< 0.001	0.002	0.06		1.6	0.007	24.5	< 0.001	< 0.0005	4.97	0.002	< 0.001	< 0.15	< 0.001	< 0.001	10.7	< 0.001	0.45	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.17	< 0.01
V25BSP	08-Feb-05	< 0.00025	< 0.005	< 0.001	0.025	< 0.05	< 0.001	< 0.001	115	0.0004	< 0.001	< 0.001	0.002	< 0.05		1.3	0.007	23	0.001	< 0.0005	4.76	0.002	< 0.001	< 0.15	< 0.001	< 0.001	11.3	< 0.001	0.4	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0005	< 0.001	0.17	< 0.01
V25BSP	14-Mar-05	< 0.00025	< 0.005	< 0.001	0.028	< 0.05	< 0.001	< 0.001	119	0.0005	< 0.001	< 0.001	0.003	0.14		1.5	0.006	21.2	0.001	< 0.0005	4.89	0.003	< 0.001	< 0.15	< 0.001	< 0.001	10.4	< 0.001	0.41	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.21	< 0.01
V25BSP	11-Apr-05	< 0.00025	0.006	< 0.001	0.028	< 0.05	< 0.001	< 0.001	106	0.0008	< 0.001	< 0.001	0.003	< 0.05		1.6	0.006	21.2	0.01	< 0.0005	4.68	0.003	< 0.001	< 0.15	< 0.001	< 0.001	10.4	< 0.001	0.39	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.27	< 0.01
V25BSP	10-May-05	< 0.00025	0.11	< 0.001	0.016	< 0.05	< 0.001	< 0.001	15.9	< 0.0002	< 0.001	< 0.001	0.004	0.14		0.8	< 0.001	3.01	0.055	< 0.0005	1.05	0.002	< 0.001	< 0.15	< 0.001	< 0.001	5.8	< 0.001	0.062	< 0.001	< 0.0005	0.002	< 0.0001	< 0.0005	< 0.001	0.038	< 0.01
V25BSP	19-Jun-05	< 0.00025	< 0.005	< 0.001	0.049	< 0.05	< 0.001	< 0.001	216	0.0012	0.002	< 0.001	0.001	< 0.05		2.2	0.02	46.4	1.71	< 0.0005	4.21	0.003	< 0.001	< 0.15	< 0.001	< 0.001	2.5	< 0.001	0.89	< 0.001	< 0.0005	< 0.001	0.0005	< 0.0005	< 0.001	0.054	< 0.01
V25BSP	20-Jun-05	< 0.00025	0.018	< 0.001	0.048	< 0.05	< 0.001	< 0.001	253	0.0014	0.003	< 0.001	0.001	0.16		2.3	0.028	53	2.57	< 0.0005	4.16	0.003	< 0.001	< 0.15	< 0.001	< 0.001	3	< 0.001	0.96	< 0.001	< 0.0005	< 0.001	0.0006	< 0.0005	< 0.001	0.058	< 0.01
V25BSP	02-Jul-05	< 0.00025	0.006	< 0.001	0.017	< 0.05	< 0.001	< 0.001	308	0.0006	0.004	< 0.001	< 0.001	0.05		3.2	0.06	84.9	8.37	< 0.0005	6.49	0.002	< 0.001	< 0.15	< 0.001	0.002	1	< 0.001	1.24	< 0.001	< 0.0005	< 0.001	0.0013	< 0.0005	< 0.001	< 0.005	< 0.01
V25BSP	10-Jul-05	< 0.00025	< 0.005	< 0.001	0.026	< 0.05	< 0.001	< 0.001	311	0.0011	0.003	< 0.001	< 0.001	0.05		2.8	0.033	65.6	5.73	< 0.0005	4.5	0.002	< 0.001	< 0.15	< 0.001	< 0.001	1.7	< 0.001	1.17	< 0.001	< 0.0005	< 0.001	0.0009	< 0.0005	< 0.001	0.018	< 0.01
V25BSP	16-Jul-05	< 0.00025	< 0.005	< 0.001	0.031	< 0.05	< 0.001	< 0.001	286	0.0016	0.003	< 0.001	0.001	< 0.05		3	0.034	73.6	7.78	< 0.0005	5.29	0.002	< 0.001	< 0.15	< 0.001	< 0.001	1.6	< 0.001	1.33	< 0.001	< 0.0005	< 0.001	0.0011	< 0.0005	< 0.001	0.022	< 0.01
V25BSP	24-Jul-05	< 0.00025	< 0.005	< 0.001	0.025	< 0.05	< 0.001	< 0.001	317	0.0019	0.004	< 0.001	< 0.001	0.06		2.8	0.035	69.1	8.09	< 0.0005	4.92	0.003	< 0.001	< 0.15	< 0.001	0.002	1.8	< 0.001	1.21	< 0.001	< 0.0005	< 0.001	0.001	< 0.0005	< 0.001	0.028	< 0.01
V25BSP	25-Jul-05	< 0.00025	< 0.005	< 0.001	0.027	< 0.05	< 0.001	< 0.001	287	0.002	0.004	< 0.001	< 0.001	< 0.05		2.7	0.04	72	8.13	< 0.0005	4.85	0.002	< 0.001	< 0.15	< 0.001	< 0.001	2	< 0.001	1.25	< 0.001	< 0.0005	< 0.001	0.001	< 0.0005	< 0.001	0.015	< 0.01
V25BSP	31-Jul-05	< 0.00025	< 0.005	< 0.001	0.022	< 0.05	< 0.001	< 0.001	286	0.0022	0.004	< 0.001	< 0.001	< 0.05		2.5	0.033	65.1	7.63	< 0.0005	4.5	0.002	< 0.001	< 0.15	< 0.001	< 0.001	1.7	< 0.001	1.15	< 0.001	< 0.0005	< 0.001	0.0009	< 0.0005	< 0.001	0.012	< 0.01
V25BSP	06-Aug-05	< 0.00025	< 0.005	< 0.001	0.023	< 0.05	< 0.001	< 0.001	329	0.0032	0.005	< 0.001	< 0.001	< 0.05		3	0.039	76.5	10.5	< 0.0005	5.16	0.002	< 0.001	< 0.15	< 0.001	0.002	1.7	< 0.001	1.35	< 0.001	< 0.0005	< 0.001	0.0012	< 0.0005	< 0.001	0.016	< 0.01
V25BSP	13-Aug-05	< 0.00025	< 0.005	< 0.001	0.021	< 0.05	< 0.001	< 0.001	338	0.0037	0.005	< 0.001	< 0.001	< 0.05		3	0.034	76.1	11.5	< 0.0005	5.06	0.002	< 0.001	< 0.15	< 0.001	< 0.001	1.6	< 0.001	1.35	< 0.001	< 0.0005	< 0.001	0.0012	< 0.0005	< 0.001	0.015	< 0.01
V25BSP	20-Aug-05	< 0.00025	< 0.005	< 0.001	0.018	< 0.05	< 0.001	< 0.001	320	0.0037	0.005	< 0.001	< 0.001	< 0.05		2.8	0.04	76.6	10.1	< 0.0005	4.51	0.001	< 0.001	< 0.15	< 0.001	0.002	1	< 0.001	1.33	< 0.001	< 0.0005	< 0.001	0.0012	< 0.0005	< 0.001	0.022	< 0.01
V25BSP	22-Aug-05	< 0.00025	< 0.005	< 0.001	0.019	< 0.05	< 0.001	< 0.001	410	0.0045	0.006	< 0.001	< 0.001	< 0.05		3.3	0.05	90.6	11.5	< 0.0005	5.8	0.002	< 0.001	< 0.15	< 0.001	0.003	1.4	< 0.001	1.57	< 0.001	< 0.0005	< 0.001	0.0014	< 0.0005	< 0.001	0.042	< 0.01
V25BSP	06-Sep-05	< 0.00025	0.014	< 0.001	0.018	< 0.05	< 0.001	< 0.001	235	0.001	0.009	< 0.001	0.003	< 0.05		2.2	0.021	51.4	0.74	< 0.0005	4.78	0.004	< 0.001	< 0.15	< 0.001	0.001	5.6	< 0.001	0.88	< 0.001	< 0.0005	< 0.001	0.0003	< 0.0005	< 0.001	0.13	< 0.01
V25BSP	11-Oct-05	< 0.00025	0.03	< 0.001	0.021	< 0.05	< 0.001	< 0.001	246	0.0014	0.022	< 0.001	0.01	< 0.05		2.1	0.02	56.8	1.37	< 0.0005	5.46	0.

Appendix 6
2005 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	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	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
V25BSP	01-Nov-05	< 0.00025	0.014	< 0.001	0.016	< 0.05	< 0.001	< 0.001	195	0.0007	0.025	< 0.001	0.011	< 0.05		1.9	0.015	40.4	0.23	< 0.0005	5.32	0.004	< 0.001	< 0.15	< 0.001	< 0.001	10.2	< 0.001	0.67	< 0.001	< 0.0005	< 0.001	0.0001	0.0011	< 0.001	0.2	< 0.01
	average	0.00025	0.013	0.001	0.025	0.05	0.001	0.001	240.9	0.0016	0.005	0.001	0.003	0.066		2.33	0.026	54.6	4.80	0.0005	4.77	0.003	0.001	0.15	0.001	0.001	4.64	0.001	0.95	0.001	0.0005	0.001	0.0007	0.0005	0.001	0.086	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.016	< 0.05	< 0.001	< 0.001	15.9	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.8	< 0.001	3.01	< 0.001	< 0.0005	1.05	0.001	< 0.001	< 0.15	< 0.001	< 0.001	1	< 0.001	0.062	< 0.001	< 0.0005	< 0.001	< 0.0001	< 0.0005	< 0.001	0.012	< 0.01
	maximum	< 0.00025	0.11	< 0.001	0.049	< 0.05	< 0.001	< 0.001	410	0.0045	0.025	< 0.001	0.011	0.16		3.3	0.06	90.6	11.5	< 0.0005	6.49	0.006	< 0.001	< 0.15	< 0.001	0.003	11.3	< 0.001	1.57	< 0.001	< 0.0005	0.002	0.0014	0.0011	< 0.001	0.27	< 0.01
	N > DL	0	7	0	20	0	0	0	20	19	15	0	11	7		20	19	20	19	0	20	20	0	0	0	6	20	0	20	0	0	1	15	3	0	19	0
	median	< 0.00025	0.014	< 0.001	0.024	< 0.05	< 0.001	< 0.001	269.5	0.0014	0.004	< 0.001	0.003	0.06		2.4	0.033	60.95	5.73	< 0.0005	4.87	0.002	< 0.001	< 0.15	< 0.001	0.002	2.25	< 0.001	1.055	< 0.001	< 0.0005	0.002	0.001	0.0007	< 0.001	0.042	< 0.01
V27	26-May-05	< 0.00025	0.049	< 0.001	0.016	< 0.05	< 0.001	< 0.001	13.3	< 0.0002	< 0.001	< 0.001	0.002	0.06		0.5	0.001	4.85	0.003	< 0.0005	1.31	< 0.001	< 0.001	0.2	< 0.001	< 0.001	7.8	< 0.001	0.051	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0009	< 0.001	0.031	< 0.01
V27	21-Sep-05	< 0.00025	0.008	< 0.001	0.026	< 0.05	< 0.001	< 0.001	20.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.4	0.001	6.28	0.005	< 0.0005	1.88	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	8.1	< 0.001	0.076	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0007	< 0.001	0.015	< 0.01
V29	22-Jun-05	< 0.00025	0.01	0.004	0.016	< 0.05	< 0.001	< 0.001	433	0.073	0.88	< 0.001	< 0.001	< 0.05		12.3	0.052	414	60.8	< 0.0005	12.7	2.29	< 0.001	< 0.15	< 0.001	0.004	12.8	< 0.001	2	< 0.001	< 0.0005	< 0.001	0.0017	0.026	< 0.001	118	< 0.01
V30	22-Jun-05	< 0.00025	< 0.005	0.003	0.012	< 0.05	< 0.001	< 0.001	336	0.076	2.51	< 0.001	< 0.001	78.7		9.3	0.066	519	122	< 0.0005	10.3	4.55	< 0.001	< 0.15	< 0.001	0.01	14.3	< 0.001	1.58	< 0.001	< 0.0005	< 0.001	0.0013	0.0029	< 0.001	386	< 0.01
V30	19-Sep-05	0.0008	< 0.005	0.004	0.012	< 0.05	< 0.001	< 0.001	376	0.047	2.5	< 0.001	< 0.001	96.6		10	0.069	614	136	< 0.0005	11.2	4.4	< 0.001	< 0.15	< 0.001	0.012	13.8	< 0.001	1.57	< 0.001	< 0.0005	0.002	0.0013	0.003	< 0.001	410	< 0.01
V31	22-Jun-05	< 0.00025	0.062	0.005	0.014	< 0.05	< 0.001	< 0.001	436	0.151	5.08	< 0.001	0.005	597		13.5	0.084	1120	571	< 0.0005	13.9	3.78	< 0.001	< 0.15	< 0.001	0.02	25.6	< 0.001	1.74	< 0.001	< 0.0005	< 0.001	0.0018	0.0028	< 0.001	1160	< 0.01
V31	19-Sep-05	< 0.00025	0.16	0.01	0.015	< 0.05	< 0.001	< 0.001	435	0.03	7.65	< 0.001	0.006	1030		13.5	0.18	1870	1090	< 0.0005	12.8	4.84	< 0.001	< 0.15	< 0.001	0.036	25.2	< 0.001	1.54	< 0.001	< 0.0005	0.001	0.002	0.0044	< 0.001	2160	< 0.01
V32	22-Jun-05	< 0.00025	363	0.018	0.007	< 0.05	0.023	< 0.001	499	19.9	21.8	0.01	0.037	2970		1.4	0.47	3500	3290	< 0.0005	7.77	14.1	0.54	< 0.15	0.002	0.1	36.9	< 0.001	0.044	< 0.001	0.0098	0.002	0.0081	0.502	0.004	10200	< 0.01
V32	19-Sep-05	< 0.00025	290	0.024	0.008	< 0.05	0.016	< 0.001	469	14.8	29.7	0.011	0.031	2930		1.7	0.54	4430	3500	< 0.0005	7.73	22.3	0.52	< 0.15	0.001	0.12	33.2	< 0.001	0.064	< 0.001	0.012	0.004	0.012	0.611	0.005	10500	< 0.01
V33	22-Jun-05	< 0.00025	6.53	0.017	0.017	< 0.05	0.003	< 0.001	452	9.41	17.7	0.002	1.18	3260		10.2	0.52	4840	3300	< 0.0005	10.6	13.1	0.003	0.2	< 0.001	0.078	19.2	< 0.001	0.25	< 0.001	< 0.0005	0.002	0.0064	0.118	< 0.001	9140	< 0.01
V33	19-Sep-05	< 0.00025	6.27	0.021	0.019	< 0.05	0.003	< 0.001	516	4.17	22.3	0.002	0.91	3610		8.6	0.67	6590	3420	< 0.0005	9.84	17.7	0.006	< 0.15	< 0.001	0.091	18.8	< 0.001	0.3	< 0.001	< 0.0005	0.003	0.0081	0.19	< 0.001	8620	< 0.01
VGMAIN	21-Jan-05	< 0.00025	< 0.005	< 0.001	0.064	< 0.05	< 0.001	< 0.001	68.6	< 0.0002	< 0.001	< 0.001	< 0.001	0.09		0.9	0.004	27.9	0.004	0.0007	3.25	0.002	< 0.001	< 0.15	< 0.001	< 0.001	9.4	< 0.001	0.27	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0063	< 0.001	0.01	< 0.01
VGMAIN	08-Feb-05	< 0.00025	0.006	< 0.001	0.065	< 0.05	< 0.001	< 0.001	74.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1	0.004	31.3	0.005	0.0007	3.79	0.002	< 0.001	< 0.15	< 0.001	< 0.001	9.5	< 0.001	0.3	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0076	< 0.001	0.02	< 0.01
VGMAIN	15-Mar-05	< 0.00025	< 0.005	< 0.001	0.071	< 0.05	< 0.001	< 0.001	80.1	< 0.0002	< 0.001	< 0.001	< 0.001	0.11		0.9	0.003	30.1	0.003	0.0008	3.71	0.002	< 0.001	< 0.15	< 0.001	< 0.001	8.1	< 0.001	0.33	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0084	< 0.001	0.009	< 0.01
VGMAIN	11-Apr-05	< 0.00025	0.006	< 0.001	0.067	< 0.05	< 0.001	< 0.001	78.3	< 0.0002	< 0.001	< 0.001	< 0.001	0.06		1.1	0.004	32.6	0.004	0.0008	4.14	0.002	< 0.001	< 0.15	< 0.001	< 0.001	9.1	< 0.001	0.32	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0083	< 0.001	0.009	< 0.01
VGMAIN	09-May-05	< 0.00025	0.033	< 0.001	0.031	< 0.05	< 0.001	< 0.001	24.5	< 0.0002	< 0.001	< 0.001	0.002	0.12		0.9	0.001	8.52	0.008	< 0.0005	1.3	0.002	< 0.001	< 0.15	< 0.001	< 0.001	6.4	< 0.001	0.093	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0013	< 0.001	0.014	< 0.01
VGMAIN	20-Jun-05	< 0.00025	0.019	< 0.001	0.048	< 0.05	< 0.001	< 0.001	51.9	< 0.0002	< 0.001	< 0.001	< 0.001	0.15		0.7	0.005	15.9	0.056	< 0.0005	2.16	0.001	< 0.001	< 0.15	< 0.001	< 0.001	8.7	< 0.001	0.22	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0016	< 0.001	0.036	< 0.01
VGMAIN	25-Jul-05	< 0.00025	< 0.005	< 0.001	0.063	< 0.05	< 0.001	< 0.001	80.3	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.8	0.008	23.1	0.38	< 0.0005	2.55	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	8.4	< 0.001	0.33	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0021	< 0.001	0.014	< 0.01
VGMAIN	22-Aug-05	< 0.00025	< 0.005	< 0.001	0.07	< 0.05	< 0.001	< 0.001	128	0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1.2	0.011	35.1	0.54	< 0.0005	3.27	< 0.001	< 0.001	< 0.15	< 0.001	0.002	6.6	< 0.001	0.51	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0029	< 0.001	0.014	< 0.01
VGMAIN	06-Sep-05	< 0.00025	< 0.005	< 0.001	0.04	< 0.05	< 0.001	< 0.001	45.8	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.7	0.004	16	0.004	< 0.0005	2.55	0.001	< 0.001	< 0.15	< 0.001	< 0.001	8.6	< 0.001	0.17	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0026	< 0.001	0.009	< 0.01
VGMAIN	10-Oct-05	< 0.00025	< 0.005	< 0.001	0.037	< 0.05	< 0.001	< 0.001	41.6	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.7	0.003	17	0.004	< 0.0005	2.35	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	9.9	< 0.001	0.16	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0026	< 0.001	0.007	< 0.01
VGMAIN	01-Nov-05	< 0.00025	< 0.005	< 0.001	0.048	< 0.05	< 0.001	< 0.001	58.4	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.8	0.004	22.5	0.004	0.0006	2.62	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	9.4	< 0.001	0.21	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0048	< 0.001	0.006	< 0.01
VGMAIN	14-Dec-05	< 0.00025	< 0.005	< 0.001	0.064	< 0.05	< 0.001	< 0.001	73.1	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		1	0.005	29.2	0.008	0.0006	3.67	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.7	< 0.001	0.25	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0057	< 0.001	0.024	< 0.01
	average	0.00025	0.009	0.001	0.056	0.05	0.001	0.001	67.1	0.0002	0.001	0.001	0.001	0.073		0.89	0.005	24.10	0.085	0.0006	2.95	0.001	0.001	0.15	0.001	0.001	8.23	0.001	0.264	0.001	0.0005	0.001	0.0001	0.0045	0.001	0.014	0.010
	minimum	< 0.00025	< 0.005	< 0.001	0.031	< 0.05	< 0.001	< 0.001	24.5	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.05		0.7	0.001	8.52	0.003	< 0.0005	1.3	< 0.001	< 0.001	< 0.15	< 0.001	< 0.001	4.7	< 0.001	0.093	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0013	< 0.001	0.006	< 0.01
	maximum	< 0.00025	0.033	< 0.001	0.071	< 0.05	< 0.001	< 0.001	128	0.0002	< 0.001	< 0.001	0.002	0.15		1.2	0.011	35.1	0.54	0.0008	4.14	0.002	< 0.001	< 0.15	< 0.001	0.002	9.9	< 0.001	0.51	< 0.001	< 0.0005	< 0.001	< 0.0001	0.0084	< 0.001	0.036	< 0.01
	N > DL	0	4	0	12	0	0	0	12	1	0	0	1	5		12	12	12	12	6	12	7	0	0	0	1	12	0	12	0	0	0	0	12	0	12	0
	median	0.00025	0.005	0.001	0.064	0.05	0.001	0.001	70.9	0.0002	0.001	0.001	0.001	0.050		0.90	0.004	25.50	0.005	0.0006	2.94	0.001	0.001	0.15	0.001	0.001	8.65	0.001	0.260	0.001	0.0005	0.001	0.0001	0.0039	0.001	0.012	0.010

IRC
Integrated Resource Consultants Inc.

Suite 160, 14480 River Road
Richmond, BC, Canada V6V 1L4
Tel. 604-278-7714 • Fax 604-278-7741
www.ircintegratedresource.com
FILE:CANTEST0505141.RTL

DATE: 5 June 2005

REPORT TO: Vijay Jain
Cantest Ltd.
4606 Canada Way
Burnaby, B.C. V5G 1K5

CHANGE FROM V25 TO PO#5. Pg. 1

REPORT ON: RAINBOW TROUT BIOASSAY RESULTS

SAMPLE DESCRIPTION: V25

IRC Sample ID No.:	0505141
Sample Name:	**505240155; PO# 10483**
Date collected:	24 May 2005
Date, time received:	24 May 2005; 1510 hours.
Collection Method:	Grab
Amount, Container:	2 x 22L plastic containers
Physical description:	Clear colourless liquid with brown solids
Date, time tested:	25 May 2005; 1115 hrs.

RAINBOW TROUT 96 HR RESULTS:
The 96 hour (static) LC_{50} was greater than 100% (v/v sample).
0% trout mortality in 100% concentration

The LC_{50} is defined as the median lethal concentration or the concentration at which there is 50% fish mortality. Results are calculated using the method described by Stephan (Methods for calculating an LC_{50} in: Aquatic Toxicology and Hazard Evaluation, American Society for Testing and Materials, 1977).

The method used for this test was as per the IRC laboratory "Standard Operating Procedure for Rainbow Trout Holding and Testing" RTver5. This procedure follows the "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout" EPS 1/RM/13, Second Edition – December 2000. Test volume was 17 litres with 10 fish in each test vessel. Aeration was by forced air through glass pipettes at a rate of approximately 6.5 ± 1 ml/L/min. The sample was not pH adjusted or filtered prior to testing.

The initial dissolved oxygen level was 10.2 mg/L at 15.0°C, the conductivity was 1211 µS/cm and the initial pH was 9.0. After pre-aerating the sample for 60 minutes, the dissolved oxygen level was 10.0 mg/L. As the dissolved oxygen level was greater than 70% saturation and less than 100% saturation, the test was initiated at this time. The test set up technician was AH.

Please call should you have any questions.

IRC Integrated Resource Consultants Inc.

Marian Zazzi
Laboratory Supervisor
enclosure

IRC
FILE:CANTEST/0505141.RTL

RAW DATA:

TEST CONCENTRATION		HOURS 0	24	48	72	96
100%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.0	9.1	9.0	8.9	9.2
	Temperature (°C)	15.0	15.5	15.0	15.0	15.0
	pH	8.7	7.4	7.3	7.2	7.3
	Conductivity (µS/cm)	1207				1226
	Symptoms	1	1	1	1	1
	Loading Density (g/L)	0.51	0.51	0.51	0.51	0.51
50%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.0	9.3	8.9	8.8	9.2
	Temperature (°C)	15.0	15.5	15.0	15.0	15.5
	PH	7.9	7.5	7.4	7.3	7.4
	Conductivity (µS/cm)	703				714
	Symptoms	1	1	1	1	1
	Loading Density (g/L)	0.51	0.51	0.51	0.51	0.51
25%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.0	9.0	8.7	8.6	9.3
	Temperature (°C)	15.0	15.5	15.0	15.0	15.5
	PH	7.7	7.6	7.5	7.4	7.4
	Conductivity (µS/cm)	405				414
	Symptoms	1	1	1	1	1
	Loading Density (g/L)	0.51	0.51	0.51	0.51	0.51
12.5%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.0	8.8	8.6	9.2	9.4
	Temperature (°C)	15.5	15.5	15.0	15.0	15.5
	PH	7.6	7.6	7.5	7.5	7.4
	Conductivity (µS/cm)	250				258
	Symptoms	1	1	1	1	1
	Loading Density (g/L)	0.51	0.51	0.51	0.51	0.51
6.2%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.0	9.1	8.8	8.9	9.1
	Temperature (°C)	15.5	15.0	15.0	15.0	15.5
	pH	7.6	7.5	7.5	7.5	7.4
	Conductivity (µS/cm)	169				177
	Symptoms	1	1	1	1	1
	Loading Density (g/L)	0.51	0.51	0.51	0.51	0.51
CONTROL	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.0	9.2	8.9	9.1	9.1
	Temperature (°C)	15.5	15.0	15.0	15.0	15.0
	PH	76	7.3	7.4	7.5	7.5
	Conductivity (µS/cm)	64				72
	Symptoms	1	1	1	1	1
	Loading Density (g/L)	0.51	0.51	0.51	0.51	0.51
	Technician	AH	MZ	AH	AH	AC

KEY TO SYMPTOMS:

1 = no apparent effect
2 = fish showing signs of stress
3 = loss of equilibrium

Clarification 10 of 15.

TEST FISH STOCK INFORMATION

Date received:	5 May 2005	
Source:	Spring Valley Trout Farm	
Species:	*Oncorhynchus mykiss* (Rainbow Trout)	
Fork Length:	Mean:	4.50cm ± 0.21cm
	Range:	4.20cm – 4.80cm
Wet weight:	Mean:	0.88 g ± 0.08 g
	Range:	0.71 g – 0.96g
Condition Factor (100xWt/length^{3}cm):	0.96	

Acclimation History	
Acclimation temperature:	14.0 to 14.5 ° CELSIUS
Treatments:	None
Water:	Dechlorinated tap water
Feeding:	Moore Clark Fry Feed
Mortality:	< 2%

RAINBOW TROUT REFERENCE TOXICANT DATA

Stock Arrival Date (y/m/d)	Test Date (y/m/d)	Toxicant	Log LC_{50} (mg/L)
04.11.24	04.12.07	Phenol	1.12
04.11.29	04.12.08	"	1.10
04.11.29	04.12.29	"	1.12
04.12.09	05.01.04	"	1.01
04.12.09	05.01.19	"	1.04
05.01.05	05.02.08	"	1.05
05.01.25	05.02.28	"	1.04
05.02.23	05.03.09	"	1.12
05.02.23	05.03.29	"	1.08
05.03.16	05.04.08	"	1.04
05.04.06	05.04.16	"	1.03
05.04.06	05.05.04	"	1.03
05.04.13	05.05.04	"	1.04
05.05.05	05.05.20	"	1.01
LAB GEOMETRIC MEAN (LOG) ± 2 standard deviations:			1.05 mg/L ± 0.09
Warning Limits (Log Values):			0.96 mg/L to 1.14 mg/L

CONTROL/DILUTION WATER QUALITY:

Hardness: 20mg/L

Total Residual Chlorine: 0 mg/L

Cantest Ltd.
506080385 V25 BSP

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

Vizon SciTec Inc.
3650 Wesbrook Mall
Vancouver, BC
Canada V6S 2L2
tel: (604) 224-4331
fax: (604) 224-0540
web: http://vizonscitec.com

Vizon Sample # : 050609J-04 Report # : 2-11-200-040-05-051

Sample Taken:	Jun. 7, 2005	Sample pH:	7.8
Sample Collected By:	C. Kinnon/R. Meers	Sample Dissolved Oxygen:	10.2 mg/L
Sample Received:	Jun. 9, 2005	Sample Temperature:	14.3 °C
Start Date/Time:	Jun. 10, 2005 2:30 PM	Sample Conductance:	1032 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	46	14.0	14.6	7.2	7.1	10.2	7.4	10	10	10	10	1
4.6	116	14.0	14.7	7.7	7.1	10.2	8.3	0	0	0	0	0
10	176	14.0	14.6	7.7	7.1	10.2	8.1	0	0	0	0	0
22	314	14.0	14.6	7.8	7.1	10.3	7.4	0	0	0	0	0
46	558	14.0	14.5	7.8	7.3	10.3	8.8	0	0	0	0	0
100	1030	14.1	14.5	7.7	7.5	10.3	8.3	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:	22 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.59 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

Weight (Mean + SD):	1.29 ± 0.48 g	Length (Mean + SD):	5 ± 0.6 cm
Weight (Range):	0.55– 2.38 g	Length (Range):	3.9– 6.3 cm

Reference Toxicant: Phenol
Test was conducted on: 05/27/2005
Test gave a 96-h LC50 of 10.86 (7, 13) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 19 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.

Analyst **Verified By**

J. Pickard P. Sinclair

Cantest Ltd.
506080384

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

Vizon SciTec Inc.
3650 Wesbrook Mall
Vancouver, BC
Canada V6S 2L2
tel: (604) 224-4331
fax: (604) 224-0540
web: http://vizonscitec.com

Vizon Sample # : 050609J-03			Report # : 2-11-200-040-05-050
Sample Taken:	Jun. 7, 2005	Sample pH:	8.1
Sample Collected By:	C. Klnnon/R. Meers	Sample Dissolved Oxygen:	10.6 mg/L
Sample Received:	Jun. 9, 2005	Sample Temperature:	14.1 °C
Start Date/Time:	Jun. 10, 2005 2:18 PM	Sample Conductance:	1710 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	46	14.3	14.4	7.2	7.1	10.1	10.1	0	0	0	0	0
4.6	168	14.3	14.4	7.4	7.5	10.1	9.2	0	0	0	0	0
10	283	14.2	14.5	7.7	7.7	10.1	9.1	0	0	0	0	0
22	509	14.1	14.6	7.9	7.9	10.3	9.0	0	0	0	0	0
46	934	14.2	14.7	8.1	8.2	10.4	9.4	0	0	0	0	0
100	1681	14.2	14.7	8.1	8.5	10.5	9.6	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:	22 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.59 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

Weight (Mean + SD):	1.29 ± 0.48 g	Length (Mean + SD):	5 ± 0.6 cm
Weight (Range):	0.55– 2.38 g	Length (Range):	3.9– 6.3 cm

Reference Toxicant: Phenol
Test was conducted on: 05/27/2005
Test gave a 96-h LC50 of 10.86 (7, 13) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 19 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.

Analyst J. Pickard

Verified By P. Sinclair

Integrated Resource Consultants Inc.

Suite 160, 14480 River Road
Richmond, BC, Canada V6V 1L4
Tel. 604-278-7714 • Fax 604-278-7741
www.ircintegratedresource.com
FILE:CANTEST/0509080.RTL

DATE: 29 September 2005

REPORT TO: Vijay Jain
Cantest Ltd.
4606 Canada Way
Burnaby, B.C. V5G 1K5

1/2 Bs. 1

REPORT ON: RAINBOW TROUT BIOASSAY RESULTS

SAMPLE DESCRIPTION:

IRC Sample ID No.:	0509080
Sample Name:	**509160309; PO# 12304**
Date collected:	13 September 2005
Date, time received:	17 September 2005; 0940 hours.
Collection Method:	Grab
Amount, Container:	2 x 22L plastic containers
Physical description:	Clear pale yellow liquid
Date, time tested:	18 September 2005; 1450 hrs.

RAINBOW TROUT 96 HR RESULTS:
The 96 hour (static) LC_{50} was greater than 100% (v/v sample).
0% trout mortality in 100% concentration

The LC_{50} is defined as the median lethal concentration or the concentration at which there is 50% fish mortality. Results are calculated using the method described by Stephan (Methods for calculating an LC_{50} in: Aquatic Toxicology and Hazard Evaluation, American Society for Testing and Materials, 1977).

The method used for this test was as per the IRC laboratory "Standard Operating Procedure for Rainbow Trout Holding and Testing" RTver5. This procedure follows the "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout" EPS 1/RM/13, Second Edition – December 2000. Test volume was 15 litres with 10 fish in each test vessel. Aeration was by forced air through glass pipettes at a rate of approximately 6.5 ±1 ml/L/min. The sample was not pH adjusted or filtered prior to testing. **NOTE: Test fish stock pre-testing holding temperature was exceeded by 1°C. The protocol required holding temperature range is 13°C to 17°C while the actual holding temperature range was 17.0°C to 17.5°C.**

The initial dissolved oxygen level was 10.5 mg/L at 14.5°C, the conductivity was 1958 µS/cm and the initial pH was 10.6. After pre-aerating the sample for 120 minutes, the dissolved oxygen level was 10.6 mg/L. Although the dissolved oxygen level was greater than 100% saturation the maximum pre-aeration time had been reached so the test was initiated at this time. The test set up technician was AC.

Please call should you have any questions.

IRC Integrated Resource Consultants Inc.

Marlan Zaitzi
Laboratory Supervisor
enclosure

IRC
FILE:CANTEST/0509080.RTL

RAW DATA:

TEST CONCENTRATION		HOURS 0	24	48	72	96
100%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.6	8.8	9.0	9.0	8.9
	Temperature (°C)	14.5	15.0	15.0	15.0	15.0
	pH	8.2	8.3	8.4	8.4	8.4
	Conductivity (µS/cm)	1956				1970
	Symptoms	1	1,2	1,2	1,2	1,2
	Loading Density (g/L)	0.53	0.53	0.53	0.53	0.53
50%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.3	8.9	9.0	8.9	8.9
	Temperature (°C)	15.0	15.0	15.0	15.0	15.0
	PH	8.2	8.2	8.2	8.2	8.2
	Conductivity (µS/cm)	1088				1101
	Symptoms	1	1,2	1,2	1,2	1,2
	Loading Density (g/L)	0.53	0.53	0.53	0.53	0.53
25%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.1	8.6	9.0	8.8	8.7
	Temperature (°C)	15.0	15.0	15.0	15.0	15.0
	PH	8.1	7.9	8.0	8.0	8.0
	Conductivity (µS/cm)	679				690
	Symptoms	1	1,2	1	1	1
	Loading Density (g/L)	0.53	0.53	0.53	0.53	0.53
12.5%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.1	9.1	9.1	8.9	8.8
	Temperature (°C)	15.0	15.0	15.0	15.0	15.0
	PH	7.9	7.9	7.9	7.9	7.9
	Conductivity (µS/cm)	362				372
	Symptoms	1	1	1	1	1
	Loading Density (g/L)	0.53	0.53	0.53	0.53	0.53
6.2%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.0	9.0	9.1	9.0	8.9
	Temperature (°C)	15.0	15.0	15.0	15.0	15.0
	pH	7.9	7.8	7.8	7.8	7.8
	Conductivity (µS/cm)	223				229
	Symptoms	1	1	1	1	1
	Loading Density (g/L)	0.53	0.53	0.53	0.53	0.53
CONTROL	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.1	9.4	9.3	9.2	9.1
	Temperature (°C)	15.0	15.0	15.0	15.0	15.0
	PH	7.7	7.3	7.4	7.4	7.4
	Conductivity (µS/cm)	57				63
	Symptoms	1	1	1	1	1
	Loading Density (g/L)	0.53	0.53	0.53	0.53	0.53
	Technician	AC	AH	AH	AH	AH

KEY TO SYMPTOMS:
1 = no apparent effect
2 = fish showing signs of stress
3 = loss of equilibrium

V2 Ps. 3

TEST FISH STOCK INFORMATION

Date received:	16 August 2005	
Source:	Sun Valley Trout Farm	
Species:	*Oncorhynchus mykiss* (Rainbow Trout)	
Fork Length:	Mean:	4.35cm ± 0.21cm
	Range:	4.00cm – 4.80cm
Wet weight:	Mean:	0.79 g ± 0.14 g
	Range:	0.59 g – 1.08g
Condition Factor (100xWt/length^{3}cm):	0.96	

Acclimation History	
Acclimation temperature:	17.0 to 17.5 °CELSIUS
Treatments:	None
Water:	Dechlorinated tap water
Feeding:	Moore Clark Fry Feed
Mortality:	< 2%

RAINBOW TROUT REFERENCE TOXICANT DATA

Stock Arrival Date (y/m/d)	Test Date (y/m/d)	Toxicant	Log LC_{50} (mg/L)
05.01.25	05.02.28	Phenol	1.04
05.02.23	05.03.09	"	1.12
05.02.23	05.03.29	"	1.08
05.03.16	05.04.08	"	1.04
05.04.06	05.04.16	"	1.03
05.04.06	05.05.04	"	1.03
05.04.13	05.05.04	"	1.04
05.05.05	05.05.20	"	1.01
05.05.11	05.06.03	"	1.04
05.06.01	05.06.14	"	1.10
05.06.01	05.07.05	"	0.99
05.06.15	05.07.05	"	0.99
05.07.05	05.07.19	"	1.04
05.07.05	05.08.02	"	1.00
05.07.05	05.08.18	"	1.08
05.08.16	05.09.06	"	1.01
LAB GEOMETRIC MEAN (LOG) ± 2 standard deviations:			1.04 mg/L ± 0.08
Warning Limits (Log Values):			0.96 mg/L to 1.12 mg/L

CONTROL/DILUTION WATER QUALITY:

Hardness: 17mg/L

Total Residual Chlorine: 12 µg/L

Pg. 1

Integrated Resource Consultants Inc.

Suite 160, 14480 River Road
Richmond, BC, Canada V6V 1L4
Tel. 604-278-7714 • Fax 604-278-7741
www.ircintegratedresource.com

FILE:CANTEST/0509081.RTL

DATE: 29 September 2005

REPORT TO: Vijay Jain
Cantest Ltd.
4606 Canada Way
Burnaby, B.C. V5G 1K5

REPORT ON: RAINBOW TROUT BIOASSAY RESULTS

SAMPLE DESCRIPTION:

IRC Sample ID No.:	0509081
Sample Name:	**509160310; PO# 12304**
Date collected:	13 September 2005
Date, time received:	17 September 2005; 0940 hours.
Collection Method:	Grab
Amount, Container:	2 x 22L plastic containers
Physical description:	Clear colourless liquid
Date, time tested:	18 September 2005; 1600 hrs.

RAINBOW TROUT 96 HR RESULTS:
The 96 hour (static) LC_{50} was greater than 100% (v/v sample).
0% trout mortality in 100% concentration

The LC_{50} is defined as the median lethal concentration or the concentration at which there is 50% fish mortality. Results are calculated using the method described by Stephan (Methods for calculating an LC_{50} in: Aquatic Toxicology and Hazard Evaluation, American Society for Testing and Materials, 1977).

The method used for this test was as per the IRC laboratory "Standard Operating Procedure for Rainbow Trout Holding and Testing" RTver5. This procedure follows the "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout" EPS 1/RM/13, Second Edition – December 2000. Test volume was 15 litres with 10 fish in each test vessel. Aeration was by forced air through glass pipettes at a rate of approximately 6.5 ±1 ml/L/min. The sample was not pH adjusted or filtered prior to testing. **NOTE: Test fish stock pre-testing holding temperature was exceeded by 1°C. The protocol required holding temperature range is 13°C to 17°C while the actual holding temperature range was 17.0°C to 17.5°C.**

The initial dissolved oxygen level was 10.6 mg/L at 14.5°C, the conductivity was 1518 µS/cm and the initial pH was 7.6. After pre-aerating the sample for 120 minutes, the dissolved oxygen level was 10.5 mg/L. Although the dissolved oxygen level was greater than 100% saturation the maximum pre-aeration time had been reached so the test was initiated at this time. The test set up technician was AC.

Please call should you have any questions.

IRC Integrated Resource Consultants Inc.

Marian Zazzi
Laboratory Supervisor
enclosure

V 25 BJY 05. C

IRC
FILE:CANTEST/0509081.RTL

RAW DATA:

TEST CONCENTRATION		HOURS 0	24	48	72	96
100%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.65	9.0	9.0	9.0	8.9
	Temperature (°C)	14.5	15.0	15.0	15.0	15.0
	pH	7.6	7.6	7.6	7.6	7.6
	Conductivity (µS/cm)	1519				1536
	Symptoms	1	1,2	1,2	1,2	1,2
	Loading Density (g/L)	0.52	0.52	0.52	0.52	0.52
50%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.4	9.0	9.1	9.0	9.1
	Temperature (°C)	15.0	15.0	15.0	15.0	15.0
	PH	7.5	7.6	7.6	7.6	7.6
	Conductivity (µS/cm)	862				874
	Symptoms	1	1,2	1,2	1,2	1,2
	Loading Density (g/L)	0.52	0.52	0.52	0.52	0.52
25%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.2	8.9	8.9	8.8	8.9
	Temperature (°C)	15.0	15.0	15.0	15.0	15.0
	PH	7.5	7.5	7.5	7.5	7.5
	Conductivity (µS/cm)	518				529
	Symptoms	1	1	1	1	1
	Loading Density (g/L)	0.52	0.52	0.52	0.52	0.52
12.5%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.2	9.0	9.1	9.1	9.0
	Temperature (°C)	15.0	15.0	15.0	15.0	15.0
	PH	7.5	7.5	7.5	7.5	7.5
	Conductivity (µS/cm)	305				314
	Symptoms	1	1	1	1	1
	Loading Density (g/L)	0.52	0.52	0.52	0.52	0.52
6.2%	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	9.9	8.7	9.2	9.3	9.2
	Temperature (°C)	15.0	15.0	15.0	15.0	15.0
	pH	7.5	7.5	7.5	7.5	7.5
	Conductivity (µS/cm)	185				192
	Symptoms	1	1	1	1	1
	Loading Density (g/L)	0.52	0.52	0.52	0.52	0.52
CONTROL	Percent Survival	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	9.8	8.8	8.8	8.7	8.9
	Temperature (°C)	15.0	15.0	15.0	15.0	15.0
	PH	7.7	7.3	7.4	7.4	7.4
	Conductivity (µS/cm)	57				63
	Symptoms	1	1	1	1	1
	Loading Density (g/L)	0.52	0.52	0.52	0.52	0.52
	Technician	AC	AH	AH	AH	AH

KEY TO SYMPTOMS:

1 = no apparent effect
2 = fish showing signs of stress
3 = loss of equilibrium

1/25 USP 1/5.5

IRC
FILE:CANTEST/0509081.RTL

TEST FISH STOCK INFORMATION

Date received:	16 August 2005	
Source:	Sun Valley Trout Farm	
Species:	*Oncorhynchus mykiss* (Rainbow Trout)	
Fork Length:	Mean:	4.29cm ± 0.27cm
	Range:	3.70cm – 4.60cm
Wet weight:	Mean:	0.78 g ± 0.18 g
	Range:	0.46 g – 0.97g
Condition Factor (100xWt/length^{3}cm):	0.99	

Acclimation History	
Acclimation temperature:	17.0 to 17.5 °CELSIUS
Treatments:	None
Water:	Dechlorinated tap water
Feeding:	Moore Clark Fry Feed
Mortality:	< 2%

RAINBOW TROUT REFERENCE TOXICANT DATA

Stock Arrival Date (y/m/d)	Test Date (y/m/d)	Toxicant	Log LC_{50} (mg/L)
05.01.25	05.02.28	Phenol	1.04
05.02.23	05.03.09	"	1.12
05.02.23	05.03.29	"	1.08
05.03.16	05.04.08	"	1.04
05.04.06	05.04.16	"	1.03
05.04.06	05.05.04	"	1.03
05.04.13	05.05.04	"	1.04
05.05.05	05.05.20	"	1.01
05.05.11	05.06.03	"	1.04
05.06.01	05.06.14	"	1.10
05.06.01	05.07.05	"	0.99
05.06.15	05.07.05	"	0.99
05.07.05	05.07.19	"	1.04
05.07.05	05.08.02	"	1.00
05.07.05	05.08.18	"	1.08
05.08.16	05.09.06	"	1.01
LAB GEOMETRIC MEAN (LOG) ± 2 standard deviations:			1.04 mg/L ± 0.08
Warning Limits (Log Values):			0.96 mg/L to 1.12 mg/L

CONTROL/DILUTION WATER QUALITY:
Hardness: 17mg/L
Total Residual Chlorine: 12 µg/L

Cantest Ltd.
V2 (512210080) - Grab

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

Vizon SciTec Inc.
3650 Wesbrook Mall
Vancouver, BC
Canada V6S 2L2
tel: (604) 224-4331
fax: (604) 224-0540
web: http://vizonscitec.com

Vizon Sample # : 051221Q-01 Report # : 2-11-200-040-05-135

Sample Taken:	Dec. 17, 2005	Sample pH:	7.9
Sample Collected By:	Dana Haggar	Sample Dissolved Oxygen:	11.2 mg/L
Sample Received:	Dec. 21, 2005	Sample Temperature:	16.2 °C
Start Date/Time:	Dec. 22, 2005 3:45 PM	Sample Conductance:	2150 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	55	15.5	16.0	7.6	7.6	9.7	9.9	0	0	0	0	0
10	307	15.5	16.0	7.9	7.9	9.8	9.5	0	0	0	0	0
18	525	15.6	16.0	8.0	8.1	9.8	9.8	0	0	0	0	0
32	837	15.6	16.1	8.1	8.2	10.2	9.4	0	0	0	0	0
56	1392	15.8	16.1	8.1	8.5	10.1	9.5	0	0	0	0	0
100	2150	15.3	16.0	8.1	8.4	10.0	10.0	0	0	0	0	0

Comments:
All fish appeared and behaved normally during the test. PO#: 13426

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	50 min.
Test Volume:	12 L	Rate of aeration:	6.5 ml/min/L
Loading Density:	0.40 g/L		

Test Organism: Rainbow Trout (*Oncorhynchus mykiss*)

Weight (Mean + SD):	0.48 ± 0.11 g	Length (Mean + SD):	3.6 ± 0.6 cm
Weight (Range):	0.21– 0.7 g	Length (Range):	0.38– 4.1 cm

Reference Toxicant: Phenol
Test was conducted on: 11/30/2005
Test gave a 96-h LC50 of 11.85 (10.26, 14.43) mg/L

Dilution Water: Vancouver Tapwater hardened and dechlorinated
EDTA Hardness: 22 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.

Analyst **Verified By**

VIZON SCITEC
Digitally signed by Christie MacKinlay
Toxicology Group

Laberge
ENVIRONMENTAL SERVICES
P.O. Box 21072
Whitehorse, Y.T.
Y1A 6P7

Office Phone: 867-668-6838
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Fax: 867-667-6956

BIOLOGICAL AND SEDIMENT MONITORING PROGRAM

AT

VANGORDA CREEK, FARO, Y.T. 2005

Submitted to:

DELOITTE & TOUCHE INC

Prepared by:

B. E. Burns

Laberge
ENVIRONMENTAL SERVICES

November, 2005

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1.0 INTRODUCTION

On November 8, 1994 Anvil Range Mining Corporation (Anvil) was officially assigned Licence Number IN89-002, which was originally issued to Curragh Resources Inc, by the Yukon Territory Water Board. The mine has not operated since 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. On April 21, 1998, Deloitte & Touch Inc was appointed as the interim receiver for the Faro Mine property, operations and assets.

On March 30, 2004, Deloitte and Touch Inc was issued Licence Number QZ03-059 to continue care and maintenance of the Anvil Range Mine site, and to conduct and/or manage additional studies and plans for another five years.

To comply with Part G, Section 64 and Schedule B of the water licence, a biological and sediment monitoring program is to be undertaken every two years on the Vangorda Creek system. Deloitte and Touch Inc contracted Laberge Environmental Services (LES) to conduct these programs during the summer of 2005. The following report presents all data collected and includes some comparisons with past monitoring programs.

2.0 STUDY AREA

The lead-zinc mine near Faro, located at approximately 62° 20' N and 133° 25' W (Figure 1), consists of three open pits, Faro, Grum and Vangorda.

The Grum and Vangorda deposits were extracted within the Vangorda Creek watershed and the ore was transported via the haul road to the mill for concentrating. The following four sampling stations are located upstream and downstream of the mined area (Figure 1):

V1: Vangorda Creek upstream of the Blind Creek Road and the Vangorda pit.

V27: Vangorda Creek just upstream of the confluence with Shrimp Creek and downstream of all mining related activity.

V5: West Fork of Vangorda Creek upstream of the mine access road and downstream of the haul road.

V8: Vangorda Creek upstream of the bridge to the Faro town water supply, and approximately 500 metres upstream of the confluence with the Pelly River.

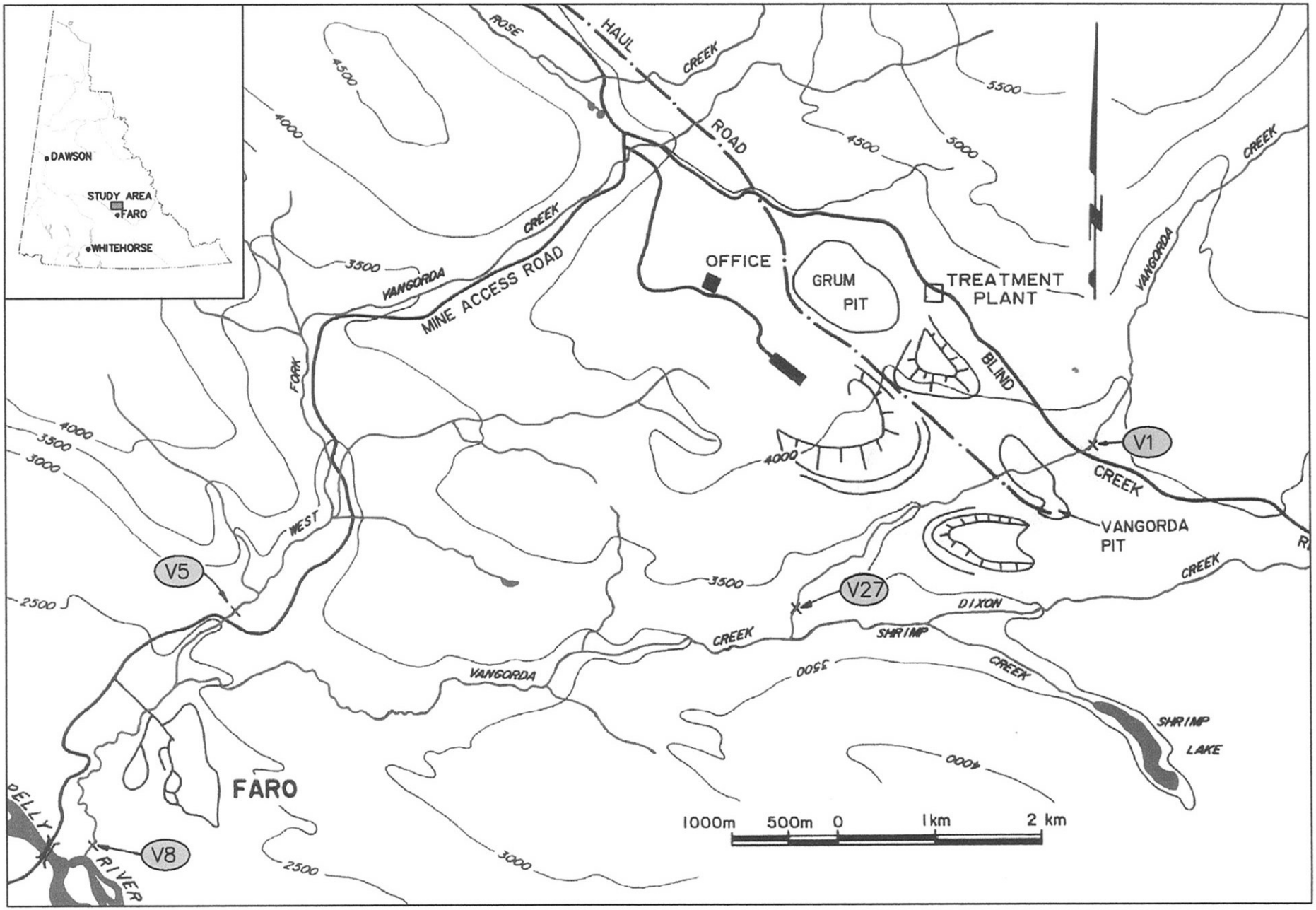


FIGURE 1 : LOCATION OF SAMPLING SITES ON VANGORDA CREEK, FARO

3.0 METHODS

3.1 Water Quality

Water quality samples were collected on two occasions during the biological monitoring program; on July 19th and 20th, and on August 24th and 25th , 2005.

3.1.1 Field Measurements

In-situ measurements were taken at each site during both surveys. Conductivity and temperature were determined with an Orion conductivity meter model 126. Dissolved oxygen readings and pH measurements were taken using Accumet field meters.

3.1.2 Chemical Analyses

All sample bottles were supplied by Cantest Laboratories of Burnaby, B.C. and were provided to LES personnel at the Faro Mine Security Office. At each site, the sample bottles were rinsed three times with the sample water prior to filling. Samples were collected in two litre plastic bottles for sulphates, alkalinity, hardness, colour, turbidity and nonfilterable reside analyses. Ammonia samples were collected in 500 mL plastic bottles and preserved with sulphuric acid. Samples to be analyzed for total and dissolved metals were each collected in 250 mL acid washed plastic bottles. The total metals samples were preserved with nitric acid. The dissolved metals samples were left unpreserved to be filtered and treated at the Cantest lab. Samples were kept cool prior to shipment to Cantest.

3.2 Water Quantity

Discharge was measured at each of the sites on both visits. An area with a uniform cross section was chosen and the velocity and depth were measured using Anvil's Global Water model FP101 in July and a AA Price meter in August. 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 sediment samples were collected from the four sites (V1, V27, V5 and V8) during the July visit. Sample sites were selected from an exposed area of 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 provided glass jars. The samples were packed on ice when shipped to Cantest in B.C.

At the lab, the samples were dried and passed through a 100 mesh (0.15 mm) stainless steel sieve. The portion passing through the stainless steel sieve was run through an ICP scan for the determination of total metal concentrations.

3.4 Benthic Invertebrate Sampling

3.4.1 Field Collection

Artificial 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 1 cm 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 on July 19th or 20th, 2005. These samplers were left to colonize for five weeks. On August 24th and 25th, 2005, the artificial 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 debris 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 Charles Low PhD, an entomologist in Victoria, B.C. for enumeration and identification.

3.4.2 Laboratory Analysis

All samples were washed through two screens with mesh sizes 1 millimetre and 180 microns. All of the organisms retained by the coarse screen were counted and identified, whereas the organisms on the 180 micron screen were subsampled as necessary. A Folsom plankton splitter was used for the subsampling. The majority of the benthos was identified to the genus level.

4.0 RESULTS AND DISCUSSION

To aid in interpretation, site V27 has been placed after V1 and prior to V5 in all of the tables and graphs. V27 is geographically located below V1 but is upstream of the confluence with the West Fork of Vangorda Creek.

4.1 Water Quality

Water quality samples were collected in July and August, 2005, at the four sites. The analytical results are presented in Appendix A. Sixteen elements were below the method detection limit in all samples: mercury (Hg), antimony (Sb), beryllium (Be), bismuth (Bi), boron (B), cadmium (Cd), chromium (Cr), cobalt (Co), phosphorus, silver (Ag), tellurium (Te), thallium (Tl), thorium (Th), tin (Sn), vanadium (V) and zirconium (Zr).

Schedule B(3) specifically requests the analysis of total hardness, alkalinity, sulphate, suspended solids, ammonia, and total and dissolved ICP metals scan including copper, iron, lead and zinc. The results for these parameters are presented in Table 1.

4.1.1 Temperature

The temperature values reflected the diurnal and seasonal timing of the sampling, ranging from 6.8°C at V5 in August, to 10.7°C in July at V27.

4.1.2 Conductivity

Conductivity, a measure of the total concentration of ionic constituents in water, was low at V1 and significantly higher at the other sites. The highest value of 596 uS/cm was recorded at V8 in August.

4.1.3 pH

All values were slightly alkaline.

4.1.4 Alkalinity

Alkalinity was low at V1 and V27 and considerably higher at V5 and V8.

TABLE 1

WATER QUALITY DATA AT VANGORDA CREEK, 2005

Sample Site	V1		V27		V5		V8		CCME (1999)
Date, 2005	July 20	August 25	July 20	August 25	July 19	August 25	July 19	August 24	
Temp °C	7.7	7.0	10.7	7.2	7.9	6.8	9.2	9.3	
Conductivity (uS/cm) Field	58	77	---	---	417	492	400	596	
Conductivity (uS/cm) Lab	53	10	307	287	384	346	364	407	
pH Field	7.1	---	---	---	8.6	---	8.4	---	6.5 - 9
pH Lab	7.5	---	---	---	8.3	---	8.3	---	
Dissolved Oxygen (mg/L)	11.6	11.3	11.2	10.9	11.8	11.8	10.7	10.9	9.5
Dissolved Oxygen (%)	102.0	98.0	101.0	97.0	104.0	104.0	99.0	100.0	
Alkalinity mg/L as CaCO3	22.3	27.7	47.5	---	171	196	117	140	
Cu: total	<0.001	<0.001	0.001	<0.001	0.002	0.001	0.001	**0.024**	0.003[1]
Cu: dissolved	<0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001	
Pb: total	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	0.002	0.007[1]
Pb: dissolved	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Zn: total	<0.005	<0.005	**0.031**	0.020	0.007	<0.005	0.011	**0.05**	0.03
Zn: dissolved	<0.005	<0.005	0.022	0.018	0.007	<0.005	<0.005	0.005	
Fe: total	<0.05	<0.05	<0.05	<0.05	**0.55**	0.25	0.23	<0.05	0.3
Fe: dissolved	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	0.07	<0.05	
Sulphate	6.9	8.8	125	147	61.8	78.8	100	210	
Ammonia	0.08	0.03	<0.01	<0.01	0.01	0.08	0.01	<0.01	1.04[2]
NFR	<1	<1	<1	<1	41	7	10	<1	
Total Hardness mg/L as CaC03	23	29	159	200	225	280	205	328	
Flow m^3/sec	0.450	0.247	0.312	0.284	0.530	0.286	0.875	0.425	

NOTE: All units are expressed as mg/L unless indicated otherwise.
Vaules in **bold** indicated exceedence of the CCME guideline for the protection of freshwater aquatic life.
[1]: Guideline derived for hardness > 180 mg/L as $CaCO_3$
[2]: Guideline derived for temperature of 10°C and pH of 8.0

4.1.5 Dissolved Oxygen

All sites were well aerated on both occasions.

4.1.6 Sulphate

Sulphate levels were very low at V1. The highest concentration, 210 mg/L, occurred at V8 in August. Sulphate concentrations normally vary from 10 to 80 mg/L in surface waters (Canadian Council of Resource and Environment Ministers (CCREM) 1987).

4.1.7 Ammonia

Ammonia levels were very low and met the CCME guideline of 1.04 mg/L.

4.1.8 Non-filterable Residue (NFR)

Both V1 and V27 had very clear waters on both occasions. The water was visually quite turbid at V5 in July and had a concentration of 41 mg/L of suspended matter. Conditions were improved further downstream where a concentration of 10 mg/L was documented at V8.

4.1.9 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. The hardness varied at each of the sites: V1 was very soft, V8 and V5 were very hard, and V27 was hard in July and very hard in August.

4.1.10 Total and Dissolved Metals

Most metal concentrations were very low where detected. The Canadian Council of Ministry of the Environment (CCME) has established recommended guidelines for the protection of freshwater aquatic life. Note that these guidelines have generally been established under laboratory conditions or at southern locations, usually using aquatic species exotic to the Yukon. As such, the levels recommended for aquatic life are simply guidelines, and not standards. The guidelines for copper and lead vary with hardness (Table 2) as these metals tend to be more toxic to aquatic life in softer waters.

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	0.030
60 - 120	moderate	0.002	0.002	0.3	0.030
120 - 180	hard	0.003	0.004	0.3	0.030
>180	very hard	0.004	0.007	0.3	0.030

The guideline for copper was exceeded only in the total metals sample from V8 during the August monitoring.

Lead was only detected in two samples where it met the CCME guideline of 0.007 mg/L for very hard waters.

The guideline for zinc is 0.030 mg/L irrelevant of hardness. This guideline was slightly exceeded in the July total metals sample at V27 and at V8 in the August total metals sample.

The guideline for iron is 0.3 mg/L and was exceeded only in July at V5 in the total metals sample.

4.2 Water Quantity

Flows were measured at each of the sites in July and August. These data are presented with the water quality data in Table 1. Flows were considerably lower in August than in July.

4.3 Stream Sediment Quality

4.3.1 Metal Analyses for the 2005 Survey

Triplicate stream sediment samples were collected from each of the sites in July. The triplicates were averaged, and standard deviation was calculated to determine the spread of the triplicates (Appendix B). Generally the replicates showed little spread and thus were representative samples of the sites. Of the 29 metals analyzed, six were below the method detection limit in all samples: antimony (Sb), beryllium (Be), molybdenum (Mo), silver (Ag), tin (Sn) and boron (B).

To conform with past studies, the metals copper, iron, lead and zinc were examined in greater 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) in Table 3. Concentrations greater than the PEL have a 50% incidence of creating adverse biological effects.

The stream sediments at V1 had the lowest concentrations of all metals examined and met all applicable guidelines. The concentration of metals in the stream sediments at V5 also met all applicable guidelines. The ISQG was exceeded for lead and zinc at V8. The highest concentration of the four metals was reported in the stream sediments at V27, which would be expected as it is the most directly affected site of those sampled. The ISQG was exceeded for copper and zinc at V27, and the PEL was exceeded for lead.

TABLE 3
SUMMARY OF STREAM SEDIMENT METAL CONCENTRATIONS, 2005

STATION NUMBER	STATION DESCRIPTION	COPPER (ug/g)	LEAD (ug/g)	IRON (%)	ZINC (ug/g)
V-1	Vangorda Cr u/s all mining activity	17.0	19.3	1.6	60
V-27	Vangorda Cr do/s activity and u/s Shrimp Cr	*36.3*	***188***	2.0	*288*
V-5	West Fork of Vangorda Cr	25.0	20.7	1.7	86
V-8	Vangorda Cr approx 500 m u/s Pelly R	34.7	*74.7*	1.9	*192*
ISQG		35.7	35.0		123
PEL		197.0	91.3		315

Note: ISQG = Interim freshwater Sediment Quality Guidelines (exceedences italicized)
PEL = Probable Effects Level (exceedences italicized and in bold)

4.3.2 Comparisons with Past Data

Stream sediments were collected at these sites in 1993 (Burns, 1993), in 1995 (Burns, 1996), in 1997 (Burns, 1998), in 1999 (Burns, 2000) in 2001 (Burns, 2002) and in 2003 (Burns, 2003) as a requirement of the company's water licence. The data for selected metals are presented in Table 4 and in Figures 2, 3, 4 and 5. The 12 year average has been plotted for each metal in each graph.

Metals in sediment are difficult to interpret because levels can vary widely as a function of natural mineralization of local soils in a given watershed, making it difficult to obtain truly representative samples. The data over the years has generally fluctuated, notably at V27. No trends can readily be produced, however the following observations were noted:

- There was a significant reduction in the concentrations of all metals at V27 in 2005.
- The concentrations of copper and iron peaked in 1999 at V27 and have been steadily decreasing in the past six years.
- Iron is relatively similar throughout the years and at the sites, with V1 and V27 having the greatest concentrations.
- Copper concentrations have not varied much at V5 and at V8.
- Concentrations of lead and zinc have generally been much greater at V27 than at the other sites. Lead levels have been consistently very low at V1 and V5.
- Zinc concentrations have remained fairly consistent at V1 and V5.

TABLE 4

COMPARISONS OF METALS IN STREAM SEDIMENTS 1993, 1995, 1997, 1999, 2001, 2003 AND 2005

Site	Year	Copper (mg/L)	Iron (%)	Lead (mg/L)	Zinc (mg/L)
V1	1993	24 (4)	3.7 (4.6)	30 (8)	120 (13)
	1995	33 (2)	3.1 (2.6)	43 (14)	177 (40)
	1997	53 (19)	2.7 (1.0)	58 (35)	132 (71)
	1999	39 (2)	4.0 (0.1)	45 (16)	141 (12)
	2001	19 (7)	2.4 (0.3)	18 (7)	88 (32)
	2003	26 (2)	2.5 (0.3)	37 (10)	132 (16)
	2005	17 (3)	1.6 (0.2)	19 (5)	60 (14)
V27	1993	52 (4)	3.2 (1.5)	587 (518)	436 (126)
	1995	59 (11)	2.7 (4.0)	1305 (1215)	519 (43)
	1997	88 (12)	3.8 (7.0)	1492 (642)	652 (55)
	1999	129 (45)	4.3 (0.7)	2069 (375)	921 (290)
	2001	102 (8)	3.9 (0.2)	2802 (1154)	868 (88)
	2003	74 (9)	3.0 (0.1)	1383 (340)	951 (125)
	2005	36 (5)	2.0 (0.02)	188 (77)	288 (26)
V5	1993	28 (1)	2.2 (0.6)	23 (1)	98 (5)
	1995	36 (2)	1.8 (0.3)	52 (2)	129 (4)
	1997	36 (2)	2.1 (0.6)	35 (3)	100 (5)
	1999	25 (1)	1.8 (0.0)	30 (2)	81 (2)
	2001	28 (7)	1.9 (0.2)	32 (7)	116 (22)
	2003	22 (4)	1.7 (0.1)	25 (8)	80 (15)
	2005	25 (3)	1.7 (0.04)	21 (1.2)	86 (6)
V8	1993	37 (0)	2.8 (0.3)	214 (11)	251 (12)
	1995	48 (4)	2.2 (1.0)	218 (70)	391 (111)
	1997	36 (5)	2.3 (0.6)	114 (6)	221 (25)
	1999	29 (2)	2.0 (0.1)	89 (40)	148 (40)
	2001	34 (1)	2.2 (0)	110 (33)	248 (41)
	2003	29 (4)	1.7 (0.1)	74 (12)	243 (73)
	2005	35 (1)	1.9 (0.01)	75 (7.2)	192 (6)

NOTE: Number in brackets is the standard deviation for that set.

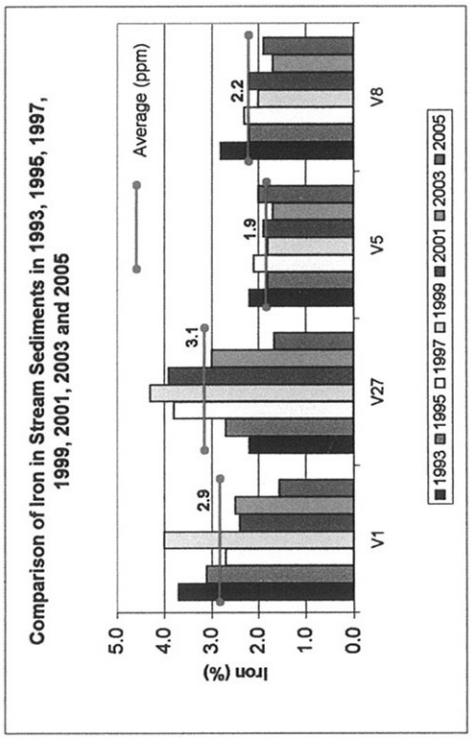


Figure 3 Comparison of iron concentrations in stream sediments over time

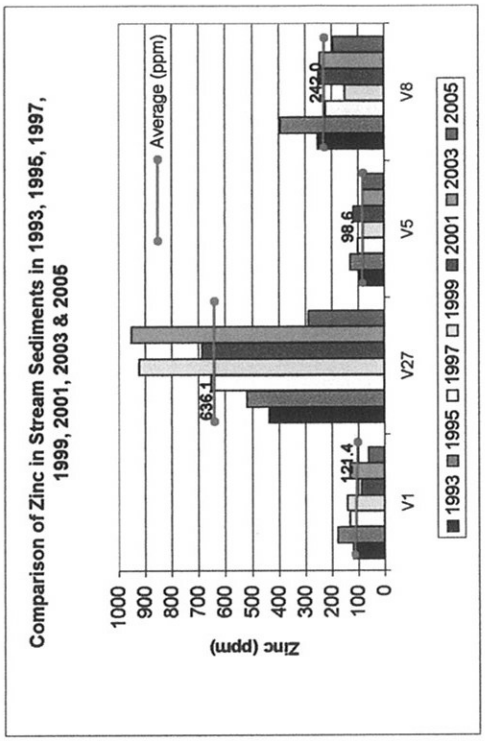


Figure 5 Comparison of zinc concentrations in stream sediments over time

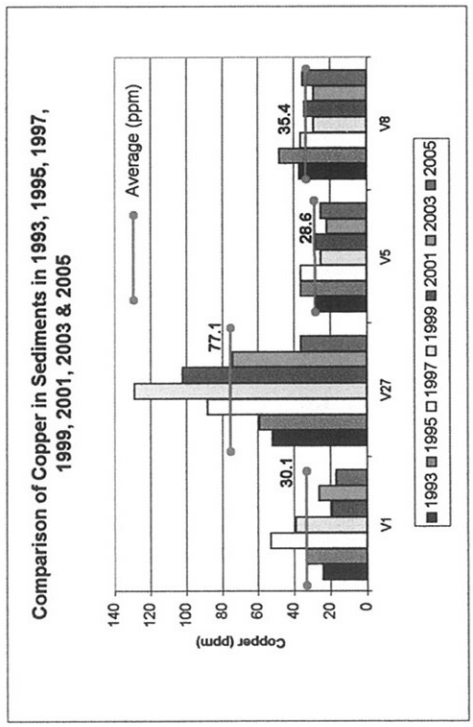


Figure 2 Comparison of copper concentrations in stream sediments over time

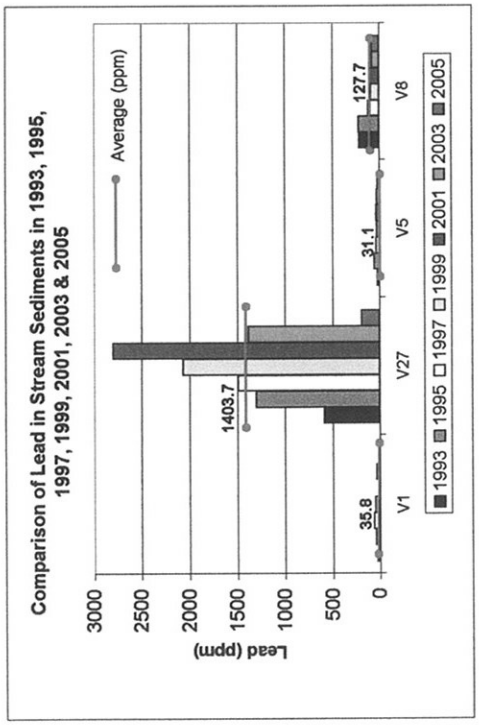


Figure 4 Comparison of lead concentrations in stream sediments over time

4.4 Benthic Invertebrates

Three phyla were found in the study area: Arthropoda, Annelida and Nematoda. A total of 61 different taxonomic groups were identified within these phyla. These data are presented in Appendix C.

4.4.1 Abundance and Taxonomic Richness

The number of organisms of the triplicates for each site was summed to give a total abundance value for that site. Population numbers varied in the study area, ranging from 5,534 individuals at V1 to 13,570 at V5.

Taxonomic richness was determined for each site by enumerating all the taxonomic groups identified from species to phylum as a measure of community diversity. The diversity ranged from 34 different taxonomic groups at V27 to 45 different taxonomic groups at V8. Diversity decreased slightly downstream of V1 at V27, but increased steadily to the mouth, V8.

The benthic community located at V8 reflects conditions in Vangorda Creek just upstream of its confluence with the Pelly River. The diverse and abundant community documented at V8 would indicate that habitat conditions (water and stream sediment quality) are favourable and consequently there should be negligible impact on the Pelly River from Vangorda Creek.

Abundance and diversity values were plotted and are displayed in Figure 6.

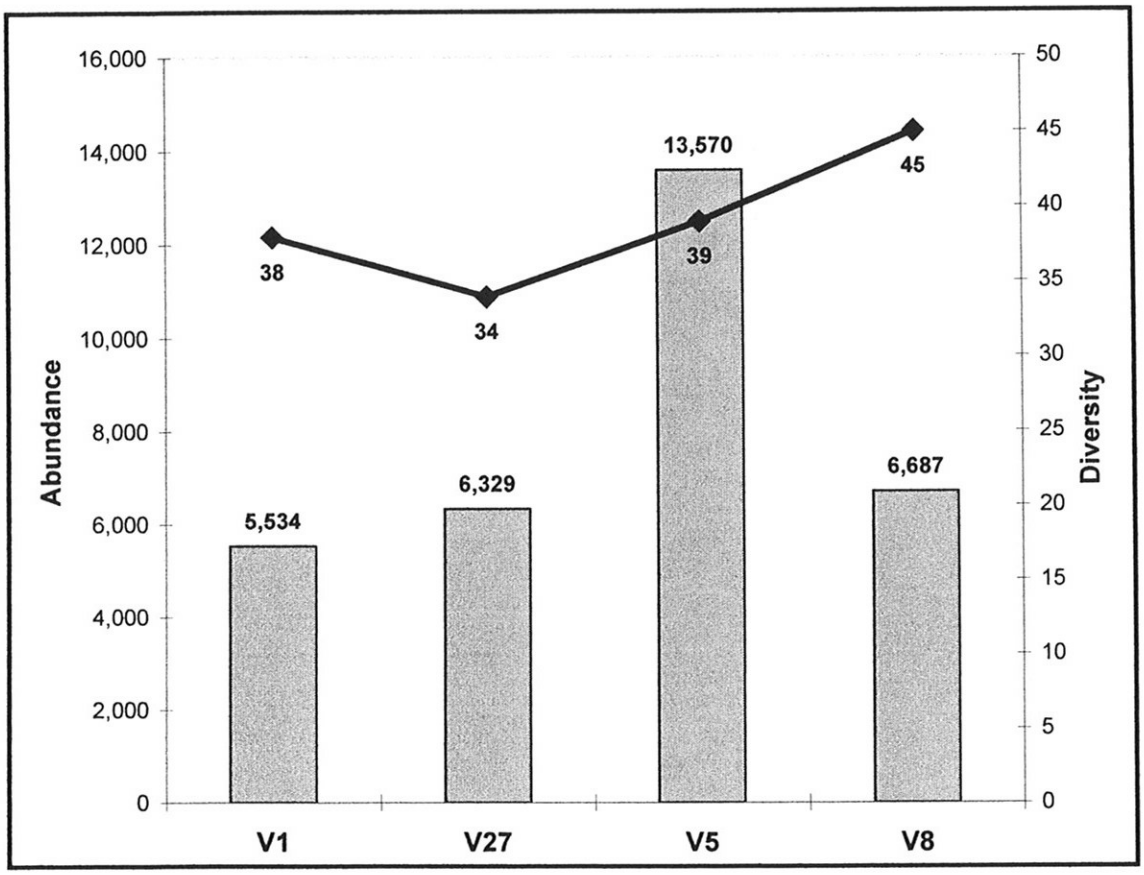


FIGURE 6 Abundance and Diversity at Vangorda Creek, 2005

4.4.2 Distribution

The composition of the benthos communities was displayed as a percentage of the major taxonomic orders for each station (Table 5). Based on this, taxa were classified with respect to their dominance within the community (Table 6).

The orders Plecoptera and/or Diptera dominated all of the sites. Ephemeroptera shared dominance with Diptera and Plecoptera at V1. Ephemeroptera was the subdominant group at V27 and V8, and common at V5. Trichopterans were subdominant at V27 and V5, and common at V1 and V8. Most of the remaining taxa were rare.

TABLE 5
THE PERCENTAGE OF COMPOSITION OF DIFFERENT TAXONOMIC GROUPS AT EACH STATION

TAXONOMIC GROUP	V1	V27	V5	V8
Ephemeroptera (mayflies)	27.2	14.9	4.6	10.3
Plecoptera (stoneflies)	29.9	56.9	11.1	25.9
Trichoptera (caddisflies)	5.4	11.1	11.6	1.1
Diptera (true flies)	36.5	16.8	71.4	59.9
Hydracarina (water mites)	0.8	0.2	0.5	2.6
Other *	0.2	0.04	0.8	0.1

* Other includes one or more of the following taxonomic groups:

Nematoda	Lepidoptera	Collembola	Oligochaeta
Thysanoptera	Aranaea	Homoptera	Hymenoptera

TABLE 6
TAXONOMIC DISTRIBUTION OF BENTHIC INVERTEBRATES

SITE	LOCATION	DOMINANT (≥25%)	SUBDOMINANT (10% to 24.9%)	COMMON (1.0% to 9.9%)	RARE (0.1% to 0.9%)	INCIDENTAL (<0.1%)
V1	Vangorda Cr u/s all mining activity	Diptera Plecoptera Ephemeroptera		Trichoptera	Hydracarina Other	
V27	Vangorda Cr d/s mining activity & u/s Shrimp Cr	Plecoptera	Diptera Ephemeroptera Trichoptera		Hydracarina	Other
V5	West Fork of Vangorda Cr	Diptera	Trichoptera Plecoptera	Ephemeroptera	Other Hydracarina	
V8	Vangorda Cr approx 500 m u/s Pelly R	Diptera Plecoptera	Ephemeroptera	Hydracarina Trichoptera	Other	

The dominant species in the study area was *Zapada sp.*, a Plecopteran, forming 23.9% of the total number of invertebrates collected. This was followed closely by *Brilla sp.*, at 22.9%.

Zapada sp. are shredders of leaf litter (Merritt and Cummins, 1988). The high numbers recorded in the study area could be due to the provision of leaf litter from the riparian shrubs and trees during the late summer/early fall time of sampling. The *Zapada* population was elevated at all of the sites.

The Dipteran *Brilla sp.* is a member of the Chironomidae Family. Large numbers of *Brilla sp.* were collected in all three baskets at V5 and formed 42% of the population here. *Brilla sp.* are burrowers (Merritt and Cummins, 1988) and the habitat conditions at V5, fine sediments and wood detritus, provided favourable conditions for this organism. *Brilla sp.* were also present at the other sites but were far less abundant.

Ephemeroptera, Trichoptera and Plecoptera are sensitive to most types of pollution (Rosenberg and Resh, 1993) and Lehmkuhl (1979) has identified several groups within these insect orders that have very low tolerance to chemical pollution. Eight taxa (four taxa within Plecoptera, three taxa within Ephemeroptera and one taxa within Trichoptera) were identified in the Vangorda watershed (Table 7).

TABLE 7

Presence (+) and Absence (-) of Sensitive Taxa at Vangorda Creek, 2005

Sensitive Taxa	V1	V27	V5	V8
Plecoptera				
Nemouridae	+	+	+	+
Perlodidae	+	+	+	+
Capniidae	+	+	+	+
Taeniopterigidae	+	+	+	+
Ephemeroptera				
Epeorus	+	+	+	+
Ephemerellidae	+	-	+	+
Rhithrogena	+	+	-	+
Trichoptera				
Rhyacophilidae	+	+	+	+
Total # of sensitive taxa:	8	7	7	8

After Lehmkuhl (1979)

All eight sensitive taxa were recorded at V1 and V8. Seven sensitive taxa were present at V27 and V5. As there appears to be good representation of pollution sensitive species at the Vangorda sites, including the downstream sites, it can be assumed that the water and stream sediments are of good quality for the support of aquatic life.

The above statement appears contradictory to the results presented in Section 4.3. The concentration of lead in the stream sediments at V27 was well over the probable effects level

(PEL). According to CCME (1999), there should be severe adverse effects on the aquatic biota under these conditions. However, very high numbers of the pollution sensitive insect orders were present here.

The benthic community at V27 was dominated by Plecoptera, with Ephemeroptera and Trichoptera as subdominant groups. All of these orders are sensitive to most types of pollution, thus their abundant numbers recorded at this site indicates that the elevated levels of metals documented in the sediments are likely not in a bioavailable form.

4.4.3 Comparisons with Past Data

Benthic invertebrate monitoring has been conducted at the four sites on Vangorda Creek every two years commencing in 1991, as a requirement of the company's water licence. Artificial substrate samplers were used for each survey with a colonization period of five to six weeks. To assess the health of the benthic communities, abundance (total population), diversity (taxonomic richness), taxonomic dominance, and presence of sensitive taxa were examined for each site per year (see Table 8). A healthy benthos community would be characterized by numerous individuals, many different types of organisms and the presence of pollution sensitive species.

The lowest population at each of the sites generally occurred in 1991 (Figure 7). During 1991, the samplers were washed into shore during a flood event leaving the baskets at V5 and V8 only partially submerged (Burns, 1991). Consequently, only the lower portion of each sampler was available for colonization, which may account for the lower populations. Population numbers were also low at all the sites in 1999. Populations fluctuated considerably during the other surveys. Of the eight sampling events, the highest populations were documented at V5 on four occassions and twice each at V5 and V27. V1 generally has had the lowest populations throughout the study period. The highest population recorded to date occurred at V5 in 2001. The variation in total abundance can be attributed to many natural factors such as climate, stream flow, life cycles of the various organisms, timing of the sampling, as well as the chemistry of the water and the stream sediments.

To enable comparisons between the surveys, taxonomic richness was determined by using the lowest common dominator. For example, in 1991 and 1993, some of the insect orders were identified to the family level only. If genera or species were identified within this family in 1995, 1997, 1999, 2001, 2003 and/or in 2005, they were lumped together and considered as one taxon. The total taxonomic richness for 1995, 1997, 1999, 2001, 2003 and 2005 are therefore lower in Table 8 than that determined in the individual studies. These diversity values are graphed in

TABLE 8

COMPARISONS OF BENTHIC DATA FOR THE YEARS 1991, 1993, 1995, 1997, 1999, 2001, 2003 AND 2005

Site	Year	Total Abundance	Taxonomic Richness	Dominant Taxa	Total # of Sensitive Taxa
V1	1991	763	17	Diptera & Ephemeroptera	6
	1993	3,090	19	Diptera & Plecoptera	7
	1995	1,758	26	Plecoptera & Diptera	8
	1997	1,663	29	Diptera & Plecoptera	9
	1999	1,025	20	Diptera & Plecoptera	7
	2001	707	21	Diptera & Plecoptera	9
	2003	1,025	30	Diptera & Plecoptera	7
	2005	5,534	32	Diptera, Plecoptera & Ephemeroptera	8
V27	1991	953	24	Diptera	6
	1993	5,952	17	Plecoptera & Diptera	5
	1995	4,929	28	Plecoptera & Diptera	9
	1997	11,751	29	Diptera & Plecoptera & Ephemeroptera	8
	1999	1,061	23	Diptera & Plecoptera	7
	2001	3,698	24	Plecoptera & Trichoptera	7
	2003	1,301	27	Ephemeroptera & Plecoptera	8
	2005	6,329	28	Plecoptera	7
V5	1991	1,298	29	Diptera	7
	1993	2,193	21	Diptera & Plecoptera	6
	1995	1,550	28	Diptera	8
	1997	9,291	38	Diptera	9
	1999	1,284	32	Diptera & Plecoptera	8
	2001	17,232	40	Plecoptera & Diptera	10
	2003	3,377	42	Plecoptera & Diptera	9
	2005	13,570	35	Diptera	7
V8	1991	594	22	Diptera	6
	1993	3,024	19	Diptera & Plecoptera	6
	1995	8,340	35	Diptera	8
	1997	904	25	Diptera & Plecoptera	6
	1999	1,061	28	Diptera	9
	2001	5,867	28	Diptera	7
	2003	3,989	31	Diptera & Plecoptera	8
	2005	6,687	36	Diptera & Plecoptera	8

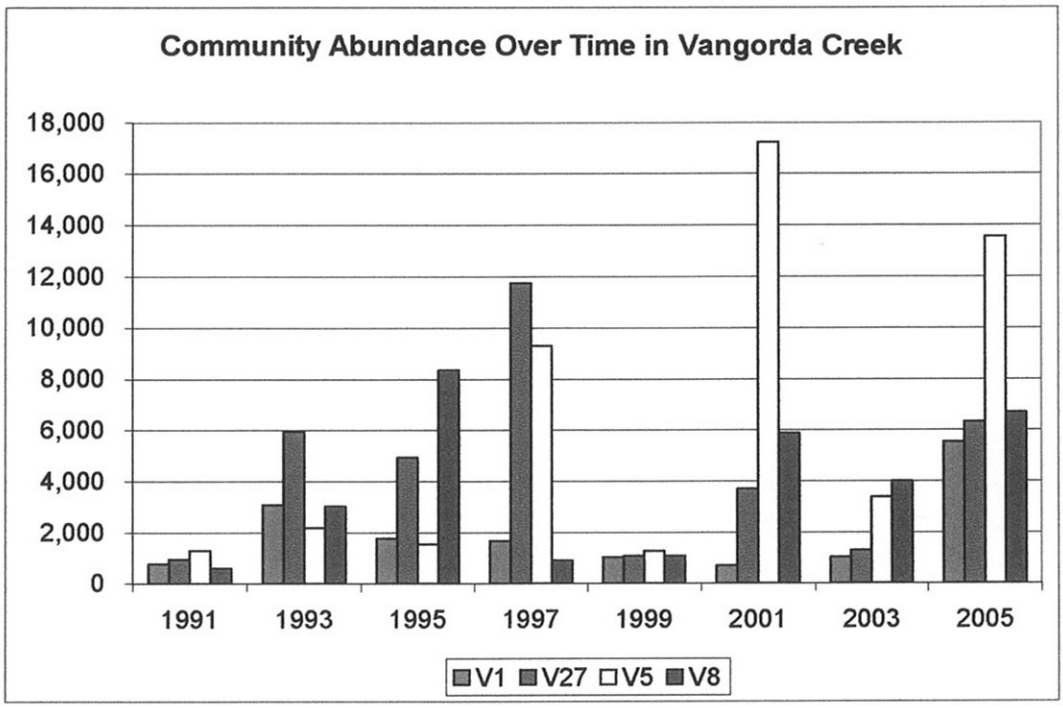


FIGURE 7 Community Abundance Over Time (1991 to 2005) in Vangorda Creek

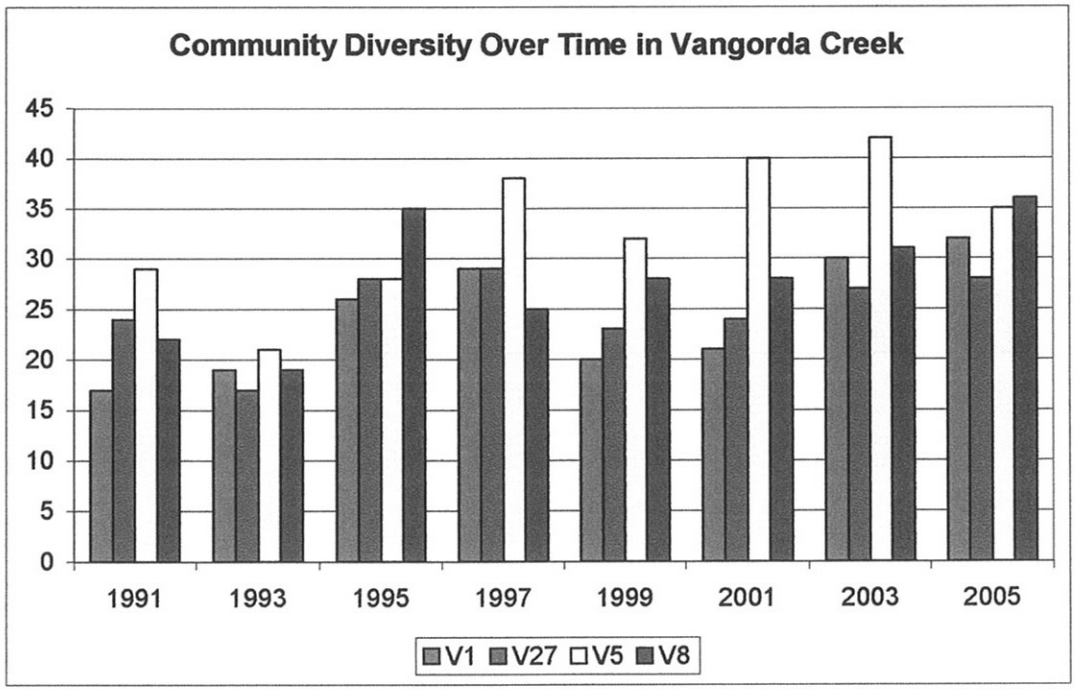


FIGURE 8 Community Diversity Over Time (1991 to 2005) in Vangorda Creek

Figure 8. Overall the communities had lower diversities in 1993 and 1999, and gradually increased in the following years. The most diverse community to date was documented at V5 in 2003.

One or more insect orders were dominant at each of the sites over time. Diptera was the dominant or co-dominant group at all of the sites during each of the surveys, with the exception of V27. In 2001, 2003 and 2005 Plecoptera, Trichoptera and/or Ephemeroptera were dominant here. Plecoptera shared dominance at most of the sites. Overall, the community structure appears to be stable over time.

The total number of sensitive taxa identified at the sites ranged from five to ten and indicates the presence of good water and sediment quality.

5.0 SUMMARY

Water quality was generally good throughout with clear, cool, slightly alkaline flows. Metal concentrations were low when detected, however copper, iron and zinc slightly exceeded the recommended CCME guideline for the protection of freshwater aquatic life at some of the sites.

The levels of metals present in the stream sediments in upper Vangorda Creek show that it drains a mineralized area. V27, which is located downstream of the Vangorda deposit, shows a general increase in the concentrations of copper, lead and zinc from 1991 to 1999, with values typically greater than the PEL. Concentrations of the metals have generally been decreasing since 1999, with a drastic reduction in the concentrations in 2005, nevertheless levels have remained greater than the ISQG and often the PEL. These levels would be a matter of concern if there was degradation of the benthic population at this site, however the high concentrations of these metals in the sediments at V27 do not appear to have impacted the benthic community.

The benthic communities at V1, V27 and V8 were relatively similar to each other in terms of structure, abundance and diversity in 2005. The population at V5 was double that of the other sites. The community at V5, although diverse, had less proportional representation from the sensitive insect orders than the communities at the other three sites.

All communities were diverse with good representation from the major groups of organisms that are usually present in lotic waters, including several pollution sensitive species. The communities appear stable over time and show no perceptible impacts as a result of any mining related activity.

6.0 REFERENCES

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APPENDIX A

WATER QUALITY DATA

APPENDIX A WATER CHEMISTRY, JULY 2005

Client:	Anvil Range Mining Corporation				
Download Date:	7/27/2005				
Project Name:	July 19th, 2005 S.S.F.				
Project Number:					
Chain of Custody:	166613				
Samples received:	7/20/2005				
Sample ID		**V-1**	**V-5**	**V-8**	**V27**
CANTEST ID		507250046	507250048	507250049	507200349
Date Sampled		7/20/2005	7/19/2005	7/19/2005	7/20/2005
Parameter	Units				
Conventional Parameters					
pH, Laboratory	pH units	7.53	8.32	8.26	
Conductivity	uS/cm	53	384	364	307
Hardness CaCO3	mg/L	23	212	179	151
Hardness (Total) CaCO3	mg/L	23	225	205	159
Total Suspended Solids	mg/L	< 1	41	10	< 1
Total Alkalinity CaCO3	mg/L	22.3	171	117	47.5
Bicarbonate Alkalinity HC(	mg/L	27.2	202	143	57.9
Carbonate Alkalinity CO3	mg/L	< 0.5	2.9	< 0.5	< 0.5
Hydroxide Alkalinity OH	mg/L	< 0.5	< 0.5	< 0.5	< 0.5
Dissolved Sulphate SO4	mg/L	6.9	61.8	99.9	125
Ammonia Nitrogen N	mg/L	0.08	0.01	0.01	< 0.01
Metals Analysis					
Total Mercury Hg	ug/L	< 0.02	< 0.02	< 0.02	< 0.02
Dissolved Aluminum Al	mg/L	0.021	0.027	0.01	0.009
Dissolved Antimony Sb	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Arsenic As	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Barium Ba	mg/L	0.019	0.06	0.044	0.029
Dissolved Beryllium Be	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Bismuth Bi	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Boron B	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Dissolved Cadmium Cd	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dissolved Calcium Ca	mg/L	7.56	51.5	45.1	41.6
Dissolved Chromium Cr	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Cobalt Co	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Copper Cu	mg/L	< 0.001	0.001	0.001	0.001
Dissolved Iron Fe	mg/L	< 0.05	0.07	0.07	< 0.05
Dissolved Lead Pb	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Lithium Li	mg/L	< 0.001	0.004	0.004	0.004
Dissolved Magnesium Mg	mg/L	1.09	20.3	16.1	11.4
Dissolved Manganese Mn	mg/L	0.001	0.032	0.016	0.19
Dissolved Mercury Hg	ug/L	< 0.02	< 0.02	< 0.02	
Dissolved Molybdenum M(	mg/L	< 0.0005	0.001	< 0.0005	< 0.0005
Dissolved Nickel Ni	mg/L	< 0.001	0.003	0.001	0.001
Dissolved Phosphorus PO	mg/L	< 0.15	< 0.15	< 0.15	< 0.15
Dissolved Potassium K	mg/L	0.2	0.7	0.6	0.6
Dissolved Selenium Se	mg/L	0.001	< 0.001	< 0.001	< 0.001
Dissolved Silicon SiO2	mg/L	7.3	9.6	8.7	8
Dissolved Silver Ag	mg/L	< 0.00025	< 0.00025	< 0.00025	< 0.00025
Dissolved Sodium Na	mg/L	1.88	3.54	2.6	2.16
Dissolved Strontium Sr	mg/L	0.039	0.22	0.19	0.17
Dissolved Tellurium Te	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

APPENDIX A WATER CHEMISTRY, JULY 2005

Sample ID		V-1	V-5	V-8	V27
CANTEST ID		507250046	507250048	507250049	507200349
Date Sampled		7/20/2005	7/19/2005	7/19/2005	7/20/2005
Parameter	Units				
Conventional Parameters					
Dissolved Thallium Tl	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Dissolved Thorium Th	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dissolved Tin Sn	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Titanium Ti	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Uranium U	mg/L	< 0.0005	0.0022	0.0021	0.0009
Dissolved Vanadium V	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Zinc Zn	mg/L	< 0.005	0.007	< 0.005	0.022
Dissolved Zirconium Zr	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Total Aluminum Al	mg/L	0.032	0.28	0.096	0.026
Total Antimony Sb	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total Arsenic As	mg/L	< 0.001	0.001	< 0.001	< 0.001
Total Barium Ba	mg/L	0.021	0.081	0.053	0.031
Total Beryllium Be	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total Bismuth Bi	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total Boron B	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Total Cadmium Cd	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Total Calcium Ca	mg/L	7.52	54.6	51.7	43.8
Total Chromium Cr	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total Cobalt Co	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total Copper Cu	mg/L	< 0.001	0.002	0.001	0.001
Total Iron Fe	mg/L	< 0.05	0.55	0.23	< 0.05
Total Lead Pb	mg/L	< 0.001	0.002	< 0.001	< 0.001
Total Lithium Li	mg/L	< 0.001	0.004	0.005	0.004
Total Magnesium Mg	mg/L	1.09	21.5	18.4	11.9
Total Manganese Mn	mg/L	0.001	0.042	0.028	0.21
Total Molybdenum Mo	mg/L	< 0.0005	0.0008	0.0006	< 0.0005
Total Nickel Ni	mg/L	< 0.001	0.003	0.002	0.001
Total Phosphorus PO4	mg/L	< 0.15	< 0.15	< 0.15	< 0.15
Total Potassium K	mg/L	0.3	0.9	0.8	0.6
Total Selenium Se	mg/L	0.001	< 0.001	< 0.001	< 0.001
Total Silicon SiO2	mg/L	8.2	11	9.9	8.2
Total Silver Ag	mg/L	< 0.00025	< 0.00025	< 0.00025	< 0.00025
Total Sodium Na	mg/L	1.42	3.2	2.69	2.03
Total Strontium Sr	mg/L	0.041	0.23	0.22	0.18
Total Tellurium Te	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total Thallium Tl	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Total Thorium Th	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Total Tin Sn	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total Titanium Ti	mg/L	< 0.001	0.005	0.003	< 0.001
Total Uranium U	mg/L	< 0.0005	0.0025	0.0024	0.001
Total Vanadium V	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total Zinc Zn	mg/L	< 0.005	0.007	0.011	0.031
Total Zirconium Zr	mg/L	< 0.01	< 0.01	< 0.01	< 0.01

APPENDIX A WATER CHEMISTRY, AUGUST 2005

Client:	Anvil Range Mining Corporation				
Download Date:	9/12/2005				
Project Name:	Aug 24, 25/05 B. Burns				
Project Number:					
Chain of Custody:	164156				
Samples received:	8/31/2005				
TABLE: Results of WATER Analyses					
Sample ID		**V1**	**V5**	**V8**	**V27**
CANTEST ID		509010165	509010166	509010167	509010168
Date Sampled		8/25/2005	8/25/2005	8/24/2005	8/25/2005
Parameter	Units				
Conventional Parameters					
Conductivity	uS/cm	10	346	407	287
True Color	CU	5	6	7	< 5
Turbidity	NTU	0.25	4.2	1.4	0.29
Hardness CaCO3	mg/L	29	246	295	177
Hardness (Total) CaCO3	mg/L	29	280	328	200
Total Suspended Solids	mg/L	< 1	7	< 1	< 1
Total Alkalinity CaCO3	mg/L	27.7	196	140	-
Bicarbonate Alkalinity HCO3	mg/L	33.8	231	166	-
Carbonate Alkalinity CO3	mg/L	< 0.5	3.8	2.4	-
Hydroxide Alkalinity OH	mg/L	< 0.5	< 0.5	< 0.5	-
Dissolved Sulphate SO4	mg/L	8.8	78.8	210	147
Ammonia Nitrogen N	mg/L	0.03	0.08	< 0.01	< 0.01
Metals Analysis					
Total Mercury Hg	ug/L	< 0.02	< 0.02	< 0.02	< 0.02
Dissolved Aluminum Al	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Dissolved Antimony Sb	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Arsenic As	mg/L	< 0.001	0.001	< 0.001	< 0.001
Dissolved Barium Ba	mg/L	0.023	0.068	0.063	0.032
Dissolved Beryllium Be	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Bismuth Bi	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Boron B	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Dissolved Cadmium Cd	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dissolved Calcium Ca	mg/L	9.2	58.7	75.8	47.4
Dissolved Chromium Cr	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Cobalt Co	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Copper Cu	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Iron Fe	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Dissolved Lead Pb	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Lithium Li	mg/L	< 0.001	0.004	0.006	0.004
Dissolved Magnesium Mg	mg/L	1.35	24	25.5	14.3
Dissolved Manganese Mn	mg/L	< 0.001	0.011	0.044	0.081
Dissolved Molybdenum Mo	mg/L	< 0.0005	0.0011	0.0006	< 0.0005
Dissolved Nickel Ni	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Phosphorus PO4	mg/L	< 0.15	< 0.15	< 0.15	< 0.15
Dissolved Potassium K	mg/L	0.3	0.8	0.9	0.6
Dissolved Selenium Se	mg/L	0.002	0.003	0.002	0.001
Dissolved Silicon SiO2	mg/L	8	9.2	8.3	8.3
Dissolved Silver Ag	mg/L	< 0.00025	< 0.00025	< 0.00025	< 0.00025
Dissolved Sodium Na	mg/L	1.53	3.26	3.1	2.24
Dissolved Strontium Sr	mg/L	0.048	0.26	0.34	0.19

APPENDIX A WATER CHEMISTRY, AUGUST 2005

Sample ID		V1	V5	V8	V27
CANTEST ID		509010165	509010166	509010167	509010168
Date Sampled		8/25/2005	8/25/2005	8/24/2005	8/25/2005
Parameter	Units				
Conventional Parameters					
Dissolved Tellurium Te	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Thallium Tl	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Dissolved Thorium Th	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dissolved Tin Sn	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Titanium Ti	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Uranium U	mg/L	< 0.0005	0.0032	0.0034	0.0015
Dissolved Vanadium V	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Zinc Zn	mg/L	< 0.005	< 0.005	0.005	0.018
Dissolved Zirconium Zr	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Total Aluminum Al	mg/L	0.013	0.15	0.13	0.01
Total Antimony Sb	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total Arsenic As	mg/L	< 0.001	0.001	0.001	0.001
Total Barium Ba	mg/L	0.025	0.079	0.071	0.037
Total Beryllium Be	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total Bismuth Bi	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total Boron B	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Total Cadmium Cd	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Total Calcium Ca	mg/L	9.36	69.3	85.7	54.7
Total Chromium Cr	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total Cobalt Co	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total Copper Cu	mg/L	< 0.001	0.001	0.024	< 0.001
Total Iron Fe	mg/L	< 0.05	0.25	< 0.05	< 0.05
Total Lead Pb	mg/L	< 0.001	< 0.001	0.002	< 0.001
Total Lithium Li	mg/L	< 0.001	0.004	0.006	0.004
Total Magnesium Mg	mg/L	1.31	25.9	27.5	15.3
Total Manganese Mn	mg/L	< 0.001	0.031	0.061	0.11
Total Molybdenum Mo	mg/L	< 0.0005	0.0013	0.0007	< 0.0005
Total Nickel Ni	mg/L	< 0.001	0.002	0.002	< 0.001
Total Phosphorus PO4	mg/L	< 0.15	< 0.15	< 0.15	< 0.15
Total Potassium K	mg/L	0.3	1.1	1.2	0.8
Total Selenium Se	mg/L	0.002	0.003	0.003	0.003
Total Silicon SiO2	mg/L	7.1	10.3	8.1	8.3
Total Silver Ag	mg/L	< 0.00025	< 0.00025	< 0.00025	< 0.00025
Total Sodium Na	mg/L	1.53	3.63	3.4	2.49
Total Strontium Sr	mg/L	0.049	0.29	0.35	0.22
Total Tellurium Te	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total Thallium Tl	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Total Thorium Th	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Total Tin Sn	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total Titanium Ti	mg/L	< 0.001	0.004	0.001	< 0.001
Total Uranium U	mg/L	< 0.0005	0.0029	0.003	0.0014
Total Vanadium V	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total Zinc Zn	mg/L	< 0.005	< 0.005	0.05	0.02
Total Zirconium Zr	mg/L	< 0.01	< 0.01	< 0.01	< 0.01

APPENDIX B

STREAM SEDIMENT DATA

APPENDIX B

STREAM SEDIMENT DATA, 2005

Sample ID	pH pH units	Antimony ug/g	Arsenic ug/g	Barium ug/g	Beryllium ug/g	Cadmium ug/g	Chromium ug/g	Cobalt ug/g	Copper ug/g	Lead ug/g	Mercury ug/g	Molybdenum ug/g	Nickel ug/g	Selenium ug/g	Silver ug/g	Tin ug/g
V1-A	7.1	< 10	< 10	49	< 1	< 0.5	13	8	19	22	< 0.01	< 4	14	< 0.2	< 2	< 5
V1-B	6.7	< 10	< 10	96	< 1	< 0.5	25	11	18	22	0.02	< 4	25	0.3	< 2	< 5
V1-C	6.9	< 10	< 10	56	< 1	< 0.5	13	10	14	14	0.01	< 4	17	< 0.2	< 2	< 5
Mean:	**6.9**	**N.D.**	**N.D.**	**67.0**	**N.D.**	**N.D.**	**17.0**	**9.7**	**17.0**	**19.3**	**0.02**	**N.D.**	**18.7**	**0.30**	**N.D.**	**N.D.**
S.D.:	**0.2**	**N.D.**	**N.D.**	**25.4**	**N.D.**	**N.D.**	**6.9**	**1.5**	**2.6**	**4.6**	**0.01**	**N.D.**	**5.7**		**N.D.**	**N.D.**
V5-A	8	< 10	11	165	< 1	0.9	54	14	27	22	0.04	< 4	68	0.7	< 2	< 5
V5-B	8.1	< 10	< 10	109	< 1	0.9	41	13	22	20	0.03	< 4	66	0.6	< 2	< 5
V5-C	8.1	< 10	< 10	139	< 1	0.8	59	14	26	20	0.04	< 4	77	0.7	< 2	< 5
Mean:	**8.07**	**N.D.**	**11.0**	**137.7**	**N.D.**	**0.87**	**51.3**	**13.7**	**25.0**	**20.7**	**0.04**	**N.D.**	**70.3**	**0.67**	**N.D.**	**N.D.**
S.D.:	**0.06**	**N.D.**		**28.0**	**N.D.**	**0.06**	**9.3**	**0.6**	**2.6**	**1.2**	**0.01**	**N.D.**	**5.9**	**0.06**	**N.D.**	**N.D.**
V27-A	7.6	< 10	27	121	< 1	1	39	16	40	267	0.18	< 4	38	0.3	< 2	< 5
V27-B	7.2	< 10	23	83	< 1	1	40	15	31	114	0.05	< 4	38	0.3	< 2	< 5
V27-C	7.2	< 10	23	113	< 1	0.9	42	15	38	183	0.08	< 4	40	0.3	< 2	< 5
Mean:	**7.33**	**N.D.**	**24.3**	**105.7**	**N.D.**	**1.0**	**40.3**	**15.3**	**36.3**	**188.0**	**0.10**	**N.D.**	**38.7**	**0.30**	**N.D.**	**N.D.**
S.D.:	**0.23**	**N.D.**	**2.3**	**20.0**	**N.D.**	**0.1**	**1.5**	**0.6**	**4.7**	**76.6**	**0.07**	**N.D.**	**1.2**	**0.00**	**N.D.**	**N.D.**
V8-A	7.5	< 10	13	119	< 1	0.9	52	14	35	70	0.06	< 4	53	0.5	< 2	< 5
V8-B	7.6	< 10	14	152	< 1	0.9	53	14	34	83	0.08	< 4	52	0.7	< 2	< 5
V8-C	7.5	< 10	15	129	< 1	0.9	46	15	35	71	0.06	< 4	53	0.6	< 2	< 5
Mean:	**7.53**	**N.D.**	**14.0**	**133.3**	**N.D.**	**0.90**	**50.3**	**14.3**	**34.7**	**74.7**	**0.07**	**N.D.**	**52.7**	**0.60**	**N.D.**	**N.D.**
S.D.:	**0.06**	**N.D.**	**1.0**	**16.9**	**N.D.**	**0.00**	**3.8**	**0.6**	**0.6**	**7.2**	**0.01**	**N.D.**	**0.6**	**0.10**	**N.D.**	**N.D.**

Sample ID	Vanadium ug/g	Zinc ug/g	Aluminum ug/g	Boron ug/g	Calcium ug/g	Iron ug/g	Iron %	Magnesium ug/g	Manganese ug/g	Phosphorus ug/g	Potassium ug/g	Sodium ug/g	Strontium ug/g	Titanium ug/g	Zirconium ug/g
V1-A	13	49	8000	< 1	1350	13800	1.4	3330	280	279	559	83	8	94	2
V1-B	20	76	13600	< 1	2510	17500	1.8	4990	391	522	1110	124	18	209	1
V1-C	14	54	8240	< 1	1410	15300	1.5	3700	335	380	533	55	13	112	2
Mean:	**15.7**	**59.7**	**9947**	**N.D.**	**1757**	**15533**	**1.6**	**4007**	**335.3**	**393.7**	**734.0**	**87.3**	**13.0**	**138.3**	**1.67**
S.D.:	**3.8**	**14.4**	**3166**	**N.D.**	**653**	**1861**	**0.19**	**871**	**55.5**	**122.1**	**325.9**	**34.7**	**5.0**	**61.9**	**0.58**
V5-A	26	92	10200	< 1	20300	16300	1.6	11500	479	1210	501	114	67	135	3
V5-B	26	80	9890	< 1	19500	17000	1.7	11700	456	832	401	114	61	128	3
V5-C	25	87	9970	< 1	18500	16700	1.7	12100	422	614	425	114	52	153	3
Mean:	**25.7**	**86.3**	**10020**	**N.D.**	**19433**	**16667**	**1.7**	**11767**	**452.3**	**885.3**	**442.3**	**114.0**	**60.0**	**138.7**	**3.00**
S.D.:	**0.6**	**6.0**	**161**	**N.D.**	**902**	**351**	**0.04**	**306**	**28.7**	**301.6**	**52.2**	**0.0**	**7.5**	**12.9**	**0.00**
V27-A	21	312	12500	< 1	9140	20200	2.0	7910	806	496	497	81	34	148	3
V27-B	22	261	13800	< 1	8770	20000	2.0	8650	664	455	403	84	34	117	3
V27-C	22	291	12600	< 1	9100	19900	2.0	8270	620	882	442	89	34	123	3
Mean:	**21.7**	**288.0**	**12967**	**N.D.**	**9003**	**20033**	**2.0**	**8277**	**696.7**	**611.0**	**447.3**	**84.7**	**34.0**	**129.3**	**3.00**
S.D.:	**0.6**	**25.6**	**723**	**N.D.**	**203**	**153**	**0.02**	**370**	**97.2**	**235.6**	**47.2**	**4.0**	**0.0**	**16.4**	**0.00**
V8-A	24	199	11500	< 1	10200	18900	1.9	9650	568	671	541	88	38	140	3
V8-B	27	189	11400	< 1	11700	19100	1.9	10200	582	735	472	82	41	159	3
V8-C	24	189	11000	< 1	10100	19100	1.9	9340	549	678	561	83	36	140	3
Mean:	**25.0**	**192.3**	**11300**	**N.D.**	**10667**	**19033**	**1.9**	**9730**	**566.3**	**694.7**	**524.7**	**84.3**	**38.3**	**146.3**	**3.00**
S.D.:	**1.7**	**5.8**	**265**	**N.D.**	**896**	**115**	**0.01**	**436**	**16.6**	**35.1**	**46.7**	**3.2**	**2.5**	**11.0**	**0.00**

APPENDIX C

BENTHIC INVERTEBRATE DATA

APPENDIX C BENTHIC INVERTEBRAE DATA, VANGORDA CREEK, 2005

	V1a	V1b	V1c	V5a	V5b	V5c	V8a	V8b	V8c	V27a	V27b	V27c	Totals	%
PHYLUM ARTHROPODA														
Class Insecta														
Order Ephemeroptera														
Family Siphlonuridae														
Ameletus sp	5												5	0.02
Family Baetidae														
Baetis sp	77	1243	69	321	177	80	193	60	396	450	153	116	3335	10.38
Family Heptageniidae														
Cinygmula sp	24	7	13			18	3	21	3	150	5	68	312	0.97
Epeorus (Iron) sp	2	14	2	3	3	4	1		1	2		1	33	0.10
Rhithrogena sp	17	13	21				1		1	1			54	0.17
Family Ephemereliidae														
Drunella grandis								1					1	0.00
Ephemerellidae J	1					16			8				25	0.08
Order Plecoptera														
Family Capniidae														
Capnia sp	2			16	1	22	187	23	110	16	16	24	417	1.30
Family Perlodidae														
Isoperla sp		1	1		1		1		1	1			6	0.02
Megarcys sp	2	1	2		1		1			2			9	0.03
Skwala paralella			1										1	0.00
Sweltsa sp group						1			1	1			3	0.01
Family Taeniopterygidae														
Taenionema sp	5	33	6	17	34	6	104	19	84	58			366	1.14
Family Nemouridae														
Zapada sp	168	1210	223	493	267	642	541	74	584	1497	977	1010	7686	23.93
Order Trichoptera														
Trichoptera Unid J	1					1	1			1			4	0.01
Trichoptera P				1									1	0.00
Family Hydropsychidae														
Arctopsyche sp	14	185	64	441	315	226	20		10	144	122	108	1649	5.13
Family Limnephilidae														
Ecclisomyia sp				1	1				1	8	8		19	0.06
Family Hydroptilidae														
Hydroptila sp								1					1	0.00
Family Rhyacophilidae														
Rhyacophilidae Juv			1	32	82	128	10	1	9	88	68	80	499	1.55
Rhyacophila (acropedes or vao)	4	15	8	61	92	171	10	1	3	19	12	13	409	1.27
Rhyacophila hyalinata		2	4	17	1	2	2	2	4	18	2	13	67	0.21
Order Diptera														
Diptera Unid A			2										2	0.01
Chironomidae A				1				1					2	0.01
Family Chironomidae														
Chironomidae P	5	22	5	17	65	2	59	9	71	1	9		265	0.83
Chironomidae L	45	634	72	576	370	563	105	15	185	106	120	122	2913	9.07
Sub Family Orthocladinae														
Brillia sp	43	405	41	1667	1920	2079	666	27	342	68	42	59	7359	22.91
Cardiocladius sp	9	199	26	17		1	8		16	24	26	17	343	1.07
Corynoneura sp	2	16					8		8				34	0.11
Cricotopus sp	20	192	25	138	323	373	907	202	879	66	19	84	3228	10.05
Eukiefferiella sp	22	120	12	148	145	146	137	16	83	80	24	34	967	3.01
Euryhapsis sp	2						8	1					11	0.03
Synorthocladius sp					16			1	9				26	0.08
Thienemanniella sp							8	1	16	8			33	0.10
Family Diamesinae														
Diamesa sp		35	2	35	16	2	2	3	1		8		104	0.32
Sub Family Chrionominae														
Micropsectra sp							8						8	0.02
Family Empididae														
Empididae P									1				1	0.00
Chelifera sp				16	64	16	8	1					105	0.33
Weidemannia sp										10	8	9	27	0.08
Family Psychodidae														
Pericoma sp				56	22	49	2		2	1			132	0.41
Family Simulidae														
Cnephia sp L				16	64	16	8	1			16		121	0.38
Prosimulium sp L	6	46	6	211	177	278	52	7	89	25	40	33	970	3.02
Prosimulium sp P						2	2		2				6	0.02
Simulium sp L		8					10	1	1	1	1		22	0.07
Family Tipulidae														
Dicranota sp				2	17	67	17						103	0.32

Unid = unidentified J = juvenile L = larvae A = adult P = pupae Dam = damaged

APPENDIX C BENTHIC INVERTEBRAE DATA, VANGORDA CREEK, 2005

	V1a	V1b	V1c	V5a	V5b	V5c	V8a	V8b	V8c	V27a	V27b	V27c	Totals	%
Order Collembola														
Collembola Unid dam				1									1	0.00
Isotomurus sp			2		16								18	0.06
Order Homoptera														
Family Aphididae		1	1	1									3	0.01
Family Cicadellidae							1						1	0.00
Order Hymenoptera														
Family Formicidae		1										1	2	0.00
Order Lepidoptera L					1								1	0.00
Order Thysanoptera		1											1	0.00
Class Arachnida														
Order Aranaea												1	1	0.00
Order Hydracarina														
Hydracarina Unid J	1	8	1					1	16				27	0.08
Lebertia sp										1			1	0.00
Sperchon sp	1	8	2				1	4		2		2	20	0.06
Unioncola sp		16	5		16	48	48	18	88	8	1		248	0.77
Oribatei			1										1	0.00
PHYLUM ANNELIDA														
Class Oligochaeta														
Order Haplotaxidae														
Family Enchytraeidae								1	9				10	0.03
Family Tubificidae				1	1								2	0.01
PHYLUM NEMATODA	1	1		32	1	64							99	0.31
Total per sample:	479	4437	618	4338	4209	5023	3140	513	3034	2857	1677	1795	32120	
Total per site:	5534			13570			6687			6329				
Taxonomic Richness per sample:	25	28	28	28	29	28	35	28	33	30	21	19		
Taxonomic Richness per site:	38			39			45			34				

Unid = unidentified J = juvenile L = larvae A = adult P = pupae Dam = damaged

2005

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, 2005

Prepared for Delloite and Touche Inc.

December, 2005

Prepared by: White Mountain Environmental Consulting, Whitehorse, Yukon

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1.0 Introduction

The following report details the results of the second 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, 2005 under the authority of License to Collect Fish No. 05-18, issued by the Department of Fisheries and Oceans.

The primary goal of this investigation is to annually sample watersheds potentially affected by the Faro and Vangorda Plateau mine sites. Specific sites within the Rose and Vangorda Creek watersheds were investigated 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*) were taken and analyzed to determine the level of metals in fish tissue.

The investigation also continued the collection of quality data on fish habitats and fish utilization suitable for use in long term monitoring. The sampling methods used in 2005 were as similar as possible to the 2004 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. 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 (not flowing at time of investigation);
R4 Rose Creek just upstream of the confluence with Anvil Creek; and
R6 Anvil Creek just upstream of the confluence with Rose Creek (control site).

Sampling sites associated with Vangorda Creek (Figure 2):

V8 Lower Vangorda Creek below the town access road; and
B1 Blind Creek near the lower bridge (control site)

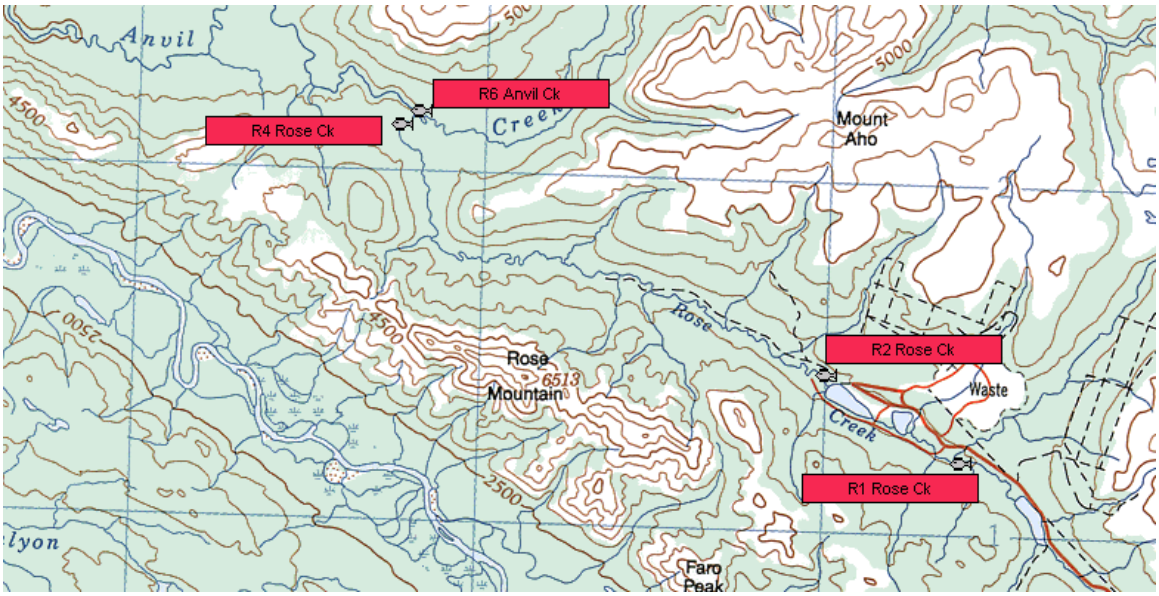


Figure 1: Sample sites associated with Rose Creek from 1:250,000 105K *Tay River* topographic map.

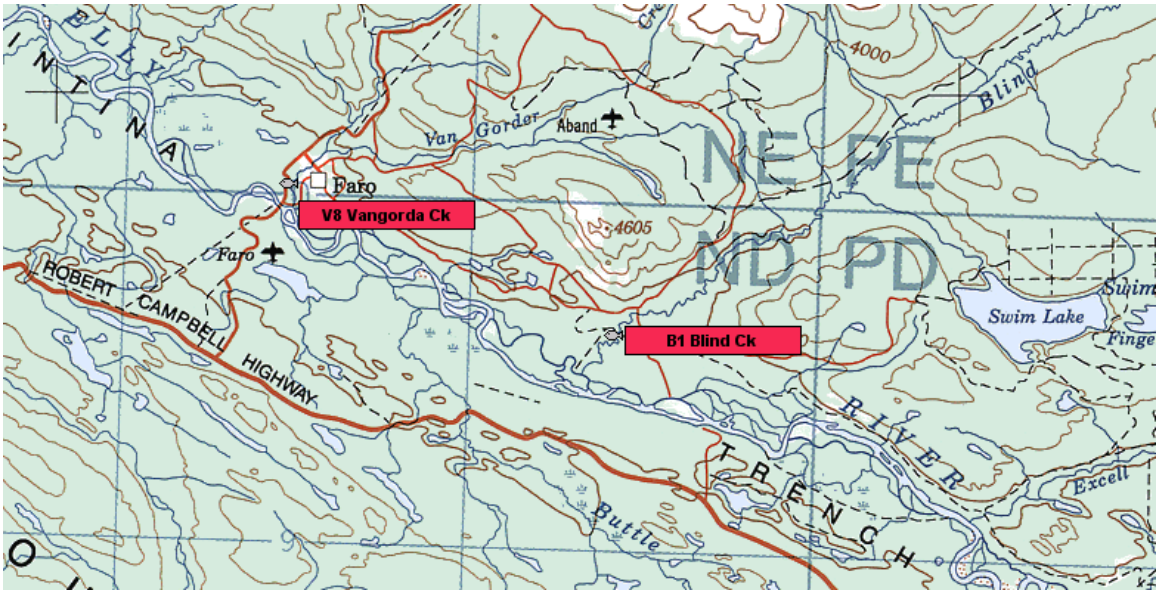


Figure 2: Sampling sites associated with Vangorda Creek from 1:250,000 105K *Tay River* topographic map.

3.0 Methods

Field investigations were conducted between August 15 and 20, 2005 when water levels were low and fish distribution was at its seasonal peak. This timing corresponds with the previous investigations which were conducted from August 9 to 16, 2004.

At each sample location the same 100 meters representative reach as sampled during 2004 was assessed. UTM locations for the downstream end of each sample reach was recorded and referenced with locations recorded during 2004 to ensure re-sampling of the same locations. 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 habitats compiled in 2004 was re-evaluated for each site, including; the site location, 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 showing current year conditions 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 2 crew members with dip nets. Each site was investigated using a single pass technique with sampling effort similar to that of 2004. 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. Mid channel efforts were difficult and dangerous in flows exceeding 1 meter per second with a depth greater than 0.8 meters, sites with these conditions were not sampled. Effort extended by electro-fishing ranged from 849 to 1,043 seconds of shocking time per site.

Minnow trapping was conducted with “Gee type” minnow traps (¼” mesh), shown to be highly effective for the capture of Yukon River juvenile chinook salmon (jcs). 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. Traps were set for an overnight period with soak times varying from 13.9 to 26.1 hours.

Beach seining was only conducted to collect metal analysis specimens from Blind Creek. 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. Effort was recorded as minutes fished and all fish captured or observed were recorded.

All fish captured 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 computer format.

3.1 Metal Sample Collection and Analysis

Fish samples for metal content analysis were collected during the course of general sampling. A maximum of 5 Arctic grayling and 5 slimy sculpins samples were collected from each site for analysis of metals in tissue. Extra effort by electro-fisher or angling was conducted to collect Arctic grayling from several of the sites and extra seine and minnow trap effort was conducted at Blind Creek to procure slimy sculpin samples.

Arctic Grayling with a fork length >200 mm were selected for tissue sampling and sculpins 80 mm or longer were selected 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 sample of approximately 50 grams for metal content analysis was taken from the caudal area and placed in separate labeled bags. Stomach contents were analyzed at the time of sampling.

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.

Sample data collected from Arctic grayling was entered to a computer format. Stomach content analysis for Arctic grayling was evaluated and coded.

The tissue samples were submitted to 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 2005 samples was an upgrade from the process used in 2004, resulting in lower detection limits for some metals and higher detection limits for others. Mercury content was not analyzed for in the 2005 samples.

4.0 Results

The sample sites showed little physical variations since 2004 and fish habitats remained stable at all sample locations, all changes observed were noted. In general water levels were greater in 2005 than in 2004. An updated general description of fish habitats and a representative photo from 2005 for each site has been presented in Appendix 1.

Fish distribution and utilization varied between each site; a summary of electro fishing results has been presented in Table 1, a summary of minnow trapping results has been presented in Table 2 and a complete listing of all minnow trapping results has been presented in Appendix 4. Angling records have been presented in Table 3.

Arctic grayling adults were common at most sites, the exceptions being site R6 where they were few and difficult to capture and at site R2 where no adult Arctic grayling were observed. Slimy sculpin were uncommon and difficult to capture at Blind Creek, were uncommon at site V8, and common at the other sites.

Juvenile chinook salmon (jcs) were recorded throughout the study area with the exceptions of R1 and R6. Jcs were far more abundant at B1 and V8 than sites associated with Rose Creek; however numbers of jcs captured at these sites were lower than those recorded during 2004.

A total of 22 Arctic grayling were taken for metal analysis, no adult grayling were captured at site R4 and only 2 were obtained from R6, a complete set of five Arctic grayling were taken from each of the other sites. Lengths ranged from 249 to 362 mm and weight from 150 to 536 grams. A complete listing of sample information for specimens collected has been presented in Appendix 3.

Slimy sculpin taken for metals analysis ranged in length from 52 to 112 mm. The weights of the 18 single fish sculpin samples ranged from 7 to 14 grams. Composite samples of two or more slimy sculpins were prepared from most sites, a total of 12 composite samples were taken.

Stomach content analysis from all Arctic grayling sampled combined consisted of 55% Tricoptera compared with 64% Tricoptera in 2004. In 2004, 23% of the remaining diet consisted of unidentified benthic organisms (mosquitoes or chironomids); the 2005 diet was more varied with 17% consisting of fish remains, including grayling fry, juvenile chinook salmon and slimy sculpins, 9% bees and wasps, 9% ants and 5% chinook salmon eggs. Sample information for stomach content analysis has been presented in Appendix 3 in conjunction with all other sample information for the fish sacrificed for metal sample analysis.

Metal content in fish flesh was generally higher in 2005 than in 2004 although still lower than 2002 and 1997 levels. Vangorda Creek continues to show the highest metal levels of the sample sites and Blind Creek the lowest. Zinc levels were noticeably higher at most sample stations for 2005, however still consistent with the general trend in lower metal concentrations from historical data (Gartner Lee, 2003). A summarized average of 5 key metals from each site for Arctic grayling and slimy sculpin has been presented in Tables 4 and 5 respectively. A complete analytical reporting of all metal content analysis is presented in Appendix 2. The metal analysis procedure conducted during 2005 was more refined than the procedure used in 2004, resulting in lowering of detection limits for several metals, this is especially evident in the manganese content where detection limits were 2.0 ug/g in 2004 and 0.05 ug/g in 2005.

Aluminum levels in slimy sculpin typically ranged between 10 and 40 ug/g. A single sculpin from site R2 (#3) had a content of 273 ug/g, and a multiple fish sample (#1) from Blind Creek had a content of 968 ug/g. The high aluminum levels recorded are likely either an artifact of sampling or a lab error, the samples the high aluminum content were recorded in did not have any other noticeably high metal content values.

4.1 Site Summary: R1 Rose Creek

4.1.a Fish Habitat and Utilization

Arctic grayling adults were present although habitat for large adults was limited, Arctic grayling juveniles were present and common. Slimy sculpin adults continue to be common. Juvenile chinook salmon were not recorded at this site during 2005 investigations. Burbot, sub adults, were captured at this site during both 2004 and 2005.

Electro-fishing consisting of 849 seconds of effort conducted through the 100 meter reach. Fish recorded by electro-fishing consisted of 13 Arctic grayling juveniles, 41 slimy sculpin adults and 2 burbot sub-adults (Table 1).

Minnow trapping at site R1 consisted of 9 traps set for approximately 18.1 hours each. The total catch from minnow trapping consisted of 1 slimy sculpin and 2 arctic grayling juveniles (Table 2).

Angling effort at site R1 for 45 minutes and produced a catch of 4 Arctic grayling adults (Table 3).

4.1.b Metal Samples

Samples taken for metal analysis included 5 Arctic grayling adults and 5 slimy sculpin adults as single fish samples.

The Arctic grayling samples ranged in length from 249 to 282 mm, and in weight from 150 to 229 gms. The sample was comprised of 3 mature males and 2 mature female. Stomach contents consisted of 25% Tricoptera, 25% salmon eggs, 15% slimy sculpin and 35% unidentified.

The salmon eggs observed in the stomach were found in a single adult male and appear to be fertilized and viable eggs (Photo # 1), indicating an adult chinook salmon had spawned nearby. No spawning site was observed however potential sites do exist at the confluence of the North and South Fork of Rose Creek (immediately downstream of site R1) or within the diversion channel downstream of site R1 and the Pump House Pond.

The individual sculpin samples ranged in length from 94 to 102 mm and in weight from 10.2 to 11.0 gms.

Concentrations of most metals in Arctic grayling and slimy sculpin taken from R1 in 2005 (Table 4 and 5) were slightly higher than recorded during 2004, but remain lower than the other sites associated with Rose Creek. Zinc levels in slimy sculpin (Table 5) were substantially higher in 2005 than those recorded during 2004; however Zinc levels in Arctic grayling were lower in 2005 than in 2004.



Figure 3: Photograph of Arctic grayling captured at site R1, showing stomach contents. Note that the chinook salmon eggs are of a bright orange color and are at an eyed stage, indicating the eggs were spawned and fertilized.

4.2 Site Summary: R2 Rose Creek

4.2.a Fish Habitat and Utilization

This site provides a wide variety of habitats, including riffles, rapids, glide areas and deep corner and side pools. Arctic grayling adults were absent from this site during 2005 investigations. Slimy sculpin were abundant; however both electro-fishing and minnow trapping showed a decline in sculpin numbers of approximately 30% from 2004 investigations. Jcs were uncommon at this site during 2005; with no jcs recorded in the minnow traps compared with 21 captured in 2004. A total of 2 jcs were recorded during electro-fishing during 2005 and no jcs were recorded by electro-fishing during 2004. Sub-adult burbot were observed to be more common during 2005 than in 2004.

Electro-fishing consisting of 884 seconds of effort was conducted through the entire 100 meter reach downstream of the tailings pond channel (Table 1). Slimy sculpin were abundant in riffle areas with a total of 76 adults and 7 fry captured. Arctic grayling adults were not recorded by electro-fishing or angling, additional visual inspections and angling effort were conducted and no grayling adults were observed.

Minnow trapping at site R2 consisted of 9 traps set for approximately 15.9 hours each. The total catch from the minnow trapping consisted of 2 adult slimy sculpin and 4 burbot (Table 2). The minnow traps set at R2 during 2005 were all set downstream of the confluence of the tailings pond channel with Rose Creek, in 2005 all traps were set upstream of this point. This may be related to the lack of jcs captured during 2005 in minnow traps.

Angling for a 45 minute period downstream of the tailings pond channel captured no Arctic grayling. Extra effort of 60 minutes angling down stream of the sample site for a distance of a further 800 meters also had no success (Table 3). Extensive visual observations to denote grayling presence was conducted at this time and no adult grayling were observed, visibility was excellent.

4.2.b Metal Samples

Samples taken for metal analysis consisted of 4 single slimy sculpin adults and one composite sample of 2 sculpins, no Arctic grayling were captured. All of the sculpin came from an area of Rose Creek immediately downstream of the confluence with the tailings pond channel.

The four individual sculpin samples ranged in length from 103 to 112 mm and in weight from 13.6 to 15.0 gms. The single composite sample was composed of 2 sculpins 95 and 85 mm in length with a combined weight of 13.4 gms.

Metal content in sculpins from R2 showed the greatest increase of all sites sampled between 2004 and 2005 for both zinc and lead. Zinc levels at R2 from the 2005 sculpin sample are the highest of all sites sampled this year (Table 5), The 2004 samples from R2 had the lowest zinc levels of the sample sites. The levels recorded in 2005 are still lower than those reported from 2002 (Gartner Lee, 2003). A single sculpin sample from site R2 had elevated levels of most metals in comparison with all other fish sampled during 2005.

4.3 Site Summary: R4 Rose Creek

4.3.a Fish Habitat and Utilization

Fish utilization of site R4 was low. Slimy sculpins were difficult to catch and specimens captured were small, as in 2004. Arctic grayling were occasional, dispersed and difficult to capture except in the area immediately upstream of Anvil creek. Jcs were recorded in the minnow trapping, however were uncommon.

Electro-fishing was conducted through all areas of the 110 meter reach and 1,043 seconds of effort recorded a total of 34 slimy sculpin small adults, 11 sculpin sub-adults, 6 sculpin fry and 6 Arctic grayling juveniles(Table 1).

Minnow trapping at site R4 consisted of 9 traps set for approximately 26.1 hours each. The total catch from minnow trapping consisted of 3 jcs (Table 2).

Angling for 30 minutes near the confluence with Anvil Creek, immediately below the actual sample reach captured 6 Arctic grayling adults (Table 3).

4.3.b Metal Samples

A complete sample of 5 Arctic grayling adults were taken from R4. The grayling ranged in length from 325 to 358 mm, in weight from 377 to 469 gms and consisted of three adult males and two mature females. The stomach contents from Arctic grayling consisted predominantly of Trichoptera with a small amount of bees and wasps.

The five slimy sculpin samples consisted of; 3 whole fish 92 to 96 mm in length, 7.7 to 10.2 gms and two composite samples; a two fish sample of 85 and 84 mm with a combined weight of 12.0 gms and another two fish sample of 76 and 80 mm with a combined weight of 9.0 gms.

Arctic grayling from 2005 on average showed higher metal levels than from 2004, zinc and manganese the exceptions were both lower. The high manganese average is attributable to a single grayling with a manganese level of 30.1 ug/g of manganese which was lower than a single grayling sampled in the 2004. The levels of manganese at this site, for both species of fish, remain the highest of all sites sampled.

Concentrations of metals in fish tissue at site R4 for both Arctic grayling (Table 4) and slimy sculpin (Table 5) were on average slightly higher than for any others recorded during the 2005 investigation. Manganese levels were considerably higher in slimy sculpins than at any other site.

4.4 Site Summary: R6 Anvil Creek

4.4.a Fish Habitat and Utilization

Flows in Anvil Creek were only slightly higher than in 2004; however the increase in flows created challenges in sampling for fish that limited the effectiveness of the fish utilization investigation. Fast and deep water precluded sampling in most of the mid channel habitats.

Fish utilization of this reach appeared low. Arctic grayling adults were uncommon and difficult to capture. Slimy sculpin adults were uncommon and slimy sculpin fry were occasional within the sampled habitats.

Electro-fishing, conducted by moving back and forth across the entire width of the creek to cover the entire 100 meter reach was not possible. Shoreline shocking along the left bank and the very lower left bank consisted of 1,021 seconds of effort and recorded 19 slimy sculpin adults, 24 sub adults and 1 fry (Table 1). Slimy sculpin were captured predominantly in areas with significant flows and near the small side channel on the left bank. No other fish were recorded during electro-fishing.

Minnow trapping at site R6 consisted of 9 traps set for approximately 25.4 hours each. The total catch from the minnow trapping was 2 adult slimy sculpin (Table 2).

A single Arctic grayling was captured during 50 minutes of Angling effort at the actual sample reach. An additional 30 minutes of angling at a pool 800 meters upstream of the site captured 1 more Arctic grayling; numerous grayling were observed at this site (Table 3).

4.4.b Metal Samples

Samples taken for metal analysis at site R6 included 2 adult Arctic grayling, both mature males. The Arctic grayling samples had lengths of 362 and 282 mm, and weights of 536 and 232 gms respectively. Stomach contents consisted of 40% Trichoptera, 40% ants and 20% wasps.

Slimy sculpin samples consisted of 2 individual fish samples both measuring 97 mm and weighing 9.9 and 8.0 grams. The other 3 samples were composites comprised of 2 fish each all in the range of 73 to 89 mm in length with combined weight totals of 10.2, 11.1 and 9.1 grams.

The concentrations of metals in fish tissue from R6 taken in 2005 remained slightly lower than those from sample sites within Rose Creek (Tables 4 and 5). Metal levels were generally lower than in 2004.

4.5 Site Summary: V8 Vangorda Creek

4.5.a Fish Habitat and Utilization

Fish habitats at the Vangorda Creek sample site were slightly modified at the downstream end of the sample reach by bridge construction. The sample site extends upstream from the location of the Town of Faro sewage force main. Modifications to the bridge adjacent to the sewer line were in progress during the sample period. The active erosion observed during 2004 has begun to stabilize in the upper section of the sample reach; however erosion near the bridge site continues to further expose the sewage force main.

The reach of Vangorda Creek investigated had extensive utilization by several fish species. Notably, jcs were very abundant, Arctic grayling sub- adults were common, Arctic grayling juveniles were occasional and slimy sculpin were uncommon.

Electro-fishing was conducted for a total of 1,015 seconds through the entire 120 meter reach (Table 1). Sampling time for this site was longer than at other sites due to turbid conditions and the large number of fish recorded. Fish recorded included 5 slimy sculpin adults, 189 jcs 2 Arctic grayling adults and 1 sub-adult. Additional electro fishing for 800 seconds for 40 meters above the sample reach and for 100 meters downstream was extended to capture Arctic grayling and slimy sculpin for metal samples. Shocking was

conducted moving downstream at least at the speed of the current and captured 2 slimy sculpin adults, 5 Arctic grayling adults and 2 sub adults.

Minnow trapping at site V8 consisted of 9 traps set for approximately 24.3 hours each. The total catch from the minnow trapping consisted of 164 jcs, for an average of 18 jcs per trap (Table 2) in comparison to 2004 when minnow traps captured 49 jcs per trap Jcs from V8 had an average length of 73.6 mm and ranged in length from 60 to 91 mm (n=15).

Angling in Vangorda Creek was attempted but the small channel and extensive vegetation limit the angling opportunities. Angling for 15 minutes produced zero fish (Table 3).

4.5.b Metal Samples

A complete set of 5 Arctic grayling samples were taken. They ranged in length from 262 to 329 mm, and in weight from 172 to 391 gms. The samples consisted of 4 mature males and 1 mature female. Stomach analysis indicated a diet consisting of 31% Tricoptera, 46% fish remains (66% juvenile arctic grayling and 33% jcs), 6% Coleoptera, and 17% unidentified.

Sculpins taken for metal analysis consisted of 3 individual samples and 2 composite samples of 2 fish each. The individual sculpin samples ranged in length from 79 to 92 mm and in weight from 7.0 to 10.5 gms. The 2 composite samples were composed of 2 fish each measuring 71, 74 mm and 70, 65 mm with combined weights of 8.1 and 7.2 grams respectively

Concentrations of metals in fish tissue for both fish species from V8 increased in 2005 from levels recorded in 2004 (Tables 4 and 5). Zinc levels in grayling from the 2005 sample compared to the 2004 sample were more than twice as high, however zinc levels in sculpins was slightly lower, and both species were still much lower than recorded during 1976 and 2002 (Gartner Lee 2003).

4.6 Site Summary: B1

4.6.a Fish Habitat and Utilization

Electro-fishing was not 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 just prior to the time of sampling. Adult salmon were observed in the study reach, several redds downstream of the weir site were noted to have less utilization than in 2004, several redds upstream of the bridge that were utilized in 2004 were inactive during 2005 sampling.

Arctic grayling were in groups throughout the study area and slimy sculpin were uncommon except near salmon redds. Grayling were more abundant in deep corner pools 100 to 200 meters above the sample reach. Jcs were abundant throughout the entire study area and in all habitats. The jcs in Blind Creek had an average length of 60.7 mm and ranged in length from 46 to 75 mm (n=49). Also recorded were 6 jcs aged 1+ ranging in length from 98 to 120 mm with an average length of 105 mm and an average weight of 9.0 grams.

In an attempt to capture slimy sculpin for metal samples a total of 26 minnow traps (13 were set in 2004) were set for an average of 17.2 hours each (Table 2). The catch consisted of 6 slimy sculpin, 1,045 jcs (0+) and 6 jcs (1+).

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. near the weir site 4 seine pulls captured 2 slimy sculpin, 5 Arctic grayling juveniles, 73 jcs and 1 jcs 1+.

Angling effort at Blind Creek, 300 meters upstream of the bridge for 70 minutes captured 7 Arctic grayling adults, a further 5 grayling were hooked but not landed (Table 3).

Metal Samples

A complete set of 5 Arctic grayling samples were taken for metals analysis, they ranged in length from 264 to 337 mm, and in weight from 168 to 402 gms. The sample consisted of 4 mature males and 1 mature female. Stomach contents consisted of 63% Tricoptera and 20% unidentified fish remains and 18% wasps.

A complete set of 5 slimy sculpin samples consisted of a single sample at 82 mm. The other four samples were all composites; 2 samples with 2 fish each, a sample with 3 fish and a sample with 4 fish. The composite samples ranged from 36 to 79 mm. Weights were not obtained from the Blind Creek sculpin sample due to equipment malfunction.

Concentrations of metals in fish flesh from Blind Creek remained lower for most metals than in fish from the other sites investigated (Tables 4 and 5). In comparison to zinc levels recorded in 2004 an increase in levels was recorded in sculpins and a decrease was recorded in Arctic grayling.

Table 1: Summary of electro-fishing results collected during investigations conducted as part of the Aquatic Life Sampling and Testing Program, conducted near Faro, Yukon during August of 2005, 2004 data is presented below for comparison.

Sample Site	Date Sampled	Sample Effort (seconds)	Sample Effort (area)	Arctic Grayling	Slimy Sculpin	Burbot	Juvenile chinook salmon	Round Whitefish
2005								
R1	Aug. 18	849	100 m.	13 juv.	41 ad.	2 sub ad.	0	0
R2	Aug. 19	884	100 m.	16 sub ad. 1 juv.	76 ad. 7 fry	7 sub ad.	2	0
R4	Aug. 17	1,043	110 m.	6 juv.	34 ad, 11 sub.ad. 6 fry	0	0	0
R6	Aug. 17	1,021	100 m.	0	19 ad. 24 sub.ad 1 fry	0	0	0
V8	Aug. 18	1,015	120 m.	2 ad. 1 sub ad.	5 ad	0	189	0
V8 extra	Aug. 18	800	140 m	5 ad. 2 sub ad.	2 ad.	0	not counted	0
2004								
R1	Aug. 14	835	100 m.	3 ad. and 15 fry	29 ad.	2 sub. ad	3	1 ad
R2	Aug. 15	741	100 m.	2 ad.	116 ad. 8 fry	2 sub. ad	0	0
R4	Aug. 13	875	110 m.	1 sub.ad.	25 ad.	0	0	0
R6	Aug. 13	875	100 m.	1 ad	25 ad, 1 fry	0	0	0
V8	Aug. 15	1,012	120 m.	11 sub. ad. 6 juv.	7	0	168	1 ad.

Summary of abbreviations: ad= adult, juv.= juvenile, sub. ad.= sub adult

Table 2: Summary of minnow trapping results (combined) collected during investigations conducted as part of the Aquatic Life Sampling and Testing Program, conducted near Faro, Yukon during August of 2005, 2004 data is presented below for comparison. A complete data set of minnow trapping results has been presented in Appendix 2.

Sample Site	Date Set 2005	Number of traps set	Average Effort in Hours	Arctic Grayling	Slimy Sculpin	Burbot	Juvenile chinook salmon	1+ chinook salmon
2005								
R1	Aug.	9	18.1	2	1	0	0	0
R2	Aug.	9	15.9	0	2	4	5	0
R4	Aug.	9	26.1	0	3	0	0	0
R6	Aug.	9	25.4	0	2	0	0	0
V8	Aug.	9	24.3	0	0	0	164*	0
B1	Aug.	26	17.2	2	6	0	1,045**	6
2004								
R1	Aug. 13	8	18.4	1	3	0	1	0
R2	Aug. 14	14	23.5	0	2	2	21	0
R4	Aug. 12	8	17.6	0	0	0	3	0
R6	Aug. 12	8	17.0	0	4	0	0	0
V8	Aug. 14	8	14.8	0	0	0	391	0
B1	Aug. 14	13	13.9	0	1	0	572	4

* average catch per trap for site V8= 18.2 jcs per trap
** average catch per trap for site B1= 40.2 jcs per trap

Table 3: Summary of angling effort and catches from effort exerted during investigations conducted as part of the Aquatic Life Sampling and Testing Program, conducted near Faro, Yukon during August of 2005.

Sample site	Date	Effort	Catch	
R1	Aug 18	45 minutes	4 Arctic grayling	
R2	Aug 19	105 minutes	0	observe 0 Ag
R4	Aug 17	30 minutes	5 Arctic grayling	
R6	Aug 17	50 minutes	1 Arctic grayling	
R6 Alternate*	Aug 18	30 minutes	1 Arctic grayling	numerous Ag observed
V8	Aug 18	15 minutes	0	poor angling location
B1	Aug 20	70 minutes	7 Arctic grayling	lost 5 Ag

*The alternate site R6 is located approximately 800 meters upstream on Anvil Creek from the established R6 sample site.

Table 4: Summary of averages for key metal concentrations (expressed as ug/g) from Arctic grayling tissue collected as part of the Aquatic Life Sampling and Testing Program, conducted near Faro, Yukon during August of 2005, 2004 is presented below for comparison.

Site	R1	R2	R4	R6	V8	B1
Total Metals						
2005						
Samples	*avg of 5*	*no sample*	*avg of 5*	*avg of 2*	*avg of 5*	*avg of 5*
Copper	0.76		0.80	0.71	0.67	0.59
Lead	<0.5		<0.5	<0.5	<0.5	<0.5
Manganese	8.3		10.41	2.76	2.76	1.88
Zinc	13.1		12.63	17.68	17.68	10.60
Cadmium	0.05		0.83	<0.05	0.167	0.09
2004						
Samples	*avg of 5*	*avg of 5*	*avg of 3*	*avg of 5*	*avg of 5*	*avg of 5*
Copper	0.68	0.74	0.96	0.77	0.53	0.50
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese	<2	<2	>2	<2	<2	<2
Zinc	9.37	7.74	9.44	8.29	8.09	6.49
Mercury	0.042	0.030	0.041	0.042	0.051	0.46

Table 5: Summary of averages for key metal concentrations (expressed as ug/g) from slimy sculpin tissue collected as part of the Aquatic Life Sampling and Testing Program, conducted near Faro, Yukon during August of 2005, 2004 data is presented below for comparison.

Site	R1	R2	R4	R6	V8	B1
Total Metals						
2005						
Samples	*avg of 5*	*avg of 5*	*avg of 5*	*avg of 5*	*avg of 5*	*avg of 5*
Copper	1.12	1.25	0.96	0.98	0.95	1.12
Lead	0.57	1.02	0.56	<.5	<.5	<.5
Manganese	24.96	38.78	47.72	26.42	7.37	8.67
Zinc	30.06	51.76	49.94	39.1	45.66	26.06
Cadmium	0.05	<0.05	<0.05	0.076	0.18	0.085
2004						
Samples	*avg of 5*	*avg of 5*	*1 sample*	*avg of 4*	*avg of 5*	*avg of 3*
Copper	0.57	1.2	0.88	0.93	0.79	0.87
Lead	0.41	0.24	0.22	0.126	0.16	0.075
Manganese	28.1	31.7	66.5	30.8	6.7	9.17
Zinc	53.1	39.3	57.6	41.0	55.14	31.27
Mercury	0.023	0.029	0.022	0.032	0.043	0.036

5.0 DISCUSSION

For comparative purposes sites R4 and R6 are physically very close to each other. Fish movements between the 2 sites likely do occur, minimizing the relevance of the comparative metals analysis. Moving these sites further upstream from the confluence zone would provide more distinction between the sites and a more valid (in the case of R6) control. Because the sample locations are described in the Fish Monitoring Plan they are essentially a part of the Water License, relocating these sites will require agreement from the interested parties. A suitable site on Anvil Creek approximately 800 meters upstream of the current station was investigated during the 2005 sampling period. This site provides a much greater opportunity for the capture of fish and a greater potential for distinction between the Rose and Anvil drainages. It is recommended that this site be relocated to the site further up Anvil Creek.

Utilization of Rose Creek by juvenile chinook salmon (jcs) during the 2005 open water season was well below levels recorded during 2004. Utilization of the lower areas of Blind and Vangorda Creeks was again significantly higher than in Rose and Anvil Creeks, but as in Rose utilization was lower than in 2004. Utilization of the outlets of both the Tay and Glenlyon Rivers was very similar to that of Anvil Creek (Sparling 2005). Lower numbers of jcs in the study area was expected as the adult chinook salmon escapement and hence the juvenile recruitment for 2004 was considerably lower than in 2003.

Utilization of Anvil Creek by adult chinook salmon in spawning condition was documented during 2005; however an enumeration survey of Anvil Creek was not conducted during 2005. A total of seven chinook salmon adults were recorded during fisheries investigations in Anvil Creek during 2005 and a single adult salmon was observed within 500 meters of the confluence of Rose and Anvil Creeks (Sparling 2005).

Personnel from the mine site reported having seen adult salmon in Rose Creek approximately 1 km downstream of the tailings discharge channel during early August of 2005. This site was investigated and no fish were observed. The observation of fertilized salmon eggs in an Arctic grayling stomach from site R1 is a clear indication that chinook salmon spawning does occur within the Rose Creek drainage. From the location of the grayling it is likely that the spawning site is above or adjacent to the tailings.

Metal analysis of fish flesh results showed variation between 2004 and 2005, still within the same ranges, the average concentrations taken in 2005 were slightly higher than those from 2004. The average levels of metal concentrations from 2004, ‘05 remain at a lower level than those reported in 1997 and 2002.

Distinctly higher levels of lead and zinc were found in sculpins from below the tailings outlet at site R2 in 2005 from those of 2004. During the 2004 investigations the tailings channel was not flowing, it was during the 2005 investigation. Sculpin samples were collected from immediately downstream of the discharge channel in both years.

The discharge and water quality may also be related to the absence of Arctic grayling adults at the site. However another factor may also be involved with the absence of Adult arctic grayling; a drilling program was conducted just prior to and during the field investigations at the site. The drilling was such that vibrations would have been significant within the sample reach for several days prior to sampling. A single Arctic grayling was observed upstream of the discharge near the outlet of the diversion channel at the time of sampling site R2. A site approximately 2 km downstream of R2

was investigated after a report of adult salmon. Careful visual observations of the site recorded no Arctic grayling or salmon and the grayling seemed to be avoiding that area as well.

References

Gartner Lee, 2003. *Fisheries and aquatic Studies at the Anvil Range Mine Complex in 2002 - Technical Memorandum*. Reference GLL 22-943, February 2003.

P.D. Sparling, 2005. *Aquatic Life Sampling and Testing Program For the Pelly River and its main Tributaries between Faro and Earn River.* Prepared for Selkirk First Nation and Type II Mines Office, Whitehorse Yukon, December, 2005

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, 2005, August 13 and 14, 2004

CHANNEL CHARACTERISTICS:

Surveyed Length:	110 m
Average Channel Width:	4 meters
Average Wetted Width:	4 meters
Average Depth:	0.3 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 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 were slightly greater than those of 2004.



Photo 1:, Rose Creek looking upstream at Site R1 from near the bottom of the sample reach.

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, 2005, August 15, 2004

CHANNEL CHARACTERISTICS:

Surveyed Length:	110 meters
Average Channel Width:	14 meters
Average Wetted Width:	8 meters
Average Depth:	0.6 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 were approximately .3 meters deeper during 2005 investigations than during 2004 investigations.



Photo 3: The tailings pond discharge channel (on left) entering Rose Creek at sample reach site R2.



Photo: The downstream end of the sample reach at site R2.

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 17 and 18, 2005, August 12, 2004

CHANNEL CHARACTERISTICS:

Surveyed Length:	110 meters
Average Channel Width:	20 meters
Average Wetted Width:	16 meters
Average Depth:	0.3 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 were 0.3 meters deeper during 2005 sampling than during the 2004 investigations.



Photo 5: Boulder habitats in the upper portion of the sample reach at site R4.

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 17 and 18, 2005, August 12, 2004

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

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.



Photo 6: Looking upstream to the top of the sample reach at site R6, from the downstream end.

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/
Date Sampled: August 19 and 20, 2005, August 14 and 15, 2004

CHANNEL CHARACTERISTICS:

Surveyed Length:	100 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 during 2005 sampling were very similar to those encountered during 2004.

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 17 and 18, 2005, August 14 and 15, 2004

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:

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: Gently meandering with much unconsolidated material forming small islands and limited amounts of instream braiding. The channel has gained some stability since 2004 with most of the unconsolidated materials being swept out. The sample reach does still have a large amount of willow debri and root

wads. This site has had modifications to the lower portion of the reach due to the construction of a new bridge designed to carry the Town of Faro sewage line. The old line was on the creek bed prior to the flooding of 2004, after which it was elevated 0.3 meters above the creek bottom. The removal of the old sewage line had not been completed at the time of sampling.



Photo 7: Looking upstream from the downstream limit of the sample reach under the new bridge at site V8.



Photo 8: The new bridge crossing at site V8.

NORWEST LABS

INFORMATION SHEET
WATERS

CONTROL NUMBER
W 51468

RESULTS & INVOICE TO:
COMPANY: Deloitte & Touche Inc.
ADDRESS: 79 Wellington St. W. Suite 1960
CITY/TOWN: P.O. Box 29 TD Centre
PROVINCE: TORONTO ONT.
POSTAL CODE: M5K 1B9
ATTENTION: Doug Sedgwick
PHONE: 416 643-8034.
FAX:
CELL:

COPY OF RESULTS TO:
COMPANY: White Mtn. Env. Cons.
ADDRESS: Box 10140
CITY/TOWN: WHITEHORSE, YT
PROVINCE: Y1A 7A1
POSTAL CODE:
ATTENTION: PAUL SPARLING
PHONE: 867-399-7019
FAX:
CELL:

WORK ORDER NO.
406715
DATE STAMP

PURCHASE ORDER NO.:
PROJECT REF.: FARO AQUATIC EFFECTS STUDY
REF./QUOTE NO.:

DATE SAMPLED D M Y
NUMBER OF SAMPLES WATER LIQ WASTE OTHER (SPECIFY)

SPECIAL INSTRUCTIONS (SEE OVER FOR IMPORTANT SAMPLE INFORMATION INSTRUCTIONS AND ANALYSIS CODES)
#70223

QA REPORT

RUSH
(UPON FILLING IN THIS SECTION THE CLIENT ACCEPTS THAT SURCHARGES WILL BE ATTACHED TO THE ANALYSIS)
NORWEST AUTHORIZATION
NAME DATE
RUSH DATE REQUIRED D M Y
TIME HR. MIN.

CLIENT NO.
LP
COMPLETION DATE D M Y

SAMPLE CUSTODY	SAMPLED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
	COMPANY	COMPANY	COMPANY	COMPANY: Donna NWLS
	DATE	DATE	DATE	DATE: Sept 7/05

	SITE I.D.	SAMPLE DESCRIPTION	OTHER	ANALYSIS PACKAGE CODES (USE CODES LISTED ON THE REVERSE OF THIS SHEET)	LAB CODING
1	R-1	ARCTIC GRAYLING	5 samples		
2	R-4		5 samples		
3	R-6		2 samples	ST33T	
4	V-8		5 samples		
5	B-1		5 samples		
6	R-1	Slimy Sculpin	5 samples		
7	R-2		"		
8	R-4		"		
9	R-6		"		
10	V-8		"		
11	B-1		5 samples	(multiple fish/sample)	
12					
13					
14					
15					

AGRI-FOOD ENVIRONMENTAL

EDMONTON	PH. (403) 438-5522	FAX (403) 434-8586
CALGARY	PH. (403) 291-2022	FAX (403) 291-2021
LANGLEY	PH. (604) 530-4344	FAX (604) 534-9996
LETHBRIDGE	PH. (403) 329-9266	FAX (403) 327-8527
WINNIPEG	PH. (204) 982-8630	FAX (204) 275-6019

ENERGY RESOURCE

EDMONTON	PH. (403) 454-1504	FAX (403) 451-4022
CALGARY	PH. (403) 291-3024	FAX (403) 250-2819
GRANDE PRAIRIE	PH. (403) 532-8709	FAX (403) 539-0611
FORT ST. JOHN	PH. (250) 785-2731	FAX (250) 785-7092
ESTEVAN	PH. (306) 634-7218	FAX (306) 634-4101

NOTE: Please complete this form in its entirety to ensure correct testing and reporting requirements.

ACCREDITED BY THE STANDARDS COUNCIL OF CANADA FOR SPECIFIC TESTS.

Report Transmission Cover Page

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Bill to: Deloitte & Touche Inc.
Report to: Deloitte & Touche Inc.
Box 29
Suite 1900, 79 Wellington St. W.
Toronto, ON, Canada
M5K 1B9
Attn: Doug Sedgwick
Sampled By:
Company:

Project ID: Faro Aquatic Effects Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **406715**
Control Number: W 51468
Date Received: Sep 07, 2005
Date Reported: Sep 19, 2005
Report Number: 743693

Contact	Company	Address
Doug Sedgwick	Cash Account	Box 29, Suite 1900, 79 Wellington St. W.
Web		Toronto, ON M5K 1B9
Email Notification		Phone: (416) 643-8034 Fax:
Copies Delivery Strategy Format		Email:
1 Post		

NOTE: **P** indicates a preliminary report is required
NOTE: **A** indicates report is delivered using automated delivery

_____ # OF PAGES IN THIS TRANSMISSION

Report Transmission Notes

Agreement Notes

Lot Notes

Sample Notes:

Notes to Clients

Lot Notes:

Sample Notes:

Batch Notes:

Method Notes:

Method Result Notes:

Reports associated with this Lot

Id/Format/Reported Date	Id/Format/Reported Date	Id/Format/Reported Date
743693 Env2 3 Smp & DL		

Comment:
See Methodology and Notes page of Analytical Report for all comments pertaining to this report.

If this report transmission is not satisfactory, please send report requirements to the address at the top of this page.

Sample Custody

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
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Fax: (604) 514-3323

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NWL Lot ID: **406715**
Control Number: W 51468
Date Received: Sep 07, 2005
Date Reported: Sep 19, 2005
Report Number: 743693

Sample Disposal Date: Oct 19, 2005

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 upper right 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: _____

If no other arrangements have been made, samples will be disposed of on Oct 19, 2005.

NORWEST LABS

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Analytical Report

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Report to: Deloitte & Touche Inc.
Box 29
Suite 1900, 79 Wellington St. W.
Toronto, ON, Canada
M5K 1B9
Attn: Doug Sedgwick
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Company:

Project ID: Faro Aquatic Effects Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **406715**
Control Number: W 51468
Date Received: Sep 07, 2005
Date Reported: Sep 19, 2005
Report Number: 743693

			NWL Number	406715-1	406715-2	406715-3	
			Sample Description	R - 1 #1 / Artic Grayling	R - 1 #2 / Artic Grayling	R - 1 #3 / Artic Grayling	
			Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**		**Results**	**Results**	**Results**	**Detection Limit**
Metals Total							
Aluminum	Total (wet weight)	ug/g		12.2	5.37	5.33	0.5
Antimony	Total (wet weight)	ug/g		<1	<1	<1	1
Arsenic	Total (wet weight)	ug/g		<0.3	<0.4	<0.3	0.4
Barium	Total (wet weight)	ug/g		0.90	0.4	0.5	0.1
Beryllium	Total (wet weight)	ug/g		<0.0050	<0.0050	<0.0050	0.01
Bismuth	Total (wet weight)	ug/g		<1	<1	<1	2
Cadmium	Total (wet weight)	ug/g		<0.05	<0.05	<0.05	0.05
Calcium	Total (wet weight)	ug/g		6540	3330	3590	0.5
Chromium	Total (wet weight)	ug/g		<0.1	<0.1	<0.1	0.1
Cobalt	Total (wet weight)	ug/g		<0.1	<0.1	<0.1	0.1
Copper	Total (wet weight)	ug/g		0.72	0.58	0.92	0.1
Iron	Total (wet weight)	ug/g		18.6	9.61	9.98	0.2
Lead	Total (wet weight)	ug/g		<0.5	<0.5	<0.5	0.5
Lithium	Total (wet weight)	ug/g		0.94	0.82	0.92	0.2
Magnesium	Total (wet weight)	ug/g		346	306	315	1
Manganese	Total (wet weight)	ug/g		8.48	4.2	5.79	0.05
Molybdenum	Total (wet weight)	ug/g		<0.1	<0.1	<0.1	0.1
Nickel	Total (wet weight)	ug/g		<0.2	<0.2	<0.2	0.3
Phosphorus	Total (wet weight)	ug/g		6090	4470	4710	1
Potassium	Total (wet weight)	ug/g		4510	4400	4560	2
Selenium	Total (wet weight)	ug/g		1.2	1.5	1.2	0.5
Silver	Total (wet weight)	ug/g		<0.4	<0.4	<0.4	0.4
Sodium	Total (wet weight)	ug/g		612	618	638	15
Strontium	Total (wet weight)	ug/g		7.74	3.58	4.01	0.01
Titanium	Total (wet weight)	ug/g		0.2	<0.1	<0.1	0.1
Vanadium	Total (wet weight)	ug/g		<0.2	<0.2	<0.2	0.2
Zinc	Total (wet weight)	ug/g		14.2	11.8	13.7	0.05
Zirconium	Total (wet weight)	ug/g		0.2	0.2	0.2	0.05

NORWEST LABS

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Box 29
Suite 1900, 79 Wellington St. W.
Toronto, ON, Canada
M5K 1B9
Attn: Doug Sedgwick
Sampled By:
Company:

Project ID: Faro Aquatic Effects Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **406715**
Control Number: W 51468
Date Received: Sep 07, 2005
Date Reported: Sep 19, 2005
Report Number: 743693

			NWL Number	406715-4	406715-5	406715-6	
			Sample Description	R - 1 #4 / Artic Grayling	R - 1 #5 / Artic Grayling	R - 4 #1 / Artic Grayling	
			Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**		**Results**	**Results**	**Results**	**Detection Limit**
Metals Total							
Aluminum	Total (wet weight)	ug/g		6.93	7.42	122	0.5
Antimony	Total (wet weight)	ug/g		<1	<1	<1	1
Arsenic	Total (wet weight)	ug/g		<0.3	<0.3	<0.3	0.4
Barium	Total (wet weight)	ug/g		0.86	0.94	2.9	0.1
Beryllium	Total (wet weight)	ug/g		<0.0050	<0.0050	<0.0049	0.01
Bismuth	Total (wet weight)	ug/g		<1	<1	<1	2
Cadmium	Total (wet weight)	ug/g		0.09	<0.05	<0.05	0.05
Calcium	Total (wet weight)	ug/g		4370	4700	5820	0.5
Chromium	Total (wet weight)	ug/g		<0.1	<0.1	1.1	0.1
Cobalt	Total (wet weight)	ug/g		<0.1	<0.1	<0.1	0.1
Copper	Total (wet weight)	ug/g		0.64	0.92	1.1	0.1
Iron	Total (wet weight)	ug/g		9.55	16.5	80.3	0.2
Lead	Total (wet weight)	ug/g		<0.5	<0.5	<0.5	0.5
Lithium	Total (wet weight)	ug/g		1.0	0.97	1.2	0.2
Magnesium	Total (wet weight)	ug/g		313	334	335	1
Manganese	Total (wet weight)	ug/g		9.77	14.4	30.1	0.05
Molybdenum	Total (wet weight)	ug/g		<0.1	<0.1	<0.1	0.1
Nickel	Total (wet weight)	ug/g		<0.2	<0.2	0.70	0.3
Phosphorus	Total (wet weight)	ug/g		5140	5320	5660	1
Potassium	Total (wet weight)	ug/g		4650	4450	4440	2
Selenium	Total (wet weight)	ug/g		1.6	1.8	1.7	0.5
Silver	Total (wet weight)	ug/g		<0.4	<0.4	<0.4	0.4
Sodium	Total (wet weight)	ug/g		673	679	768	15
Strontium	Total (wet weight)	ug/g		4.40	5.31	5.29	0.01
Titanium	Total (wet weight)	ug/g		<0.1	<0.1	1.5	0.1
Vanadium	Total (wet weight)	ug/g		<0.2	<0.2	<0.2	0.2
Zinc	Total (wet weight)	ug/g		14.2	11.6	15.8	0.05
Zirconium	Total (wet weight)	ug/g		0.2	0.2	0.3	0.05

NORWEST LABS

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Analytical Report

Bill to: Deloitte & Touche Inc.
Report to: Deloitte & Touche Inc.
Box 29
Suite 1900, 79 Wellington St. W.
Toronto, ON, Canada
M5K 1B9
Attn: Doug Sedgwick
Sampled By:
Company:

Project ID: Faro Aquatic Effects Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **406715**
Control Number: W 51468
Date Received: Sep 07, 2005
Date Reported: Sep 19, 2005
Report Number: 743693

			NWL Number	406715-7	406715-8	406715-9	
			Sample Description	R - 4 #2 / Artic Grayling	R - 4 #3 / Artic Grayling	R - 4 #4 / Artic Grayling	
			Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**		**Results**	**Results**	**Results**	**Detection Limit**
Metals Total							
Aluminum	Total (wet weight)	ug/g		5.17	5.40	7.01	0.5
Antimony	Total (wet weight)	ug/g		<1	<2	<1	1
Arsenic	Total (wet weight)	ug/g		<0.3	<0.4	<0.3	0.4
Barium	Total (wet weight)	ug/g		0.77	0.83	0.91	0.1
Beryllium	Total (wet weight)	ug/g		<0.0049	<0.0050	<0.0050	0.01
Bismuth	Total (wet weight)	ug/g		<1	<2	<1	2
Cadmium	Total (wet weight)	ug/g		0.2	0.08	0.06	0.05
Calcium	Total (wet weight)	ug/g		4400	3830	9630	0.5
Chromium	Total (wet weight)	ug/g		0.1	<0.1	<0.1	0.1
Cobalt	Total (wet weight)	ug/g		<0.1	<0.1	<0.1	0.1
Copper	Total (wet weight)	ug/g		0.76	0.55	0.98	0.1
Iron	Total (wet weight)	ug/g		12.8	13.4	13.4	0.2
Lead	Total (wet weight)	ug/g		<0.5	<0.5	<0.5	0.5
Lithium	Total (wet weight)	ug/g		1.0	0.96	1.2	0.2
Magnesium	Total (wet weight)	ug/g		320	294	352	1
Manganese	Total (wet weight)	ug/g		3.1	9.92	6.14	0.05
Molybdenum	Total (wet weight)	ug/g		<0.1	<0.1	<0.1	0.1
Nickel	Total (wet weight)	ug/g		<0.2	<0.2	0.3	0.3
Phosphorus	Total (wet weight)	ug/g		5140	4660	7230	1
Potassium	Total (wet weight)	ug/g		4710	4440	4260	2
Selenium	Total (wet weight)	ug/g		2.3	1.7	1.6	0.5
Silver	Total (wet weight)	ug/g		<0.4	<0.4	<0.4	0.4
Sodium	Total (wet weight)	ug/g		642	689	725	15
Strontium	Total (wet weight)	ug/g		5.05	3.20	6.70	0.01
Titanium	Total (wet weight)	ug/g		<0.1	<0.1	<0.1	0.1
Vanadium	Total (wet weight)	ug/g		<0.2	<0.2	<0.2	0.2
Zinc	Total (wet weight)	ug/g		9.90	11.5	16.2	0.05
Zirconium	Total (wet weight)	ug/g		0.2	0.2	0.3	0.05

NORWEST LABS

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
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Analytical Report

Bill to: Deloitte & Touche Inc.
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Box 29
Suite 1900, 79 Wellington St. W.
Toronto, ON, Canada
M5K 1B9
Attn: Doug Sedgwick
Sampled By:
Company:

Project ID: Faro Aquatic Effects Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **406715**
Control Number: W 51468
Date Received: Sep 07, 2005
Date Reported: Sep 19, 2005
Report Number: 743693

			NWL Number	406715-10	406715-11	406715-12	
			Sample Description	R - 4 #5 / Artic Grayling	R - 6 #1 / Artic Grayling	R - 6 #2 / Artic Grayling	
			Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**		**Results**	**Results**	**Results**	**Detection Limit**
Metals Total							
Aluminum	Total (wet weight)	ug/g		33.3	3.0	6.20	0.5
Antimony	Total (wet weight)	ug/g		<1	<1	<1	1
Arsenic	Total (wet weight)	ug/g		<0.3	<0.3	<0.3	0.4
Barium	Total (wet weight)	ug/g		0.61	0.4	0.84	0.1
Beryllium	Total (wet weight)	ug/g		<0.0050	<0.0050	<0.0050	0.01
Bismuth	Total (wet weight)	ug/g		<1	<1	<1	2
Cadmium	Total (wet weight)	ug/g		<0.05	<0.05	<0.05	0.05
Calcium	Total (wet weight)	ug/g		4080	2580	5900	0.5
Chromium	Total (wet weight)	ug/g		<0.1	<0.1	<0.1	0.1
Cobalt	Total (wet weight)	ug/g		<0.1	<0.1	<0.1	0.1
Copper	Total (wet weight)	ug/g		0.61	0.67	0.75	0.1
Iron	Total (wet weight)	ug/g		50.8	7.13	10.1	0.2
Lead	Total (wet weight)	ug/g		<0.5	<0.5	<0.5	0.5
Lithium	Total (wet weight)	ug/g		1.0	0.90	1.1	0.2
Magnesium	Total (wet weight)	ug/g		318	286	335	1
Manganese	Total (wet weight)	ug/g		2.8	1.6	3.8	0.05
Molybdenum	Total (wet weight)	ug/g		<0.1	<0.1	<0.1	0.1
Nickel	Total (wet weight)	ug/g		<0.2	<0.2	<0.2	0.3
Phosphorus	Total (wet weight)	ug/g		4710	4080	5800	1
Potassium	Total (wet weight)	ug/g		4200	4470	4580	2
Selenium	Total (wet weight)	ug/g		1.0	1.5	1.6	0.5
Silver	Total (wet weight)	ug/g		<0.4	<0.4	<0.4	0.4
Sodium	Total (wet weight)	ug/g		667	544	623	15
Strontium	Total (wet weight)	ug/g		3.21	2.23	4.57	0.01
Titanium	Total (wet weight)	ug/g		<0.1	<0.1	<0.1	0.1
Vanadium	Total (wet weight)	ug/g		<0.2	<0.2	<0.2	0.2
Zinc	Total (wet weight)	ug/g		9.73	8.37	9.83	0.05
Zirconium	Total (wet weight)	ug/g		0.2	0.2	0.2	0.05

NORWEST LABS

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Analytical Report

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Attn: Doug Sedgwick
Sampled By:
Company:

Project ID: Faro Aquatic Effects Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **406715**
Control Number: W 51468
Date Received: Sep 07, 2005
Date Reported: Sep 19, 2005
Report Number: 743693

	NWL Number	406715-13	406715-14	406715-15	
	Sample Description	V - 8 #1 / Artic Grayling	V - 8 #2 / Artic Grayling	V - 8 #3 / Artic Grayling	
	Matrix	Tissue	Tissue	Tissue	
Analyte	**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Metals Total					
Aluminum Total (wet weight)	ug/g	8.46	8.08	8.01	0.5
Antimony Total (wet weight)	ug/g	<2	<1	<1	1
Arsenic Total (wet weight)	ug/g	<0.4	<0.3	<0.3	0.4
Barium Total (wet weight)	ug/g	1.2	1.1	1.7	0.1
Beryllium Total (wet weight)	ug/g	<0.0050	<0.0050	<0.0049	0.01
Bismuth Total (wet weight)	ug/g	<2	<1	<1	2
Cadmium Total (wet weight)	ug/g	<0.05	0.1	<0.05	0.05
Calcium Total (wet weight)	ug/g	9820	8150	15800	0.5
Chromium Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.1
Cobalt Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.1
Copper Total (wet weight)	ug/g	0.57	1.0	0.56	0.1
Iron Total (wet weight)	ug/g	12.2	15.4	9.29	0.2
Lead Total (wet weight)	ug/g	<0.5	<0.5	<0.5	0.5
Lithium Total (wet weight)	ug/g	1.3	1.2	1.3	0.2
Magnesium Total (wet weight)	ug/g	330	334	391	1
Manganese Total (wet weight)	ug/g	3.7	3.7	3.3	0.05
Molybdenum Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.1
Nickel Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.3
Phosphorus Total (wet weight)	ug/g	7150	6440	9660	1
Potassium Total (wet weight)	ug/g	4140	4260	3960	2
Selenium Total (wet weight)	ug/g	1.1	2.3	1.4	0.5
Silver Total (wet weight)	ug/g	<0.4	<0.4	<0.4	0.4
Sodium Total (wet weight)	ug/g	742	720	854	15
Strontium Total (wet weight)	ug/g	11.1	7.22	12.6	0.01
Titanium Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.1
Vanadium Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.2
Zinc Total (wet weight)	ug/g	16.1	12.0	22.9	0.05
Zirconium Total (wet weight)	ug/g	0.3	0.2	0.3	0.05

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			NWL Number	406715-16	406715-17	406715-18	
			Sample Description	V - 8 #4 / Artic Grayling	V - 8 #5 / Artic Grayling	B - 1 #1 / Artic Grayling	
			Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**		**Results**	**Results**	**Results**	**Detection Limit**
Metals Total							
Aluminum	Total (wet weight)	ug/g		4.3	5.81	17.6	0.5
Antimony	Total (wet weight)	ug/g		<1	<1	<1	1
Arsenic	Total (wet weight)	ug/g		<0.3	<0.3	<0.3	0.4
Barium	Total (wet weight)	ug/g		0.50	0.86	1.8	0.1
Beryllium	Total (wet weight)	ug/g		<0.0050	<0.0050	<0.0049	0.01
Bismuth	Total (wet weight)	ug/g		<1	<1	<1	2
Cadmium	Total (wet weight)	ug/g		0.3	0.1	<0.05	0.05
Calcium	Total (wet weight)	ug/g		3520	5870	4460	0.5
Chromium	Total (wet weight)	ug/g		<0.1	<0.1	0.1	0.1
Cobalt	Total (wet weight)	ug/g		<0.1	<0.1	<0.1	0.1
Copper	Total (wet weight)	ug/g		0.4	0.82	0.80	0.1
Iron	Total (wet weight)	ug/g		6.66	9.92	37.6	0.2
Lead	Total (wet weight)	ug/g		<0.5	<0.5	<0.5	0.5
Lithium	Total (wet weight)	ug/g		1.0	1.0	0.85	0.2
Magnesium	Total (wet weight)	ug/g		316	314	285	1
Manganese	Total (wet weight)	ug/g		1.5	1.6	8.30	0.05
Molybdenum	Total (wet weight)	ug/g		<0.1	<0.1	<0.1	0.1
Nickel	Total (wet weight)	ug/g		<0.2	<0.2	0.3	0.3
Phosphorus	Total (wet weight)	ug/g		4560	5520	4680	1
Potassium	Total (wet weight)	ug/g		4590	4140	4000	2
Selenium	Total (wet weight)	ug/g		2.0	2.2	1.2	0.5
Silver	Total (wet weight)	ug/g		<0.4	<0.4	<0.4	0.4
Sodium	Total (wet weight)	ug/g		539	671	690	15
Strontium	Total (wet weight)	ug/g		3.50	5.31	4.59	0.01
Titanium	Total (wet weight)	ug/g		<0.1	<0.1	0.5	0.1
Vanadium	Total (wet weight)	ug/g		<0.2	<0.2	<0.2	0.2
Zinc	Total (wet weight)	ug/g		16.8	20.6	9.58	0.05
Zirconium	Total (wet weight)	ug/g		0.2	0.2	0.3	0.05

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			NWL Number	406715-19	406715-20	406715-21	
			Sample Description	B - 1 #2 / Artic Grayling	B - 1 #3 / Artic Grayling	B - 1 #4 / Artic Grayling	
			Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**		**Results**	**Results**	**Results**	**Detection Limit**
Metals Total							
Aluminum	Total (wet weight)	ug/g		7.44	9.43	116	0.5
Antimony	Total (wet weight)	ug/g		<1	<1	<1	1
Arsenic	Total (wet weight)	ug/g		<0.3	<0.3	<0.3	0.4
Barium	Total (wet weight)	ug/g		1.1	1.1	0.84	0.1
Beryllium	Total (wet weight)	ug/g		<0.0049	<0.0050	<0.0049	0.01
Bismuth	Total (wet weight)	ug/g		<1	<1	<1	2
Cadmium	Total (wet weight)	ug/g		0.06	0.2	0.05	0.05
Calcium	Total (wet weight)	ug/g		7810	6760	5760	0.5
Chromium	Total (wet weight)	ug/g		<0.1	<0.1	0.2	0.1
Cobalt	Total (wet weight)	ug/g		<0.1	<0.1	<0.1	0.1
Copper	Total (wet weight)	ug/g		0.55	0.50	0.59	0.1
Iron	Total (wet weight)	ug/g		8.51	10.2	7.92	0.2
Lead	Total (wet weight)	ug/g		<0.5	<0.5	<0.5	0.5
Lithium	Total (wet weight)	ug/g		0.99	0.99	0.98	0.2
Magnesium	Total (wet weight)	ug/g		328	342	313	1
Manganese	Total (wet weight)	ug/g		1.9	1.6	1.5	0.05
Molybdenum	Total (wet weight)	ug/g		<0.1	<0.1	<0.1	0.1
Nickel	Total (wet weight)	ug/g		<0.2	<0.2	<0.2	0.3
Phosphorus	Total (wet weight)	ug/g		6220	5870	5360	1
Potassium	Total (wet weight)	ug/g		3980	4240	4120	2
Selenium	Total (wet weight)	ug/g		1.4	1.8	1.4	0.5
Silver	Total (wet weight)	ug/g		<0.4	<0.4	<0.4	0.4
Sodium	Total (wet weight)	ug/g		609	597	646	15
Strontium	Total (wet weight)	ug/g		6.87	6.50	5.88	0.01
Titanium	Total (wet weight)	ug/g		<0.1	0.2	<0.1	0.1
Vanadium	Total (wet weight)	ug/g		<0.2	<0.2	<0.2	0.2
Zinc	Total (wet weight)	ug/g		9.62	14.3	10.6	0.05
Zirconium	Total (wet weight)	ug/g		0.2	0.2	0.2	0.05

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NWL Lot ID: **406715**
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	NWL Number	406715-22	406715-23	406715-24	
	Sample Description	B - 1 #5 / Artic Grayling	R - 1 #1 / Slimy Sculpin	R - 1 #2 / Slimy Sculpin	
	Matrix	Tissue	Tissue	Tissue	
Analyte	**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Metals Total					
Aluminum Total (wet weight)	ug/g	13.4	20.9	23.9	0.5
Antimony Total (wet weight)	ug/g	<1	<1	<1	1
Arsenic Total (wet weight)	ug/g	<0.4	<0.3	<0.3	0.4
Barium Total (wet weight)	ug/g	1.2	2.0	3.2	0.1
Beryllium Total (wet weight)	ug/g	<0.0050	<0.0050	<0.0049	0.01
Bismuth Total (wet weight)	ug/g	<1	<1	<1	2
Cadmium Total (wet weight)	ug/g	0.05	<0.05	0.07	0.05
Calcium Total (wet weight)	ug/g	6160	9540	16000	0.5
Chromium Total (wet weight)	ug/g	<0.1	1.1	0.51	0.1
Cobalt Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.1
Copper Total (wet weight)	ug/g	0.52	1.2	1.3	0.1
Iron Total (wet weight)	ug/g	31.5	48.8	49.4	0.2
Lead Total (wet weight)	ug/g	<0.5	<0.5	0.50	0.5
Lithium Total (wet weight)	ug/g	1.1	1.1	1.3	0.2
Magnesium Total (wet weight)	ug/g	336	271	341	1
Manganese Total (wet weight)	ug/g	2.8	18.1	34.5	0.05
Molybdenum Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.1
Nickel Total (wet weight)	ug/g	<0.2	0.80	0.4	0.3
Phosphorus Total (wet weight)	ug/g	5740	6520	9360	1
Potassium Total (wet weight)	ug/g	4320	2550	2790	2
Selenium Total (wet weight)	ug/g	1.4	0.80	1.0	0.5
Silver Total (wet weight)	ug/g	<0.4	<0.4	<0.4	0.4
Sodium Total (wet weight)	ug/g	638	808	974	15
Strontium Total (wet weight)	ug/g	5.48	12.6	18.8	0.01
Titanium Total (wet weight)	ug/g	<0.1	0.68	0.56	0.1
Vanadium Total (wet weight)	ug/g	0.3	0.2	0.2	0.2
Zinc Total (wet weight)	ug/g	8.94	21.0	43.3	0.05
Zirconium Total (wet weight)	ug/g	0.2	0.3	0.4	0.05

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NWL Lot ID: **406715**
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	NWL Number	406715-25	406715-26	406715-27	
	Sample Description	R - 1 #3 / Slimy Sculpin	R - 1 #4 / Slimy Sculpin	R - 1 #5 / Slimy Sculpin	
	Matrix	Tissue	Tissue	Tissue	
Analyte	**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Metals Total					
Aluminum Total (wet weight)	ug/g	96.2	20.4	218	0.5
Antimony Total (wet weight)	ug/g	<1	<1	<1	1
Arsenic Total (wet weight)	ug/g	<0.3	<0.3	<0.3	0.4
Barium Total (wet weight)	ug/g	2.1	1.6	4.7	0.1
Beryllium Total (wet weight)	ug/g	<0.0049	<0.0049	<0.0049	0.01
Bismuth Total (wet weight)	ug/g	<1	<1	<1	2
Cadmium Total (wet weight)	ug/g	<0.05	<0.05	<0.05	0.05
Calcium Total (wet weight)	ug/g	9020	6480	11000	0.5
Chromium Total (wet weight)	ug/g	1.2	0.2	1.3	0.1
Cobalt Total (wet weight)	ug/g	<0.1	<0.1	0.2	0.1
Copper Total (wet weight)	ug/g	1.2	1.0	0.92	0.1
Iron Total (wet weight)	ug/g	155	45.1	448	0.2
Lead Total (wet weight)	ug/g	0.64	<0.5	<0.5	0.5
Lithium Total (wet weight)	ug/g	1.2	0.95	1.4	0.2
Magnesium Total (wet weight)	ug/g	312	275	425	1
Manganese Total (wet weight)	ug/g	26.4	13.7	32.1	0.05
Molybdenum Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.1
Nickel Total (wet weight)	ug/g	0.79	0.2	0.98	0.3
Phosphorus Total (wet weight)	ug/g	6320	5430	7420	1
Potassium Total (wet weight)	ug/g	2700	2930	2740	2
Selenium Total (wet weight)	ug/g	1.2	1.0	1.1	0.5
Silver Total (wet weight)	ug/g	<0.4	<0.4	<0.4	0.4
Sodium Total (wet weight)	ug/g	784	755	801	15
Strontium Total (wet weight)	ug/g	13.0	9.01	14.7	0.01
Titanium Total (wet weight)	ug/g	0.88	0.54	5.30	0.1
Vanadium Total (wet weight)	ug/g	0.3	0.3	0.75	0.2
Zinc Total (wet weight)	ug/g	22.5	33.1	30.4	0.05
Zirconium Total (wet weight)	ug/g	0.4	0.3	0.4	0.05

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	NWL Number	406715-28	406715-29	406715-30	
	Sample Description	R - 2 #1 / Slimy Sculpin	R - 2 #2 / Slimy Sculpin	R - 2 #3 / Slimy Sculpin	
	Matrix	Tissue	Tissue	Tissue	
Analyte	**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Metals Total					
Aluminum Total (wet weight)	ug/g	15.2	26.5	273	0.5
Antimony Total (wet weight)	ug/g	<2	<1	<1	1
Arsenic Total (wet weight)	ug/g	0.4	<0.3	<0.3	0.4
Barium Total (wet weight)	ug/g	3.0	3.3	7.24	0.1
Beryllium Total (wet weight)	ug/g	<0.0050	<0.0050	<0.005	0.01
Bismuth Total (wet weight)	ug/g	<2	<1	<1	2
Cadmium Total (wet weight)	ug/g	<0.05	<0.05	0.05	0.05
Calcium Total (wet weight)	ug/g	12700	8800	10600	0.5
Chromium Total (wet weight)	ug/g	0.3	0.2	1.1	0.1
Cobalt Total (wet weight)	ug/g	<0.1	<0.1	0.3	0.1
Copper Total (wet weight)	ug/g	1.5	0.87	1.8	0.1
Iron Total (wet weight)	ug/g	54.4	89.0	650	0.2
Lead Total (wet weight)	ug/g	0.50	<0.5	2.4	0.5
Lithium Total (wet weight)	ug/g	1.0	0.99	1.5	0.2
Magnesium Total (wet weight)	ug/g	354	305	421	1
Manganese Total (wet weight)	ug/g	30.7	27.4	62.5	0.05
Molybdenum Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.1
Nickel Total (wet weight)	ug/g	0.64	0.4	1.4	0.3
Phosphorus Total (wet weight)	ug/g	7580	6290	6660	1
Potassium Total (wet weight)	ug/g	2700	2770	2670	2
Selenium Total (wet weight)	ug/g	0.94	0.98	0.83	0.5
Silver Total (wet weight)	ug/g	<0.4	<0.4	<0.4	0.4
Sodium Total (wet weight)	ug/g	812	996	804	15
Strontium Total (wet weight)	ug/g	11.2	7.42	9.54	0.01
Titanium Total (wet weight)	ug/g	0.2	0.67	8.64	0.1
Vanadium Total (wet weight)	ug/g	0.2	0.3	0.98	0.2
Zinc Total (wet weight)	ug/g	39.3	35.2	68.7	0.05
Zirconium Total (wet weight)	ug/g	0.4	0.4	0.50	0.05

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	NWL Number	406715-31	406715-32	406715-33	
	Sample Description	R - 2 #4 / Slimy Sculpin	R - 2 #5 / Slimy Sculpin	R - 4 #1 / Slimy Sculpin	
	Matrix	Tissue	Tissue	Tissue	
Analyte	**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Metals Total					
Aluminum Total (wet weight)	ug/g	10.4	60.7	13.1	0.5
Antimony Total (wet weight)	ug/g	<1	<1	<1	1
Arsenic Total (wet weight)	ug/g	<0.3	<0.3	<0.3	0.4
Barium Total (wet weight)	ug/g	2.5	2.0	3.5	0.1
Beryllium Total (wet weight)	ug/g	<0.0049	<0.0050	<0.0050	0.01
Bismuth Total (wet weight)	ug/g	<1	<1	<1	2
Cadmium Total (wet weight)	ug/g	<0.05	<0.05	<0.05	0.05
Calcium Total (wet weight)	ug/g	13800	11000	12800	0.5
Chromium Total (wet weight)	ug/g	0.3	0.4	0.1	0.1
Cobalt Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.1
Copper Total (wet weight)	ug/g	1.1	0.97	0.70	0.1
Iron Total (wet weight)	ug/g	35.6	155	23.9	0.2
Lead Total (wet weight)	ug/g	0.58	0.61	<0.5	0.5
Lithium Total (wet weight)	ug/g	1.0	1.1	0.95	0.2
Magnesium Total (wet weight)	ug/g	328	338	309	1
Manganese Total (wet weight)	ug/g	31.9	41.4	58.8	0.05
Molybdenum Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.1
Nickel Total (wet weight)	ug/g	0.4	0.50	<0.2	0.3
Phosphorus Total (wet weight)	ug/g	8090	7020	7760	1
Potassium Total (wet weight)	ug/g	2680	2810	2610	2
Selenium Total (wet weight)	ug/g	1.0	1.2	0.73	0.5
Silver Total (wet weight)	ug/g	<0.4	<0.4	<0.4	0.4
Sodium Total (wet weight)	ug/g	882	794	987	15
Strontium Total (wet weight)	ug/g	12.7	8.57	11.5	0.01
Titanium Total (wet weight)	ug/g	<0.1	1.8	0.2	0.1
Vanadium Total (wet weight)	ug/g	0.2	0.4	0.2	0.2
Zinc Total (wet weight)	ug/g	56.5	59.1	38.1	0.05
Zirconium Total (wet weight)	ug/g	0.4	0.4	0.4	0.05

NORWEST LABS

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Attn: Doug Sedgwick
Sampled By:
Company:

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Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **406715**
Control Number: W 51468
Date Received: Sep 07, 2005
Date Reported: Sep 19, 2005
Report Number: 743693

	NWL Number	406715-34	406715-35	406715-36	
	Sample Description	R - 4 #2 / Slimy Sculpin	R - 4 #3 / Slimy Sculpin	R - 4 #4 / Slimy Sculpin	
	Matrix	Tissue	Tissue	Tissue	
Analyte	**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Metals Total					
Aluminum Total (wet weight)	ug/g	9.98	39.1	9.47	0.5
Antimony Total (wet weight)	ug/g	<2	<1	<1	1
Arsenic Total (wet weight)	ug/g	<0.4	<0.3	<0.3	0.4
Barium Total (wet weight)	ug/g	2.6	4.4	3.1	0.1
Beryllium Total (wet weight)	ug/g	<0.0050	<0.0049	<0.0050	0.01
Bismuth Total (wet weight)	ug/g	<2	<1	<1	2
Cadmium Total (wet weight)	ug/g	<0.05	<0.05	<0.05	0.05
Calcium Total (wet weight)	ug/g	10300	10400	12200	0.5
Chromium Total (wet weight)	ug/g	<0.1	0.2	0.2	0.1
Cobalt Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.1
Copper Total (wet weight)	ug/g	0.85	1.4	1.1	0.1
Iron Total (wet weight)	ug/g	27.5	78.7	19.4	0.2
Lead Total (wet weight)	ug/g	<0.5	0.56	<0.5	0.5
Lithium Total (wet weight)	ug/g	0.94	0.97	0.89	0.2
Magnesium Total (wet weight)	ug/g	277	290	311	1
Manganese Total (wet weight)	ug/g	31.4	60.5	50.0	0.05
Molybdenum Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.1
Nickel Total (wet weight)	ug/g	<0.2	0.73	<0.2	0.3
Phosphorus Total (wet weight)	ug/g	6730	6430	7610	1
Potassium Total (wet weight)	ug/g	2610	2540	2650	2
Selenium Total (wet weight)	ug/g	1.1	1.2	1.0	0.5
Silver Total (wet weight)	ug/g	<0.4	<0.4	<0.4	0.4
Sodium Total (wet weight)	ug/g	811	981	818	15
Strontium Total (wet weight)	ug/g	9.66	9.59	10.6	0.01
Titanium Total (wet weight)	ug/g	<0.1	1.1	<0.1	0.1
Vanadium Total (wet weight)	ug/g	0.2	0.3	0.2	0.2
Zinc Total (wet weight)	ug/g	47.8	45.4	55.5	0.05
Zirconium Total (wet weight)	ug/g	0.4	0.4	0.3	0.05

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	NWL Number	406715-37	406715-38	406715-39	
	Sample Description	R - 4 #5 / Slimy Sculpin	R - 6 #1 / Slimy Sculpin	R - 6 #2 / Slimy Sculpin	
	Matrix	Tissue	Tissue	Tissue	
Analyte	**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Metals Total					
Aluminum Total (wet weight)	ug/g	8.52	12.8	15.3	0.5
Antimony Total (wet weight)	ug/g	<1	<1	<1	1
Arsenic Total (wet weight)	ug/g	<0.4	<0.3	<0.3	0.4
Barium Total (wet weight)	ug/g	3.3	3.6	3.3	0.1
Beryllium Total (wet weight)	ug/g	<0.0050	<0.0049	<0.0050	0.01
Bismuth Total (wet weight)	ug/g	<1	<1	<1	2
Cadmium Total (wet weight)	ug/g	<0.05	0.06	0.08	0.05
Calcium Total (wet weight)	ug/g	14600	17600	12300	0.5
Chromium Total (wet weight)	ug/g	<0.1	0.1	1.0	0.1
Cobalt Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.1
Copper Total (wet weight)	ug/g	0.74	0.82	0.88	0.1
Iron Total (wet weight)	ug/g	14.6	24.9	38.2	0.2
Lead Total (wet weight)	ug/g	<0.5	<0.5	<0.5	0.5
Lithium Total (wet weight)	ug/g	0.96	1.0	0.85	0.2
Magnesium Total (wet weight)	ug/g	325	346	304	1
Manganese Total (wet weight)	ug/g	37.9	37.0	25.1	0.05
Molybdenum Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.1
Nickel Total (wet weight)	ug/g	<0.2	<0.2	0.55	0.3
Phosphorus Total (wet weight)	ug/g	8510	9680	7470	1
Potassium Total (wet weight)	ug/g	2750	2570	2690	2
Selenium Total (wet weight)	ug/g	1.0	1.2	1.4	0.5
Silver Total (wet weight)	ug/g	<0.4	<0.4	<0.4	0.4
Sodium Total (wet weight)	ug/g	836	1020	863	15
Strontium Total (wet weight)	ug/g	13.0	13.4	9.94	0.01
Titanium Total (wet weight)	ug/g	<0.1	0.1	0.3	0.1
Vanadium Total (wet weight)	ug/g	0.2	0.2	0.3	0.2
Zinc Total (wet weight)	ug/g	62.6	60.2	37.0	0.05
Zirconium Total (wet weight)	ug/g	0.4	0.4	0.3	0.05

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			NWL Number	406715-40	406715-41	406715-42	
			Sample Description	R - 6 #3 / Slimy Sculpin	R - 6 #4 / Slimy Sculpin	R - 6 #5 / Slimy Sculpin	
			Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**		**Results**	**Results**	**Results**	**Detection Limit**
Metals Total							
Aluminum	Total (wet weight)	ug/g		19.6	17.4	34.4	0.5
Antimony	Total (wet weight)	ug/g		<1	<1	<1	1
Arsenic	Total (wet weight)	ug/g		<0.3	<0.3	0.5	0.4
Barium	Total (wet weight)	ug/g		3.4	2.5	3.8	0.1
Beryllium	Total (wet weight)	ug/g		<0.0049	<0.0050	<0.005	0.01
Bismuth	Total (wet weight)	ug/g		<1	<1	<1	2
Cadmium	Total (wet weight)	ug/g		0.09	0.08	0.07	0.05
Calcium	Total (wet weight)	ug/g		14800	10200	13100	0.5
Chromium	Total (wet weight)	ug/g		<0.1	0.4	0.3	0.1
Cobalt	Total (wet weight)	ug/g		<0.1	<0.1	<0.1	0.1
Copper	Total (wet weight)	ug/g		1.1	0.88	1.2	0.1
Iron	Total (wet weight)	ug/g		35.8	34.8	196	0.2
Lead	Total (wet weight)	ug/g		<0.5	<0.5	<0.5	0.5
Lithium	Total (wet weight)	ug/g		0.98	0.86	0.90	0.2
Magnesium	Total (wet weight)	ug/g		360	291	308	1
Manganese	Total (wet weight)	ug/g		21.7	24.4	23.9	0.05
Molybdenum	Total (wet weight)	ug/g		<0.1	<0.1	0.1	0.1
Nickel	Total (wet weight)	ug/g		<0.2	0.4	0.4	0.3
Phosphorus	Total (wet weight)	ug/g		8760	6790	7520	1
Potassium	Total (wet weight)	ug/g		2810	2580	2700	2
Selenium	Total (wet weight)	ug/g		1.3	1.4	1.3	0.5
Silver	Total (wet weight)	ug/g		<0.4	<0.4	<0.4	0.4
Sodium	Total (wet weight)	ug/g		937	982	918	15
Strontium	Total (wet weight)	ug/g		10.7	7.97	10.2	0.01
Titanium	Total (wet weight)	ug/g		0.4	0.4	0.69	0.1
Vanadium	Total (wet weight)	ug/g		0.3	0.2	0.51	0.2
Zinc	Total (wet weight)	ug/g		32.9	29.8	35.5	0.05
Zirconium	Total (wet weight)	ug/g		0.4	0.3	0.4	0.05

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			NWL Number	406715-43	406715-44	406715-45	
			Sample Description	V - 8 #1 / Slimy Sculpin	V - 8 #2 / Slimy Sculpin	V - 8 #3 / Slimy Sculpin	
			Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**		**Results**	**Results**	**Results**	**Detection Limit**
Metals Total							
Aluminum	Total (wet weight)	ug/g		37.8	28.7	27.8	0.5
Antimony	Total (wet weight)	ug/g		<1	<1	<1	1
Arsenic	Total (wet weight)	ug/g		<0.3	<0.3	<0.3	0.4
Barium	Total (wet weight)	ug/g		1.8	1.6	1.5	0.1
Beryllium	Total (wet weight)	ug/g		<0.0049	<0.0050	<0.0049	0.01
Bismuth	Total (wet weight)	ug/g		<1	<1	<1	2
Cadmium	Total (wet weight)	ug/g		0.2	0.2	0.1	0.05
Calcium	Total (wet weight)	ug/g		8320	10700	6730	0.5
Chromium	Total (wet weight)	ug/g		0.2	0.1	<0.1	0.1
Cobalt	Total (wet weight)	ug/g		<0.1	<0.1	<0.1	0.1
Copper	Total (wet weight)	ug/g		1.0	1.1	0.92	0.1
Iron	Total (wet weight)	ug/g		75.0	50.3	48.9	0.2
Lead	Total (wet weight)	ug/g		<0.5	<0.5	<0.5	0.5
Lithium	Total (wet weight)	ug/g		0.83	0.94	0.80	0.2
Magnesium	Total (wet weight)	ug/g		297	301	272	1
Manganese	Total (wet weight)	ug/g		6.24	5.12	8.03	0.05
Molybdenum	Total (wet weight)	ug/g		<0.1	<0.1	<0.1	0.1
Nickel	Total (wet weight)	ug/g		0.3	0.3	<0.2	0.3
Phosphorus	Total (wet weight)	ug/g		5980	7080	5480	1
Potassium	Total (wet weight)	ug/g		2770	2690	2700	2
Selenium	Total (wet weight)	ug/g		3.4	2.4	2.8	0.5
Silver	Total (wet weight)	ug/g		<0.4	<0.4	<0.4	0.4
Sodium	Total (wet weight)	ug/g		756	895	986	15
Strontium	Total (wet weight)	ug/g		8.94	10.5	7.79	0.01
Titanium	Total (wet weight)	ug/g		0.79	0.56	0.66	0.1
Vanadium	Total (wet weight)	ug/g		0.3	0.3	0.2	0.2
Zinc	Total (wet weight)	ug/g		48.0	48.0	44.6	0.05
Zirconium	Total (wet weight)	ug/g		0.4	0.4	0.3	0.05

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			NWL Number	406715-46	406715-47	406715-48	
			Sample Description	V - 8 #4 / Slimy Sculpin	V - 8 #5 / Slimy Sculpin	B - 1 #1 / Slimy Sculpin - Multiple Fish / Sample	
			Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**		**Results**	**Results**	**Results**	**Detection Limit**
Metals Total							
Aluminum	Total (wet weight)	ug/g		35.3	30.4	968	0.5
Antimony	Total (wet weight)	ug/g		<1	<1	<1	1
Arsenic	Total (wet weight)	ug/g		<0.3	<0.3	<0.3	0.4
Barium	Total (wet weight)	ug/g		2.6	1.9	3.9	0.1
Beryllium	Total (wet weight)	ug/g		<0.0050	<0.0050	<0.0050	0.01
Bismuth	Total (wet weight)	ug/g		<1	<1	<1	2
Cadmium	Total (wet weight)	ug/g		0.2	0.2	0.08	0.05
Calcium	Total (wet weight)	ug/g		14400	10400	9040	0.5
Chromium	Total (wet weight)	ug/g		<0.1	<0.1	1.6	0.1
Cobalt	Total (wet weight)	ug/g		<0.1	<0.1	<0.1	0.1
Copper	Total (wet weight)	ug/g		0.82	0.90	2.0	0.1
Iron	Total (wet weight)	ug/g		51.0	52.6	54.5	0.2
Lead	Total (wet weight)	ug/g		<0.5	<0.5	<0.5	0.5
Lithium	Total (wet weight)	ug/g		1.0	0.92	0.82	0.2
Magnesium	Total (wet weight)	ug/g		366	302	297	1
Manganese	Total (wet weight)	ug/g		11.4	6.05	8.53	0.05
Molybdenum	Total (wet weight)	ug/g		<0.1	<0.1	<0.1	0.1
Nickel	Total (wet weight)	ug/g		<0.2	0.2	0.3	0.3
Phosphorus	Total (wet weight)	ug/g		8990	6570	5970	1
Potassium	Total (wet weight)	ug/g		2810	2680	2560	2
Selenium	Total (wet weight)	ug/g		2.4	1.9	1.9	0.5
Silver	Total (wet weight)	ug/g		<0.4	<0.4	<0.4	0.4
Sodium	Total (wet weight)	ug/g		842	1000	889	15
Strontium	Total (wet weight)	ug/g		14.2	11.4	11.6	0.01
Titanium	Total (wet weight)	ug/g		0.66	0.75	1.2	0.1
Vanadium	Total (wet weight)	ug/g		0.4	<0.2	0.4	0.2
Zinc	Total (wet weight)	ug/g		49.8	37.9	28.1	0.05
Zirconium	Total (wet weight)	ug/g		0.4	0.4	0.4	0.05

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	NWL Number	406715-49	406715-50	406715-51	
	Sample Description	B - 1 #2 / Slimy Sculpin - Multiple Fish / Sample	B - 1 #3 / Slimy Sculpin - Multiple Fish / Sample	B - 1 #4 / Slimy Sculpin - Multiple Fish / Sample	
	Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Metals Total						
Aluminum	Total (wet weight)	ug/g	17.6	14.7	19.9	0.5
Antimony	Total (wet weight)	ug/g	<1	<1	<1	1
Arsenic	Total (wet weight)	ug/g	<0.3	<0.3	0.4	0.4
Barium	Total (wet weight)	ug/g	4.4	4.2	2.9	0.1
Beryllium	Total (wet weight)	ug/g	<0.0049	<0.0050	<0.0050	0.01
Bismuth	Total (wet weight)	ug/g	<1	<1	<1	2
Cadmium	Total (wet weight)	ug/g	<0.05	0.1	0.06	0.05
Calcium	Total (wet weight)	ug/g	10400	9810	7580	0.5
Chromium	Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.1
Cobalt	Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.1
Copper	Total (wet weight)	ug/g	0.91	0.74	0.96	0.1
Iron	Total (wet weight)	ug/g	32.3	29.4	33.0	0.2
Lead	Total (wet weight)	ug/g	<0.5	<0.5	<0.5	0.5
Lithium	Total (wet weight)	ug/g	0.84	0.82	0.73	0.2
Magnesium	Total (wet weight)	ug/g	295	296	293	1
Manganese	Total (wet weight)	ug/g	9.85	7.53	7.53	0.05
Molybdenum	Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.1
Nickel	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.3
Phosphorus	Total (wet weight)	ug/g	6580	6530	5680	1
Potassium	Total (wet weight)	ug/g	2680	2740	2650	2
Selenium	Total (wet weight)	ug/g	1.6	1.7	1.6	0.5
Silver	Total (wet weight)	ug/g	<0.4	<0.4	<0.4	0.4
Sodium	Total (wet weight)	ug/g	774	804	889	15
Strontium	Total (wet weight)	ug/g	13.5	13.8	9.87	0.01
Titanium	Total (wet weight)	ug/g	0.3	0.2	0.73	0.1
Vanadium	Total (wet weight)	ug/g	0.2	0.2	0.2	0.2
Zinc	Total (wet weight)	ug/g	26.1	23.8	20.1	0.05
Zirconium	Total (wet weight)	ug/g	0.3	0.3	0.3	0.05

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	NWL Number	406715-52	406715-53	406715-54	
	Sample Description	B - 1 #5 / Slimy Sculpin - Multiple Fish / Sample	R6 / Slimy Sculpin	R7 / Slimy Sculpin	
	Matrix	Tissue	Tissue	Tissue	
Analyte	**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Metals Total					
Aluminum Total (wet weight)	ug/g	76.8	11.4	9.41	0.5
Antimony Total (wet weight)	ug/g	<2	<1	<1	1
Arsenic Total (wet weight)	ug/g	<0.4	<0.3	<0.3	0.4
Barium Total (wet weight)	ug/g	6.78	4.1	3.3	0.1
Beryllium Total (wet weight)	ug/g	<0.0050	<0.0050	<0.0050	0.01
Bismuth Total (wet weight)	ug/g	<2	<1	<1	2
Cadmium Total (wet weight)	ug/g	0.1	<0.05	<0.05	0.05
Calcium Total (wet weight)	ug/g	14500	15300	14000	0.5
Chromium Total (wet weight)	ug/g	0.2	<0.1	<0.1	0.1
Cobalt Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.1
Copper Total (wet weight)	ug/g	1.0	0.72	0.62	0.1
Iron Total (wet weight)	ug/g	124	19.6	16.0	0.2
Lead Total (wet weight)	ug/g	<0.5	<0.5	<0.5	0.5
Lithium Total (wet weight)	ug/g	1.0	0.94	0.88	0.2
Magnesium Total (wet weight)	ug/g	353	345	335	1
Manganese Total (wet weight)	ug/g	9.93	86.1	55.8	0.05
Molybdenum Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.1
Nickel Total (wet weight)	ug/g	0.4	<0.2	<0.2	0.3
Phosphorus Total (wet weight)	ug/g	8160	9070	8160	1
Potassium Total (wet weight)	ug/g	2500	2750	2680	2
Selenium Total (wet weight)	ug/g	1.0	0.92	0.96	0.5
Silver Total (wet weight)	ug/g	<0.4	<0.4	<0.4	0.4
Sodium Total (wet weight)	ug/g	842	911	948	15
Strontium Total (wet weight)	ug/g	16.8	15.9	12.6	0.01
Titanium Total (wet weight)	ug/g	2.3	<0.1	<0.1	0.1
Vanadium Total (wet weight)	ug/g	0.5	0.2	<0.2	0.2
Zinc Total (wet weight)	ug/g	32.2	59.4	57.6	0.05
Zirconium Total (wet weight)	ug/g	0.4	0.4	0.4	0.05

Approved by: C William Warning

Bill Warning, B.Sc.
Lab Operations Manager

Norwest Labs
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Methodology and Notes

Bill to: Deloitte & Touche Inc.
Report to: Deloitte & Touche Inc.
Box 29
Suite 1900, 79 Wellington St. W.
Toronto, ON, Canada
M5K 1B9
Attn: Doug Sedgwick
Sampled By:
Company:

Project ID: Faro Aquatic Effects Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **406715**
Control Number: W 51468
Date Received: Sep 07, 2005
Date Reported: Sep 19, 2005
Report Number: 743693

Method of Analysis:

MethodName	Reference	Method	Date Analysis Started	Location
Metals (Total) in tissue (Surrey)	US EPA	Metals & Trace Elements by ICP-AES, 6010B	16-Sep-05	Norwest Labs Surrey

* Norwest method(s) is 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
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Faro Aquatics Metal Samples 2005

	Fork Lgth	Rnd Wt	Sex/Mat	Stomach	contents			
Site R-1 R	Slimy Sculpin							
ss#1	99 mm	11 gm						
ss#2	99 mm	11 gm						
ss#3	94 mm	10.5 gm						
ss#4	102 mm	10.8 gm						
ss#5	98 mm	10.8 gm						
Site R-1 R	Arctic Grayling							
ag#1	260 mm	184 gm	M7	F=5	3=ss,2 ui	F=20	5= caddis fly	
ag#2	249 mm	150 gm	F1	F=0			3= fish (ss)	
ag#3	269 mm	213 gm	M7	F=0			5= salmon eggs	
ag#4	282 mm	229 gm	F1	F=5	5=cadis		7= unidentified	
ag#5	269mm	323 gm	M7	F=10	5= salmon eggs, 5=ui muck			
Site R-2 R	Slimy Sculpin							
	Fork Lgth	Rnd Wt						
ss#1	103 mm	14 gm						
ss#2	110 mm	14 gm						
ss#3	112 mm	13.6 gm						
ss#4	107 mm	15 gm						
ss#5	95, 85 mm	7.1 + 6.3 gm						
Site R-2 R	Arctic Grayling							
no Arctic Grayling from site R-2 during 2005 sampling								
Site R-4 R	Slimy Sculpin							
	Fork Lgth	Rnd Wt						
ss#1	92 mm	10.2 gm						
ss#2	96 mm	10.1 gm						
ss#3	94 mm	7.7 gm						
ss#4	85, 84 mm	12.0 gm total		composite of 2 fish in sample				
ss#5	76, 80 mm	9.0 gm total		composite of 2 fish in sample				
Site R-4 R	Arctic Grayling		Sex/Mat	Stomach	Contents			
ag#1	350 mm	469 gm	M7	F=10	10= lg.cad	F=45	39= caddis fly	
ag#2	348 mm	425 gm	M7	F=10	8= cad, 2=ant		4= ant	
ag#3	358 mm	377 gm	M7	F=10	10=cad		2= bee	
ag#4	339 mm	393 gm	F2	F=5	2=bee, 2=ant, 1=cad			
ag#5	325 mm	384 gm	F2	F=10	10=cad			
Site R-6 R	Slimy Sculpin							
	Fork Lgth	Rnd Wt						
ss#1	97 mm	8.0 gm						
ss#2	87, 83 mm	5.6 + 5.4 gm		composite of 2 fish in sample				
ss#3	84, 89 mm	5.3 +4.9 gm		composite of 2 fish in sample				
ss#4	79, 73 mm	4.7 +4.4 gm		composite of 2 fish in sample				
ss#5	71, 69, 70	3.2 + 2.8 + 3.3 gm		composite of 3 fish in sample	sample ss#5 not analzed for metal content			
ss#6	97 mm	9.9 gm						
Site R-6 R	Arctic Grayling							
ag#1	362 mm	536 gm	M7	F= 20	10=ants, 5=bee/wasp, 5=cad, tr=green worm	F=25	10= caddis fly	
ag#2	282 mm	232 gm	M7	F=5	5=cad		10= ant	
a total of 2 Arctic grayling were sampled from site R-6 during 2005							5= bees/wasp	
							tr green worm	
Site B-1 Bli	Slimy Sculpin							
	Fork Lgth		*Weights for Blind Creek slimy sculpin samples were not obtained*					
ss#1	81, 79 mm mm			composite of 2 fish in sample				
ss#2	74, 72 mm			composite of 2 fish in sample				
ss#3	76, 67, 43 mm			composite of 3 fish in sample				
ss#4	61, 52, 36, 54 mm			composite of 4 fish in sample				
ss#5	82 mm							
Site B-1 Bli	Arctic Grayling							
ag#1	290 mm	226 gm	M7	F=10	10=cad, tr=wasp	F=40	25= cad	63%
ag#2	294 mm	230 gm	F2	F=5	5=wasp		7= wasp	18%
ag#3	264 mm	168 gm	M6	F=5	5=cad		8= fish rem	20%
ag#4	296 mm	229 gm	M7	F=10	8= ui fish remains, 2=wasp			
ag#5	357 mm	402 gm	M7	F=10	10=cad			

Site V-8 Va Slimy Sculpin

	Fork Lgth	Rnd Wt	
ss#1	92 mm	10.5 gm	
ss#2	90 mm	9.4 gm	
ss#3	79 mm	7.0 gm	
ss#4	71, 74 mm	3.7 + 4.4 gm	composite of 2 fish in sample
ss#5	70, 65 mm	3.9 + 3.3 gm	composite of 2 fish in sample

Site V-8 Va Arctic Grayling

ag#1	275 mm	236 gm	M7	F=5	5=ui	F=32	10=caddis fly	31%
ag#2	262 mm	172 gm	M7	F=2	2=beetles		2= beetles	6%
ag#3	285 mm	231 gm	M7	F=5	5=cad		15= fish (10= Ag, 5= jc	46%
ag#4	329 mm	391 gm	F2	F=trace	tr=cad/wasp		5=unidentified	17%
ag#5	320 mm	332 gm	M7	F=20	10=Ag (3 juv), 5=1 jcs, 5=cad			

sex and maturity index
F1 =immature female
F2 = mature female
F3 = gravid female
F4 = ripe female
F5 = spent female

M6 = immature male
M7 = mature male
M8 = gravid male
M9 = ripe male
M10 = spent male

Stomach Contents
Stomach content fullness based on a scale of 20 points with 0 being empty and 20 being full, 25 represents disten
points are awarded to content items based on estimated percentage of contents

Stomach Content Summary

R1
F=20
5= caddis fly
3= fish (ss)
5= salmon eggs
7= unidentified

R4
F=45
39= caddis fly
4= ant
2= bee

R6
F=25
10= caddis fly
10= ant
5= bees/wasp
tr green worm

B1
F=40
25= cad
7= wasp
8= fish remains

V8
F=32
10=caddis fly
2= beetles
15= fish (10= Ag, 5= jcs)
5=unidentified

Total for all sites

F=162	89= Caddis fly	55%
	14= ants	8.60%
	14= bees/ wasps	8.60%
	28= fish (10 Ag, 5 jcs, 3 SS, 8 UI)	17.30%
	5= salmon eggs	3.10%
	12= unidentified	7.40%
	2= beetles	1.20%

2005 Aquatic Life Minnow Trapping Catch Records

Location	date set	date lift	time set	time lift	soak time s	catch s. sculpin	A.grayling	burbot	jcs	JCS +1	CPUE	comments
Site R1; Rose Creek South Fork above confluence with North Fork Rose												
R1-1	Aug. 17	Aug. 18	1730	1130	18	0	0	0	0	0		10m u/s confluence with NFRose, bed rock
R1-2	Aug. 17	Aug. 18	1730	1130	18	0	0	0	0	0		8m u/s conf. NFR, grassy cut bank
R1-3	Aug. 17	Aug. 18	1733	1135	18	0	0	0	0	0		25m u/s confl.,lg bldr side flow
R1-4	Aug. 17	Aug. 18	1733	1135	18	1	0	0	0	0		28m u/s confl, side flow, cut bank, willows
R1-5	Aug. 17	Aug. 18	1735	1140	18.1	0	0	0	0	0		35m u/s conf,lg bldr, side flow
R1-6	Aug. 17	Aug. 18	1740	1145	18.1	0	0	0	0	0		50m u/s confl, willow sweep cut bank
R1-7	Aug. 17	Aug. 18	1740	1150	18.2	0	0	0	0	0		60m u/s conf. side flow, gravel, cut bank
R1-8	Aug. 17	Aug. 18	1745	1151	18.1	1	0	0	0	0		70m u/s confl. Btm of isle, bldrs
R1-9	Aug. 17	Aug. 18	1745	1151	18.1		2					top of isle willow cover
R1-2005 total catch for 9 traps						1	2	0	0	0		
Site R2; Rose Creek below the confluence with the Tailings Discharge Channel												
R2-1	Aug. 18	Aug. 19	1900	1100	16	0	0	0	0	0		RB at discharge chan, rb
R2-2	Aug. 18	Aug. 19	1900	1100	16	0	0	1	1	0		10m d/s OL, LOD, rb
R2-3	Aug. 18	Aug. 19	1900	1100	16	0	0	1	1	0		45m d/s OL cut bank,rb
R2-4	Aug. 18	Aug. 19	1900	1100	16	1	0	0	2	0		60m d/s OL collapsed bankrb
R2-5	Aug. 18	Aug. 19	1905	1055	15.8	0	0	2	0	0		80m d/s OL pool edge, rb
R2-6	Aug. 18	Aug. 19	1905	1050	15.7	0	0	0	0	0		105m d/s OL undercut bank, lb
R2-7	Aug. 18	Aug. 19	1910	1055	15.7	1	0	0	1	0		110m d/s OL gravel, rb
R2-8	Aug. 18	Aug. 19	1910	1050	15.6	0	0	0	0	0	wash out	115m d/s OL cut bank, willows rb
R2-9	Aug. 18	Aug. 19	1910	1050	15.6	0	0	0	0	0		
R2- 2005 total catch for 9 traps						2	0	4	5			
Site R4; Rose Creek immediately upstream of the confluence with Anvil Creek												
R4-1	Aug. 17	Aug.18	1130	1345	26.3	0	0	0	0	0		d/s end of reach, lb
R4-2	Aug. 17	Aug.18	1130	1345	26.3	0	0	0	0	0		d/s end of reach, corner pool, rb
R4-3	Aug. 17	Aug.18	1135	1345	26.2	0	0	0	0	0		10m u/s r#2, log, corner pool, rb
R4-4	Aug. 17	Aug.18	1140	1345	26.1	0	0	0	0	0		25m u/s #2, LOD, bank set, rb
R4-5	Aug. 17	Aug.18	1145	1345	26	0	0	0	0	0		20m u/s #4, willow over, rb
R4-6	Aug. 17	Aug.18	1145	1345	26	0	0	0	0	0		10m u/s #5, mid chan,bldrs
R4-7	Aug. 17	Aug.18	1150	1350	26	1	0	0	0	0		20m u/s #5, grass cut bank, rb
R4-8	Aug. 17	Aug.18	1150	1355	26.1	2	0	0	0	0		5m u/s #7, grass cut bank, rb
R4-9	Aug. 17	Aug.18	1155	1355	26	0	0	0	0	0		10m d/s #2, rb
R4 2005 total catch for 9 traps						3	0	0	0	0		

Site R6; Anvil Creek immediately upstream of the confluence with Rose Creek

R6-1	Aug. 17	Aug.18	1225	1355	25.5	0	0	0	0	0	10m below reach, rb
R6-2	Aug. 17	Aug.18	1230	1400	25.5	0	0	0	0	0	btm of reach, rb
R6-3	Aug. 17	Aug.18	1230	1400	25.5	0	0	0	0	0	20m u/s #2, rb
R6-4	Aug. 17	Aug.18	1235	1400	25.4	0	0	0	0	0	10m into lb side chan
R6-5	Aug. 17	Aug.18	1240	1405	25.3	1	0	0	0	0	top lb, side chan
R6-6	Aug. 17	Aug.18	1240	1405	25.3	0	0	0	0	0	just below lb side chan
R6-7	Aug. 17	Aug.18	1245	1410	25.3	0	0	0	0	0	above mid chan bldr, lb
R6-8	Aug. 17	Aug.18	1245	1410	25.4	1	0	0	0	0	20m u/s #7, lb
R6-9	Aug. 17	Aug.18	1300	1412	25.2	0	0	0	0	0	10m u/s #9,lb
						2					
V8-1	Aug.17	Aug. 18	815	900	24.7	0	0	0	64	0	5m u/s sewage pipe, rb
V8-2	Aug.17	Aug. 18	820	905	24.6	0	0	0	18	0	30m u/s #1, side bldr pool, rb
V8-3	Aug.17	Aug. 18	820	911	24.7	0	0	0	24	0	45m u/s #1, sweeper and LOD, rb
V8-4	Aug.17	Aug. 18	815	918	24	0	0	0	17	0	55m u/s #1, mid chan , sand
V8-5	Aug.17	Aug. 18	820	923	24	0	0	0	12	0	75m u/s #1, side flow, bldrs, sand, lb
V8-6	Aug.17	Aug. 18	830	926	24	0	0	0	5	0	85m u/s #1, side pool, org debri, lb
V8-7	Aug.17	Aug. 18	825	929	24	0	0	0	2	0	75m u/s #1, willow sweep, lb
V8-8	Aug.17	Aug. 18	825	934	24.1	0	0	0	7	0	100m u/s #1, mid chan near rock face
V8-9	Aug.17	Aug. 18	830	940	24.1	0	0	0	15	0	130m u/s #1, across from rock face, lb
total									164	average= 18.2	
B1-1	Aug. 14	Aug. 15	1920	1245	17.4	1	0	0	21	0	15m u/s bridge, lb
B1-2	Aug. 14	Aug. 15	1920	1240	17.3	0	0	0	94	0	15m u/s br, rb
B1-3	Aug. 14	Aug. 15	1925	1225	17	0	0	0	0	0	30m u/s br, rb
B1-4	Aug. 14	Aug. 15	1925	1225	17	0	0	0	54	3	30m u/s br, lb
B1-5	Aug. 14	Aug. 15	1930	1230	17	0	0	0	27	0	45m u/s br, lb
B1-6	Aug. 14	Aug. 15	1920	1225	17.1	0	0	0	45	0	45m u/s br, rb
B1-7	Aug. 14	Aug. 15	1920	1220	17	0	0	0	5	0	55m u/s br, lb
B1-8	Aug. 14	Aug. 15	1925	1220	16.9	0	0	0	110	0	80m u/s br, lb
B1-9	Aug. 14	Aug. 15	1920	1200	16.7	1	0	0	48	0	80m u/s br, rb
B1-10	Aug. 14	Aug. 15	1920	1245	17.4	0	0	0	57	0	under br sub trees, lb
B1-11	Aug. 14	Aug. 15	1920	1245	17.4	0	0	0	52	0	under br, sub trees, lb
B1-12	Aug. 14	Aug. 15	1930	1245	17.3	0	0	0	19	0	under br, LOD, rb
B1-13	Aug. 14	Aug. 15	1930	1250	17.3	1	0	0	21	0	under br, stick jam, rb
B1-14	Aug. 14	Aug. 15	1940	1300	17.3	0	0	0	36	0	30m d/s br, rb
B1-15	Aug. 14	Aug. 15	1940	1300	17.3	0	1	0	107	2	40m d/s br, rb
B1-16	Aug. 14	Aug. 15	1940	1300	17.3	0	1	0	98	1	15m d/s br, lb
B1-17	Aug. 14	Aug. 15	1920	1300	17.7	0	0	0	120	0	18m d/s br, lb
B1-18	Aug. 14	Aug. 15	1940	1305	17.4	0	0	0	27	0	21m d/s br, lb
B1-19	Aug. 14	Aug. 15	1920	1305	17.7	0	0	0	0	0	
B1-20	Aug. 14	Aug. 15	1945	1305	17.3	1	0	0	51	0	
B1-21	Aug. 14	Aug. 15	1950	1310	17.4	0	0	0	42	0	
B1-22	Aug. 14	Aug. 15	2000	1310	17.1	0	0	0	5	0	
B1-23	Aug. 14	Aug. 15	2000	1310	17.1	0	0	0	5	0	
B1-24	Aug. 14	Aug. 15	2000	1310	17.1	0	0	0	1	0	
B1-25	Aug. 14	Aug. 15	2000	1315	17.2	1	0	0	0	0	
B1-26	Aug. 14	Aug. 15	2000	1315	17.2	1	0	0	0	0	
B1 2005 total catch for 26 traps					17.22692	6	2	0	1045	6	
								average	40.19231		

Fork lengths from jcs taken in trap B1-11

64	
53	average= 60.7
59	range= 46 to 75
74	n= 49
58	
68	
63	
62	
58	
46	
67	
51	
61	
66	
62	
63	
59	
61	
64	
69	
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64	
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59	
59	
62	
52	
61	
55	
59	
54	

Fork lengths and weights for jcs 1+ from B1

mm	wt
110	9
98	8
102	10
98	
120	
105	
average	105.5

Fork lengths for jcs from V8-9

91	
75	
74	average=73.57mm
76	n= 15
79	range = 60-91mm
78	
74	
66	
70	
73	
60	
73	
71	
70	

Anvil Range Mine Adaptive Management Plan - Annual Review for 2005



Prepared for:
Deloitte & Touche Inc.
(acting as the Court Appointed Interim Receiver for Anvil Range Mining Corporation)

Prepared by:
Gartner Lee Limited

Reference:
GLL 50642

Date:
February 2006

Distribution:
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10 Deloitte & Touche Inc.
2 Gartner Lee Limited

Gartner Lee

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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 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. 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 2005 activities:

1. Degraded Groundwater Quality in Rose Creek Valley Aquifer;
   One new trigger activated in 2005 for dissolved iron at X24A.
2. Degraded Water Quality in Vangorda Creek Downstream of the Mine Facilities;
   One trigger was activated in 2005 for sulphate. Data analysis demonstrated that this trigger was due to seasonal variation in sulphate. It is recommended that the sulphate trigger be modified to include two seasonal components: winter (November – April) 171 mg/L and open water (May – October) 75 mg/L).
3. Degraded Water Quality in Rose Creek Downstream of the Mine Facilities;
   Two triggers were activated in 2005 for sulphate and zinc. Data analysis demonstrated that this was an isolated event that was caused by relatively low flow conditions during a period of release of (compliant) effluent in March. It is recommended that the AMP Protocol be modified such that during periods of discharge and weekly sample collected that monthly average values be used for data review.

4. Degraded Seepage Quality from the Grum Rock Dump;
   No new triggers in 2005.
5. Degraded Water Quality in the North Fork of Rose Creek;
   One trigger was activated in 2005 for sulphate. Data analysis demonstrated that this trigger was due to seasonal variation in sulphate. It is recommended that the sulphate trigger be modified to include two seasonal components: winter (November – April) 29.5 mg/L and open water (May – October) 14.8 mg/L).
6. Water level in Grum Pit Reaches Maximum Desired Elevation;
   No triggers were activated in 2005.
7. Disruption of Fannin Sheep Migration Through the Mine Site; and
   No triggers were activated in 2005.
8. Wind Dispersed Tailings Result in Adverse Effects in the Terrestrial Environment.
   No triggers were activated in 2005.

Other than the specific recommendations listed above, the AMP program functioned as intended in 2005 and no other changes should be made.

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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.

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. 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 (i.e., to 2008).

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 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 2005, 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 the ongoing hydrogeological and geochemical investigations of the Rose Creek Tailings Facility and the Rose Creek Valley Aquifer. Further, certain monitoring wells are monitored a total of four times per year, specifically as part of the AMP.

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 location 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, iron 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
$Zn_{(D)}$, $Fe_{(D)}$, SO_4	X24, X25	• 3 consecutive results > upper 75 percentile of reference period; or • statistically significant trend projects > 75^{th} percentile of reference period within 3 years.	Quarterly
	P03-04, -08 and -09	• statistically significant trend.	Quarterly

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 Follow Up to 2004 Review

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 X24A, X24C and X24D;*
2. *Dissolved zinc in X24D; and*
3. *Dissolved iron in monitoring wells X25A and X25B.*

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 developed by Robertson Geoconsultants as part of the closure planning studies. The fundamental outcome of this modeling exercise was to determine it 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. Details of the predictive modeling are presented in Appendix A. The following provides a summary of the results of predictive modeling.

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 input concentrations used for the four scenarios are summarized in Table 2-1.

Table 2-1. Summary of Model Inputs

Run	Description	Input Concentrations (mg/L)			
		North Aquifer – X24		South Aquifer – X25	
		Sulphate	Dissolved Zinc	Sulphate	Dissolved Zinc
Fall 2004	Base Case	1302	0.033	334	0.006
Sens 1	20% Increase	1562	0.040	401	0.007
Sens 2	50% Increase	1953	0.050	501	0.009
Sens 3	100% Increase	2604	0.066	668	0.012

The model output for calculated sulphate and dissolved zinc concentrations are provided in Table 2-2 for three locations below the Cross Valley Dam:

- X13 – combined toe seepage at Cross Valley Dam;
- X14 – Rose Creek Downstream of X13 input; and
- RC9 – Rose Creek upstream of Next Creek.

Table 2-2. Summary of Model Output – Concentrations (mg/L)

Run	Description	Calculated Concentrations (mg/L)					
		X13		X14		RC9	
		Sulphate	Dissolved Zinc	Sulphate	Dissolved Zinc	Sulphate	Dissolved Zinc
Fall 2004	Base Case	908	0.03	138	0.03	128	0.039
Sens 1	20% Increase	1078	0.04	157	0.04	146	0.04
Sens 2	50% Increase	1332	0.05	187	0.04	173	0.04
Sens 3	100% Increase	1756	0.06	237	0.041	218	0.041

The time of travel for sulphate, assumed to be a conservative solute, from the Intermediate Dam to the toe of the Cross Valley Dam is estimated to be in the order of 2 years. Therefore, the estimated sulphate concentrations would apply approximately two years from the fall of 2004 around 2006 / 2007. As discussed in Appendix A, zinc is a potentially reactive constituent and therefore the predicted zinc concentrations for the base case may not materialize until 2008 to 2018.

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 with in 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 then ongoing monitoring and assessment of all related water quality data. Potential longer-term issues are beyond the scope of this Adaptive Management Plan and are being investigated as part of the development of the Final Closure and Reclamation Plan.

2.4 2005 Review

The ongoing management review of the relevant groundwater quality data from X24 and X25 at the toe of the Intermediate Dam was carried out on four occasions in 2005: June, July, September and November. This data review included assessment of the two following specific thresholds for dissolved iron, 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.

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 also carried out on four occasions in 2005: June, July, September and November. This data review included an assessment of the following specific threshold for dissolved iron, dissolved zinc and sulphate:

- A statistically significant trend in the groundwater monitoring results with a requirement of a minimum of 4 results.

The results of the review are summarized in Table 2-3 and Table 2-4. In 2005 there were no new trigger locations above those already identified. However, in September an additional trigger was activated at location X24A for dissolved iron with three consecutive concentrations of iron above the threshold of 0.188 mg/L. As well, the trigger for dissolved iron activated for X25A in 2004 is no longer valid with dissolved iron concentrations at this location dropping in 2005 to levels well below the threshold value of 0.168 mg/L.

Assessment of the water quality data and sampling techniques indicates that the elevated levels of iron may be due to slight variations in sampling methodology during the reference period. Iron concentrations in groundwater are very susceptible to oxidation/reduction and slight variations in sampling protocols can result in different dissolved iron concentrations. For example, if a well is not properly purged prior to sampling, the sample volume in the tube may be exposed to oxidizing conditions, resulting in iron precipitating out of solution. Once the sample is brought to the surface and filtered, this sample could have a lower concentration of dissolved iron. The sensitivity of iron concentrations, particularly at these low levels, to minor variations in sampling methodology creates some uncertainty in the interpretation of the results prior to 2002 when the sampling method was reviewed and updated. Furthermore, iron has not been identified as a contaminant of concern in the receiving environment through the ongoing aquatic risk assessment work being carried out as part of closure planning. Therefore it is recommended that dissolved iron no longer be an indicator in AMP Protocol for the Rose Creek Aquifer.

Table 2-3. Select Sulphate and Iron Data for Rose Creek Valley Aquifer (2005)

Date	**X24A** Sulphate (mg/l)	**X24C** Sulphate (mg/l)	**X24D** Sulphate (mg/l)	**X24A** Iron (mg/l)	**X25A** Iron (mg/l)	**X25B** Iron (mg/l)
May 2005		*1410*	*1450*			
July 2005	*1260*	*1410*	*1490*	*0.449*	<0.03	*0.672*
Sept. 2005	*1170*	*1180*	*1390*	*0.438*	0.038	*0.62*
Oct. 2005	*929*	*981*	*1340*	*0.406*	<0.03	*0.585*
Threshold	**729**	**980**	**1057**	**0.188**	**0.168**	**0.49**

Table 2-4. Select Zinc Data for Rose Creek Valley Aquifer (2005)

Date	**X24D** Zinc (mg/l)
May 2005	*0.0517*
July 2005	*0.0488*
Sept. 2005	*0.0569*
Oct. 2005	*0.0482*
Threshold	**0.03**

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.

3.2 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
$Zn_{(T)}$, $Cu_{(T)}$, TSS, SO_4	V8	• 3 consecutive results > upper 75 percentile of reference period; or • statistically significant trend projects > 75^{th} percentile of reference period within 3 years.	Monthly

3.3 Review

A management review of the relevant water quality data from V8 was carried out on a monthly basis in 2005. 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.

The results of the review are summarized in Table 3-1 and in Figure 3-1, Figure 3-2, and Figure 3-3. Review of the March water quality data from V8 against the pre-defined thresholds indicated that the concentration of sulphate was greater than the trigger level for three consecutive monthly samples (January 21st, February 8th and March 15th). This was documented in the monthly data report to the Yukon Water Board dated April 28, 2005. This trend in elevated sulphate concentrations during the winter low flow months is consistent with historical trends and a seasonal variation is known to occur at this location as well as other locations in the Vangorda Creek Drainage due to influence of groundwater "baseflow" during the winter season.

Table 3-1. Summary of AMP Data for V8

Date	Total Zinc	Total Copper	Total Suspended Solids	Sulphate
1/21/2005	0.012	<0.0010	2	*159*
2/8/2005	0.014	<0.0010	<1	*155*
3/15/2005	0.009	<0.0010	<1	*176*
4/11/2005	0.011	0.0010	<1	*175*
5/9/2005	0.037	0.0060	*67*	33.3
6/20/2005	0.022	0.0020	<2	133
7/25/2005	0.024	0.0020	*10*	*238*
8/22/2005	0.015	<0.0010	1	*312*
9/5/2005	0.026	0.0010	<1	102
10/11/2005	0.007	<0.0010	<1	82.1
11/1/2005	0.031	*0.0450*	<1	112
12/15/2005	0.022	<0.0010	<1	*139*
Trigger	**0.042**	**0.022**	**8**	**136**

Note: *Italics* = Exceeds Trigger Value

Figure 3-1. Vangorda Creek (V8) Sulphate (2003 – 2005)

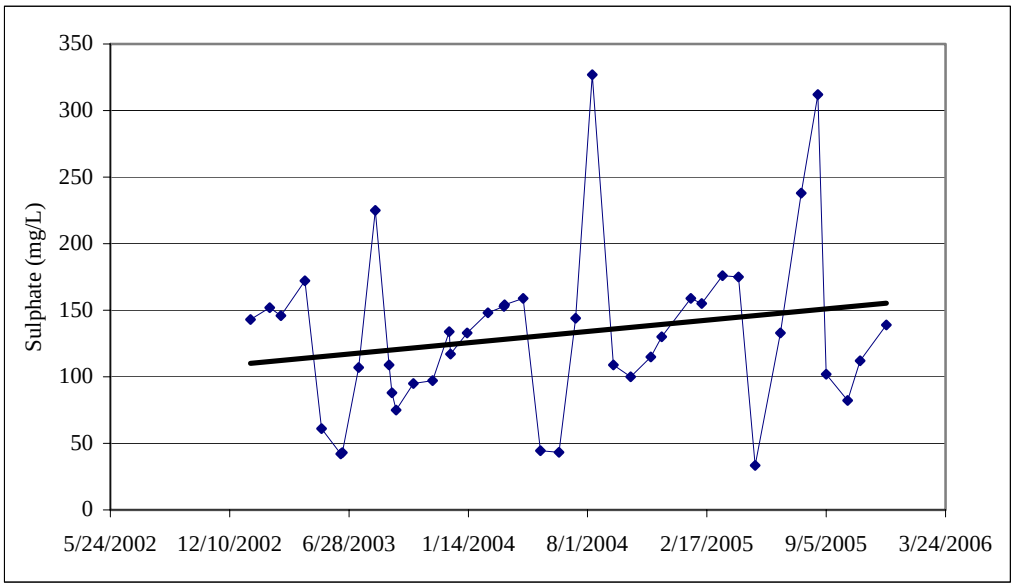


Figure 3-2. Vangorda Creek (V8) Total Suspended Solids (TSS) (2003 – 2005)

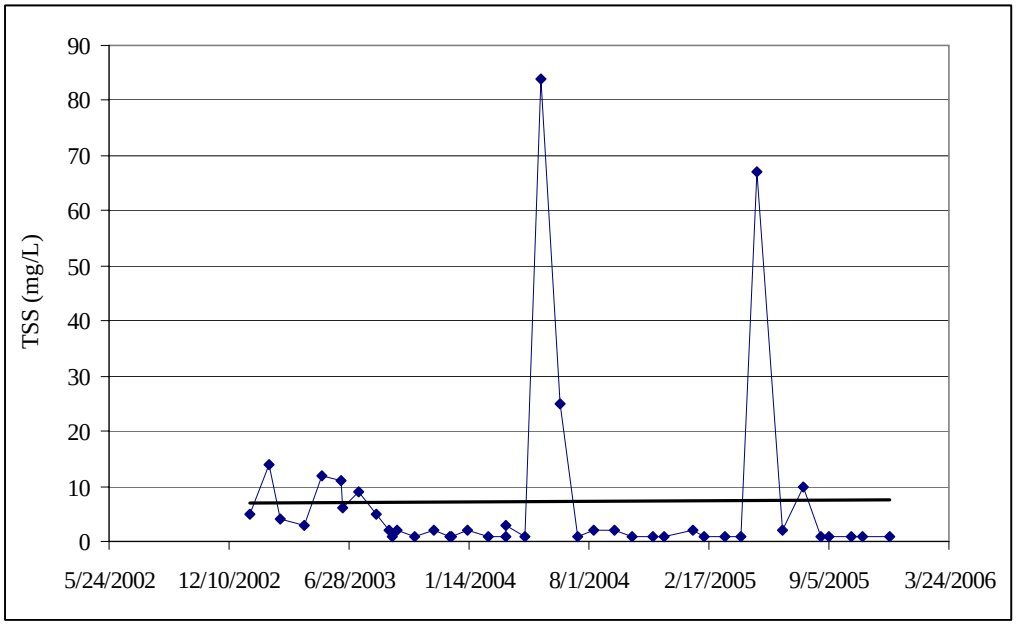
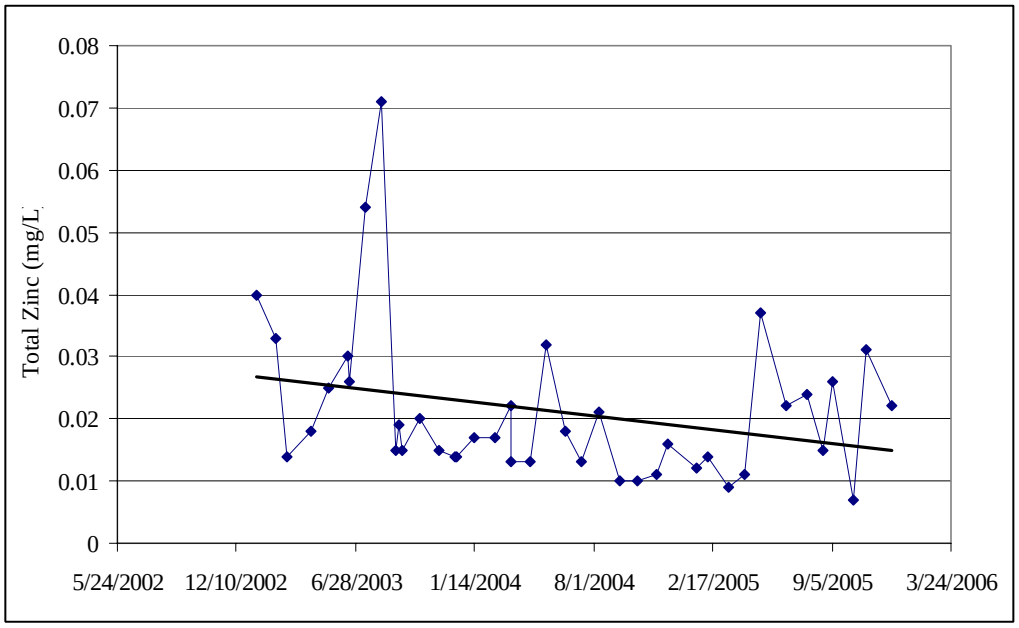


Figure 3-3. Vangorda Creek (V8) Total Zinc (2003 – 2005)



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 location V8, 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 variations in sulphate.*

As expected the sulphate concentration at V8 in April continued to exceed the threshold value due to ongoing low flow conditions. Assessment of the May 2005 data showed that with the onset of spring freshet, the concentrations of sulphate dropped to 44.4 mg/L well below the threshold value of 126.

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 as illustrated in Figure 3-1. 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). A statistical summary of the seasonal sulphate concentrations for the defined reference period (1998 – 2002) is presented in Table 3-2.

Table 3-2. Vangorda Creek (V8) Summary of Seasonal Statistics

	Winter (November – May)	Open Water Season (May – October)
Number of Samples	31	34
Minimum	46.0	12.0
25th Percentile	110.0	34.5
Median	136.0	58.0
Mean	140.9	71.7
75th Percentile	171.0	74.8
Maximum	274.0	328.0

Given this seasonal variability in the concentrations of sulphate in Vangorda Creek at V8, it is 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).

Indicators	Locations	Thresholds	Period
$Zn_{(T)}$, $Cu_{(T)}$, and TSS	V8	• 3 consecutive results > 75th percentile of reference period; or • statistically significant trend projects > 75th percentile of reference period within 3 years.	January - December
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 3 years.	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 3 years.	Winter (Nov. – April)

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 for total metals, dissolved metals, pH, temperature, conductivity, total suspended solids, sulphate, ammonia and hardness (YWB 2004). Water quality is measured weekly during periods of effluent discharge to the creek. 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
$Zn_{(T)}$, $Cu_{(T)}$, SO_4	X14	• 3 consecutive results > upper 75 percentile of reference period; or • statistically significant trend projects > 75^{th} percentile of reference period within 3 years.	Monthly and Weekly when discharge

4.3 Review

A management review of the relevant water quality data from X14 was carried out on a monthly basis in 2005. 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. Review of the March water quality data from X14 against the pre-defined thresholds indicated that the concentrations of sulphate and total zinc were greater than the trigger levels for three consecutive weekly samples (March 8th, March 14th and March 22nd). During this period compliant effluent was being discharged to Rose Creek at the typical average effluent flow rate of 460 Lps with sulphate concentrations ranging from 755 mg/L to 908 mg/L and total zinc concentrations ranging from 0.34 to 0.47 mg/L. The elevated concentrations in Rose Creek were attributed to the release of a proportionally large volume of effluent during a period of proportionally low (i.e., winter) creek flow. This was documented in the monthly data report to the Yukon Water Board dated April 28, 2005. The following short term management plan was outlined for this trigger event:

> *Upon receipt and analysis of the upcoming monthly samples for April water sample 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 assessment of consecutive samples where these cross over monthly and weekly time frames.*

As anticipated the concentrations of both zinc and sulphate concentrations in April returned to levels below the threshold values following the temporary period of effluent release from the Cross Valley Pond in March. 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. It is recommended that this modified procedure be permanently adopted into the AMP.

Table 4-1. Summary of AMP Data for X14 (2005)

Date	Total Zinc	Total Copper	Sulphate
1/12/2005	0.028	<0.001	*182*
2/8/2005	0.028	<0.001	165
3/8/2005	*0.21*	0.001	*409*
3/14/2005	*0.19*	0.001	*541*
3/22/2005	*0.2*	<0.001	*557*
4/11/2005	0.019	<0.001	145
5/10/2005	0.035	0.003	34.3
5/31/2005	0.019	0.001	40.7
6/11/2005	0.017	<0.001	45.2
6/19/2005	0.022	0.001	64.2
6/21/2005	0.027	<0.001	77.1
7/2/2005	0.011	<0.001	86.1
7/10/2005	0.029	0.002	89.7
7/17/2005	0.035	<0.001	91.6
7/25/2005	0.024	<0.001	71.4
7/31/2005	0.029	0.001	65.4
8/6/2005	0.037	0.001	88.9
8/13/2005	0.051	<0.001	111
8/20/2005	0.051	<0.001	109
8/23/2005	0.05	<0.001	109
8/27/2005	0.049	0.004	97.7
9/5/2005	0.06	0.001	139
9/6/2005	0.057	<0.001	136
9/11/2005	0.05	<0.001	130
9/18/2005	0.03	<0.001	123
9/24/2005	0.034	<0.001	111
10/1/2005	0.066	<0.001	129
10/10/2005	0.028	<0.001	41.4
11/1/2005	0.043	<0.001	67
12/13/2005	0.056	0.002	111
Trigger	**0.08**	**0.022**	**166**

Note: *Italics* = Exceeds Trigger Value

Figure 4-1. Rose Creek (X14) Sulfate (2003 – 2005)

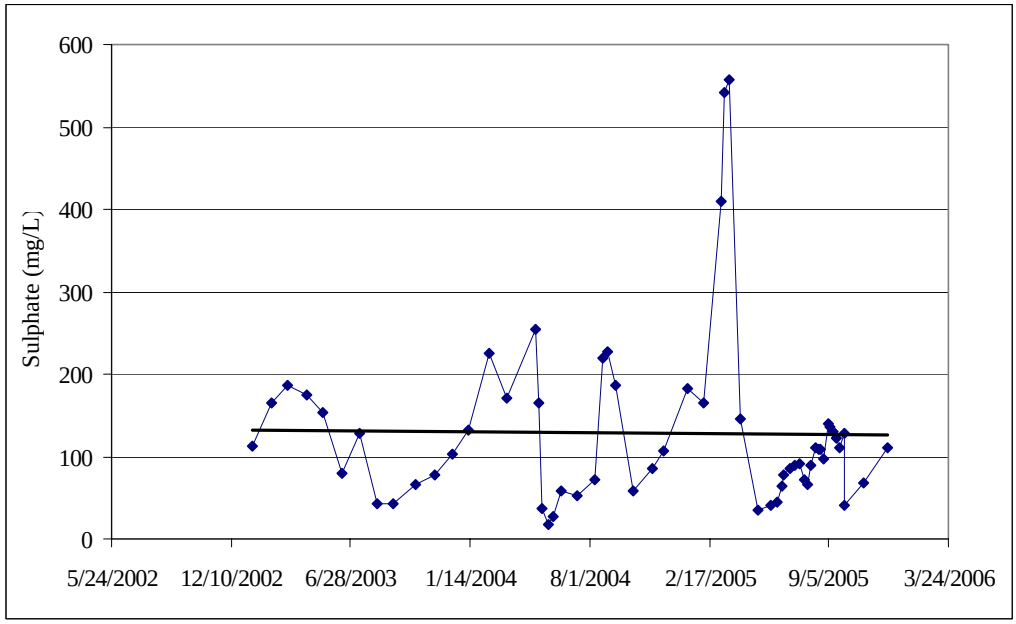
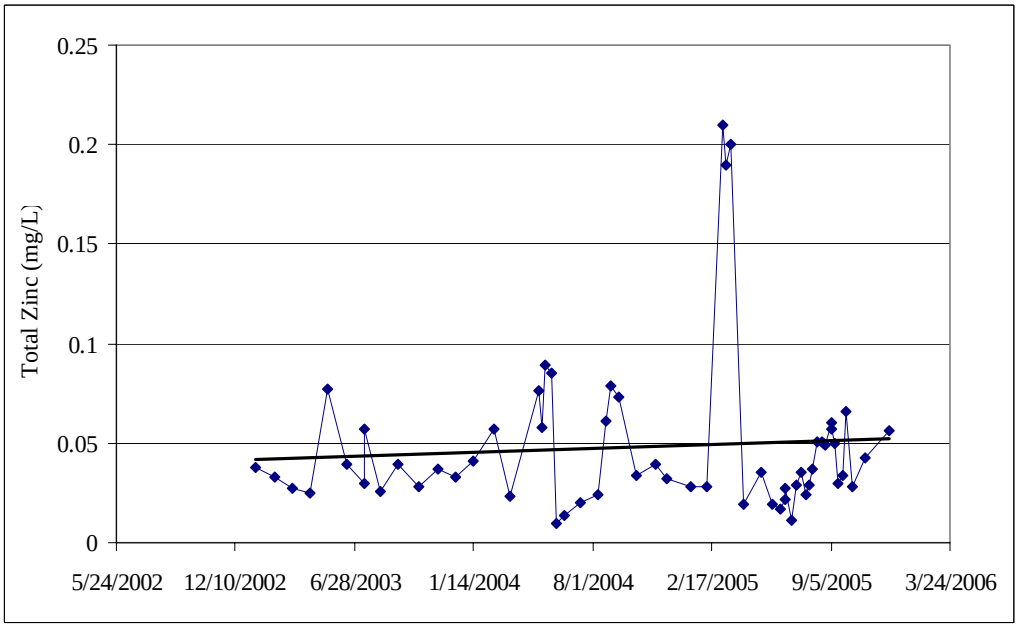


Figure 4-2. Rose Creek (X14) Total Zinc (2003 – 2005)



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
$Zn_{(T)}$, $Cu_{(T)}$, SO_4	V2	• 3 consecutive results > upper 75 percentile of reference period; or • statistically significant trend projects > 75^{th} percentile of reference period within 3 years.	Monthly

5.3 Review

Review of the reference period data (1998 to 2002) carried out as part of the development of the AMP Implementation Protocol indicated that both statistical 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.

The ongoing management review of the relevant water quality data from V2 was carried out monthly in 2005. The results of the review are summarized in Table 5-1 and in Figure 5-1 and Figure 5-2 for total copper, total zinc and suphate. There are no additional triggers beyond that for sulphate identified in

2004. Trend analysis of sulphate using data from 2003 on indicates that there continues to be a statistically significant increasing trend in sulphate.

Table 5-1. Summary of 2005 AMP Data for V2 (mg/L)

Date	Total Zinc	Total Copper	Sulphate
1/21/2005	0.0220	0.002	*941*
2/8/2005	0.0240	0.002	*816*
3/14/2005	0.0110	0.003	*909*
4/11/2005	0.0100	0.001	*788*
5/9/2005	0.0480	0.002	*718*
6/21/2005	0.0080	0.001	*1000*
7/25/2005	0.0360	0.004	*1010*
8/22/2005	0.0310	0.001	*1000*
9/6/2005	0.0100	0.002	*1020*
9/21/2005	0.0140	<0.001	*974*
10/11/2005	0.0360	<0.001	*918*
10/25/2005	0.0090	0.001	*1010*
11/1/2005	0.0280	0.001	*1000*
11/15/2005	0.0090	<0.020	*1020*
12/15/2005	0.0330	<0.001	*1160*
Trigger	**0.10**	**0.031**	**553**

Note: *Italics* = Exceeds Trigger Value

Figure 5-1. Grum Creek (V2) Sulphate (2003 – 2005)

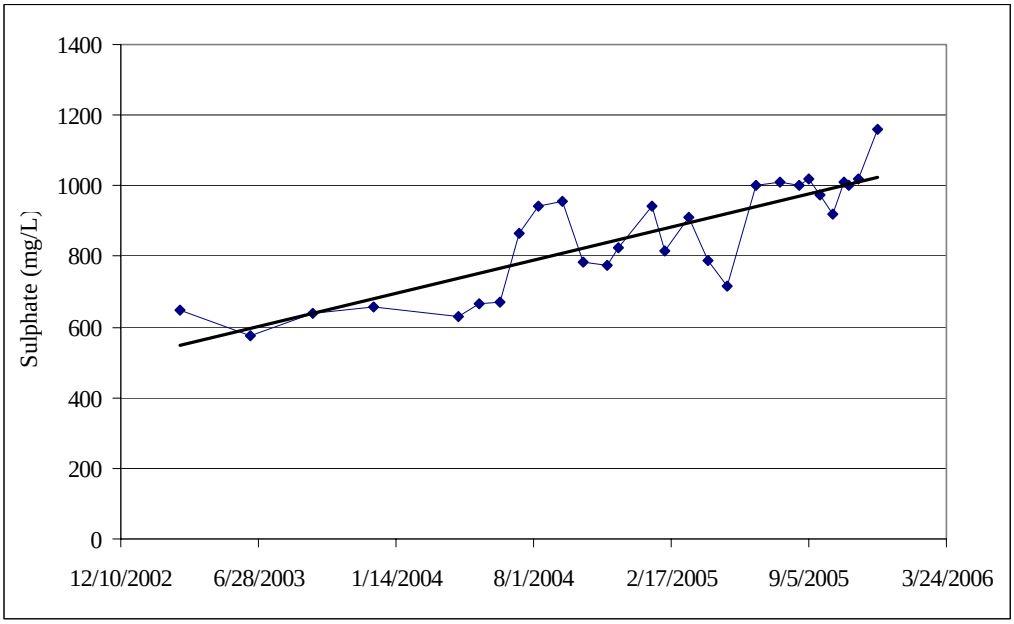
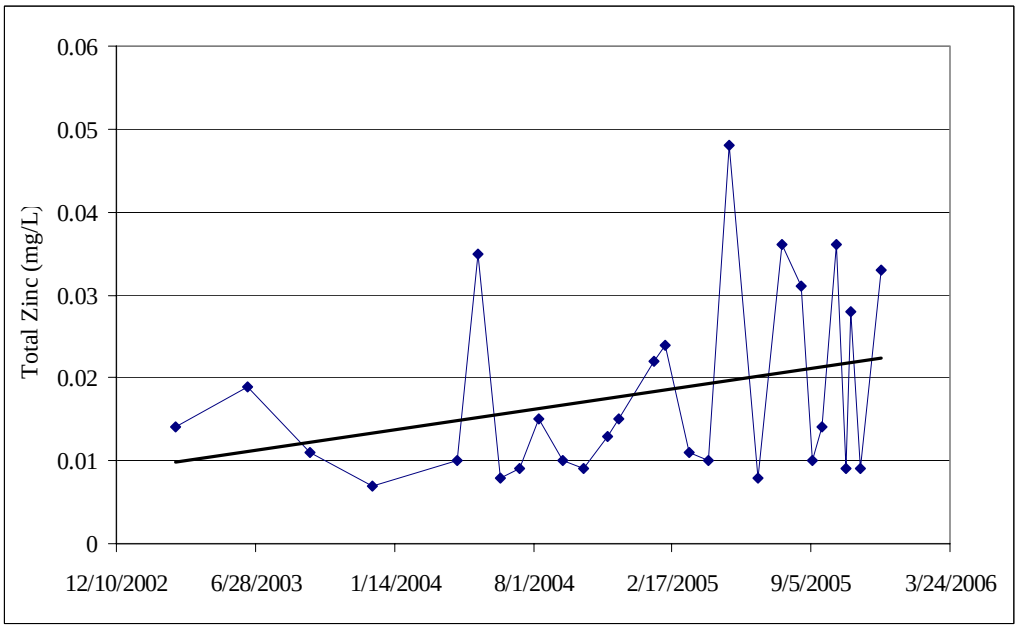


Figure 5-2. Grum Creek (V2) Total Zinc (2003 – 2005)



The response to the trigger for sulphate concentration in Grum Creek is conducted by SRK Consulting on behalf of the Interim Receiver. The following information has been developed by SRK Consulting.

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 a 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 by SRK Consulting on behalf of the Interim Receiver which addressed five of the six key components of the response plan. The main findings discussed 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 the dump is generating zinc loads on the order of 1700 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 all 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 zinc loads in Vangorda Creek are on the order of 140 kg/year; and
- 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 of surface water with site management;
- Adopt a zinc concentration of 0.5 mg/L in three consecutive samples as an interim threshold for 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 of 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 biweekly sampling of Moose Seep was initiated, in September 2005. Results of this sampling were screened by Gartner Lee 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.

Options for implementation of water collection and transfer were discussed with site management. It was confirmed that the required pumps, pipe, and related hardware are available on site to implement collection and transfer on short notice.

Sampling of Grum Dump toe seeps and seepage/surface water stations between Grum Dump and Vangorda Creek was carried out in both May and September 2005. Results at all stations were similar to previous results, with downgradient stations showing elevated sulphate concentrations, but zinc concentrations near or below detection limits of 0.005 mg/L.

Four monitoring wells were installed southeast of Grum Dump as part of the AMP response activities in August and September 2005. Two wells were installed between Moose Pond and Vangorda Creek to assess water quality, and in particular zinc concentrations, in shallow groundwater. Dissolved zinc concentrations were found to be 0.008 mg/L or less during November 2005 monitoring. An additional well was installed to monitor shallow groundwater adjacent to Grum Creek, and another well was installed to replace a damaged well to allow continued monitoring of deep groundwater near Tributary A.

Continuous monitoring of discharge in the main stem of Grum Creek was initiated with the installation of a water level data logger in the pool behind the weir installed in September 2004. This instrument was installed in early May, prior to peak freshet flows, and was removed in late September to prevent instrument damage due to freezing conditions. The data will be used to calibrate the water and load balance.

A detailed summary of 2005 response activities will be provided in the 2006 AMP Event #4 Response status report, which is scheduled for completion in April 2006 by SRK Consulting.

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

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
$Zn_{(T)}$, $Cu_{(T)}$, SO_4	X2	• 3 consecutive results > upper 75 percentile of reference period; or • statistically significant trend projects > 75^{th} percentile of reference period within 3 years.	Monthly

6.3 Review

A management review of the relevant water quality data from X2 was carried out on a monthly basis in 2005. 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 6-1 and in Figure 6-1 and Figure 6-2. Review of the March water quality data from X2 against the pre-defined thresholds indicated that the concentration of sulphate was greater than the trigger level for three consecutive monthly samples (January 21st, February 8th and March 15th). This was documented in the monthly data report to the Yukon Water Board dated April 28, 2005. This trend in elevated sulphate concentrations during the winter low flow months is consistent with historical trends due to influence of groundwater "baseflow" during the winter season.

Table 6-1. Summary of AMP Data at X2

Date	Total Zinc	Total Copper	Sulphate
1/21/2005	0.031	0.002	*37.2*
2/8/2005	0.035	0.001	*31.8*
3/15/2005	0.031	0.001	*33.2*
4/11/2005	0.038	0.001	*34*
5/9/2005	0.031	0.003	4
6/20/2005	0.016	0.001	10.4
7/25/2005	0.015	0.001	10.6
8/22/2005	0.023	0.001	15.1
9/6/2005	0.036	0.001	16.4
10/10/2005	0.028	0.001	16.6
11/1/2005	0.035	0.001	24.6
12/15/2005	0.058	0.001	*28.1*
Trigger	**0.06**	**0.028**	**26**

Note: *Italics* = Exceeds Trigger Value

Figure 6-1. North Fork Rose Creek (X2) Sulphate (2003 – 2004)

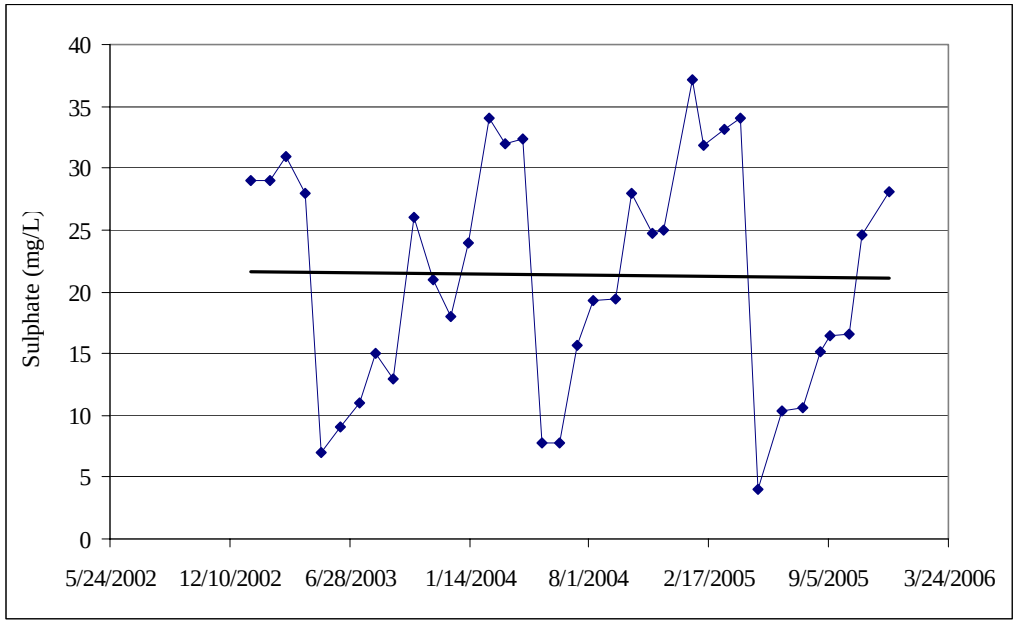
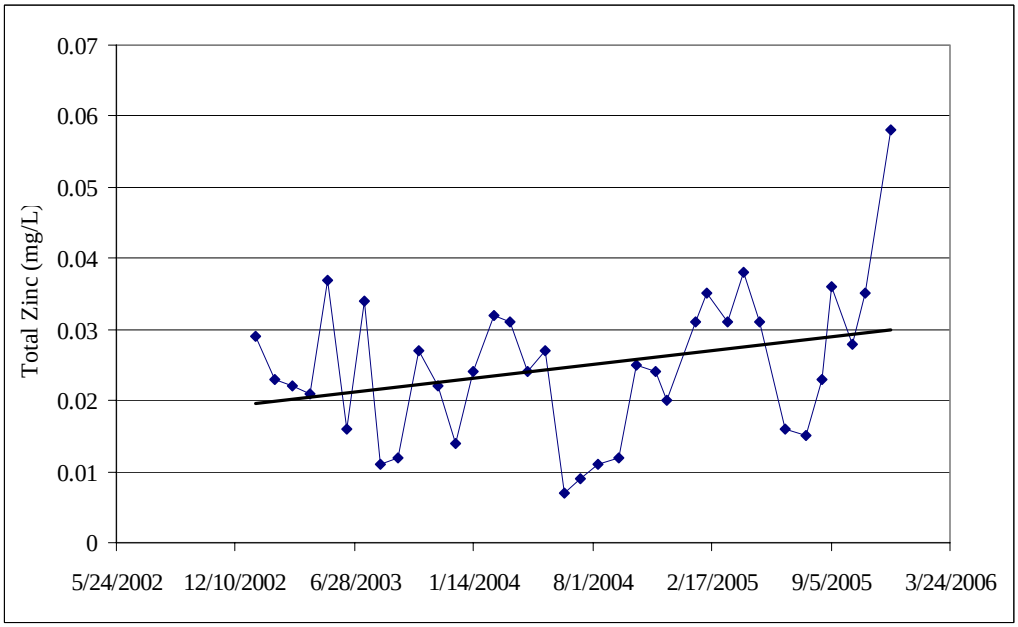


Figure 6-2. North Fork Rose Creek (X2) Zinc (2003 – 2004)



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 location X2, 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 variations in sulphate."*

As expected the sulphate concentration at X2 in April continued to exceed the threshold value due to ongoing low flow conditions. Assessment of the May 2005 data showed that with the onset of spring freshet, the concentrations of sulphate dropped to 4.0 mg/L well below the threshold value of 26.

An assessment was carried out to determine if there are 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 variability as illustrated in Figure 6-1. 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). A statistical summary of the seasonal sulphate concentrations for the defined reference period (1998 – 2002) is presented in Table 6-2.

Table 6-2. North Fork Rose Creek (X2) Summary of Seasonal Statistics

	Winter (November – May)	**Open Water Season (May – October)**
Number of Samples	31	30
Minimum	7.0	4.0
25th Percentile	22.0	8.3
Median	26.0	11.5
Mean	26.6	11.9
75th Percentile	29.5	14.8
Maximum	52.0	22.0

Given this seasonal variability in the concentrations of sulphate in the North Fork of Rose Creek at X2, it is recommended that the AMP Protocol for X2 modified for sulphate to include two seasonal components: open water season (May – October) and winter (November – April).

Indicators	Locations	Thresholds	Period
$Zn_{(T)}$ and $Cu_{(T)}$	X2	• 3 consecutive results > 75th percentile of reference period; or • statistically significant trend projects > 75th percentile of reference period within 3 years.	January - December
SO_4	X2	• 3 consecutive results > 75th percentile of reference period (14.8 mg/L); or • statistically significant trend projects > 75th percentile of reference period within 3 years.	May - October
SO_4	X2	• 3 consecutive results > 75th percentile of reference period (29.5 mg/L); or • statistically significant trend projects > 75th percentile of reference period within 3 years.	Winter (Nov. – April)

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 2003. Further, a report has been completed (GLL 2003a) that indicates that it is unlikely that the pit will fill to a level requiring active management during the term of the Water Licence (to the end of 2008). 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 by 2008 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 1210.8 m asl; or • Projected timeframe of 1 year or less.	• Monthly; or • Annual.

7.3 Review

Water elevations were measured by mine personnel through 2005 as illustrated on Figure 7-2. The maximum measured elevation was 1193.64 m asl, which is well below the threshold elevation of 1210.8 m asl. Therefore, the first trigger for pit water elevation was not activated in 2005. 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 7-2, this is approximately 21.5 m below the elevation at which surface outflow would occur. This is planned to allow adequate time to develop management plans for the pit water prior to any water releases.

The timeframe for reaching the maximum desired elevation was projected using the observed rate of increase through 2003, 2004 and 2005 and the measured precipitation at the Faro airport over the available period of record, 1978 to 2005. The measured rate of rise is illustrated on Figure 7-1, as are a best-fit power function and the projected rate of rise used for assessment of the AMP trigger.

The "incremental" line on Figure 7-1 indicates the rate of rise for each individual (primarily monthly measurement). The "cumulative" line on Figure 7-1 indicates the cumulative rate of rise for each measurement as compared to the initial survey in 2003. The "power" curve illustrated on Figure 7-1 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 7-1 shows the projected rate of rise that has been used to project future water levels (as illustrated On Figure 7-2). The power curve and the long-term projection curve both begin at the most recent measurement, December 2005. Figure 7-1 also 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 precipitation measured in 2003 and 2004 was 95% and 108% of the 27-year record (Table 7-1), which can be considered "normal" for the purpose of this study. The precipitation measured in 2005 was 121% of the 27-year average, indicative of higher than normal precipitation and runoff. These observations suggest that the long term projection is based on slightly conservative (i.e., wet) conditions.

The projection for the pit water level is illustrated on Figure 7-2 and demonstrates that the timeframe for reaching the AMP threshold elevation of 1210.8 m asl is in the order of a minimum 5 years, well beyond the threshold value of 1 year. Therefore, no trigger was activated in 2005 regarding the projected filling timeframe.

The projection is considered to be conservative (i.e., overestimating the rate of rise) because it does not fully account for a decreasing rate of rise over time due to the increasing area of the pit. New 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 in a preliminary

state and 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.

Table 7-1. Precipitation at the Faro Airport, 1978 to 2005

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
Max	35.7	25.8	45	19.5	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	**15.4**	**11.7**	**11.6**	**7.3**	**24.4**	**35.7**	**57.4**	**46.2**	**38.2**	**24.2**	**17.6**	**15.6**	**308.3**
Min	0.4	2	trace	0.4	7.6	11.1	13.5	13.8	trace	8.6	3.5	3.9	
Year	1978	2000	1978	2003	2003	1980	2004	1979	1997	2000	1996	1983	
St.Dev	9.2	7.9	10.7	5.0	16.6	15.2	26.6	24.2	19.0	11.5	9.9	10.6	

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

Figure 7-1. Grum Pit Water, Rate of Rise

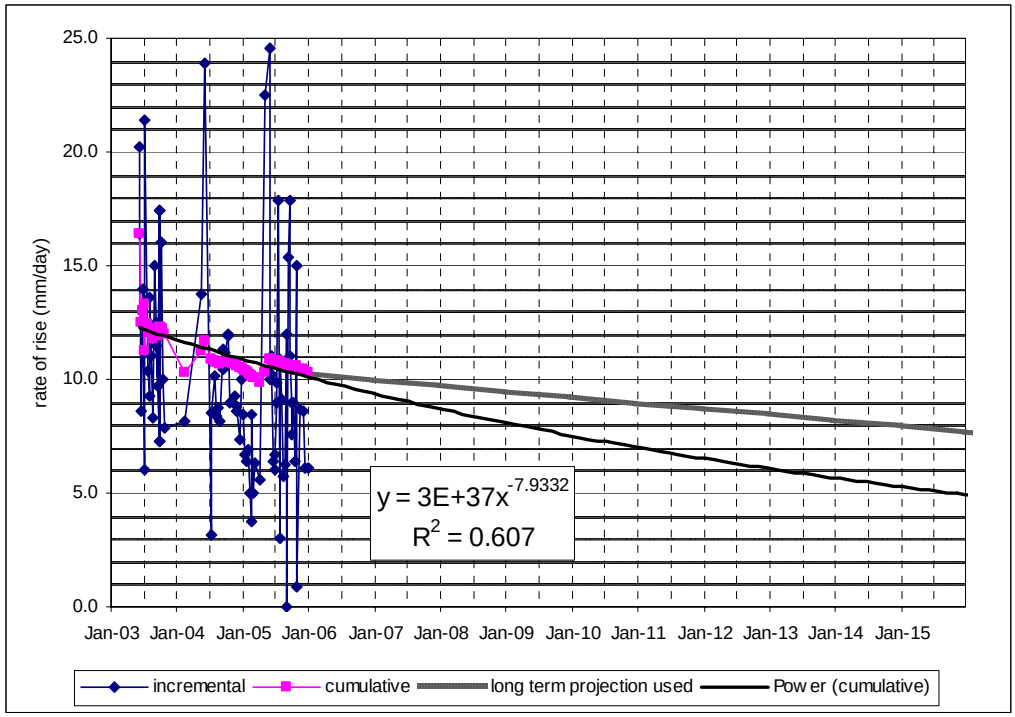
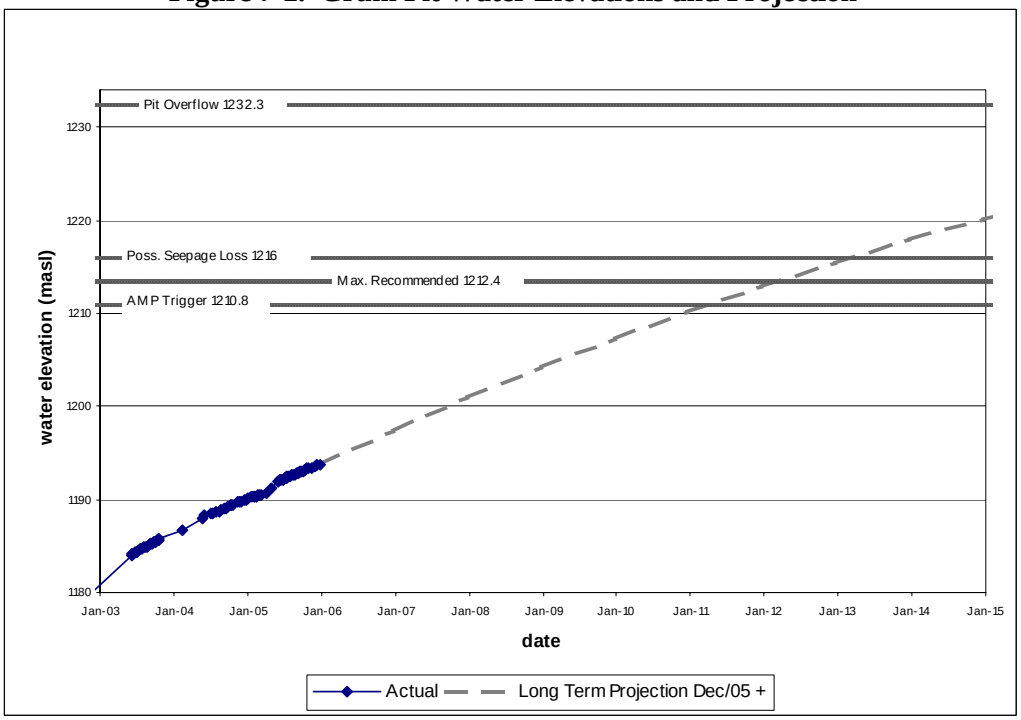


Figure 7-2. Grum Pit Water Elevations and Projection



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 to 2008 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	On-going

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 on a monthly basis, with no triggers being activated.

9. AMP Event 8, Wind Dispersed Tailings Result in Adverse Effects in the Terrestrial Environment

9.1 Description

Historical 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 (2003) Water Licence Renewal Environmental Assessment Report. However, that information was not sufficient to 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 were increasing, diminishing or remaining static.

The presence of contaminants in the terrestrial environment has the potential to cause adverse effects on wildlife and human resource users, socio-economic use, traditional/cultural use and human health.

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 of the environment such that short term (i.e. 2008) mitigation measures for a reduction in wind dispersion are recommended".

9.3 Review

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. This study has been carried out 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 in December. This report, Anvil Range Mine Complex – Terrestrial Effects Study: Investigation into Metal Concentration in Vegetation, Wildlife and Soils, along with attached cover letter provided a comprehensive summary of the results of the study to date. A copy of the letter is provided in Appendix B.

Because of the complex scheduling of various aspects of the project, not all technical results were available at December 31, 2005. Further, additional discussions with the First Nations regarding the final results is necessary to complete the study.

An update report is to be submitted to the Board in March 2005 and a “final” study report will be submitted when all aspects of the study have been completed, which may be by June 30, 2006.

At that time, an assessment of the need for short-term mitigation measures can be completed that will resolve the trigger for this AMP Event.

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, 3, 4 and 6 we recommend that the following modifications be implemented at this time, specifically:

1. AMP Event 1 – removal of dissolved iron as an indicator for Rose Creek Valley Aquifer;
2. AMP Event 2 – modification of sulphate trigger at V8 to include two seasonal components: open water season (May – October) and winter (November – April);
3. AMP Event 3 – use of monthly average value for AMP data review at X14 during periods of consecutive weekly samples; and
4. AMP Event 5 – modification of sulphate trigger at X2 to include two seasonal components: open water season (May – October) and winter (November – April).

Other than these specific recommendations, the AMP program functioned as intended in 2005 and no other changes should be made.

Appendices

Appendix A. Results of Rose Creek Water and Load Balance Model Sensitivity Runs, Groundwater AMP Assessment – Robertson GeoConsultants Inc. February 29, 2005.

Robertson GeoConsultants Inc.

Suite 640, 580 Hornby St., Vancouver, B.C., V6C 3B6
Phone: (604) 684-8072 · Fax: (604) 684-8073

Memorandum

DATE: February 28, 2005

TO: Leslie Gomm, Gartner Lee Limited

CC: Eric Denholm, Gartner Lee Limited

FROM: Christoph Wels, Robertson GeoConsultants Inc.

RE: Results of Rose Creek Water and Load Balance Model Sensitivity Runs, Groundwater AMP Assessment

Dear Leslie:

This memo summarizes sensitivity runs carried out using the calibrated Rose Creek Water and Load Balance Model as requested by Gartner Lee on January 18, 2005. The model was used to estimate the loading via groundwater to Rose Creek (and resulting concentrations) for different (assumed) concentrations in groundwater at the Intermediate Dam (end of Reach IV in the model).

The following four scenarios were simulated:

- "Base Case" using SO4 and Zn concentrations observed in X24 and X25 in the fall of 2004;
- Sensitivity Run 1 assuming a 20% increase in SO4 and Zn in X24 and X25;
- Sensitivity Run 2 assuming a 50% increase in SO4 and Zn in X24 and X25; and
- Sensitivity Run 3 assuming a 100% increase in SO4 and Zn in X24 and X25.

Table 1 summarizes the fall 2004 groundwater quality data provided by GLL. The load balance model assumes complete mixing in a northern and southern portion of the aquifer. Hence, the model input concentrations for the North (GWN4) and South (GWS4) aquifer were calculated using a depth-weighted average of the concentrations measured at X24 and X25, respectively. The averaged concentrations used in the "Base Case" model scenario and subsequent sensitivity runs are summarized in Table 2.

Table 1. Concentrations of SO4 and Zn at X24 and X25, Fall 2004.

ID	Area	Fall 2004 Concentrations	
		SO4 (mg/L)	Zn (mg/L)
X24A	North Aquifer	1200	0.01
X24C		1200	0.02
X24D		1400	0.05
X25A	South Aquifer	250	0.01
X25B		360	0.005

Table 2. Input Concentrations used for Rose Creek Water and Load Balance Model.

Run #	Description	Input Concentrations (mg/L)			
		North Aquifer - X24		South Aquifer - X25	
		SO4	Zn	SO4	Zn
Fall 2004	Base Case	1302	0.033	334	0.006
Sens 1	20% increase in [SO4] and [Zn]	1562	0.040	401	0.007
Sens 2	50% increase in [SO4] and [Zn]	1953	0.050	501	0.009
Sens 3	100% increase in [SO4] and [Zn]	2604	0.066	668	0.012

The SO4 and Zn loads in all model runs were calculated assuming baseflow conditions in Rose Creek observed on October 19/20 2004, i.e. conditions used for calibration of the water and load balance model.

Tables 3 and 4 summarize the calculated SO4 and Zn concentrations and loads for the following locations:

- Combined toe seepage at X Valley Dam ("X13");
- Rose Creek after inflow o all X Valley seepage ("X14");
- Rose Creek just upstream of next Creek (model designation "RC9").

A graphical output from the Water and Load Balance model (a box-and-stick diagram illustrating the various fluxes) for the "Base Case" scenario is also provided in Figures 1 and 2. Note that locations X13 and X14 correspond to Cross-Valley Seep 6 (XV-Seep6) and RC8, respectively.

Table 3. SO4 and Zn concentrations (t/y) calculated by the Rose Creek Water and Load Balance Model.

Run #	Description	Calculated Loads (t/y)					
		X13		X14		RC9	
		SO4	Zn	SO4	Zn	SO4	Zn
Fall 2004	Base Case	897	0.03	2194	0.62	2750	0.84
Sens 1	20% increase in [SO4] and [Zn]	1064	0.04	2511	0.63	3137	0.85
Sens 2	50% increase in [SO4] and [Zn]	1315	0.04	2987	0.64	3719	0.86
Sens 3	100% increase in [SO4] and [Zn]	1733	0.05	3780	0.66	4687	0.89

Table 4. SO4 and Zn concentrations (mg/L) calculated by the Rose Creek Water and Load Balance Model.

Run #	Description	Calculated Concentrations (mg/L)					
		X13		X14		RC9	
		SO4	Zn	SO4	Zn	SO4	Zn
Fall 2004	Base Case	908	0.03	138	0.03	128	0.039
Sens 1	20% increase in [SO4] and [Zn]	1078	0.04	157	0.04	146	0.04
Sens 2	50% increase in [SO4] and [Zn]	1332	0.05	187	0.04	173	0.04
Sens 3	100% increase in [SO4] and [Zn]	1756	0.06	237	0.041	218	0.041

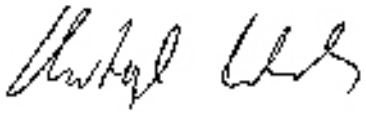
It should be noted, that the travel time for a conservative solute from the Intermediate Dam to the toe of the X Valley Dam has been estimated to be in the order of 2 years. In other words, the estimated sulphate load for the base case (Fall 2004 data) would apply around 2006-2007. The transport of the reactive constituent zinc may be delayed by as much as 2-7 times, based on existing attenuation tests (RGC, 2004). In other words, the predicted zinc concentrations for the base case may not materialize until 2008-2018.

Sensitivity runs 1 to 3 are hypothetical scenarios meant to illustrate the sensitivity of the load estimates to a range of conditions that might be observed some time in the future.

Please do not hesitate to contact myself regarding the contents of this memo.

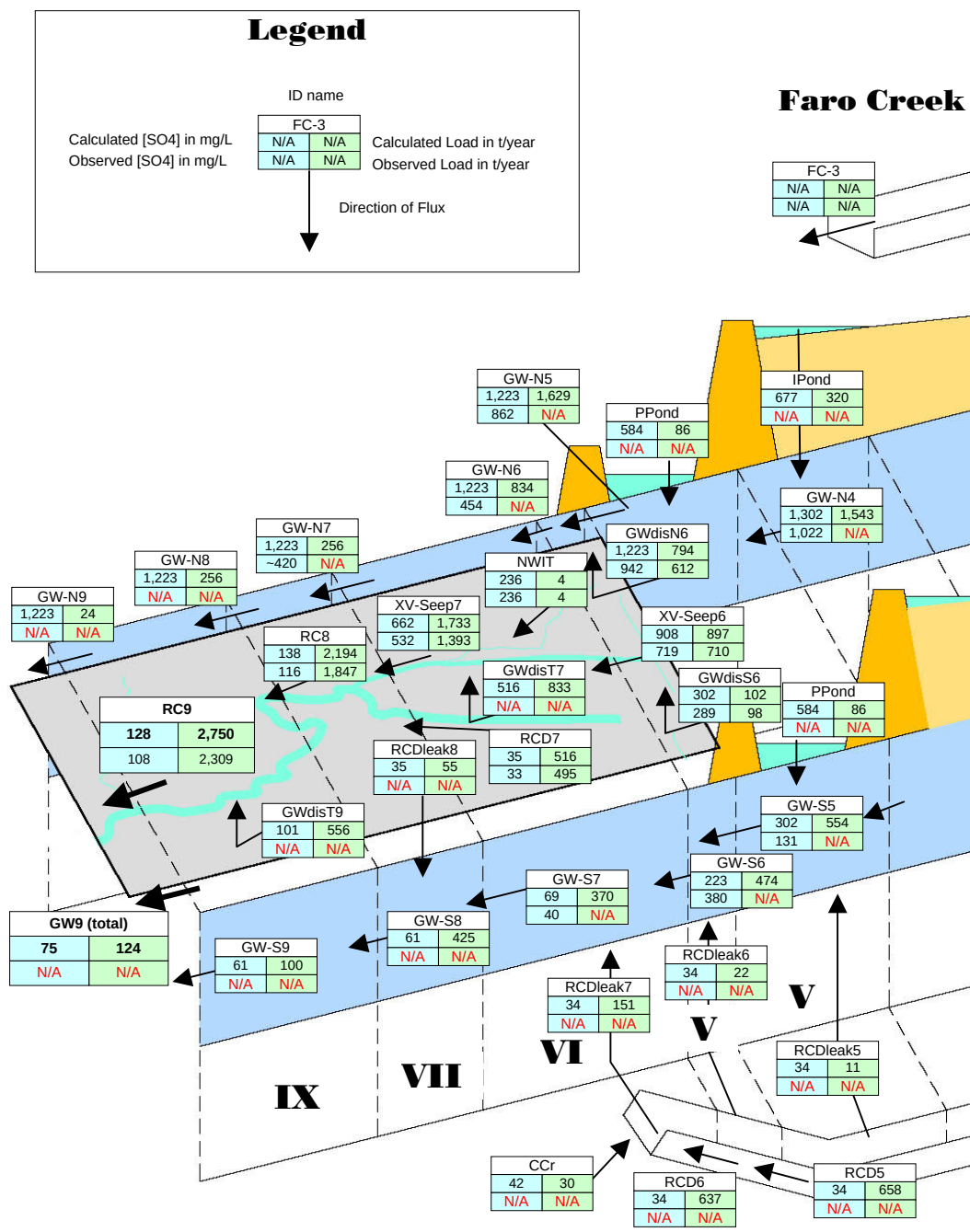
Sincerely,

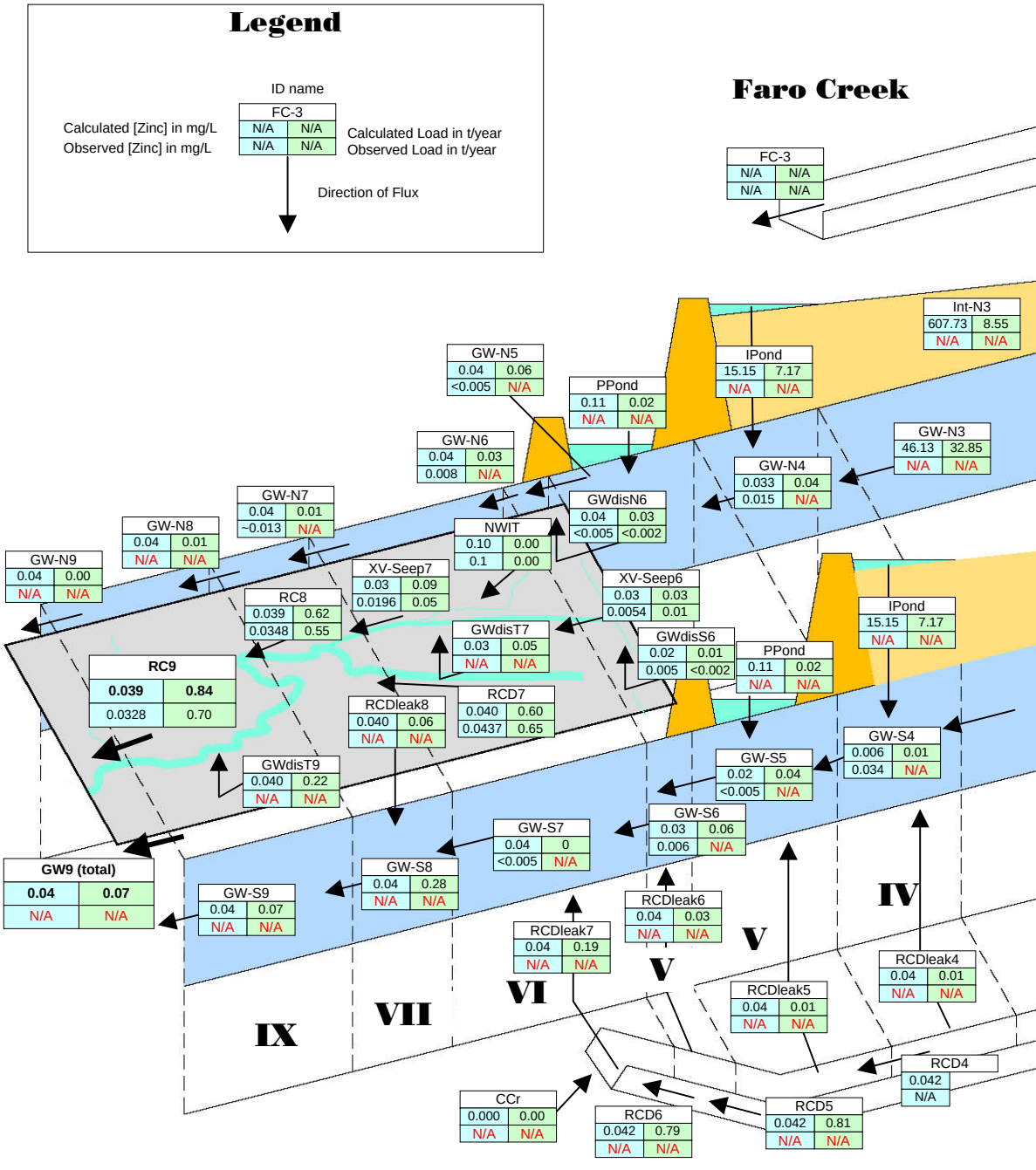
ROBERTSON GEOCONSULTANTS INC.



Christoph Wels, Ph.D.
Senior Hydrogeologist

Att. 2 figures (separate pdf file)


Legend
ID name
FC-3
N/A N/A
N/A N/A
Calculated [SO4] in mg/L
Observed [SO4] in mg/L
Calculated Load in t/year
Observed Load in t/year
Direction of Flux
Faro Creek
FC-3
N/A N/A
N/A N/A
GW-N5
1,223 1,629
862 N/A
PPond
584 86
N/A N/A
IPond
677 320
N/A N/A
GW-N6
1,223 834
454 N/A
GW-N4
1,302 1,543
1,022 N/A
GW-N7
1,223 256
~420 N/A
GWdisN6
1,223 794
942 612
GW-N8
1,223 256
N/A N/A
NWIT
236 4
236 4
GW-N9
1,223 24
N/A N/A
XV-Seep7
662 1,733
532 1,393
XV-Seep6
908 897
719 710
RC8
138 2,194
116 1,847
GWdisT7
516 833
N/A N/A
GWdisS6
302 102
289 98
PPond
584 86
N/A N/A
RC9
128 2,750
108 2,309
RCDleak8
35 55
N/A N/A
RCD7
35 516
33 495
GWdisT9
101 556
N/A N/A
GW-S5
302 554
131 N/A
GW-S6
223 474
380 N/A
GW-S7
69 370
40 N/A
GW9 (total)
75 124
N/A N/A
GW-S8
61 425
N/A N/A
GW-S9
61 100
N/A N/A
RCDleak6
34 22
N/A N/A
RCDleak7
34 151
N/A N/A
RCDleak5
34 11
N/A N/A
CCr
42 30
N/A N/A
RCD6
34 637
N/A N/A
RCD5
34 658
N/A N/A
IX
VII
VI
V
V


Legend
ID name
FC-3
N/A N/A
N/A N/A
Calculated [Zinc] in mg/L
Observed [Zinc] in mg/L
Calculated Load in t/year
Observed Load in t/year
Direction of Flux
Faro Creek
FC-3 N/A N/A N/A N/A
Int-N3 607.73 8.55 N/A N/A
GW-N5 0.04 0.06 <0.005 N/A
IPond 15.15 7.17 N/A N/A
PPond 0.11 0.02 N/A N/A
GW-N6 0.04 0.03 0.008 N/A
GW-N3 46.13 32.85 N/A N/A
GW-N4 0.033 0.04 0.015 N/A
GW-N7 0.04 0.01 ~0.013 N/A
GWdisN6 0.04 0.03 <0.005 <0.002
GW-N8 0.04 0.01 N/A N/A
NWIT 0.10 0.00 0.1 0.00
GW-N9 0.04 0.00 N/A N/A
XV-Seep7 0.03 0.09 0.0196 0.05
XV-Seep6 0.03 0.03 0.0054 0.01
RC8 0.039 0.62 0.0348 0.55
IPond 15.15 7.17 N/A N/A
GWdisT7 0.03 0.05 N/A N/A
GWdisS6 0.02 0.01 0.005 <0.002
PPond 0.11 0.02 N/A N/A
RC9 0.039 0.84 0.0328 0.70
RCD7 0.040 0.60 0.0437 0.65
RCDleak8 0.040 0.06 N/A N/A
GW-S4 0.006 0.01 0.034 N/A
GW-S5 0.02 0.04 <0.005 N/A
GWdisT9 0.040 0.22 N/A N/A
GW-S6 0.03 0.06 0.006 N/A
GW-S7 0.04 0 <0.005 N/A
GW9 (total) 0.04 0.07 N/A N/A
GW-S8 0.04 0.28 N/A N/A
GW-S9 0.04 0.07 N/A N/A
RCDleak6 0.04 0.03 N/A N/A
RCDleak7 0.04 0.19 N/A N/A
RCDleak4 0.04 0.01 N/A N/A
RCDleak5 0.04 0.01 N/A N/A
RCD4 0.042 N/A
CCr 0.000 0.00 N/A N/A
RCD6 0.042 0.79 N/A N/A
RCD5 0.042 0.81 N/A N/A
IV
V
V
VI
VII
IX

Appendix B. December 22, 2005 Letter to YWB - Phase I of the Anvil Range Mine Complex – Terrestrial Effects Study: Investigation into Metal Concentration in Vegetation, Wildlife and Soils

December 22, 2005

Yukon Water Board
106-409 Range Road
Whitehorse, Yukon
Y1A 3V1

Dear Board:

Re: Anvil Range Mine, Terrestrial Effects Study

Introduction

On behalf of Deloitte & Touche Inc. (in its appointed capacity as Interim Receiver of Anvil Range Mining Corporation), we are pleased to submit five bound copies and one unbound original of the report for Phase I of the Anvil Range Mine Complex – Terrestrial Effects Study: Investigation into Metal Concentration in Vegetation, Wildlife and Soils as per Part F, Item 49 of Water Licence QZ03-059.

Gartner Lee Limited was retained by the Interim Receiver to develop and execute the Terrestrial Effects Study for the Anvil Range Mine. This study was initiated under the recommendation of the Environmental Assessment conducted in support of the application 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 findings of the Terrestrial Effects Study will provide input for both the current care and maintenance activities and the development of the Final Closure and Reclamation Plan. The goal of this study is to provide a comprehensive assessment of the terrestrial resources in the vicinity of the Anvil Range Mine. This is being accomplished through investigations of the spatial extent, timing and concentrations of metals in vegetation, air, soil and wildlife.

The Terrestrial Effects Study is a multi-year study that was initiated in the summer of 2004. Phase I of the project included all activities conducted during the summer and fall of 2004 and the winter of 2004 / 2005. The attached two-volume report provides a summary for Phase I activities. This report was finalized with input from internal reviewers and representatives from DIAND, Government of Yukon, Faro Mine Closure Project Office, Ross River Dena Council, Selkirk First Nation and the Town of Faro. Phase II of the Terrestrial Effects Study, now underway, includes all activities conducted between spring 2005 and the completion of the study in March 2006.

The Terrestrial Effects Study can be thought of as attempting 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?

The Water Licence (QZ03-059) requires submission of a project report, by December 31, 2005, that responds to the short term, care and maintenance related issues represented in the first question stated above. This letter, with the accompanying report, responds to this Water Licence requirement.

All reasonable efforts have been made to schedule activities to meet this requirement while ensuring that the work was scientifically sound and provided confident conclusions. However, the complexities and timing of the various study components and the need to provide a scientifically sound report that includes full participation of the First Nations and the Town of Faro require that additional time be taken to complete Phase II. Therefore, the study results to date do not yet fully answer the first question for the project.

This letter, with the accompanying report, describes the observations that can be drawn from the study information at this time and also describes the schedule for developing an “answer” to the first question that the project is to address.

Background Related to the Water Licence Requirement

It has been generally accepted that past mine operations caused some dispersion of dust and tailings in the air. Likely sources include the mill, tailings impoundments, rock piles and roads. Local knowledge from the Ross River Dena, as well as observations from mine personnel, have highlighted this as a concern. Further, questions have been raised whether some areas of the mine site, such as the tailings impoundments, present a risk to animals as they move through these areas.

These concerns were discussed through 2002 and 2003 as part of the process for renewal of the Water Licence resulting in the following actions:

1. a sampling program was undertaken in 2002 to provide preliminary information on the distribution and concentrations of metals in local vegetation and soil; and
2. an outline for a broad-based assessment of effects in the terrestrial environment was proposed that would build upon the preliminary sampling program and that would actively incorporate local knowledge to answer the two fundamental questions stated in the introduction of this letter.

The study outline was discussed throughout the Environmental Assessment process and subsequent presentations to the Yukon Water Board. The result of these discussions was that the Terrestrial Effects Study became a requirement of the renewed Water Licence (#QZ03-059), as intended. Specifically, Part F, Item 49 of the Water Licence requires that:

> *"A terrestrial effects study, as described in the application, shall be carried out. The completed study shall be submitted to the Board by December 31, 2005."*

The study outline, as it was initially presented to the Yukon Water Board in the Application for Renewal, is provided as Attachment A for reference. Two key concepts from the outline are excerpted as follows:

> *"The follow-up study program is proposed to be a multi-year study … the exact scope of the proposed study and the detailed study workplan would be developed, based on both community and scientific objectives, prior to the initiation of work…*

and

> *A study report will be prepared … that provides all of the results of the study and recommendations for mitigative actions… in the short term while the FCRP is being developed and implemented*."

Study Design

A detailed study design was developed that followed from the outline provided in the Water Licence Renewal Application, building on the information collected during the 2002 sampling program. The study design was developed through discussions with First Nations (Ross River Dena Council and Selkirk First Nation), the Town of Faro, governmental representatives and scientific groups. The general approach to the development of the Terrestrial Effects Study design consisted of four main phases:

- conceptual study design;
- information sharing and gathering / stakeholder involvement;

- preliminary study design and review; and
- final study design.

This iterative approach allowed for effective dialogue between federal, territorial, First Nation and consulting experts and provided valuable input and feedback to the final study design.

Certain aspects of the study design were fixed at the outset of the project in 2004, out of necessity to ensure that the study remained focused on achieving its goals. Other aspects of the study design were managed on an on-going basis to integrate results as they were received.

At the outset of the project, specific study objectives were defined as:

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; and
5. investigation of metal levels in wildlife tissues, including species of importance to humans.

Following the completion of Phase I, two additional study objectives were determined:

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.

Table 1 outlines the broad methods employed to meet these objectives within each phase of the project, the rationale for each objective as well as a reference to the section (where applicable) in the attached report where each objective is discussed in detail.

Table 1. Objectives of the Terrestrial Effects Study

	Objective[1]	Project Activities in 2004 – Phase I	Proposed Activities in 2005 – Phase II	What will be Achieved?	Section
1	**Definition of the spatial distribution of elevated metal concentrations, including definition of the distance to reference levels**	• Non-random sampling design overlain on a grid network; • Sampling of *Cladina* lichen; and • Sampling of surface (moss), h-horizon, b-horizon at a subset of sites.	• Lichen sampling beyond end-of-transect locations defined in Phase I of the Terrestrial Effects Project.	• Verify spatial extent of zone of elevated metal concentrations, including definition of the distance to reference levels.	Section 2
2	**Determination of whether the elevated levels are strictly related to historic mine activities or whether it continues today**	• Moss bag sampling	• Continued moss bag sampling	• Provides data on timing, patterns and relative levels of current airborne deposition (moss bags). •	Section 3
3	**Improve characterization of natural background (reference) concentrations**	• Conduct additional reference sampling; • Results of interpolation will also assist in interpretation of where elevated elemental concentrations level off	• Lead isotope analysis of moss bags on Swim Lakes.	• Distinguishes current deposition sources (i.e., long-range sources and potential mine site sources) and therefore determination the validity of the reference area (note 2004 / 2005 lichen and soil data support validity of reference area).	Section 4
4	**Investigation of metal levels in vegetation species of importance to humans and wildlife**	• Sample vegetation species of importance to humans (*e.g.*, species used for medicinal and / or consumption use) and / or wildlife (*e.g.*, forage species) • Sample soils at mineral lick sites	• Continued sampling of vegetation species of importance to human and / or wildlife (fill in data gaps from 2004 and response to input from First Nations and Community Members during Phase I and work plan development).	• Will provide data for a human health and ecological risk assessment; and • Will assist in verification of the extent of elevated elemental concentrations in food chain originating from the ARM.	Section 5
5	**Investigation of metal levels in wildlife tissue, including species of importance to humans**	• Collect tissue samples (liver, kidneys and muscle) from wildlife species in the vicinity of the ARM	• Collect whole body specimens of small mammals (voles and shrews); • Continued collection of tissue samples from wildlife species trapped or hunted in the vicinity of the ARM.	• Will provide data for a human health and ecological risk assessment; and • Will assist in verification of the extent of elevated metal concentrations in food chain originating from the ARM.	Section 6
6	**Determination of ambient air metal concentrations**		• Mini-vol sampling	• Provides ambient air metal concentrations to feed into a human health and ecological risk assessment (mini-vol sampling).	
7	**Identification of potential sources of ongoing deposition**		• Lead isotope analysis of moss bags on ARM.	• Distinguishes current deposition sources on ARM (lead isotopes)	

1

Summary of Work in Progress

A substantial amount of work is presently being carried out as part of the Phase II of the Terrestrial Effect Study. The following provides a summary of this ongoing work:

- spatial distribution of elevated concentrations;
  Lead in lichen continues to be used as the primary method for determining the extent of deposition from the Anvil Range Complex. In the fall of 2005, the lichen sampling program was extended beyond the area sampled in 2004 to define, if possible, where lead lichen levels return to reference levels.
- continuation of the assessment of ongoing deposition;
  The moss bags will continue to be used to determine whether there is ongoing airborne deposition. Moss bags were deployed in early April and in mid-June. This, along with that from the first half of 2005, provides one full year of data over which to observe any seasonal changes in depositional patterns along with relative amounts under varying environmental conditions.
- determination of ambient air concentrations;
  Although the moss bags are useful indicators of current airborne deposition, they do not provide the actual ambient air concentrations of the various metals of concerns. To provide this information, air quality data was collected using mini-vol air samplers. Initially a two-week program was carried out to measure dust and air concentrations adjacent to potential dust sources. This was then followed up by a longer term program to collect ambient air data over a wider range of climatic conditions. This latter program ran until mid-November and all samples have been sent out for analysis.
- identification of potential sources of deposition;
  Lead isotope analysis of moss bag samples is currently being carried out to delineate the sources of current deposition. This is being done through the interpretation of lead isotope signatures in the moss bag samples and a comparison against signatures of the Faro, Vangorda and Grum deposits along with those obtained from samples collected from potential deposition sources.
- collection and analysis of additional vegetation species; and
  Of the species collected and analyzed in 2004 / 2005, there were not enough samples of northern rough stemmed mushrooms, bear root, tree sap and horsetails to sufficiently detect any statistically significant differences between areas. Additional vegetation sampling was carried out in the fall of 2005 to collect these species, along with aquatic grasses.
- collection and analysis of additional small mammals, furbearers and game species.
  In order to complete the wildlife portion of this project, additional sampling was carried out in 2005. This included the collection and analysis of the following species: grouse,

beaver, ground squirrel, marmot, willow ptarmigan, muskrat, voles, shrews and deer mice. These samples have been processed and sent out for analysis. Although the raw data has been received from the laboratory, we are still awaiting the quality assurance/quality control data from the laboratory. Once the QA/QC data have been approved, the data can be summarized, analyzed and interpreted. In addition, 2 moose and 4 caribou samples have been collected and are being archived for analysis at a later date.

Summary of Results to Date

The overall observation that can be made at this time is that the mine site, especially the Faro tailings and mill, has been a source for localized dispersion of metals in soil, vegetation and small animals. Further, it appears that some degree of metal dispersion continues to take place. As will be described below under "Next Steps", an important piece of information that has not yet been finalized is whether the observed metal concentrations present a serious risk to animals and / or humans.

The following is a brief summary of the key findings to date of the Terrestrial Effects Study, including any preliminay results from Phase II:

- spatial distribution of elevated concentration;
  Lead concentrations in lichen samples suggest that the Faro mine area has been the primary source of lead transport. The two zones with highest lead concentration are immediately adjacent to the Faro mine. In contrast, the area affected near the Grum/Vangorda mine is smaller and lead concentrations are much lower. Although data for soils have not yet been completely analyzed with the 2005 samples included, a preliminary examination suggests that both lead and zinc concentrations are much higher in soils sampled near the Anvil Range Mine than in those collected at the Swim Lakes reference area.
- assessment of ongoing deposition;
  Elevated lead concentrations in moss bags near the Faro tailings impoundment / mill complex indicate that deposition is ongoing and not just historical with lead concentrations in moss bags highest near the Faro tailings impoundment / mill complex. In most cases, the pattern of lead deposition appeared to be consistent with wind directions and velocities for the period under consideration; however, this was not the case in summer. High precipitation levels in the spring may have resulted in increased soil moisture and reduced air borne deposition.
- collection and analysis of vegetation species; and

Lead concentrations decreased significantly as distance from the mine increased for almost all plant species groups analyzed. Concentrations of a number of other metals are also related to distance from the mine. These findings indicate that many metals (particularly lead) occur near the mine at elevated levels in vegetation that may be consumed by humans and wildlife.

- collection and analysis of small mammals.
  Lead concentrations in the tissues and organs of red-backed voles collected in 2004 are greatly elevated in zones immediately adjacent to the Faro tailings impoundment / mill complex.

On-Going Consultations

Gartner Lee, on behalf of the Interim Receiver, has led and managed the study, working closely with a number of specialist firms. Gartner Lee has also established an on-going series of consultative meetings and workshops with First Nations, community and scientific groups. This approach contributes to ensuring that the best available information is gathered and used in the study.

The First Nations and the community of Faro have been engaged throughout the study, and have provided critical guidance and input through a series of well-attended workshops. Members of the Ross River Dena and Selkirk First Nation have, for example, provided direction to the study on the most appropriate types of vegetation and wildlife to be sampled and on the most appropriate sampling locations. The accompanying report provides additional information on meetings and participation with Ross River Dena, Selkirk First Nation and the Town of Faro.

Additionally, opportunities to employ a number of First Nations graduates from the Yukon College Environmental Technician Program were identified during the course of the study. These individuals have worked on the study as field and office assistants, and contributed positively on the project.

Similarly, consultations with the scientific group have also been undertaken. A series of workshops have been used to gather scientific input on study design and field plans. This input has allowed for the incorporation of important detailed knowledge into the study.

Schedule for Next Steps

Previously in this letter, we described that the study information can not yet answer the first question of the project. In this letter we have described the goals and design of the study, the components of the study that have been completed and those that are underway, the study results

to date, and the means for the direct participation of First Nations and others in the Terrestrial Effects Study. Listed below are the next steps required to answer to the first study question:

1. complete the analysis of the Phase II information;
2. complete a preliminary assessment of risks to animals and people (through a HHERA) based on the Phase II results of the Terrestrial Effects Study;
3. assess the need for short-term mitigation actions to ensure that animals and people are adequately protected from risks;
4. if it is necessary, develop a short term action plan to be implemented while the Final Closure and Reclamation Plan is being developed and approved;
5. meet with the Ross River Dena Council, Selkirk First Nation, Town of Faro, Faro Mine Closure Project Office and governmental representatives and incorporate their feedback into the work; and
6. present the above work to the Yukon Water Board in the form of a final report.

Throughout all of this work, on-going consultations with First Nations, community and scientific groups will continue. We estimate that Phase II of the Terrestrial Effects Study (step 1 above) will be complete by March 2006, thereby enabling the subsequent steps to proceed. Shortly thereafter, we will provide an update to the status and summary results. Depending, in part, on the need for short term mitigation and consultations with all of the various participating organizations, all of the above activities should be completed through the spring of 2006, resulting in the submission of the final report to the Yukon Water Board by June 30, 2006.

Closing

We trust that this letter and the accompanying report are clear and understandable. Please contact the undersigned if you have any questions regarding the information presented.

Sincerely,
GARTNER LEE LIMITED
(on behalf of the Interim Receiver)

original signed

Leslie Gomm, P.Eng., Ph.D.
Senior Environmental Engineer

c.c: Valerie Chort, Deloitte & Touche Inc.
Roger Payne, Faro Mine Closure Planning Office

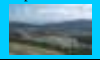
RISK CLASSIFICATION MATRIX FOR ELEMENTS ON THE ANVIL RANGE MINE SITE - 2004-05 REVIEW

LEGEND:

Element Name Colour Indicates Risk Classification

Very High Risk	**Mod. High Risk**	**Low Risk**	**Element "Retired"**
High Risk	**Moderate Risk**		

Note: Realignment with the new INAC – Northern Affairs Contaminated Sites Program Risk Matrix has resulted in five risk categories rather than the original six as the Low and Lowest Risk categories have been combined

I. DAMS	II. DIVERSIONS	III. PONDS	IV. DUMPS	V. TAILINGS&SEDIMENTS	VI. WATER	VII. INFRASTRUCTURE	VIII. BUILDINGS&YARDS
I.1 Fresh Water Supply Dam 	II.1 Faro Creek Diversion 	III.1 Faro Main Pit 	IV.1 Faro Valley Rock Dump	V.1 Original Tailings Impoundment	VI.1 Rose Creek Valley Aquifer	VII.1 Mine Access Road	VIII.1 Faro Offices/W'House/Dry
I.2 Intermediate Dam 	II.2 Rose Creek Diversion 	III.2 Faro Zone II Pit 	IV.2 Faro Northeast Rock Dump	V.2 Second Tailings Impoundment 	VI.2 North Fork Rose Creek Aquifer	VII.2 Faro Mine Roads	VIII.2 Faro Maintenance Shops
I.3 Cross Valley Dam 	II.3 North Fork Rose Creek Diversion 	III.3 Fresh Water Reservoir 	IV.3 Faro Zone II Rock Dumps	V.3 Intermediate Tailings Impoundment	VI.3 Old Faro Creek Channel	VII.3 Faro Pit Pumping System	VIII.3 Mill
I.4 North Fork Rock Drain 	II.4 North Wall Interceptor Ditch	III.4 Intermediate Pond 	IV.4 Faro Main Rock Dump	V.4 1975 Tailings Spill	VI.4 South Fork Rose Creek	VII.4 Zone II Pit Pumping System	VIII.4 Concentrate Loadout
I.5 Pumphouse Pond Dam 	II.5 Faro Valley Interceptor Ditch 	III.5 Cross Valley Pond 	IV.5 Faro Northwest Rock Dump	V.5 Emergency Tailings Area	VI.5 North Fork Rose Creek	VII.5 Faro Water Treatment Plant (Mill)	VIII.5 Faro Used Oil Storage
I.6 VG Creek Headworks Dam / Culvert 	II.6 Vangorda Waste Rock Dump Collector Ditch 	III.6 Copper Sulphate Plant Pond 	IV.6 Faro Low Grade Dumps	V.6 Faro Main Pit Tailings	VI.6 Rose Creek	VII.6 Mill Effluent Pipeline	VIII.6 Faro Guardhouse
I.7 Little Creek Dam 	II.7 Vangorda Creek Diversion 	III.7 Pumphouse Pond 	IV.7 Faro Crusher Stockpile Dumps	V.7 Cross Valley Pond Treatment Sediment Beach	VI.7 Vangorda Creek	VII.7 YEC Power Supply System	VIII.7 Faro Misc Buildings&Yards
I.8 Sheep Pad Pond Dyke 	II.8 Vangorda Creek - Haul Road Crossing Culvert	III.8 Rock Drain Head Pond 	IV.8 Vangorda Rock Dump	V.8 Vangorda WTP Sediments	VI.8 Grum Creek	VII.8 Mine Power Distribution System (Faro)	VIII.8 Faro Fresh Water Pumping System
I.9 Moose Pond Dyke 	II.9 Vangorda Pit Diversion Ditches 	III.9 Vangorda Open Pit 	IV.9 Grum Waste Rock Dump			VII.9 Faro Telephone Line	VIII.9 Copper Sulphate Plant

RISK CLASSIFICATION MATRIX FOR ELEMENTS ON THE ANVIL RANGE MINE SITE - 2004-05 REVIEW

LEGEND:

Element Name	Colour Indicates Risk Classification

Very High Risk	Mod. High Risk	Low Risk	Element "Retired"
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Note: Realignment with the new INAC – Northern Affairs Contaminated Sites Program Risk Matrix has resulted in five risk categories rather than the original six as the Low and Lowest Risk categories have been combined

I. DAMS	II. DIVERSIONS	III. PONDS	IV. DUMPS	V. TAILINGS&SEDIMENTS	VI. WATER	VII. INFRASTRUCTURE	VIII. BUILDINGS&YARDS
I.10 Groucho Pond Dyke	II.10 Grum Interceptor Ditch 	III.10 Grum Open Pit 	IV.10 Grum Overburden Dump			VII.10 Faro Landfill Site	VIII.10 Bulk Explosives Plant
I.11 VG WTP Sedimentation Pond Dyke 		III.11 Sheep Pad Pond 	IV.11 Grum Ore Transfer Pad			VII.11 FWSD Access Road	VIII.11 Contaminated Soil at Faro Mine Site
I.12 Rose Creek Diversion Dyke		III.12 Little Creek Pond 	IV.12 Vangorda Pit Sulphide Stockpile Area			VII.12 Down Valley Lime Plant	VIII.12 Grum Office
		III.13 Moose Pond 				VII.13 Grum Access Road	VIII.13 Grum Shop
		III.14 Groucho Pond				VII.14 Mine Power Distribution System (Grum)	VIII.14 Grum Misc Buildings&Yards
		III.15 Vangorda WTP Sedimentation Pond 				VII.15 Grum Mine Roads	VIII.15 Grum Underground Adit
						VII.16 Vangorda Haul Road	VIII.16 Contaminated Soil at Vangorda Plateau Mine Site
						VII.17 Little Creek Dam Pumping System	VIII.17 Grizzly/DY Adit
						VII.18 Vangorda Pit Pumping System	VIII.18 Site Analytical Laboratory

RISK CLASSIFICATION MATRIX FOR ELEMENTS ON THE ANVIL RANGE MINE SITE - 2004-05 REVIEW

LEGEND:

Element Name	Colour Indicates Risk Classification

Very High Risk	Mod. High Risk	Low Risk	Element "Retired"
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Note: Realignment with the new INAC – Northern Affairs Contaminated Sites Program Risk Matrix has resulted in five risk categories rather than the original six as the Low and Lowest Risk categories have been combined

I. DAMS	II. DIVERSIONS	III. PONDS	IV. DUMPS	V. TAILINGS&SEDIMENTS	VI. WATER	VII. INFRASTRUCTURE	VIII. BUILDINGS&YARDS
						VII.19 Vangorda Water Treatment Plant	
						VII.20 Claims and Leases	
						VII.21 Personnel/Staffing	
						VII.22 Occupational Health and Safety	
						VII.23 Public Safety	
						VII.24 Refueling Station	
						VII.25 Environmental Equipment Package	

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Memo

Date: August 2005

To: Community Liaison Committee Members

From: Deloitte & Touche Inc.
Interim Receiver of Anvil Range Mining Corporation
("Interim Receiver)

Subject: Meeting Minutes – July 6, 2005

On Wednesday, July 6, 2005, the second annual meeting of the Community Liaison Committee ("CLC") for Anvil Range Mining Corporation ("Anvil Range") was held at the community recreation centre in Faro, Yukon.

Under the previous water licence, there was a requirement to maintain a Technical Advisory Committee, however, this requirement was not carried forward into the new water licence. During the Yukon Water Board hearing on the application for a new water licence, Deloitte & Touche Inc. ("D&T") committed to hold meetings to update the community on its annual care and maintenance activities. The Anvil Range Mine Community Liaison Committee was established. A list of the attendees for the July 6 meeting is attached as Appendix A.

The meeting was arranged in two parts. In the morning, presentations were made covering the care and maintenance activities, annual budget and an update on the comprehensive risk assessment program. Following the morning break, the Faro Mine Closure Planning Office provided an update on the closure planning process. A tour of the mine site was completed during the afternoon. The agenda for the meeting was as follows:

Agenda

1. **Welcome/Introductions**

2. **Overview-Status of Receivership Administration**

3. **2004-2005 Care and Maintenance Programs**

4. **Water Treatment and Testing Programs**

5. **Comprehensive Risk Assessment Update**

6. **Questions and Answers Session**

7. **Faro Mines Closure Planning Office – Update**

8. **Site Tour**

1. Welcome/Introductions

Wes Treleaven, Senior Vice President with D&T and the Partner responsible for the Anvil Range administration opened the meeting by welcoming all participants, presented the proposed agenda and introduced the team from D&T (Valerie Chort - National Partner for Environment, Health and Safety Services, Greg Stevens - Director, Dana Haggar - Site Operations Manager, Anvil Range). All attendees were invited to introduce themselves and their organizational affiliation and to complete the sign-in sheet. Participants were encouraged to ask questions throughout the presentations. All participants were given a map of the Faro and Vangorda sides of the property and graphical information on the Faro and Faro Zone II pit water levels.

Mr. Treleaven advised the attendees that the 2004 water treatment programs were similar to that of the previous year. The intermediate pond was pumped and treated so that adequate emergency storage capacity was maintained. The Faro and Vangorda pits were pumped and the water was treated.

During the 2004 operating season, the Faro Mill Water Treatment Plant was shut down for approximately two months during which time additional cyanide analysis was carried out by several independent laboratories. It was determined that initial concerns were created as a result of faulty testing and by following the required test procedures as set out in the Water Licence, the site has been compliant. As a result of the extended shutdown, the water level at the end of the pumping season in the Faro Pit was higher than the prior year, however, it was within the acceptable range and it's planned that by the end of this season, levels will be similar to those obtained in 2003.

There is a dedicated group of staff who oversee the water treatment programs to ensure that all effluent discharge meets the regulatory requirements. As reported in the 2004 Anvil Range Annual Report submitted to the Yukon Water Board, all water discharged from the property was within regulatory compliance.

Also, during the past year, further upgrades to the site's laboratory, security guardhouse and the employee dry building were completed. Mr. Treleaven advised that the participants would have the opportunity to see the new employee facility during the site tour. The employee dry building was installed as a result of a directive received from the Yukon Workers' Compensation Board to ensure that employees have appropriate facilities at the mine site.

Mr. Treleaven advised that the Interim Receiver had recently completed its 38th court report which outlined the past year's care and maintenance activities and special projects. A copy of the environmental section of the court report was made available to those who wanted a copy.

Mr. Treleaven advised that in reviewing the care and maintenance activities for the mine site, he was going to make the presentation by way of a number of pictures. The slide presentation shown to the participants during the meeting is attached as Appendix B. These meeting minutes should be reviewed in parallel with the attached photos/slides.

2. Overview - Status of Receivership Administration

During the past 12 months, there has been an active ongoing care and maintenance program at the mine site. Also, a number of care and maintenance projects were undertaken. A stable workforce of approximately 35 employees was employed to support the care and maintenance activities which include site security and water treatment, maintenance of roadways and physical structures, and building maintenance.

Mr. Treleaven also advised that a number of additional staff and outside contractors completed special field work programs including: a continuation of the grass seeding program in the Fresh Water Supply Reservoir basin, upgrades to the Rose Creek Diversion and removal of contaminated soil in the area that was previously referred to as the BXL/Brentgag (previously known as Stanchem) area. In summary, the past year was a very active and productive one and all water treatment programs were properly carried out meeting all of the Water Use Licence requirements.

Mr. Treleaven stated that on an overall basis the mine is in better shape today than it was several years ago; however, there continues to be some degradation around certain mine structures, which, if left unattended, could pose a risk in the future.

Mr. Treleaven advised that the resolution of the outstanding issue relating to the Trusteed Environmental Fund ("TEF"), which had not been properly set up to qualify as a reclamation fund under the *Income Tax Act* has been resolved. The TEF will now be combined with the funds in the established Reclamation Trust Fund. The trustees of the TEF have authorized this combination. As at May 31, 2005, Mr. Treleaven reported that the reclamation funds totaled approximately $13 million with an additional $1,480,000 being held as security under the Water Licence via way of a

Letter of Credit. Now that the tax issue has been resolved with CRA, the Interim Receiver will be able to complete a final distribution to the Affected Creditors.

A number of legal questions continue to remain outstanding regarding mining claims and property leases. The Interim Receiver continues to work with government officials to determine which mining claims may be ultimately returned to the public registry.

Mr. Treleaven also advised that the Interim Receiver has commenced a long term disposition program of the mill assets and last year completed a sale of three of the large grinding mills. There are active ongoing negotiations for other large components such as the primary and secondary crushers. With an increase in mining activities during the past couple of years around the world, there has been interest shown in a number of the mill assets with a number of foreign purchasers attending at the mine site. This will be an ongoing program which will likely take several years to complete.

Finally, Mr. Treleaven advised that the Interim Receiver will continue to report to the court at least three times a year. The May report is a summary of the year's activities and provides an overall accounting summary for the year ending March 31st. The November report provides a status update on the summer season's activities and the February report sets out the proposed budget for the coming year. The same sequence will occur during the 2005 - 2006 operating year.

3. New Water Use Licence QZ03 - 059

Mr. Treleaven advised that the new water licence, which is a type A licence, is a five-year care and maintenance licence which requires the applicant to file monthly reports and an Annual Report. Mr. Treleaven advised that all licence terms were met during the past year. Each month, a report was filed in addition to a substantial Annual Report which included the required geotechnical studies to the Yukon Water Board. Copies of the Annual Report were provided to the Town of Faro, the community of Ross River and to Selkirk First Nations.

Mr. Treleaven advised that he wanted to update the attendees on certain requirements as set out in the Water Licence, which were as follows:

Paragraph 51 - Water Treatment Sludge Management Study: A requirement under the Water Use Licence was that a Water Treatment Sludge Management Plan was to be prepared and submitted to the Board by June 30, 2004. Mr. Treleaven confirmed that such a plan had been submitted to the Yukon Water Board. Mr. Treleaven advised that in accordance with the plan as filed, a new Sludge Containment Cell had been constructed on the first tailings impoundment and is being used to collect the sludge produced from the Faro Mill Water Treatment Plant as well as sludge removed during the winter from the polishing pond. Also a new storage cell was constructed on the Grum Overburden Dump to contain sludge removed during the winter from the Vangorda Clarification Pond. Mr. Treleaven advised that a long term sludge management plan is also being prepared. The plan that was filed last year focused on the management of sludge during the term of the current water licence.

Paragraph 52 - Grum Pit Water Management Plan: Under the Water Use Licence, a water management plan for the Grum Pit was to be prepared and submitted to the Board by June 30, 2004. Such a plan was submitted to the Yukon Water Board. Mr. Treleaven advised that last year, a large bioremediation test project was undertaken at the Grum Pit . The results of this program, which essentially was applying fertilizer to the Grum Pit to activate the growth of algae, was successful. The results showed that there was a reduction in zinc content in the pit water. With the success of last year's test program, a decision has been made to continue the program this year and to conduct a similar program in the Faro Pit. Mr. Treleaven advised that during the site tour, attendees would be given the opportunity to view both pits which have turned green as a result of the fertilizer and resultant algae growth.

Paragraph 53 - Aquatic Life Sampling and Testing Program: Another requirement under the Water Use Licence was for an Aquatic Life Sampling and Testing Program to be filed with the Board by April 30, 2004. Mr. Treleaven advised that the plan was filed after consultation with the Department of Fisheries and Oceans and that the proposed program required a sampling and testing program in both Rose Creek and Vangorda Creek on an annual basis, during the five year term of the

licence. Results of the study were included in the annual report filed with the Yukon Water Board. A similar study will be carried out again this year by White Mountain Environmental Services.

Paragraph 54 - Adaptive Management Plan: Under the Water Use Licence an Adaptive Management Plan was to be prepared and submitted to the Yukon Water Board by June 30, 2004. Mr. Treleaven advised that in consultation with the communities of Ross River, Town of Faro and Selkirk First Nations, an Adaptive Management Plan covering eight events had been developed and submitted to the Yukon Water Board. During the Water Board hearing which took place during the fall of 2003, it was acknowledged that there were certain elements at the mine site which at the present time did not represent major concerns, however they require careful monitoring. An Adaptive Management Plan was identified as a management approach to track eight events at the mine site. For each of the events, the plan identified 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 results relating to the monitoring of the Adaptive Management Plan were included in the Annual Report filed with the Yukon Water Board.

Mr. Treleaven advised that as a result of this process, the trigger for two of the events being the Grum Seep and the Ground Water Quality in the Rose Creek Aquifir have been activated. Yukon Water Resources and the Water Board have been notified and additional monitoring programs are being established.

Mr. Carl Sidney representing the Yukon Salmon Committee asked what the specific eight elements were. Mr. Treleaven advised that the elements focused mainly on water, including the Rose Creek Valley Aquifer, Vangorda Creek, seepage from the Grum Rock Dump and there were a couple of elements that were not water related such as monitoring the migration of the Fannin sheep through the mine site. Mr. Treleaven advised that he did not have the Adaptive Management Program with him and undertook to provide Mr. Sidney a summary of the eight elements.

Paragraph 55 – Comprehensive Risk Assessment: A requirement under the licence is that the Comprehensive Risk Assessment is to be updated annually and is to be submitted to the Board as

part of the Annual Report. Mr. Treleaven advised that this work had been completed and that Ms. Chort would be providing an update to the attendees.

Paragraph 56 – Rose Creek Tailings Facility Management Plan: Mr. Treleaven advised that a water management plan for the Rose Creek Tailing Facility was to be prepared and submitted to the Yukon Water Board by March 31, 2005. The plan was to include an evaluation of the tailing oxidation and alternative water discharge scenarios. Mr. Treleaven confirmed that two reports covering both topics had been filed with the Board prior to March 2005. The first report looked at the management regime in maintaining the current water level in the Intermediate Pond. By lowering the water level which was a recommendation following the dams safety inspection, additional tailings prone to oxidization would be exposed. However, a lower water level, provides increased emergency storage capacity and lessens pressure on the dam. The report concluded that in weighing the various alternatives that the current approach is the most desirable. The second report looked at the times of year when water could be discharged and considered the impact of hardness on the Rose Creek downstream of the tailings impoundment. Again the report supported the current regime of treating water during the summer months and discharging from the Cross Valley pond to Rose Creek.

Mr. Treleaven indicated that all of the required filings with the Yukon Water Board have been filed on schedule. In closing this portion of the presentation, Mr. Treleaven advised that one other very important paragraph in the Water Use Licence is paragraph 58 which sets out the requirement that a final closure plan for the mine is to be prepared and submitted to the Yukon Water Board by December 31, 2006. Following the presentation on the care and maintenance programs, Mr. Treleaven advised that the Faro Mine Closure Planning Office would provide an update on the closure planning process.

Mr. Treleaven highlighted that one of the key issues with respect to the new Water Licence is the significant increase in water testing requirements which Mr. Dana Haggar will be addressing later during the presentation. While the licence specifies a few additional water testing locations, the key difference between the new and old licence is that the majority of the water tests have increased in

frequency. Mr. Treleaven advised that the testing costs have increased significantly and have been built into this year's budget which will also be discussed later during the presentation.

4. 2004 Care and Maintenance Programs

Care and maintenance activities were reviewed by presenting pictures of the various elements at the mine site. Mr. Treleaven advised that the care and maintenance activities carried out during the past 12 months mirrored those of the previous year. Also, geotechnical studies conducted by BGC (Faro side of the property) and SRK Consulting (Vangorda side of the property) will be conducted again this year. As in the past, Laberge Environmental Services will complete the benthic study and White Mountain will complete the required fish study. All of the study reports will also be included in the Annual Report filed with the Yukon Water Board.

Slides 4 and 5 – Faro Mine Site Overview and Faro Mine Site - Mr. Treleaven outlined the routing for this afternoon's site tour pointing out stops which would be taken including the Fresh Water Supply Reservoir, the guard house and a stop at the top of the Faro Valley Rock Dump to see both the Faro Diversion Ditch and the Faro Pit. Mr. Treleaven pointed out that a complete set of orthorectified (aerial photos) have now been acquired for the complete mine site, from which contour maps with two metre contour intervals have been prepared. These aerial photos have been assisting the engineers in basic engineering inputs.

Slide 6 – Faro Mine Access Road – Mr. Treleaven advised that the mine access road is deemed a public road and the Yukon Government is responsible to maintain the road. Mr. Treleaven advised that since the commencement of the receivership, the mine site staff have completed some small repair work to the road, however, it continues to deteriorate. The Interim Receiver has been having discussions with the Yukon Government requesting that repairs and maintenance work be carried out on the road particularly in sections where there are a number of lifts which are quite dangerous. Mr. Treleaven advised those planning to attend this afternoon's tour that they be particularly careful in driving down from the mine site and to maintain a reasonable speed especially when they reached the lower section of the road.

Slides 7, 8, 9 and 10 - Fresh Water Supply Reservoir, Fresh Water Dam Beach Channel, Breach Channel Riffle and South Fork of Rose Creek - Mr. Treleaven provided a brief overview of the breach of the Fresh Water Supply Dam which took place in November and December 2003. Initial seeding programs were commenced in 2003 and were completed in 2004. Slide 7 shows that the South Fork of Rose Creek has returned to its original creek bed. Mr. Treleaven advised that on the tour, we would stop at the reservoir basin to see the significant amount of vegetation growth which is accomplishing the objective of providing erosion control. Mr. Treleaven confirmed that during the Spring Freshet, little if any erosion occurred and that no further seeding was planned at this time. Rather we were going to let nature take its course over the next year or two. Mr. Treleaven showed two pictures of the Breach Channel (8 and 9) with the constructed riffles in place noting that the entire channel is working as originally planned and engineered. A small slide on the west side of the reservoir will be corrected during the coming winter. Slide 10 is a picture looking south showing the entire Breach Channel. Mr. Treleaven pointed out that the lower right hand corner of the picture is the location of the original Rose Creek Channel and that the current channel is man made. Following the breach, it was determined that this section of the channel would be reevaluated and if it was working adequately, there would be no intent of damming the creek to force it back into its original creek bed. Mr. Treleaven confirmed that the channel has worked well and that no further action is planned in altering any of the water courses. Mr. Treleaven confirmed that there is a separate Water Licence for this structure and as such an Annual Report is filed with the Yukon Water Board. The structure continues to be evaluated, and a separate fish study for the waters in the Breach Channel and Reservoir Basis is carried out each year.

Slides 11, 12 and 13 – K8 Location Spring Freshet, Breached Channel – Spring Freshet and Spring Freshet Rose Creek Valley 2005 – Mr. Treleaven advised that many of the water channels are designed to hold capacities far greater than what we would be seeing today and this is mainly to accommodate the high flows that occur during the Spring Freshet as well as storm events. For this year's presentation, Mr. Treleaven pointed out that a number of pictures were taken around the property on May 17th when it was determined that the Spring Freshet had peaked. Slide 11 (K8 Location) shows the waterflow at the K8 Location which is a main tributary flowing into the Fresh Water Supply Basin. Some additional erosion control work with the installation of additional rip rap

had been completed earlier this year at this location. Slide 12 (Breached Channel) is a picture of the Spring Freshet flowing through the Breached Channel which shows that the flood plane is completely covered and the final slide in this section (slide 13) shows the water level just below the Fresh Water Supply Dam breach in the Rose Creek Valley. Mr. Treleaven suggested that while on tour, attendees should take note of the current water levels and reflect on the levels as shown in this group of slides.

Slides 14 and 15 – BXL – Stanchem Location and BXL/Stanchem Excavation – Mr. Treleaven pointed out where the previous BXL/Stanchem buildings had been located and advised that two years ago the structures had been dismantled and the copper sulfate pond had been removed. During 2004, soils in this location were tested and found to contain levels of contamination. Over 8,000 cubic metres of soil were removed (slide 15) and this area has been reclamated.

Slides 16 and 17 – Pumphouse Pond – Spring Freshet - Mr. Treleaven presented two pictures showing the water level at the Pumphouse Pond on May 17th. The first picture (16) shows that the pond level had flooded the area adjoining the Pumphouse building and in the next picture (17), it shows that the water was overflowing the Pumphouse dam which had not previously occurred in past Spring Freshets.

Slide 18 – Down Valley Tailings Impoundment and Rose Creek Diversion – This picture provided an overview of the Down Valley showing the Tailings and Water Impoundments. Mr. Treleaven pointed out the location of the new sludge containment cell on the first tailings impoundment and certain monitoring wells that were drilled in 2001. Some of 2001 wells are to be decommissioned this year because they are leaking. Mr. Treleaven pointed out that the group would be traveling around the tailings impoundment and pointed out the area where two tailing test covers were installed a year ago and advised that the covers continue to be inspected on a regular basis and there does not appear to be any sinking of the cover materials into the tailings. Mr. Treleaven pointed out where a significant section of the Rose Creek Diversion Road was raised approximately 1 metre to ensure that the Rose Creek Diversion met the licence requirement of a 1 in 500 year flood event. It was also pointed out that the back slope of the Intermediate Dam had been resurfaced and that a new

larger culvert had been installed near the Intermediate Pond water treatment plant to carry the north interceptor ditch water.

Slides 19, 20 and 21 – Rose Creek Diversion – Spring Freshet and Spring Freshet 2005 – X14 - These pictures showed water levels reached during the Spring Freshet through the Rose Creek Diversion. The first picture is at the Fuse Plug, the second being in the section where the Rose Creek Diversion had been upgraded and the third picture is the roadway to the water testing location X14 which actually was submerged and was washed away during the Spring Freshet. Mr. Treleaven advised that the road access to X14 has been re-established.

Slide 22 – Rose Creek and Anvil Creek - Mr. Treleaven advised that a new requirement under the Water Licence is that 3 times a year being summer, fall and winter, that water is to be tested where Rose Creek meets with Anvil Creek. He pointed out that a helicopter landing pad had been established to facilitate the transport of individuals to this location to ensure that the water is properly collected. It was asked what the distance is to this location and Mr. Haggar advised that it was approximately 25 kilometers.

Slides 23, 24 and 25 – Intermediate Spillway and Cross Valley Pond - Mr. Treleaven provided a brief overview of the water treatment program for the Intermediate Pond. Water from the Intermediate Pond is siphoned to a box container in which lime is added and the water then flows into the Cross Valley Pond. Near the entrance from the Spillway a significant amount of sludge had accumulated (slides 24 and 25) and it was determined that to properly manage this pond which is the last pond before water is released to Rose Creek, that the sludge materials had to be removed. During the winter of 2005, over 10,500 cubic metres (approximately 1,200 truck loads) of sludge were removed from the pond and deposited in the new sludge containment cell located on the first tailings impoundment. Due to weather conditions in late April, the project could not be completed and it is planned that the remaining sludge and sludge created through this year's program will be removed next winter.

Slide 26 – Bathymetry of Cross Valley Pond - Mr. Treleaven advised that as part of the study addressing the water discharge scenarios, the bathymetry of the Cross Valley Pond was completed.

We found this to be very accurate in determining the depth and locations of sludge and in identifying where we could install our siphon to achieve the maximum depth for reducing the water level in the Cross Valley Pond. Prior to starting the sludge removal program, the Cross Valley Pond was reduced to the lowest level we have seen, thus exposing the large areas of sediments.

Slides 27, 28, and 29 – Cross Valley Pond – Sludge Containment, Cross Valley Pond – Culvert Installation and Cross Valley Pond – Faro Mill Water Discharge Installation - Mr. Treleaven advised that sludge management and containment are very important issues and Mr. Haggar came up with two ideas as to how we could control the containment of sludge from both the Intermediate Pond water treatment facility and the Faro Mill treatment facility. As shown in slide 27, the water from the Intermediate Pond treatment box now travels by way of a pipe directly into a vertical culvert. The vertical culvert (slide 28) was installed 15 feet deep, encased in rock to provide stability with screens, as shown in the picture, to allow the water to escape with minimum turbulence. The containment area was constructed allowing for the sediment to be deposited away from the siphon area. As picture 27 shows, a significant amount of new sediment has already been produced this year. Slide 29 shows the installation where the Faro Mill water is released in the Cross Valley Pond. The larger vertical pipe installation acts as an energy dissipation culvert for the rapid flow of water and again it was installed 15 feet in rock to provide stability. As the water comes up into the culvert, it then flows by way of a flat pipe to a second culvert and is discharged. Again a containment cell has been constructed which will hold the sediments and it is planned that sediments will be removed, as required, from this containment cell. The amount of sludge resulting from this water is significantly less as most of the sludge is captured within the mill and only a small amount will actually be deposited in this cell.

During the past two years, water from the Faro Mill Treatment Plant has been released at the top of the Intermediate Spillway. We have seen evidence that sludge is being deposited in the spillway and this has clearly shown to us that this water should not be discharged directly to the Rose Creek as this sludge material should be captured prior to being released.

Slide 30 – Cross Valley Pond (Polishing Pond) - Slide 30 is an aerial photo of the Cross Valley Pond and the Intermediate Pond water treatment plant area. Mr. Treleaven pointed out the two new installations along with the culvert for the North Interceptor Ditch. Mr. Treleaven confirmed that all operations in this area are now electrically powered and that the treatment program is working very well.

Slides 31 and 32 – Cross Valley Pond Siphon & Floating Siphon - The next two pictures (31 and 32) are pictures of the original siphon in the Cross Valley Pond which laid on the bottom of the pond. Mr. Treleaven pointed out that on some occasions, some materials would be sucked off the bottom and to correct this, Mr. Haggar again came up with the idea of creating a floating siphon which is in a deep area of the pond. To the best of our knowledge this has never been previously accomplished and it is working well.

Slides 33, 34, 35 and 36 – North Interceptor Ditch Culvert and First Tailings Impoundment Sludge Containment Cell – Mr. Treleaven pointed out that previously the culvert at the North Interceptor Ditch was very small and each year it would freeze up causing glaciation in this area. Mr. Treleaven advised that the culvert previously located at the Fresh Water Supply Spillway was removed and has now been installed in this location making it much better during the winter. Slide 35 provides an aerial picture of the sludge containment cell built on the first tailings impoundment during the 2004/2005 winter. It is approximately 100 metres long by 40 metres wide and 2 metres deep. This cell should be able to hold all of the sludge produced during the current water licence from both the Polishing Pond and water treated from the Faro Pit. Slide 36 shows the pipe installed from the Faro Mill to the containment cell to transfer sludge from the Faro water treatment plant to this location on a regular basis.

Slides 37 and 38 – Employee Dry Building and Septic Tile Bed – Slide 37 shows the Security Guard House which is the main office building used at the mine site. Mr. Treleaven pointed out that the

Yukon Workers' Compensation Board issued a directive requiring the Interim Receiver to install an employee building containing appropriate showers and washroom facilities. A water well was drilled (brown wood building lower corner) to a depth of 390 feet and sufficient water is now available to supply both the office and the employee dry buildings. During the installation of the Employee Dry Building, we discovered that the original septic tank did not have a septic tile bed and accordingly, under Yukon regulations, an appropriately sized bed was installed earlier this year by the employees at the mine site (slide 38).

Slide 39 – Faro Mill – Mr. Treleaven pointed out that the mill continues to be used as a water treatment plant and that the Norcan Shop is used as the maintenance facility at the mine site. Significant upgrades to the Norcan Shop were completed during the past year, including the installation of new furnaces which run on waste oil produced at the mine site. A waste oil separator was retrieved from the mill and is used to process waste oil from the site. As noted above, the oil is then used to fuel the furnaces and heat the building. Also new doors and a new stock room facility have been installed in the Norcan Shop. Mr. Treleaven advised that EBA of Whitehorse has inspected the circuits within the water treatment plant and will be reattending later this year to complete their inspection. Mr. Treleaven advised that the Interim Receiver wants to ensure that it is aware of the current condition of the water treatment plant, particularly the cement liners in the clarifier and thickener tanks.

Slide 40 – Concentrate Load Out Building – Mr. Treleaven advised that as noted during last year's meeting, the Interim Receiver in cooperation with Yukon College, developed a building dismantling course for six individuals from the community of Ross River. The course went very well and these individuals have been rehired along with a Vancouver based demolition company (Impact Demolition) who will provide supervisory services to oversee the dismantling of the Concentrate Load Out Building. Mr. Treleaven pointed out that during the tour, the attendees would notice that all of the clad siding had been removed and that the main structure was being worked on.

Slides 41, 42, 43 and 44 – Zinc Concentrate, Bagging Operation, Bagged Zinc Concentrate and Zinc Concentrate Loading - Mr. Treleaven advised that prior to the dismantling of the Concentrate Load

Out Building, the Interim Receiver had determined that there was approximately 1,600 tonnes of zinc concentrate located in this area. As a result of improved pricing in zinc concentrate, the Interim Receiver was able to negotiate an arrangement with Teck Cominco whereby this material was bagged and shipped to their smelter in Trail B.C. for processing. The actual quantity shipped turned out to be significantly greater at approximately 2,600 tonnes. Slide 43 shows that the staff at the site were able to reactivate the conveyor system and that they developed a unique way of holding the special bags in place during the filling process. Each bag held approximately 1.5 tonnes of zinc concentrate. The bags were loaded onto transport trucks and 57 truckloads have been taken from the site.

Slide 45 – Faro Scrap Yard – Mr. Treleaven pointed out that during last year and again this year, a Scrap Steel Recovery Program is being carried out at the mine site. Also, used vehicle tires are being collected and in some cases have been recovered for use as there is now a world-wide shortage of large used tires. Mr. Treleaven also pointed out that a new power line from the mill to the Faro Barge had been installed and that the old lines have been taken down and are being collected.

Slide 46 – Faro Pit – Mr. Treleaven showed a recent picture of the Faro Pit and indicated that the north wall is continuing to be monitored and that again this year Golder & Associates will be attending at the mine site to reassess the stability of the pit wall. As noted in previous meetings, Golder and & Associates had completed an assessment of the pit wall in 2002 and indicated that the pit wall would have an estimated life of between 5 and 10 years. This is a very important issue as it would require the relocation of the Faro Diversion. Mr. Treleaven also pointed out that the Faro Zone II Pit is regularly pumped and he noted the location where the water enters the Faro pit which is in the southeast corner.

Slides 47, 48, 49, 50 and 51 – Faro Valley, Faro Creek Diversion, Faro Valley Ditch and Faro Valley Seep - Mr. Treleaven pointed out that attempts are made each year to try and minimize the water flowing into the various pits at the mine site. In slide 47, Mr. Treleaven noted that a significant amount of water collects behind the Faro Valley Dump which is seepage from the Faro Diversion and from the west side of the Faro Valley. This water seeps through the Faro Dump and is

the main contributor of contaminated water to the Faro Pit as it is quite high in zinc which it collects as it migrates through the dump. Slide 48 shows the Faro Diversion. Mr. Treleaven reviewed the work which was carried out two years ago wherein a bentomat liner was placed in sections of the Faro Creek Diversion. This has significantly improved the functioning of the diversion in that there is no significant ice build up now in the winter and that the amount of leakage has been reduced by a significant amount. Also the ditch on the west side of the valley (slide 49) is being maintained to ensure that as much water can be collected from the west side of the valley and diverted into the Faro Creek Diversion. Nevertheless as shown through slides 50 and 51, ground water seeps are still being discovered. Earlier this year we discovered a seep very close to the Faro Valley Dump which actually flows into the dump. This water will be diverted and captured hopefully in a separate location and will be diverted into the Faro Creek Diversion.

Slides 52, 53 and 54 – North Fork of Rose Creek Rock Drain – Mr. Treleaven advised that the North Fork Rock Drain is being monitored carefully and that a data logger has been installed to measure the flow of water. Also debris on the upstream side of the drain will be removed this year. The rockface on the down stream side is also being monitored to ensure proper erosion control.

Slides 55 and 56 – Vangorda Plateau Mine Site Overview and Grum/Vangorda Plateau - Mr. Treleaven reviewed the Vangorda Plateau Mine Site and pointed out where the participants would go during the afternoon tour.

Slide 57 and 58 – Grum Pit – Mr. Treleaven pointed out that the bioremediation program is continuing this year and that the barge that was built and installed last year had survived the winter and was being utilized again this year. Mr. Treleaven pointed out that there continues to be a significant amount of slumpage on the northeast wall of the pit and that three electrical poles on the roadway up to the Vangorda Water Treatment plant would have to be relocated later this year.

Slide 59, 60, 61 and 62 – Vangorda Plateau, Vangorda Sludge Containment, Sludge Containment and Vangorda Clarification Pond – Slide 59 is an overview of the Vangorda Water Treatment Plant which includes the clarification pond and the Grum Overburden Dump. Slide 60 is an aerial photo of the containment sludge cell on the Grum Overburden Dump and shows the 2004 sludge

containment cell (lower corner) and the two new sludge containment cells built in 2005 which will eventually be combined into one large cell. Slide 61 shows the depth of the material. We estimate that approximately 8,000 cubic metres (1,000 truck loads) of material was removed from the Vangorda Clarification Pond. Slide 62 shows the Clarification Pond in April and the road access which was built into the Clarification Pond. The removal of the sludge from this pond will now be an annual care and maintenance project.

Slide 63 – Vangorda Plateau – Mr. Treleaven pointed out that all of the ditching on the Vangorda plateau was being maintained. The Sheep Pad Ponds are effectively working for sediment control and it is planned during this winter that some sediments contained in the Sheep Pad Ponds will be removed. Mr. Treleaven also pointed out the Little Creek Dam and the water contained behind this dam and advised that during the Spring Freshet, this pond rose 8 feet in 12 hours. Again because the property is inspected several times a day, appropriate action was taken to ensure that this water was pumped to the Vangorda Pit.

Slides 64, 65, 66 and 67 – Vangorda Flume - At the conclusion of last year's presentation, Mr. Treleaven showed a number of pictures of an event which took place on June 8, 2004. This storm event caused severe damage to the Vangorda Flume and slides 64 and 65 were a reminder of the amount of water that was in the flume. Slides 66 and 67 showed the extensive amount of remediation work which was carried out during the fall of 2004 wherein 9 new sections of the flume were installed and a significant amount of rip rap was installed along sides of the flume from top to bottom.

Slides 68, 69 and 70 – Vangorda Drop Box - Pictures 68 and 69 show the results of the June 8, 2004 event when the drop box, which receives the water from the plunge pool by way of a culvert and then directs it under the main access road to flow into Vangorda Creek, broke and overflowed causing a significant amount of erosion. The coupler on the culvert entering the drop box also separated. A major task was completed wherein this was rewelded and encased in cement and the entire area was regraded and properly fitted with rip rap for future waterflow control.

Slides 71, 72, 73, 74, 75, 76 – Vangorda Flume and Plunge Pool - Mr. Treleaven advised that notwithstanding all of the work that was carried out last year, on May 17, 2005, during a storm event, the capacity of the flume was exceeded and sections (slide 72) started to lift. Without the quick action of the staff to save this structure, it would have been seriously damaged. As shown in this slide the boom of the backhoe was placed on the far side of the flume structure to prevent it from lifting. There are plans for later this fall to take out this section of the flume and re-anchor it with better tie downs. Slide 74 shows that the volume of water exceeded the flume capacity and again a lot of damage was incurred (Slide 75) to several of the cross members. Slide 76 shows that a significant amount of erosion took place at the end of the flume and this area will be excavated and rip rap will be installed to prevent further erosion.

Slide 77 – Vangorda Rock Dump – Mr. Treleaven advised that the toe of the Vangorda Rock Dump continues to have a significant amount of erosion and as noted on the slide, a number of erosion gullies have formed on the toe of the dump. It is now becoming customary that every two to three years, this entire area has to be regraded to re-establish the toe. The drains will also be fixed his year.

Slide 78 – Vangorda Pit - Mr. Treleaven discussed steps currently being taken to prevent water flowing into the pit by ensuring that ditches above the pit are properly excavated and maintained. Mr. Treleaven advised that it's planned that this year the Vangorda Pit will be pumped through to the end of August and that with the significant lowering of the water level it is unlikely that this pit will have to be pumped for at least the next two seasons.

Slide 79 and 80 – Vangorda Dump Covers – Mr. Treleaven advised that as part of the closure planning process, a decision was made to install test covers on the Vangorda Rock Dumps. During the fall of 2004, five covers, two on the flat and three on the slope, were installed with varying thicknesses and compaction profiles. During June of this year, instrumentation was installed in each of the covers and the covers are being monitored on a daily basis.

Slide 81 and 82 – V27 Location – Mr. Treleaven pointed out that one of the important water sampling locations is known as V27 and that access to this site is very difficult and dangerous. Accordingly, steps will be taken this year to provide a safe access trail to the location.

Slide 83 and 84 – Faro Mine Site - In closing this portion of the presentation, Mr. Treleaven pointed out that during last summer (slide 83) working conditions were very difficult as there was a blanket of smoke during July and August due to the numerous forest fires throughout the Yukon.

Financial Update

The year end of the Interim Receivership coincides with the federal government's year end. Each year a comprehensive budget is established which includes security, maintenance and environmental costs. For security and maintenance, costs have been consistent throughout the past several years. Site security is maintained year round. The environmental protection (water treatment) budget has also been relatively constant during the past three years. Overall, for the past three years, the mine site's total care and maintenance budget has been slightly in excess of $4 million. The major accounts by expenditure category were shown on slides 85 through 87.

Mr. Treleaven advised that during 2004, $6.7 million was expended on operations and year end purchases and of this amount, $4.8 million representing 72% was expended in the Yukon. Also $5.9 million was spent on special projects, mainly site investigation and assessment work and of the total amount of $12.6 million spent, $7.7 million was expended in the Yukon representing 62% of all expenditures.

Mr. Treleaven also advised that a couple accounts have shown a significant increase over the past year and in particular that of Yukon Electric (YEC). Mr. Treleaven advised that the Interim Receiver had met earlier in the year with representation from YEC to clarify certain issues and to confirm that a proposed rate increase of approximately 19% was being put through. The increase in Support Services reflect the significant increase in water testing programs and finally the increase in fuel and lubricants reflects the significant increase in the price of diesel and gasoline.

Water Treatment and Testing Programs

Mr. Dana Haggar, the Anvil Range Site Manager, provided an overview of the ongoing water treatment and water testing programs at the Faro and Vangorda mine sites. Mr. Haggar again emphasized the significant increase in water testing requirements under the new Water Use Licence and the significant amount of work that is carried out by the site's lab technicians and independent labs in Vancouver.

Comprehensive Risk Assessment

Valerie Chort presented a summary of this year's update to the Comprehensive Risk Assessment ("CRA"). This is a dynamic process, which was initiated in 2001 and has been regularly updated since that time to reflect site care and maintenance activities as well as the information gained from ongoing studies. The purpose of the update is to track how risks have been changing over time and to assess progress with respect to the overall objective of lowering the risk for the remaining elements on site. Slides 90 through 94 summarize the results of the 2003-04 update. Mr. Chort advised that the Interim Receiver had been working with DIAND – Northern Affairs Contaminated Sites program group in their establishment of a risk methodology and that we have aligned our risk program to the risk matrix established by the Northern Affairs Contaminated Sites program. In essence, some titles have changed, however the overall methodology is similar. As a result there are five categories rather than our original six and that the low and lowest risk categories have been combined. Also during the past year an additional two elements were retired which brings the total number of retired elements to nine since 2001. Slide 93 provides an overview of the matrix comparing the results for the past year to the original 2001 risk assessment. Categories of high risk and low risk continue to experience the most significant shifts with changes of 41% and 72% respectively, since 2001.

Faro Mine Closure Planning Office

Representatives of the Faro Mine Closing Planning Office (FMCPO) provided an overview of the closure planning process and introduced Mr. Roger Payne as the new director of the FMCPO. Attached as Appendix C is a copy of their presentation.

Site Tour

Following the presentations, the group proceeded to complete a site tour. A few minor questions relating to information presented during the morning slide presentation were asked however there was no new information presented or debated. The tour was completed by mid-afternoon, at which point the CLC meeting was drawn to a close.

Appendix A

JULY 7, 2005 COMMUNITY LIAISON COMMITTEE MEETING

ATTENDEES

Name	Representing
Dana Haggar	Anvil Range Mining Corp.
Valerie Chort	Deloitte & Touche Inc.
Wes Treleaven	Deloitte & Touche Inc.
Russ Smoler	DIAND
Mary Smolders	DIAND
Line Gagnon	DIAND
Roger Payne	Faro Mine Closure Planning Office
Kathlene Suza	Ross River Dena Council
Robert Van Bibber	Selkirk First Nation
Lizzie Hall	Selkirk First Nation
Ted Baker	Town of Faro
Larry Baran	Town of Faro
Saskia Bunicich	Town of Faro
Marg Crombie	Type II Mines Project Office
Lois Craig	Yukon Government
Brad Finnon	Yukon Government
Carl Sidney	Yukon Salmon Committee

Deloitte.



Community Liaison Committee Meeting

July 6, 2005

Audit. Tax. Consulting. Financial Advisory.

Agenda

1. Welcome/introductions
2. Overview – Status of Receivership Administration
3. 2004-2005 Care and Maintenance Programs
4. Water Treatment and Testing Programs
5. Comprehensive Risk Assessment Update
6. Questions and Answers

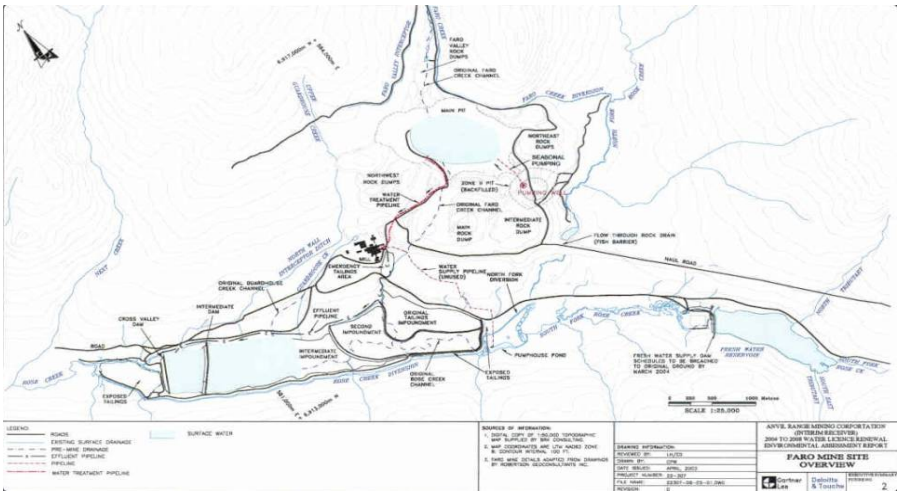
Break

7. Faro Mine Closure Planning Office - Update
8. Site Tour (Lunch at the Mine Site)

2004 Care and Maintenance Program

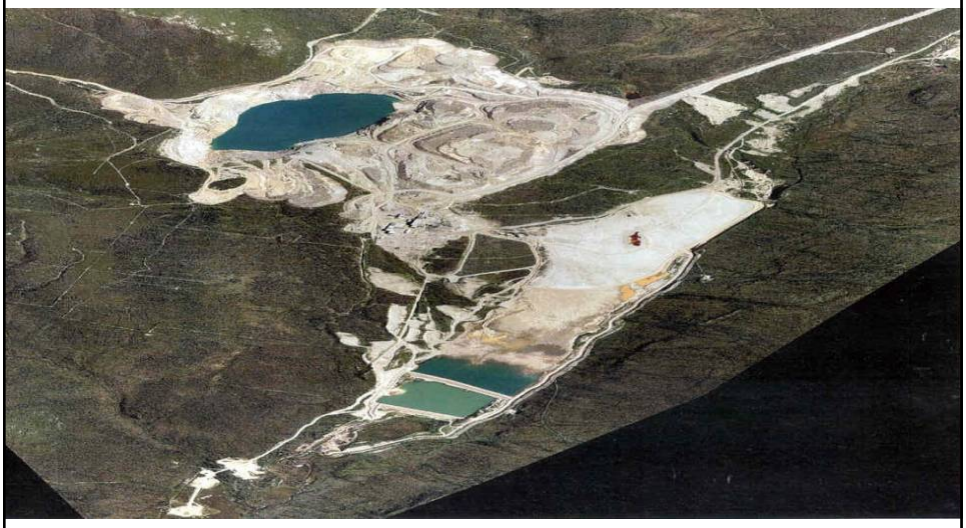
3

Faro Mine Site Overview



4

Faro Mine Site



5

Faro Mine Access Road



6

June 2, 2005

Fresh Water Supply Reservoir



7

June 2, 2005

Fresh Water Dam Beach Channel



8

June 2, 2005

Breach Channel Riffle



9

June 2, 2005

South Fork of Rose Creek



10

May 17, 2005

K8 Location Spring Freshet



11

May 17, 2005

Breached Channel – Spring Freshet



12

May 17, 2005

Spring Freshet Rose Creek Valley 2005



13

June 2, 2005

BXL – Stanchem Location



14

Fall 2004

BXL / Stanchem Excavation



15

May 17, 2005

Pumphouse Pond – Spring Freshet



16

May 17, 2005

Pumphouse Pond – Spring Freshet



17

Down Valley Tailings Impoundment and Rose Creek Diversion



18

May 17, 2005

Rose Creek Diversion – Spring Freshet



19

May 17, 2005

Rose Creek Diversion – Spring Freshet



20

May 17, 2005

Spring Freshet 2005 – X14



21

June 2, 2005

Rose Creek and Anvil Creek



22

Intermediate Spillway



23

Fall 2004

Cross Valley Pond



24

Fall 2004

Cross Valley Pond



25

Bathymetry of Cross Valley Pond

26

June 2, 2005

Cross Valley Pond – Sludge Containment



27

April 5, 2005

Cross Valley Pond – Culvert Installation



28

Cross Valley Pond
Faro Mill Water Discharge Installation

May 31, 2005



29

June 2, 2005

Cross Valley Pond (Polishing Pond)



30

Fall 2004

Cross Valley Pond Siphon



31

May 31, 2005

Cross Valley Pond Floating Siphon



32

August 2004

North Interceptor Ditch Culvert



33

August 2004

North Interceptor Ditch Culvert



34

First Tailings Impoundment Sludge Containment Cell

June 2, 2005



35

Faro Sludge Containment Cell

June 2, 2005



36

June 2, 2005

Employee Dry Building Installation



37

May 31, 2005

Septic Tile Bed



38

Faro Mill



39

Concentrate Load Out Building



40

Zinc Concentrate



41

Bagging Operation



42

Bagged Zinc Concentrate



43

Zinc Concentrate Loading



44

Faro Scrap Yard



45

Faro Pit



46

June 2, 2005

Faro Valley



47

June 2, 2005

Faro Creek Diversion



48

June 2, 2005

Faro Valley Ditch



49

May 31, 2005

Faro Valley Seep



50

June 2, 2005

Faro Valley Seep



51

June 2, 2005

North Fork of Rose Creek Rock Drain



52

June 2, 2005

North Fork Rock Drain



53

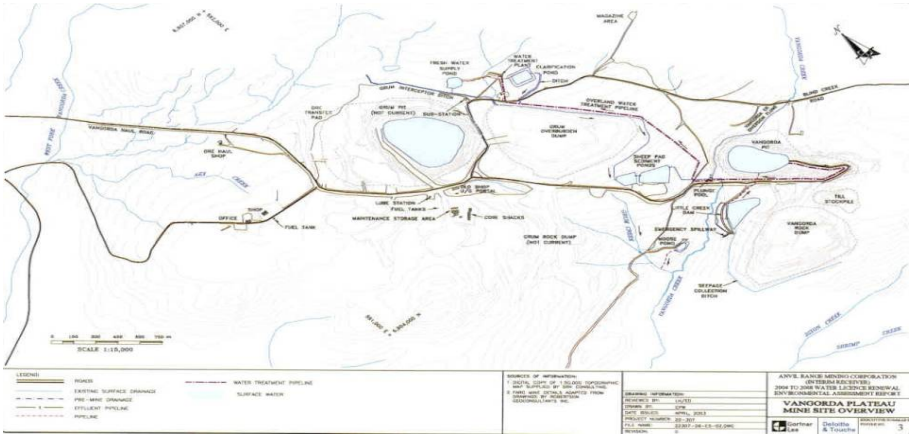
June 2, 2005

North Fork Rock Drain



54

Vangorda Plateau Mine Site Overview



55

Grum/Vangorda Plateau



56

June 2, 2005

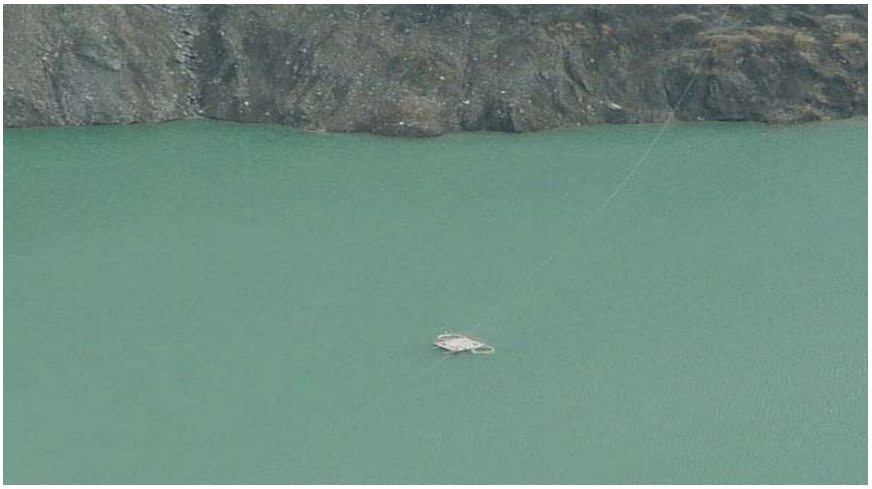
Grum Pit



57

June 2, 2005

Grum Pit



58

June 2, 2005

Vangorda Plateau



59

June 2, 2005

Vangorda Sludge Containment



60

April 2005

Sludge Containment



61

April 2005

Vangorda Clarification Pond



62

Vangorda Plateau



63

June 8, 2004

Vangorda Flume



64

June 8, 2004

Vangorda Flume



65

Fall 2004

Vangorda Flume



66

Fall 2004

Vangorda Flume



67

June 9, 2004

Vangorda Drop Box



68

June 9, 2004

Vangorda Drop Box



69

Fall 2004

Vangorda Drop Box



70

May 17, 2005

Vangorda Flume



71

May 17, 2005

Vangorda Flume



72

May 17, 2005

Vangorda Flume



73

May 17, 2005

Vangorda Flume



74

May 17, 2005

Vangorda Flume



75

May 19, 2004

Vangorda Plunge Pool



76

June 2, 2005

Vangorda Rock Dump



77

June 2, 2005

Vangorda Pit



78

June 2, 2005

Vangorda Dump Covers



79

June 2, 2005

Vangorda Dump Covers



80

June 2, 2005

V27 Location



81

June 2, 2005

V27 Location



82

Summer 2004

Faro Mine Site



83

Summer 2004

Faro Mine Site



84

Table 1

Security and Maintenance Main Expenditures	2003 $	2004 $	2005 $
Payroll and Benefits	330,500	335,250	383,750
Mechanical and maintenance	99,000	97,000	100,000
Insurance	60,000	144,000	150,000
Contractors	41,000	70,000	115,000
Fuel and Lubricants	119,500	100,000	120,500
Security & Maintenance Program TOTAL	**$907,850**	**$1,039,450**	**$1,161,950**

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Table 2

Environmental (Water Treatment) Main Expenditures	2003 $	2004 $	2005 $
Payroll and Benefits	1,083,600	1,210,400	1,279,900
Environmental Engineering	160,000	190,000	190,000
Lime	330,000	280,000	100,000
Lease payments	264,000	264,000	264,000
Maintenance and Parts	194,000	190,000	190,000
Yukon Electric	730,000	650,000	775,000
Support Services Labs	100,000	77,000	162,000
Fuel and Lubricants	166,000	108,000	180,000
Environmental (Water Treatment) PROGRAM TOTAL	**$3,114,600**	**$3,128,500**	**$3,379,900**

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Table 3

	2003	2004	2005
Care & Maintenance Budget TOTAL	**$4,082,450**	**$4,168,000**	**$4,541,850**

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Water Treatment
And Testing Programs

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Comprehensive Risk Assessment

2004/2005 Update

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Comprehensive Risk Assessment

- The Comprehensive Risk Assessment, initiated in 2001, has been updated to reflect the 2004-2005 care and maintenance activities as well as the results of the special projects that were completed during this timeframe.
- A major part of the 2005 review was to realign the existing risk rankings with DIAND's – Northern Affairs Contaminated Sites Program Risk Matrix.
- The categories of High risk and Low risk continue to experience the most significant shifts with changes of 41% and 72% respectively, since 2001.
- An element was added in the 2004/05 review: Site Analytical Laboratory recognizing the importance of the lab to the management of the site.
- An additional two (2) elements were "retired" during the 2004/05 review. This brings the total number of retired elements to nine (7), since 2001.

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Comprehensive Risk Assessment (Cont'd)

I. DAMS	II. DIVERSIONS	III. PONDS	IV. DUMPS	V. TAILINGS&SEDIMENTS	VI. WATER
I.1 Fresh Water Supply Dam 	II.1 Faro Creek Diversion 	III.1 Faro Main Pit 	IV.1 Faro Valley Rock Dump	V.1 Original Tailings Impoundment	VI.1 Rose Creek Valley Aquifer
I.2 Intermediate Dam 	II.2 Rose Creek Diversion 	III.2 Faro Zone II Pit 	IV.2 Faro Northeast Rock Dump	V.2 Second Tailings Impoundment 	VI.2 North Fork Rose Creek Aquifer
I.3 Cross Valley Dam 	II.3 North Fork Rose Creek Diversion 	III.3 Fresh Water Reservoir 	IV.3 Faro Zone II Rock Dumps	V.3 Intermediate Tailings Impoundment	VI.3 Old Faro Creek Channel
I.4 North Fork Rock Drain 	II.4 North Wall Interceptor Ditch	III.4 Intermediate Pond 	IV.4 Faro Main Rock Dump	V.4 1975 Tailings Spill	VI.4 South Fork Rose Creek
I.5 Pumphouse Pond Dam 	II.5 Faro Valley Interceptor Ditch 	III.5 Cross Valley Pond 	IV.5 Faro Northwest Rock Dump	V.5 Emergency Tailings Area	VI.5 North Fork Rose Creek
I.6 VG Creek Headworks Dam / Culvert 	II.6 Vangorda Waste Rock Dump Collector Ditch 	III.6 Copper Sulphate Plant Pond 	IV.6 Faro Low Grade Dumps	V.6 Faro Main Pit Tailings	VI.6 Rose Creek

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Department of Indian and Northern Affairs (DIAND) – Northern Affairs Contaminated Sites Program Risk Matrix

Likelihood	Consequence Severity				
	Low	Minor	Moderate	Major	Critical
Almost Certain	Moderate	Moderately High	High	Very High	Very High
Likely	Moderate	Moderate	Moderately High	High	Very High
Possible	Low	Moderate	Moderately High	High	High
Unlikely	Low	Low	Moderate	Moderately High	Moderately High
Very Unlikely	Low	Low	Low	Moderate	Moderately High

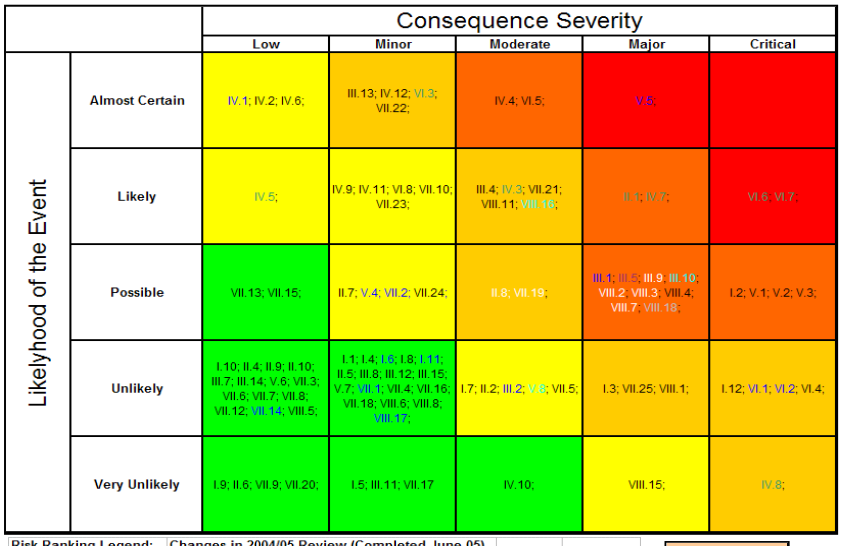
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Comprehensive Risk Assessment (Cont'd)

Number of elements in category	2001 Risk Assessment	2002-03 Update	2003-04 Update	DIAND Risk Matrix Classification	2004-05 Update	% Change from 2001
Highest Risk	1	1	0	Very High	3	200% increase *
High	29	16	15	High	17	41% decrease
Moderately High	25	28	26	Moderately High	19	24% decrease
Moderate	26	26	21	Moderate	19	26% decrease
Low	25	34	38	Low	43	72% increase
Lowest Risk	0	1	2			
Element no longer exists or poses no risk	N/A	N/A	5	Elements "retired" as of 2001 as they are no longer pose a risk	7	
TOTAL	106	106	107		108	

* As a result of realignment to DIAND risk classification

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Risk Ranking Legend:	Changes in 2004/05 Review (Completed June 05)	
Very High	Black	Risk ranking did not change
High	Blue	Risk ranking changed due to 2004/05 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	Turquoise	Risk ranking changed due to the addition/modification of an event
Element Retired	White	Risk ranking changed due to the alignment to the INAC Risk Matrix
	Grey	New element added in 2004/05 review

II.3; III.3; III.6; VII.11; VIII.9; VIII.10; VIII.12; VIII.13; VIII.14;

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Questions and Answers

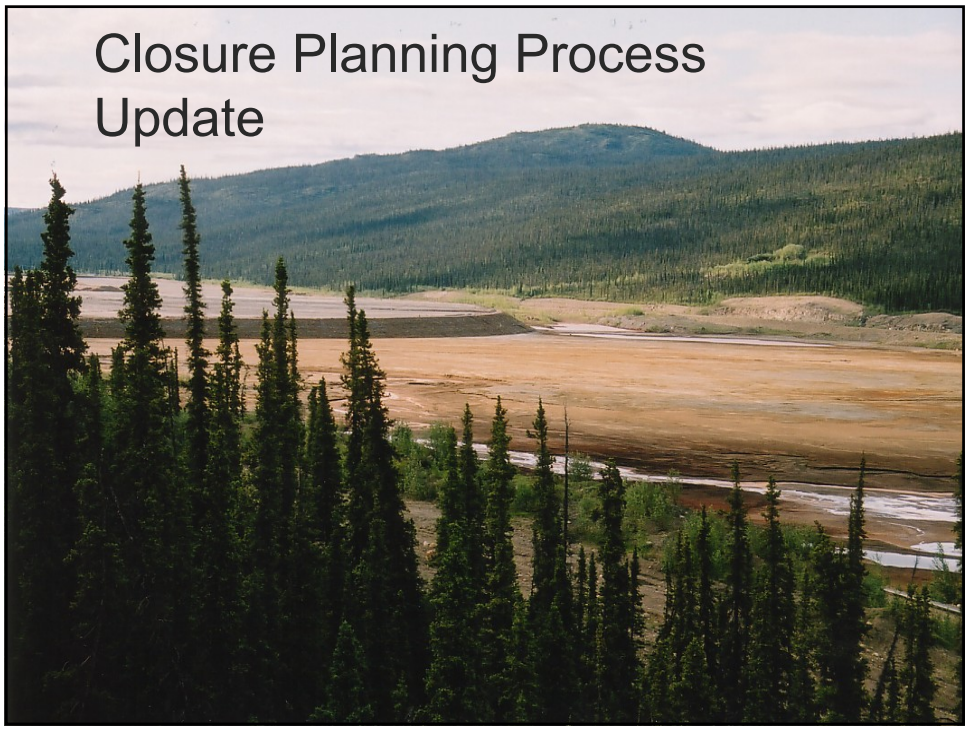
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Faro Mine Closure Planning
Community Liaison Committee Meeting
July 6, 2005


Closure Planning Process Update

Agenda



Closure Planning Process Update
- Background
- Planning/Management Structure
- Staffing Update
- Closure Planning Process

Technical Program
- Key technical gaps
- 2004 Technical Studies
- 2005 Technical Studies

Closure Objectives

Initial Closure Concepts
- Faro Mine Area
- Tailings Area
- Vangorda/Grum Area

Next steps/Timeline

3

Background



- On April 1, 2003, administrative control of lands and resources was transferred from the Northern Affairs Program - DIAND to YG
- DIAND and the Government of Yukon agreed to a co-operative approach to the management of Type II Mine Sites under government care
- Type II Mines Project Office established to oversee interim care and maintenance through closure planning and final reclamation of these sites

4

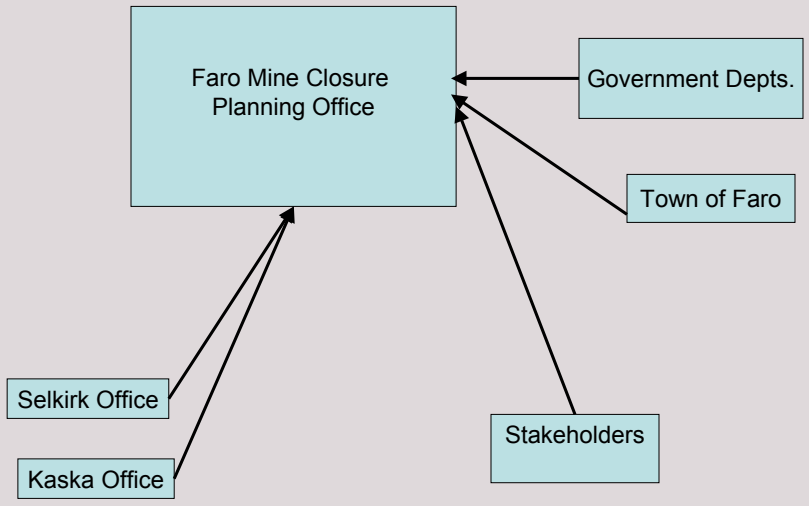
Faro Site



- DIAND and GY acknowledged in January 2003 that the Faro Anvil Range mine would not reopen
- DIAND and GY acknowledged that government would be responsible for closure
- Faro Mine Closure Planning Office created to oversee development of Faro Mine closure plan

5

Closure Planning/Management Structure



Faro Mine Closure Planning - Staffing Update



FMCP Office
- Project Director - Roger Payne
- Technical Management - Bill Slater/John Brodie

Ross River
- Coordinator - Kathlene Suza

Selkirk
- Coordinator - Ellie Marcotte

Town of Faro
- Liaison – Ted Baker

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Project Director



- Roger Payne, B.Sc. (Civil Engineering)
- Phasing in over next two months
- Experience in development and implementation of closure program for uranium mines at Elliott Lake, Ontario
- Elliott Lake is similar to Faro in that it was primarily a mining town, with mine being largest employer and most of town's tax base reliant on mine

8

Technical Manager



- Bill Slater Consulting has been hired to provided technical manger services; John Brodie will be working with Bill Slater
- Bill and John have extensive knowledge of the Faro Mine site through their previous responsibilities
- John has extensive experience in technical aspects of mine closure, especially geotechnical engineering
- Bill has extensive experience in environmental impact assessment for mining activities

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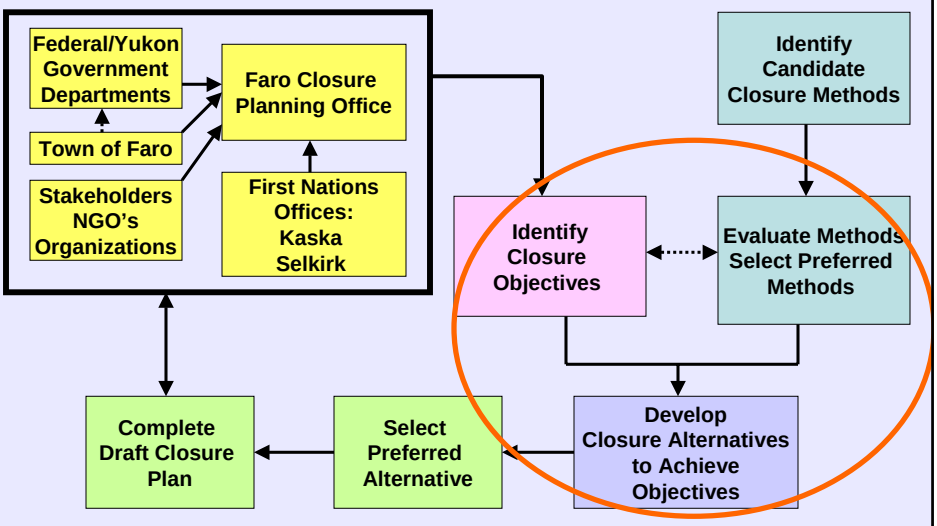
Faro Mine Closure Planning Process/Steps



- Technical Studies/Closure Methods
- Closure Objectives
- Identification of Alternatives
- Evaluation of Alternatives against Objectives
- Selection of Preferred Alternative
- Development of Closure Plan

10

Closure Plan Development: where we are now





Key Study Areas



- Water quality predictions for seepage from waste rock dumps and open pits
- Groundwater contamination below the tailings
- Surface water diversion closure measures
- Surface and groundwater flow paths, treatment requirements and options
- Alternative tailings, waste dump and pit closure measures

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2004 Technical Studies



- Hydrogeology Studies
  - Refine tailings groundwater flow and contamination modelling
  - Investigate waste rock seepage collection requirements
- Hydrology Studies
  - Rose Creek diversion options
  - Haul road rock drain assessment
- Geotechnical studies
  - Initiate tailings and waste rock dumps cover trials
  - Continue Faro pit plug dam investigations
  - Assess upgrade requirements for Rose Creek/tailings dams

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2004 Technical Studies (cont'd)



- Water Quality
  - Continue ARD monitoring and lab studies
  - Complete waste rock water quality predictions
  - Maintain water quality database
  - Develop long-term sludge handling/storage options
  - Grum Pit Lake bio-treatment test
- Closure Methods Studies
  - Tailings relocation methods
  - Develop soil remediation plan
  - Vangorda pit back-fill study
  - Oxide fines (mill area) remediation options
- Environmental Assessment Studies
  - Develop site-specific water quality objectives
  - Evaluate terrestrial effects

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2005/06 Technical Studies



- Overall site water balance and contaminant loading balance
- Monitor cover trials
- Bioremediation testing in Faro Pit
- Design Investigations for:
  - Plug dam
  - Faro Pit inflow and outflow channel
  - Groundwater collection systems
- Groundwater contaminant attenuation investigations
- Determination of Probable Maximum Flood
- Environmental Assessment Studies
  - Water quality objectives
  - Terrestrial effects
  - Human health and ecological risk assessment
- Emergency Tailings Area reclamation alternatives
- Oxide Fines/Low Grade Ore Stockpiles management

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Closure Objectives – Faro Mine



Faro Mine – Closure Objectives



- Protect human health and safety
- Protect and to the extent practicable restore the environment, including land, air, water, fish and wildlife
- Return mine site to an acceptable state of use, that reflects pre-mine lane use where possible
- Maximize local and Yukon socio-economic benefits
- Manage long-term site risk in a cost effective manner
- Site remediation without transfer of deferred costs to Yukon

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Initial Closure Alternatives – Faro Mine





- Site has been divided into three large areas:
  - Faro Mine area
  - Tailings area
  - Vangorda/Grum area
- Initial closure concepts developed for each area

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Initial Closure Concepts – Faro Mine Area



- Faro Pit
  - Flow-through pit
  - Isolated pit
  - Biological treatment
  - Conventional water treatment
  - Plug dam
- Waste Rock Dumps
  - Relocation
  - Low infiltration covers
  - Vegetation covers
  - Seepage collection and treatment
- Faro Creek diversion
  - Divert into pit
  - Divert to east
  - Divert to west

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Initial Closure Concepts – Tailings Area



- Complete relocation of tailings to faro pit
  - All dams removed
  - Rose Creek returned to valley bottom
- Soil Cover on tailings
  - Dams and Rose Creek diversion upgraded to withstand severe earthquakes and flood events
- Partial relocation of Tailings to Faro Pit
  - Some dams retained and upgraded to withstand severe earthquake and flood events
  - Part of Rose Creek diversion upgraded
  - Part of Rose Creek returned to valley bottom
- All three options will likely require some collection, pumping and treatment of water containing metals

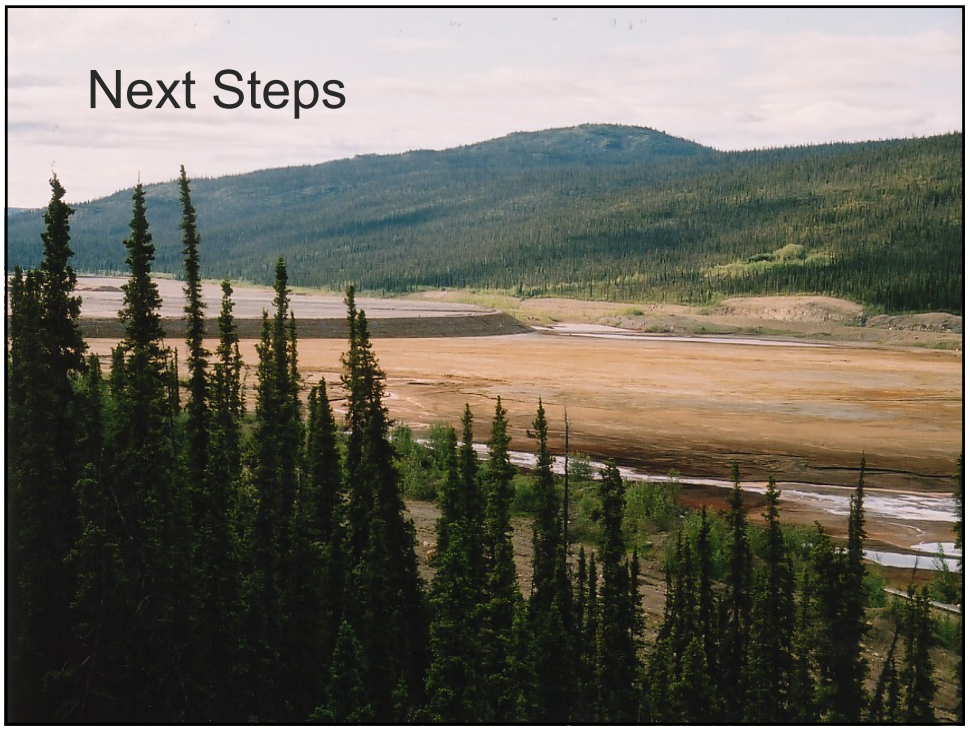
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Initial Closure Concepts – Vangorda/Grum Mine area



- Vangorda Pit
  - Backfill with waste rock
  - Maintain as a dirty water pit and treat discharge water
- Grum Pit
  - Biological treatment
- Waste Rock Dumps
  - Relocation
  - Low infiltration covers
  - Vegetation covers
  - Contingency seepage collection and treatment
- Vangorda Creek Diversion
  - Over backfilled pit
  - Relocate close to current alignment
  - Divert to Dixon Creek

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Next Steps



- Closure alternatives defined for each component of the site
  - Where additional information is needed, information is being collected
  - Comparable costs are been developed for each alternative and outstanding risks and uncertainties evaluated
- Evaluation of closure alternatives against closure objectives to determine preferred alternative
- Determine preferred alternative
- Preparation of final, comprehensive Faro Mine Closure Plan (begin Fall 2005)

25

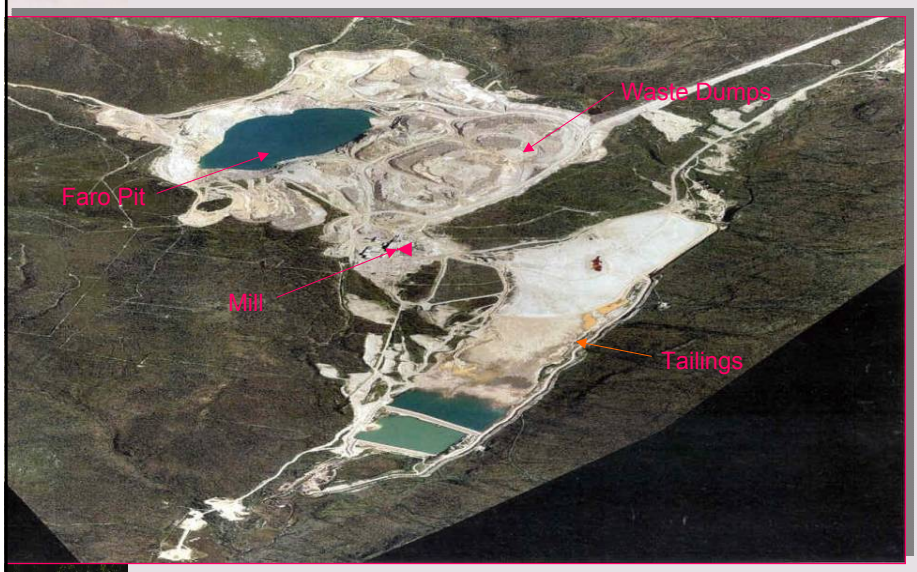
Schedule



- January – August 2005 – Technical synthesis
- May - October 2005 – development of alternatives
- Nov - Dec 2005 – Selection of preferred alternative
- Jan - Dec 2006 – Preparation of Faro Mine Closure Plan; development of EA and regulatory documentation
- 07/08 – EA and regulatory approvals

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FARO



27

Vangorda Plateau



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Faro Valley – Tailings and Water Impoundments



29



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Faro Pit



Faro Main Rock Dump



Faro Mine Complex



Faro Mill Area



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Rock Drain / North Fork of Rose Creek



Vangorda Haul Road



Grum Rock Dump



Grum Pit



Vangorda Pit



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Memo

Date: December 1, 2005

To: Anvil Range Mining Corporation ("Anvil Range")
Community Liaison Committee ("CLC")

From: Deloitte & Touche, Interim Receiver for Anvil Range

Subject: Mid Year Update

Dear Committee Members:

During the CLC meeting held on Wednesday, July 6, 2005 in Faro, Yukon, we provided a copy of the environmental section contained in the Interim Receiver's 38th court report. This report section outlined the care and maintenance activities and special projects which took place during the 2004-2005 operating year. Following the July 6th meeting, we forwarded a copy of the minutes of the meeting and our presentation materials.

The 2005 summer has been very busy with lots of activities taking place at the mine site. The first six months of this fiscal year have been productive and we have met our objectives. The water treatment programs worked well and all pits and ponds were at their required levels at the end of the pumping season. In fact, the Vangorda Pit was taken down to the approximate water level that the pit was at in 1999 and therefore we are not planning on having to pump and treat the Vangorda pit water next year. Significant improvements were carried out in re-establishing ditches above the Faro Pit which will reduce the loading on the Faro Pit particularly in the spring. Also following the May storm event which damaged the Vangorda Flume, the Flume was repaired and strengthened and emergency overflow culverts were installed in the Headworks Dam. Engineering plans for this work were filed with the Yukon Water Board and the installation was supervised by SRK, the resident engineer for the Vangorda Plateau. There were many other care and maintenance tasks carried out during the summer.

We also continued to assist the Faro Mine Closure Planning Office ("FMCPO") in coordinating site work carried out by consulting engineers for over 30 investigative projects. A major drilling program was carried out over two months and four different drills were used. The drilling program was completed on schedule and on budget. There were several studies completed which will provide valuable data and insight to assist the FMCPO in designing a final closure and reclamation plan.

We have just completed our 39th Court Report and in the Environmental Section, the activities carried out during April to September were summarized. We have enclosed a copy of this section of the report to keep you apprised of activities and developments which have taken place during this period.

Deloitte.

We wish to assure you that all work necessary to ensure that the mine site was in a safe and proper condition for the winter was carried out. During the winter, water testing samples will be collected as required and the mine site will be routinely inspected. In January and February we are planning to remove the treatment sludge which has been deposited in the Polishing Pond to ensure that the Polishing Pond will properly function next year.

We have started our work with the various consulting engineers on preparing the annual reports which are to be filed with Yukon Water Board, and these will be completed after the calendar year end. After filing these with the Water Board, we will ensure that copies will be provided as we did last year to the Town of Faro, Ross River and Selkirk First Nations.

If you have any questions regarding the ongoing care and maintenance programs for the Anvil Range mine site, please do not hesitate to contact us. We will continue to keep you advised of significant developments and please note that we plan to have our annual meeting of the CLC in Faro, Yukon on Wednesday July 5, 2006. Please note this date and further details regarding the meeting will be sent out a couple of months beforehand.

Regards,



ENVIRONMENTAL SECTION ONLY CONTAINED IN THE 39TH COURT REPORT

Court File No. 98-BK-001208

ONTARIO

SUPERIOR COURT OF JUSTICE

COMMERCIAL LIST

IN BANKRUPTCY AND INSOLVENCY

IN THE MATTER OF ANVIL RANGE MINING CORPORATION;

AND IN THE MATTER OF THE *COMPANIES' CREDITORS ARRANGEMENT ACT*, R.S.C. 1985, c. C-36, AS AMENDED;

AND IN THE MATTER OF THE *COURTS OF JUSTICE ACT*, R.S.O. 1990, c. C-43, AS AMENDED;

AND IN THE MATTER OF *THE BANKRUPTCY AND INSOLVENCY ACT*, R.S.C. 1985, c. B-3, AS AMENDED;

AND IN THE MATTER OF THE PLAN OF COMPROMISE OR ARRANGEMENT OF ANVIL RANGE MINING CORPORATION.

THIRTY NINTH REPORT OF THE INTERIM RECEIVER

(NOVEMBER 18, 2005)

HEENAN BLAIKIE LLP
P.O. Box 185, Suite 2600
Royal Bank Plaza, South Tower
Toronto, Ontario M5J 2J4

Kenneth D. Kraft (LSUC #31919P)
Lorri G. Charnetski (LSUC # 40033V)

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416-360-8425 (fax)

Solicitors for Deloitte & Touche Inc., in its capacity as the interim receiver of Anvil Range Mining Corporation and Anvil Mining Properties Inc.

VII Environmental Matters[1]

64. As noted in previous reports, the Mine has significant environmental aspects that must be diligently managed on a day-to-day basis. This portion of the Report summarizes activities that the Interim Receiver carried out relating to the environmental management of the Mine for the Operating Period. The objective continues to be minimization of any risk to the environment and the release of only compliant water to the surrounding environment.

A. Operating Period Summary

65. The following highlights the significant activities and events relating to care and maintenance that occurred at the Mine during the Operating Period, including:

i. Attending separate meetings in April, with a representative from the Yukon Type II Office, with the Chiefs and council members for Selkirk First Nation and Ross River, and the Mayor and council members for Faro, to review the previous year's care and maintenance activities and the planned activities to be carried out during the Operating Year.

ii. Arranging for proposals and issuing authorization letters for the required care and maintenance activities as required under the current Water Licence. The following contracts were entered into:

- BGC Engineering Inc. ("BGC") for monitoring requirements on the Faro portion of the Mine (the "Faro Site");
- Gartner Lee Limited ("GLL") for overall water monitoring requirements and preparation of the annual report to be delivered to the Water Board by February 28, 2006;

[1] The details in this part of the Report are more for the information of local stakeholders and are not anticipated to form the part of any substantive submissions to this Honourable Court

- Lebarge Environmental Services to carry out hydrometric measurements and associated tasks and to carry out the 2005 biological monitoring program for Vangorda Creek;

- White Mountain Environmental Consulting to carry out the aquatic life sampling and testing program requirements; and

- SRK Consulting ("SRK") for monitoring requirements on the Vangorda portion of the Mine (the "Vangorda Site").

All of the reports for the above will be issued during the winter and prior to the delivery of the annual report to the Water Board.

iii. Recalling employees in May for start up of operations. The Faro Mill water treatment plant was put into operation on May 5. The Vangorda water treatment plant was put into operation on May 16. Both treatment facilities operated throughout the season resulting in a significant draw down of the Vangorda Pit water to a point that, when the system was closed in early August, it was determined that there will be no requirement to treat Vangorda Pit water for at least two years. The Faro Mill water treatment system was shut down in late September with water levels in the Pit at acceptably low levels. Significant freeboard was in place at both the polishing pond and the intermediate pond, in line with best water management practices for water containment systems. In general, the water systems throughout the Mine were in good condition for the winter shut down.

iv. Completing modifications to the effluent discharge system from the mill to the polishing pond during April and starting up the system in late April. This project is discussed further in paragraphs 69(ii) and 74 below.

v. During May, a floating siphon was installed on the polishing pond. The floats allow for the suction side of the siphon to remain at a constant level while the pipe rises and falls in response to the siphoning to reduce the risk of drawing in sediments from the bottom of the pond. The system was designed by Mine management and has performed well.

vi. Following water sampling protocols and conducting water monitoring throughout the Mine as required by the Water Licence.

vii. Conducting regular environmental inspections throughout the Vangorda Site and at the Faro Site and preparing monthly environmental reports related to activities during the Operating Period.

viii. Attending to Mine visits by Environment Canada personnel on April 1 and 2 and on several other occasions throughout the Operating Period. No issues were raised.

ix. Attending to a Mine visit by Yukon Water Resources personnel on April 13 and on several other occasions throughout the Operating Period. No issues were identified.

x. Carrying out maintenance on both light and heavy duty equipment throughout the Operating Period, utilizing Whitehorse contractors.

xi. Arranging for the purchase of a DH5 Cat in May 2005. The Cat was utilized extensively throughout the Operating Period for normal care and maintenance activities as well as Special Projects requirements.

xii. Carrying out lead testing of all Mine employees during the summer with results indicating that employees were within the acceptable range. As noted in paragraph 173, these results differed from those received after tests were conducted on certain Ross River personnel utilized to dismantle the ore concentrate load out facility.

xiii. Updating the emergency response manual, which will be printed in a pocket booklet form this winter so that the employees can have it readily available should an emergency occur. The manual will be reviewed on an annual basis and revisions made pending site changes or additional requirements. Regular Environment Health and Safety meetings were held throughout the Operating Period. Training programs included technical instruction from BGC and a propane filling course for seven employees.

xiv. Attending to a Mine visit by EBA Engineering to assess the integrity of equipment utilized in the water treatment facility in the Faro mill. A report will be issued later this year.

xv. Arranging for Ross River personnel to be utilized for the continued removal of obsolete power lines (as described in paragraph 186, below) with work beginning in June and continuing through to September.

xvi. Preparing a draft landfill operating plan as part of the license application for the operation of a landfill site. The application was submitted in the spring and a permit was issued during the summer that covered the operation of both the current landfill site and a proposed future site for non-hazardous structural materials. A First Nations contractor was utilized to ensure the current landfill was up to the standards as set out in the landfill operating plan with the necessary soil coverings at intermittent levels in the landfill site. By late summer, the landfill was in proper operating condition and meeting all requirements of the permit.

xvii. Preparing an application for a permit to burn waste oil collected on site during the winter to provide heat to the maintenance shops. The application was submitted in September and a permit was received in October.

xviii. Attending to visits throughout the Operating Period by the many engineering consulting personnel pertaining to the care and maintenance programs, remediation programs, and site assessment and investigation programs relating to the closure planning. This required significant coordination to ensure equipment requirements, site access and other requirements were in place to carry out the work.

xix. Attending to ongoing visits by the Yukon Workers' Compensation Board ("Yukon WCB") relating to employee activities with Mine management taking action where necessary to correct any deficiencies reported.

xx. Arranging for the removal of small quantities of hazardous chemicals located at the Mine, as further described in paragraph 174 below, which was accomplished by the end of September.

xxi. Arranging for the installation of a septic tank and bed at the Guard House, and supervising the building of a well house for the water well and pumping system, which provides water to both the Mine Dry and Guard House buildings. All systems were fully operational prior to the end of September.

xxii. Using a helicopter on May 17 to determine the extent of the snow pack behind the Vangorda headworks dam and the remainder of the property. Excessive stream flows washed out access to location X14 and a portion of the Rose Creek Diversion channel near the emergency spillway located by the second tailings impoundment. Necessary work was done to repair the damage.

xxiii. Making necessary repairs to the sludge containment system that is located on the first tailings impoundment relating to some cracking on the crest and sloughing of the embankments. In addition, it was necessary to decant storm water that had collected on top of the sludge.

xxiv. Purchasing six additional computers and a server in response to streamlining data storage that is generated on site mainly focusing on lab requirements. The computer system was put into operation during the summer months.

xxv. Re-grading of the access road above the Faro Pit as well as modifying the ditch systems to ensure good drainage along the Faro Pit Diversion system embankments and roadway.

xxvi. Resurfacing the Intermediate Dam face as part of the annual maintenance programs.

xxvii. Arranging a Mine tour for Ross River Elders and others from Faro during the Operating Period.

xxviii. Adding additional lime to the intermediate pond to increase the pH level, which had dropped as a result of procedural changes in the disposition of the Faro Mill sludge.

xxix. Completing the fencing on the Grum Till Dump where sludge has been stored from the Vangorda clarification pond to prevent wildlife from entering the storage area.

B. Special Projects

1. Projects Related to Care and Maintenance

66. In the Interim Receiver's thirty seventh report to this Honourable Court, dated March 16, 2005, a proposed budget for the Operating Year was presented. The budget was approved by the March 2005 Order. The approved budget provided funding for approximately 65 projects. The approved budget and project list are attached as Schedule "M".

67. The following section provides an update on the status of each project. As noted previously, there has been some agreed upon realignment of certain budget amounts with DIAND's approval and the Interim Receiver believes that not all of the requested and approved funding will be required this Operating Year.

(i) Continuation of Current Environmental Protection Activities

68. The activities relating to this area include several seasonal programs for pumping and treating water from the Faro and Vangorda Pits, environmental monitoring programs (physical stability, biological activity, water quality), Mine management and reporting, maintenance of physical structures and other related activities. The performance of these activities provides protection to the surrounding environment and meets the requirements of the Water Licence.

69. The following summarizes a few of the more significant activities carried out during the Operating Period.

i. Vangorda Flume Storm Event – on May 17, 2005, a storm event occurred and the Vangorda flume was damaged. An overnight rain event occurred while there was still a significant amount of snow on the south side of the valley. The rain with the additional snow melt caused a higher than normal flow in the Vangorda Creek. The flow exceeded the flume's capacity and it caused the flume to lift and turn. Mine staff immediately prevented further damage to the flume by extending the back hoe bucket to hold the particular sections of the flume in place. As a result of this storm event, a number of damaged cross members were replaced and several flume sections were realigned. In addition, the Vangorda flume roadway was raised by one meter in the lower section and additional rip rap was installed along sections of the flume. There was also significant erosion at the plunge pool

where the water enters the pool from the Vangorda flume and this was also repaired with additional rip rap.

ii. Modification to the Faro Water Treatment Effluent Discharge System – it had been previously determined that the effluent discharge from the Faro Mill water treatment operation should be modified to allow for the direct discharge into the polishing pond and that effluent discharge settling tanks be installed as part of the effluent discharge system. A similar installation for the intermediate water treatment operation was also put in place. The effluent discharge system was installed in the spring of 2005 by Mine personnel. The effluent system has performed successfully throughout the Operating Period and no further adjustments to this system are required.

iii. Issues relating to the bioremediation field program for the Faro Pit – as described in paragraph 121, below, the Faro Pit bioremediation treatment program was carried out during the late spring and early summer.

iv. Site support requirements re: engineering assessment and investigation – as described in greater detail in paragraph 100 below, there was a major drilling program at the Mine involving several drilling rigs on site over a two month period.

v. Minimization of seeps into the Pits – there continues to be a program to minimize clean water seeps from migrating into the Pits which contain contaminated water at the Faro, Grum and Vangorda Pits. Additional seeps were intercepted during the Operating Period, with the water being channeled to the clean water systems that are diverted around the contaminated areas on site. As a result of similar work over the past three years, it has been observed that there has been a reduction in the fill rate, which translates into significant savings in reduced treatment costs.

(ii) **Fresh Water Supply Dam Water Licence Monitoring Program**

70. A five year Water Licence was issued in November 2003 relating to the breach of the Fresh Water Supply Dam ("FWSD"). Certain monitoring requirements as set out in the Water Licence are required to take place each year through to 2008. The following monitoring requirements were carried out during the Operating Period:

i. Assessment of the FWSD breach channel following the spring freshet. No repairs were required during the Operating Period.

ii. Assessment of the revegetation program relating to the FWSD reservoir and channel system. The assessment concluded that no additional revegetation was required as the willow staking and seeding programs were established or are in the process of being established throughout the system.

iii. A fish utilization assessment throughout the FWSD reservoir system was completed. The assessment concluded that fish habitat was being re-established and that there were no issues in this area.

iv. Water monitoring on a prescribed schedule as set out in the Water Licence was carried out during the Operating Period.

A report will be prepared summarizing the above for submission to the Water Board.

71. As part of the agreement relating to the FWSD Breach project, Faro arranged for the installation of a public boat launch on the Pelly River in close proximity to the town. The installation was completed within the agreed upon timeframe and the Interim Receiver paid the balance of compensation due under an agreement with Faro.

(iii) **Adaptive Management Plan (AMP) Monitoring and Trigger Response Program**

72. A Water Licence requirement was the preparation and submission of an Adaptive Management Plan (the "AMP") to the Water Board. The AMP is a management tool that provides a framework for responding to unforeseen environmental conditions that may result from the natural degradation of Mine facilities and waters. It provides Mine management with a framework within which decisions can be quickly and efficiently made. It also provides regulators with a consistent and predictable approach to respond to unforeseen conditions. The AMP focused on eight events which could occur at the

Mine and which would have a significant impact on the surrounding environment. Two trigger events were activated following the filing of the AMP with the Water Board in June 2004. The two events for which the triggers had been activated are the "Degraded Seepage Quality from the Grum Rock Dump" and the "Degraded Water Quality in the Rose Creek Valley Aquifer". In response to the activation of these triggers, additional monitoring and assessment work was carried out during the Operating Period to determine what modifications (if any) may be necessary to minimize risk to the surrounding environment. Additional ground water wells were installed and ongoing monitoring of current conditions was carried out. As a result of the continuing field investigations, engineering reports on both events will be issued this winter. The AMP activities also included the ongoing monitoring requirements relating to the eight established AMP events.

(iv) **Water Management Requirements**

73. A number of water management projects were proposed in the budget and activities undertaken with respect to these are summarized as follows:

Project 4A – Faro Water Treatment/Upgrade Facility/Integrity Testing/Sludge Management

74. As noted in paragraph 69 (ii) above, the effluent discharge system from the mill water treatment facility was modified and is operating successfully. In addition, integrity testing of the water treatment facility tanks and related equipment was carried out with further testing to occur in the spring of 2006. No significant issues have been identified at this time. The sludge containment system established on the first tailings impoundment facility as per the engineering recommendations was monitored during the Operating Period including necessary decanting of storm water collected in the containment area and reinforcement of the containment dike surrounding the area.

Project 4B – Vangorda Flume Headworks and Upper Wall Drain Modifications

75. As a result of the 100 year flood event, which occurred in June 2004, SRK recommended that there should be an engineer-designed overflow system established at the headworks dam at the head of the Vangorda flume. As required by the engineering design, two overflow culverts were installed as part of an emergency overflow system. As noted previously, there were also repairs carried out on the flume system as a result of a second

but smaller flood event which occurred in May 2005. The installation of the emergency overflow system was carried out by Mine personnel.

Project 4C – Faro Creek Diversion Clean Water Collection System

76. It has been recognized that a portion of the water originating from the snow melt and precipitation is not captured in the Faro Creek diversion above the Faro Pit. This uncaptured water collects behind and flows through the contaminated Faro Valley waste rock dump which is located above the Faro Pit. These seeps add a considerable amount of contaminate loading into the Faro Pit. A weir was installed with flow measurements being taken of the Faro Valley water prior to entering the waste rock dump. Work was also carried out by a First Nations contractor to improve the collection ditch system on roadways above the Faro Pit to enable interception of seeps and diversion of the clean water away from the Pit.

Project 4D – Remove and Cap Obsolete Pump House Wells

77. Three water wells and associated piping located near the original pump house were identified as being obsolete. The obsolete piping was removed, the wells capped and the surrounding area cleaned of debris. First Nations personnel were utilized for this work.

Project 4E – Rip Rap Production for Emergency Response Requirements

78. At the time of the 100 year flood occurrence at Vangorda in June 2004, there was a stockpile of rip rap located at the flume facility. Mine personnel were able to utilize this rip rap in constructing an emergency overflow channel during the flood event and thus prevented an overflow and potential failure of the Vangorda flume headworks dam, which would have had a major impact on the flume system with significant associated damage and cost. It was therefore decided that it should be standard practice to have stockpiles of rip rap available at strategic locations around the Mine for emergency response requirements. A First Nations contractor was utilized to produce the rip rap during the Operating Period.

Project 4F – Prepare Safe Access to V27 Monitoring Location

79. The Water Licence requires sampling at location V27 in the spring, summer and fall. The access slope is very steep and the use of a safety rope is required to reach this sampling location. It was recognized that this site represented a high risk for Mine

personnel with respect to safe access. During the Operating Period, an ATV access route and a helicopter pad located adjacent to the monitoring location were created. The work was carried out by First Nations personnel.

Project 4G – Rehabilitation of Toe Drains – Vangorda Waste Rock Dump

80. There has been and continues to be an ongoing requirement to rehabilitate the toe drains at various locations along the Vangorda waste rock dump. Weather conditions, including the spring freshet, cause sloughing of the toe embankments and other slough erosions which can result in a blockage of the drains. Work was carried out during the summer utilizing a First Nations contractor, which included general grading, rehabilitation along the slope above the drains, and clean up as required.

Project 4H - Intermediate Dam Spillway Refurbishment/Cross Valley Dam Spillway Assessment

81. During the 2004-2005 operating year it was determined that the Intermediate Dam Spillway required modifications and additional armoring with rip rap. While it was originally planned that this work would be carried out last year, due to weather conditions the program was postponed to this year. In the spring of 2005, it was determined that the Water Licence stipulates in paragraph 41 that the Intermediate Dam Spillway is to have a capacity to carry the complete one in 500 year design flow of Rose Creek. It was also recognized that the design work to be done during this year would include an evaluation of the capacity of the Cross Valley Dam Spillway to bring it to a 500 year flood capacity as required by the Water Licence. Consulting engineers are in the process of carrying out the design activities for both spillways and will determine the estimated costs to construct the spillways to meet the 500 year flood event requirement. The engineers are determining if there is a design that can both meet this criteria and not increase the risks of contaminated water being released from the Intermediate Pond into the Polishing Pond. If the criteria cannot be met or if the emergency storage capacity of the Intermediate Pond is eliminated, it may be necessary to inform the Water Board of the issues along with a recommended course of action. The report from the consulting engineers will be received later this year.

(v) **Mine Site Facilities Upgrade**

82. A number of facility upgrades were planned for and completed during the Operating Period, which are summarized as follows:

Project 5A – Building Upgrade for Warehouse Requirements

83. It was recognized that spare parts and supplies were located in various storage areas throughout the Mine including the main shops, NorCan building and Guard House. It was also recognized that the management of spare parts required enhanced controls. In order to properly track and maintain a minimum/maximum level of supplies and materials on hand, a central distribution point was organized with one employee responsible for stocking and issuing parts and tracking consumption of supplies such as fuel and lubricants. An area has been set up in the NorCan shop with improved lighting and controlled access to the stores area. A stores person has been put in place during the operating season to have proper control of parts and supplies issued along with the necessary tracking and reordering.

Project 5B - Guest House/General Housing Repairs

84. General repairs were required at the four residences owned by Anvil Range and located in Faro. These residences are utilized by engineering consultants and Mine management. Due to limited availability of skilled trades during the Operating Period, it is anticipated that only half of the planned work will be completed this Operating Year. Additional repairs will be carried in the 2006-2007 operating year.

Project 5C - Additional Field Radios/ Phone Sets and Peripheral Phone System Equipment

85. Following a field evaluation of the communications system in the spring it was necessary to purchase three additional telephone sets for use by consulting engineers and others at the Mine.

(vi) **Electrical Infrastructure Rehabilitation**

86. This project is a continuation of an ongoing program to upgrade and rehabilitate transmission lines and electrical switch gear throughout the Mine. The purpose is to ensure reliable electrical power availability, safe operating equipment, and energy efficient switch gear. During the Operating Period, power lines near the Grum Pit were

relocated to ensure the lines would not collapse as a result of further degradation of the Pit walls.

(vii) **EHS Employee Training and Manual Updates**

87. The importance of documenting the operating procedures, environment health and safety requirements and, in general, ensuring safe working conditions for employees and contractors at the Mine, is an ongoing priority. There is also emphasis on ongoing employee training with adherence to the Yukon WCB requirements. As described in paragraphs 65(xii) and (xiii) above, the Interim Receiver continued to offer employee training and testing during the Operating Period and continued to update the environment health and safety manual. In addition, signs were posted at strategic road locations alerting hunters and others that personnel are present throughout the Mine, and hunting is therefore prohibited.

(viii) **Monitoring Instrumentation Refurbishment**

88. Each year the Mine is inspected by consulting geotechnical engineers which cover the monitoring requirements as set out in the Water Licence. It was noted by BGC that certain instrumentation utilized for monitoring requirements and certain monitoring wells were obsolete, non-functional, or required upgrades. Recommendations were received at the end of the 2004-2005 operating year on upgrades required to bring all instrumentation to acceptable standards. The work was carried out during the summer of 2005 with a report to be issued later this year.

(ix) **Refurbishment of Portion of the Public Mine Access Road**

89. It has been noted over the past several years that there is a need to rehabilitate the main access road from Faro to the Mine to ensure safe driving conditions and secure access to the Mine. Following discussions with YG, it was agreed that YG's Department of Highways would assume the responsibility of bringing the road up to a safe condition. During the summer of 2005, highway crews worked on the road and made significant improvements to the lower half.

(x) **Waste Dump Rehabilitation**

90. It was discovered that at the end of last year, there was no permit to operate the current waste dump facility and that an application had to be made along with an operating plan

for its ongoing use. It was determined that the application should include the design and use of a future dump to handle non-hazardous building materials collected from the Mine as the buildings are dismantled, as described in paragraph 187 below. It was recognized that there would be a requirement to rehabilitate the dump which has been in use for many years. Rehabilitation work would include re-sloping existing areas, pushing waste material into the centre area and then applying an earth cover. The application and operating plan were submitted and a permit was issued for the current waste dump as well as the intended new waste dump. The waste dump was rehabilitated and Mine management is following the approved operating procedures.

(xi) **Faro Creek Diversion Dye Trace**

91. Golder Associates ("Golder") carried out a program two years ago to investigate alternatives to relocating the Faro Creek Diversion. This program was completed recognizing the ongoing deterioration of the Faro Pit wall towards the Faro Creek Diversion, which is parallel to the access road. A further evaluation by Golder assessing the Pit wall regression was carried out during the summer of 2005 and it was found that the regression was minimal over the past two years

(xii) **Assessment and Decommissioning of Leaking Tailings Monitoring Wells**

92. A series of groundwater monitoring wells were installed in the fall of 2001 in the Rose Creek tailings facility as a means of investigating groundwater quality beneath and down gradient of the tailings facility. These wells expanded upon an existing groundwater monitoring network. The groundwater quality results that were obtained from the 2001 monitoring wells included some unanticipated trends, i.e. contaminant concentrations increased with depth in the aquifer soils at some locations. Hypotheses to explain these occurrences were considered, one of which is that highly contaminated tailings porewater might be leaking into the deeper wells that were installed in the underlying aquifer soils.

93. In 2004, a field investigation was initiated by GLL to evaluate the integrity of the P01-series of wells and to assess the potential for leakage from those wells into the underlying tailings. The results of this field program suggested that several of the P01-series wells were leaking, resulting in contaminated tailings porewater from the tailings deposit leaking into the sand and gravel aquifer underlying the Rose Creek tailings facility. A draft report summarizing the findings of the leakage testing was issued in November 2004. Following discussions with the Yukon Type II Office, Environment

Canada and associated consultants, consensus was reached in June 2005 as to the number of wells that should be decommissioned. In addition, a number of wells were identified as requiring further monitoring.

94. In August 2005, Robertson GeoConsultants Inc. ("RGC") was retained to decommission the leaking wells in the Rose Creek tailings storage facility. This work included: (i) an initial review of the decommissioning options for the leaking wells; and (ii) field supervision of well decommissioning which occurred between September 27 and October 2, 2005. The decommissioning work consisted of well preparation work (including removal of any down hole equipment and down hole videotaping); and (ii) sealing of all piezometers using a bentonite slurry mixture. A total of 17 leaking monitoring wells of the P01-series were successfully sealed over the course of two days. The results of the well decommissioning work are summarized in a draft report, issued in October 2005.

(xiii) **Update of Comprehensive Risk Assessment**

95. A Comprehensive Risk Assessment for the Mine was developed in 2001 and updated in 2003, 2004 and 2005. The risk assessment process is dynamic and requires continual updating and evaluation to ensure that it is relevant and addresses issues in order of highest priority. It was further updated in 2005 to reflect the information gained throughout the course of ongoing care and maintenance activities as well as through the numerous site investigations conducted in 2004-2005.

96. During this year's review, efforts were directed to realign the Comprehensive Risk Assessment ranking with the risk methodology and output format recently developed by DIAND, and to transfer Comprehensive Risk Assessment data for Anvil Range onto the DIAND database. After this year's reports are reviewed, the Comprehensive Risk Assessment will again be updated.

(xiv) **E-Room Management**

97. The complexity and data management requirements of the Mine have increased significantly over the past several years and it is expected this will continue. The Anvil Range E-Room was created in 2002 as a vehicle to manage the significant number of activities and studies being conducted at the Mine. The E-Room is accessible to the regulatory agencies as well as to external consultants as an information sharing mechanism. During the Operating Period the E-Room continued to be maintained and

was expanded as required reflecting the data management and information sharing needs of the current year's approved projects.

2. Projects Related to Regulatory Approvals

(xv) Application to Modify Water Licence/Obtain Regulatory Approvals

98. Funds were set aside during the budget approval process in anticipation of the need for potential Water Licence amendments or regulatory approvals related to proposed projects for the Operating Year (e.g. oxide fines, landfill, bioremediation cells, etc.). To date, there has been no need to make any application for any regulatory hearings.

3. Projects Related to Consultation

(xvi) Stakeholder Communication Relating to Care and Maintenance Activities

99. On July 6, 2005, a Community Liaison Committee Meeting was held in Faro. Representatives from the Interim Receiver, Faro, the Yukon Type II Office, Ross River, Selkirk First Nations, and other regulatory agencies were in attendance. The Interim Receiver presented a comprehensive update of the status of the interim receivership and all ongoing Mine activities and projects. An overview of the Comprehensive Risk Assessment and a Mine tour were also provided. Other consultations have taken place during the Operating Period.

4. Projects Related to Site Investigation and Assessment

100. For the current operating year there are 31 projects relating to site investigation and assessment. The FMCPO approves the scope of work relating to the projects and is responsible for the overall management of the projects. The field work coordination and financial control process is managed by the Interim Receiver in conjunction with the Mine's operating management. The field activities relating to the above projects included an intensive drilling program that was carried out during the summer and fall of the Operating Year. During August there were four separate drilling rigs on site to carry out the necessary soil and rock investigations, water monitoring investigations, and contamination levels investigations in the tailings impoundment. The drilling program required 12 hour days and careful coordination between projects to ensure that any down time was minimized and that the drilling work would be completed prior to winter conditions setting in. The drilling program began in late July and ended on October 1. It

was necessary for Mine management to provide access to difficult and remote locations required in the drilling program and bulldozers and other earth moving equipment were used to meet these requirements.

(xvii) **Basic Engineering Inputs**

Project 17 A – Additional Borrow Source Investigations

101. The 2005-2006 work plan for this project involved undertaking additional work to investigate material sources for cover construction and, to a lesser extent, earthwork construction. Although the FCRP alternatives are still being developed, it is likely that the area of greatest need would be for fine grained materials on the Faro Site.

102. The work plan involved the following activities:

i. incremental terrain evaluation by a surficial geologist with the Yukon Geological Survey;

ii. drilling with a light-weight portable drill in the currently mapped areas; and

iii. incremental drilling in areas identified outside the currently mapped areas.

103. A report and supporting information issued by the Yukon Geological Survey in late 2004 provided new drilling targets outside the currently mapped areas on the Faro Site. Following discussions with the FMCPO, it was agreed that the next step would be to remobilize the light-weight portable drill and complete approximately seven drill holes in what was hoped would be fine grained till deposits. The field work was completed during the Operating Period. A report summarizing the field work, laboratory testing and conclusions will be issued later this year.

Project 17B – Ongoing Maintenance of Water Quality Data base

104. The Anvil Range Mine water quality database currently exists electronically in a relational database format that is managed through a commercial software program called EQWin. The database contains the entire amassed record of surface and groundwater quality data with a few samples dating back to the early 1970's. GLL has updated the database monthly since mid-2000 and performs routine maintenance and backups in the course of managing the database.

105. In 2004-2005, a comprehensive quality control ("QC") review of the Anvil Range Mine water quality database was completed by GLL. The objective of this review was to document and resolve as many data errors within the database as could reasonably be identified and to recommend an on-going program for quality control. The above process identified a number of data sources generated from other studies (seepage, tailings monitoring, etc.) that are not currently included in the database. Also, the above process provided the determination that the database should be converted to the more transferable MS-Access format and this process was initiated. The conversion to MS-Access is also linked to an initiative being undertaken by Environment Canada - Yukon Region.

106. The scope of work to be completed in the Operating Year was aligned to that of last year. Based on the lessons learned from the 2004-2005 work as described above, a prioritized approach was adopted. The focus was on continuing to improve the usability of, and confidence in, the database by targeting those sample locations with the most immediate needs for the AMP, Water Licence reporting and closure planning studies. GLL's project plan for this year involved five main tasks:

i. Correction of Errors Identified in 2004-2005: This task was conducted through the new MS-Access interface. Corrections that have been reviewed and approved by the GLL Project Manager will be entered into the database with documentation of the old data, the new data and rationale for change.

ii. Refine MS-Access Interface: This task introduced other database users to the MS-Access Interface that was made available at the conclusion of the 2004-2005 program. It informed those users of the data that the database is available and showed them how they may use it.

iii. Housekeeping Corrections: There are a number of corrections required in the database that are considered to be housekeeping as opposed to correction of errors and outliers. Correction of these items is important for efficient management of the database and to avoid confusion when transferring data to others.

iv. Continued Identification, Investigation and Correction of Errors: The procedures for identification, investigation and correction of errors and outliers will continue according to the established QA/QC protocol. The approach was prioritized to target data of most immediate interest.

v. Project Report: All of the above tasks are in the process of being completed and a report on 2005-2006 project activities is anticipated to be issued in March 2006 and will document all identified errors, the methods and results of investigation of those data entries, and all changes made to the database. The initial database files (i.e., prior to any changes made under this project) will be attached to the report in electronic format as will the amended database files.

(xviii) **Continuing ARD Monitoring**

107. A comprehensive characterization of acid rock drainage ("ARD") status and potential of all rock dumps at the Mine was conducted by SRK in 2002. This study included the compilation of all previous studies of Faro/Vangorda/Grum ARD and a gap analysis, the completion of drill holes to sample waste rock and to install temperature and gas monitoring devices, as well as the sampling and analysis of rock from drill holes and seepage water.

108. Further seep surveys were completed in May, June and September of 2003 at the Faro, Vangorda and Grum waste rock dumps. The purpose of the surveys was to determine the water quality associated with discrete areas of seepage pathways from each of the major waste rock dumps.

109. SRK was retained in the Operating Year to carry out the necessary monitoring and analysis to update selected aspects of their "Geochemical Studies of Waste Rock at the Anvil Range Mining Complex: Phase 3 Report". Investigations included a continuation of the spring and fall waste rock seep surveys and oxygen/thermal monitoring. These tasks were completed in accordance with the methods used for the previous three years of seep surveys. The survey included examining the base of all of the waste rock dumps and stockpiles, and collecting water samples from any flowing seeps that emerge from these areas. Field measurements included pH, conductivity, redox, and flow. The samples were submitted to the lab for routine analyses, including pH, conductivity, acidity, alkalinity, sulphate, chloride, and dissolved metals.

110. The results of this year's work will be presented in a final report, documenting the locations of the seeps, field notes, laboratory results, and review of the data quality. The interpretation presented in previous seep survey memos will be updated, and, as was requested in the final 2004-2005 report, an updated discussion of routine monitoring data at key water licence stations will be included as part of the final report.

(xix) **Refine Dump Water Balance/Water Quality Predictions**

Project 19A - Continue Dump Water Balance Investigations

111. In 2003-2004, a study to investigate the hydrology and water balances of the waste dumps at the Anvil Range Mine was initiated. The study was performed by Yukon Water Resources in Whitehorse. SRK provided a liaison and review role for the execution of the study. The report, which summarized the preliminary water balance for waste rock dumps, contained recommendations for improving the water balance through the acquisition of site-specific meteorological data, snow surveys and comprehensive soil moisture sampling.

112. The work for 2004-2005 involved additional field work and a revision of the water balance. Similarly, in the Operating Year, updates to the dump water balance will be made based on the completion of snow surveys done in April and May 2005 and monitoring water balance instruments installed in 2003 for an additional hydrologic year, i.e. until at least May 2006. The data produced will be reviewed and revisions will be made to the dump water balance developed in 2003 later this year.

Project 19B - Revise Waste Dump Water Quality Predictions

113. In 2003-2004, the results of the studies entitled “Continue ARD Studies” and “Investigate Dump Water Balances” were combined to predict contaminant concentrations in seepage from Faro, Grum and Vangorda waste rock dumps. The primary objective of the project was to develop estimates of contaminant concentrations in water draining from the waste rock and ore dumps at the Faro, Vangorda and Grum Sites. The estimates are needed to provide a basis for assessing water collection and treatment requirements, and downstream water quality impacts. The results of this work were summarized in a report which presents updated estimates of contaminant concentrations in drainage from the waste rock and ore dumps at the Mine. The concentration estimates were then used together with estimates of runoff and infiltration to predict overall contaminant loadings. The water quality estimates were derived from the site geochemical investigation (SRK Report 1CD003.011.610, Geochemical Studies of Waste Rock at the Anvil Range Mining Complex – Phase 3 Report), and therefore represent the most current understanding of the site geochemistry. The report presents estimates for current average, current maximum and future worst case conditions.

114. In 2004-2005, additional data generated in the continuation of both of these studies was reviewed and integrated into the existing water quality prediction model. This exercise is proposed once again for the Operating Year to further refine the model. It is anticipated that this work will be completed in late fall of 2006, once the relevant 2005-2006 data has been analyzed and interpreted.

Project 19 C – Overall Site Water Balance

115. In early 2002, a preliminary water balance and contaminant loading model was developed for Rose and Vangorda Creeks. This model provided a summary of creek flow data and contaminant loading data such that preliminary observations could be made regarding the relative contribution of contaminants from each of the major source areas. A considerable amount of new information regarding surface water flow, groundwater flow, and contaminant loading rates has been developed since 2002 that can be used to update and enhance the preliminary model.

116. During the Operating Year, SRK was retained to develop an updated version of the water balance. The specific objectives for the investigation included:

i. estimation of water quality downstream of the Mine, to be used in the Level 2 Human Health and Ecological Risk Assessment ("HHERA"); and

ii. assessment of effects on downstream water quality by various remedial measures.

117. The work plan was comprised of three phases as described below:

i. Phase I: Development of Water and Load Balance

- Task 1 – Prepare Water Balance: In this task the overall Mine water balance was to be developed. This involved developing a conceptual representation of the overall Mine water balance (including possible variations associated with the candidate closure measures or scenarios).

- Task 2 – Prepare Load Balance: In this task the Mine water balance was used to calculate contaminant loading balances and to estimate water quality that may result under various closure scenarios.

ii. Phase II - Complete Initial Water Quality Modeling Runs: In this initial phase of water quality modeling, two sets of runs will be prepared as follows:

- A series of runs will be completed to be used in the HHERA. The inputs for these runs will be developed in collaboration with the working group and will represent the widest possible range of conditions.

- A series of runs will be prepared to reflect the realistic performance of the primary alternatives that are being developed in a separate project.

iii. Phase III – Complete Water Quality Modeling Runs: Several studies planned for the Operating Year will provide information that can be used to improve the water and load balance and Phase III will allow for an update of the water and load balance in late 2005 to ensure that this updated information is taken into account. The update will be completed after results of the other investigations are available, and will include discussions with the working group to decide what changes are needed.

118. Phases I and II are complete and Phase III is ongoing with a report to be filed later this year.

(xx) **Develop Faro/Grum/Vangorda Decommissioning Methods**

Project 20A - Monitor Mine Area Cover Trials

119. During the fall of 2004, mine cover trials were established on the Vangorda waste rock dump. Required instrumentation for the cover trials was installed during the spring and early summer of 2005. A monitoring program was initiated which began in early summer 2005 and will continue over the next several years. A report summarizing the results of the cover performance will be filed later this year.

Project 20B - Further Evaluation Relating to Plug Dam Investigations and Design

120. A conceptual design for the Plug Dam was developed by BGC in the fall of 2004 on the basis of a preliminary geotechnical investigation. It was determined that further investigation of the proposed Plug Dam and Faro Creek area would be required to advance the design beyond the conceptual level. It was further determined that a significant drilling program would be required to determine the depth of the core trench cutoff required and to confirm the type of seepage control needed for the Dam and foundation. The field work was completed during the Operating Period and a report will be issued later this year.

Project 20C - Bioremediation Field Program Relating to Faro Pit

121. As part of the Grum Pit bioremediation trial treatment program carried out in the summer and fall of 2004, several test cells were set up in the Grum Pit made up of water from the Vangorda and Faro Pit lakes. From these initial tests it was recommended that consideration be given to complete a trial program in the Faro Pit with some testing relating to the Vangorda Pit. It was recognized that treatment protocols would be different from those utilized from the Grum Pit program. The Faro Pit water is treated through the Faro Mill water treatment system and released into the polishing pond and then into the environment to maintain a proper level of water in the Faro Pit. The bioremediation of the Faro Pit began in the late spring and in mid July, significant issues were encountered at the Faro Mill water treatment plant relating to algae in the water clogging up the water treatment system. Following discussions with the consulting engineers, it was agreed that the bioremediation program should be discontinued to enable the proper treatment of the water in the water treatment facility through significant additions of lime. Over the next six to eight week period, the algae issue and clogged treatment system improved to normal in early September. There was sufficient data obtained during the bioremediation field program prior to shut down in July to provide some understanding of the bioremediation opportunity at the Faro Pit.

Project 20D - Conceptual Design for Inflow and Outflow Channel from Faro Pit

122. This program was intended to have two components: (i) the diversion of clean water currently bypassing the Faro Pit via the Faro Creek diversion to flow into the Pit; and (ii) the diversion of water out of the Faro Pit into an existing channel or creek. It was determined that the focus should be on the outflow channel from the Faro Pit. It was also understood that a field drilling program would be required. The drilling work was completed during the summer and a report will be issued later this year.

Project 20E - Continuation of Seepage Investigations and Designs

123. In 2004, RGC reviewed geochemical data for the Faro, Grum and Vangorda Sites, the results of which suggested that ARD has reached groundwater at certain locations. Two locations were identified as high priority due to the observation of deterioration in water quality (indicated by increasing levels of zinc and sulphate over time). These are:

i. The Emergency Tailings Area ("ETA"): the presence of tailings combined with seepage from the upgradient waste rock indicates a potential for high

concentrations of contaminants to enter the Rose Creek Valley Aquifer via a combination of surface water and groundwater.

ii. Intermediate Dump draining towards the North Fork Rose Creek ("NFRC") downstream of the rock drain: down-gradient of the rock drain, contaminant concentrations have been observed to increase at a cluster of observation wells located close to the creek. The proximity of seepage affecting groundwater to the creek itself is a concern.

124. Four areas of lower priority were also identified as requiring further study: Zone II Pit draining towards the NFRC; Grum Dump draining southeast; Grum Dump draining southwest; and Old Faro Creek Channel near the Faro Pit. At these areas, either water quality data suggested the potential for future seepage problems or the geographical area could act as a future conduit for seepage flow.

125. The 2004 field program included investigations at the high priority ETA and NFRC, as well as the Grum Dump draining southeast, which is one of the lower priority areas. Investigations at other lower priority areas, below the Zone II Pit and at the Old Faro Creek Channel near the Faro Pit, were deferred. As a result of the findings and resulting recommendations from the 2004 field work, additional seepage investigations were planned and completed during the Operating Period to further delineate and characterize the extent of contamination.

126. High priority areas included the NFRC ("S-cluster") area and the ETA. Work in the NFRC area included additional monitoring well installations to delineate the extent of contamination, slug testing, a detailed stream survey, and finalization of conceptual design for seepage collection. At the ETA, weirs were installed to monitor surface flows and the data used, in addition to groundwater flow analyses, to complete the sizing of a seepage interception system. Results will be used to prepare final design and detailed cost estimates for the ETA seepage interception and treatment system (pumping wells, catch basin, pumping system, treatment plan).

127. Moderate priority seepage areas investigated included the area below the Zone II Pit and the Faro Creek channel immediately below the Faro Pit. Below the Zone II Pit, wells were installed and tests completed. Local sediments were tested to identify the source of elevated zinc. A water balance for the Zone II Pit will be developed and used to assess requirements for seepage interception. At the Faro Creek area, monitoring wells were

installed and hydraulic testing performed. Results will be used to assess the potential for seepage from the Faro Pit towards X23 for different closure options for the Faro Pit.

128. As a result of the importance of this project, the original scope of work and budget were expanded to include a significant drilling component. Through discussions with the FMCPO and the Yukon Type II Office, agreement was reached that the work was essential in providing the required supporting data to assist in the closure planning process. All required field work has been completed and reports will be reviewed later this year.

Project 20F - Long Term Sludge Handling Beyond Current Water Licence Period

129. Following significant discussions relating to the proposed scope of work on this project, it was decided that the project should not proceed this year. The reason for this decision was that the closure plan options were still under consideration and that the final closure plan recommended would indicate what requirements there would be for water treatment and in turn the type and amount of sludge that would be created from this treatment. At that time, it would then be possible to determine the quantity and chemical makeup of sludge produced under that closure plan option.

Project 20G - Finalize Engineering Design and Estimated Related Costs for Faro Creek Diversion Relocation

130. It had been previously determined that there were two possible locations for the Faro Creek diversion should the Faro Pit wall deterioration jeopardize the current diversion location. It was therefore intended that a program would be undertaken to finalize engineering design and related estimates for the relocation as specified by the alternatives. The second part of this project was to have Golder re-evaluate the rate of regression of the Pit wall and confirm the life expectancy of the current Faro Creek diversion. It was decided that the second part concerning the determination of the life expectancy should be carried out first so that a determination can then be made as to the timeframe of when a new diversion location would be required. Golder carried out the re-evaluation of the rate of regression of the Pit wall and determined that there had been very little regression during the past two years. They also concluded that the regression would be on a gradual basis and that it was unlikely there would be any type of catastrophic failure due to the make-up of the rock. Notwithstanding this determination, Golder recommended that an emergency response plan should be set up in the event there

was a catastrophic failure of the Pit wall resulting in the flow of Faro Creek diversion water into the Pit. A monitoring program was designed for Mine management to carry out over the next several years as an ongoing evaluation of the rate of regression. At this time, Golder estimates the life expectancy to be the same as previously determined, which is five to ten years. Because of these conclusions, no additional work was done on the diversion relocation alternatives.

Project 20H - Finalize Engineering Design and Estimated Related Costs for Vangorda Creek Diversion Relocation

131. Conceptual designs for the relocation of the Vangorda Creek diversion were developed by SRK in the spring of 2003. These designs included upgrading of the existing diversion around the north perimeter of the Vangorda Pit, partially backfilling of the Vangorda Pit to create a causeway, which included a lined channel would be built to convey the creek and the relocation of Vangorda Creek to the Dixon/Shrimp Creek catchment basin. It was determined that further evaluation of the option to relocate Vangorda Creek to the Dixon Creek catchment basin was required when considering the various options. The planned program involved a detailed survey along the proposed corridor of the diversion and other technical evaluations. After further consideration in the spring of 2005, it was decided to focus the evaluation on the diversion capacity as it enters Shrimp Creek. The evaluation was carried out during the Operating Period and a report will be issued later this year.

(xxi) **Continue Tailings Ground Water Studies**

132. In 2001, a comprehensive hydrogeological and geochemical investigation of the Rose Creek tailings facility was conducted for the purpose of updating the characterization of the hydrogeological system and geochemical state of the tailings (GLL, 2002). As part of this investigation, 22 groundwater monitoring wells were established at 11 locations in and downstream of the tailings impoundments. In 2003, a follow up drilling and coring investigation was undertaken using sonic drilling technology to obtain detailed stratigraphic information from ground surface down to bedrock. As part of this program, 76 additional groundwater sampling points were established at nine locations within and down gradient of the tailings impoundments.

133. The 2005-2006 monitoring work, conducted by GLL continued to build on past projects and involved the collection and analysis of groundwater samples associated with the Rose

Creek tailings facility and the provision of a report of the field and laboratory data. The established schedule of twice per year, spring and fall, sampling of monitoring wells associated with the Rose Creek tailings facility was continued. The collection of many of these samples was linked to monitoring requirements of the Water Licence and the AMP to ensure an efficient sampling approach. The work required to sample all of the monitoring wells increased substantially in 2004-2005 because of the introduction of the 2003 wells. This is due to both the increased number of monitoring points (increase from 40 wells to 116 wells to sample plus replicates) and the increased time required for sampling of each (i.e. a low flow pumping method for deeper wells). The work plan involved three primary tasks described below:

i. Collection and Analysis of Groundwater Samples: This task involved the collection and analysis of groundwater samples from all wells associated with the Rose Creek tailings facility according to the established schedule and procedures. The number of wells requiring sampling and the time and equipment required to conduct the sampling remained at the effort required for 2004-2005 because of the introduction of the 2003 installations, as described above.

ii. Update Field Methods Manual: This task involved the further development and updating of the "Field Methods Manual" to include the most current information and procedures.

iii. Groundwater Data Report: A report that documents the 2005-2006 groundwater quality data will be prepared upon receipt of the fall data.

134. All required sampling has been completed and the Task 3 report will be received later this year.

(xxii) **Develop Tailings Decommissioning Methods**

Project 22 A – Finalize Tailings Relocation Plan

135. Based on the results of the 2004-2005 assessment of tailings relocation, further refinement studies were identified as part of this year's priorities. These were: (i) further geochemical characterization in order to provide a better estimate of the extent of the potential lime addition; and (ii) further elaboration of the detailed mine plan for a single relocation option. SRK submitted a proposal to investigate the lime demand uncertainties, which was reviewed and approved in August (and is described below). Further work

required to complete the scope of a detailed mine plan is currently undergoing discussion and a project is expected to be defined later this year.

136. During the 2004-2005 tailings relocation study, estimates of the lime demand for the tailings were derived to investigate the cost implications for tailings relocation. These estimates were derived from six bulk tailings samples, two from each of the Original, Secondary and Intermediate impoundments, which were subjected to lime neutralization tests. The lime demand results from these tests were then extrapolated to the underlying tailings based on paste pH and conductivity measurements at depth. The lime neutralization costs were estimated to be significant, in the order of $80,000,000, for all of the tailings. It was recognized that verification of these estimates was required to further the design of the tailings relocation option. The verification would involve an additional series of lime neutralization tests, as described below:

i. Sample Selection: Three deep bore holes were completed to obtain samples from the entire depth of the tailings profile. Additional tailings samples for the lime demand testing were obtained from the attenuation testing bore holes (as described in paragraphs 147 to 151, below) that were located within each tailings deposit. Samples were prepared to represent each one meter interval of the tailings from surface to the base of the tailings deposit.

ii. Testing:

- Lime Demand Testing: The paste pH and conductivity of each composite sample were determined prior to testing and moisture determinations were also completed for each composite sample. Lime demand tests were completed on representative subsamples of about 200g from each composite sample.

- Settling Tests: Settling tests were completed on selected samples to establish settled densities of the neutralized tailings.

- Aging Tests: At completion of the lime demand and settling tests, neutralized tailings with various lime additions were placed in three columns. A water cover of at least one meter was established over the top of the tailings solids.

- Mineralogy: Selected samples of the neutralized tailings were submitted for mineralogical examination to assess secondary mineral formation.

- Reporting: The results from the testing will be used to estimate the overall lime demand for the tailings contained in each of the impoundments. In addition, contaminant concentrations that may develop in the neutralized tailings in the long term will be estimated from the porewater monitoring results. A report will be prepared later this year summarizing the above approach and results.

Project 22B - Monitor Tailings Cover Trial Areas

137. In the spring of 2004, a tailing cover trial area was established and, as a result, a multi-year monitoring program was required and implemented to evaluate the performance of this trial cover. The day-to-day monitoring activities were carried out by Mine personnel during the Operating Period. A report will be issued later this year relating to the cover performance to date.

Project 22C - Further Investigation re: Rose Creek Dam Upgrades

138. Investigations carried out by Klohn Crippen during 2004 identified areas of concern relating to the structural capability of the various dams that make up the tailings infrastructure. Further investigation was carried out to confirm the design and cost to remediate these concerns during the summer of 2005. An evaluation of the Cross Valley Dam's stability was also included in the investigation. An engineering report will be issued later this year detailing the results of the investigation.

Project 22D - Monitoring Relating to the North Fork Rock Drain

139. An assessment was carried out on the North Fork rock drain by BGC during the 2004-2005 operating year. The preliminary conclusion reached was that the North Fork rock drain could perform adequately under either earthquake or flood conditions. Therefore, consideration could be given to the North Fork rock drain remaining in place as part of the closure plan. However, it was recognized that additional data collection was necessary to confirm this assessment. During the evaluation of the scope of work for this determination it was decided that the scope of work should be expanded to include failure mode analysis relating to the long-term performance of the rock drain. It was therefore recognized that the cost of the expanded evaluation including field activities would be

considerably higher than the original budget. The evaluation is in progress with an engineering report to be issued later this year.

Project 22E - North Fork Rock Drain Fish Study

140. During the stakeholder discussions in January 2005 it was determined that it would be appropriate to do an evaluation of the available fish habitat located above the North Fork rock drain in order to better understand the impact of the rock drain on fish. A field investigation and assessment was carried out during the summer of 2005 and a report will be issued this year. Preliminary findings indicate that fish are capable of moving through the rock drain as the head pond above the rock drain was found to have a significant fish population.

Project 22F - Rose Creek Diversion Upgrade to PMF Requirements

141. The purpose of this study was to expand the conceptual design of the Rose Creek diversion to meet Probable Maximum Flood ("PMF") requirements which was completed in 2004. The design would be based on a full PMF being passed through the Rose Creek diversion channel with no rock drains relating to attenuation. A field investigation was carried out during the summer of 2005 which included a significant drilling program. The collected field information will be utilized this fall and winter to complete an engineering design of a PMF rated channel, including an estimate of the total cost, and a report will be issued later this year.

Project 22G - Re-Evaluate the PMF Estimate

142. PMF for the Mine was estimated in 2003 on the basis of an assumed Probable Maximum Precipitation ("PMP"). It was determined that a site-specific PMP evaluation should be performed based on ongoing site-specific precipitation data and creek flow measurements. The PMP evaluation was carried out during the Operating Period and a peer review has been authorized. The agreed-upon PMF value will be utilized in determining the Rose Creek diversion design noted above.

Project 22H - Complete Ground Water Collection Design

143. Building on the work that was initiated in 2004-2005, two subsequent projects were identified and approved for the Operating Year: (i) pumping tests at the Cross Valley Dam; and (ii) investigation into zinc attenuation below the tailings.

144. The rationale for the pump test study was described in a RGC memorandum dated May 6, 2005 and entitled "Task 22H(a) – Pump Testing in Rose Creek Valley", the results of which suggested that current and future tailings seepage is impacting the local groundwater, and that groundwater interception may be required in the future to protect Rose Creek. In 2004, GLL developed a preliminary design for a groundwater interception system in the Rose Creek Valley aquifer. However, this design was based on modeling alone.

145. On June 18, 2005, a conference call was held with various stakeholders, including staff from Yukon Type II Office, FMCPO, Environment Canada and the Interim Receiver, to discuss the scope of work for this project. During this call it was agreed that this study should be carried out during the Operating Year and RGC was instructed to develop a detailed work plan. The primary purpose of this study was to design a groundwater interception system for the Rose Creek aquifer using pump tests and a numerical model. Due to the importance and complexity of the study, the scope of work involved the five major tasks described below:

i. Development of Work Plan. This included a data review and the development of a preliminary flow model of the lower Rose Creek Valley to develop criteria for the proposed pump tests (including duration and rate of pumping).

ii. Drilling and Development. The proposed pump test drilling program was carried out using an air rotary rig and included two pumping wells and two observation wells. The exact locations of the well screens were determined based on the observed stratigraphy and return flow rates.

iii. Pumping Tests. The proposed pump test program consisted of a seven day constant discharge ("CD") pump test in the northern portion of the Rose Creek Valley, and a 24 hr CD pump test in the southern portion.

iv. Test Interpretation & Design. In this task, a local groundwater flow model was developed to interpret the pump test data and to design a groundwater interception system.

v. Costing & Reporting. A cost estimate is currently being developed for the installation of the recommended groundwater interception system, including drilling/well installation and pump and controller setup.

146. The report is being prepared summarizing the outcomes of the above listed tasks, and will be submitted later this year.

Project 22 H – Attenuation Testing

147. During the 2004-2005 field season, water and load balance calculations for the Rose Creek tailings deposit completed by RGC indicated that zinc concentrations in the aquifer are substantially lower than were expected. It was therefore hypothesized that the zinc is being removed by one or all of the following mechanisms:

i. adsorption or absorption by organic soils underlying the tailings;

ii. co-precipitation with iron and/or manganese at or near the tailings-soil interface; and/or

iii. attenuation in the aquifer itself by adsorption to mineral soils.

148. The attenuation testing completed last year by SRK established that the third mechanism, while clearly active, may not fully explain the amount of zinc that is missing. Understanding which of the above mechanisms is contributing to zinc removal is important as some of the mechanisms have the potential to be irreversible, that is, they could permanently remove zinc from solution. Other mechanisms, or future changes in geochemical conditions, could lead to zinc being released.

149. During the Operating Year, SRK was retained to further investigate the mechanisms for attenuation. Specifically, the primary objectives of the study were to:

i. obtain samples of tailings from depths that have been exposed to porewater with elevated zinc concentrations, but that still remain neutral in pH;

ii. obtain samples of organic materials and aquifer soils that have been exposed to high levels of soluble zinc from the overlying tailings;

iii. analyze the samples to determine where the zinc is being removed from solution; and

iv. carry out a series of tests to attempt to identify the dominant zinc removal mechanisms.

150. During the course of the summer field season, investigations were undertaken in two stages comprised of a field drilling and sampling program, which included a series of field tests, a laboratory investigation. All field work has been completed. Required samples have been collected and are being analyzed.

151. A draft report is currently being prepared which will present and discuss the results from the field and laboratory investigations, up to and including the sequential leach extractions, and making recommendations as to whether column tests should be initiated. To the extent possible, the results of the testing will be used to estimate the overall attenuation capacity of the underlying soils and the aquifer, and to infer intermediate and long term effects. A final report will be prepared after review comments are received from the working group.

(xxiii) **Develop Site-Specific Objectives**

Project 23A - Implement Phase II of Terrestrial Effects Study Plan

152. GLL was retained in 2004 to develop and execute a Terrestrial Effects Study Design for the Mine. This study was initiated under the recommendation of the Environmental Assessment conducted in support of the application for the Water Licence for ongoing care and maintenance activities at the Mine. The findings of the Terrestrial Effects Study will feed into Mine care and maintenance activities and into the development of the FCRP.

153. The Terrestrial Effects Study was initiated in the summer of 2004 and Phase I of this project included all activities conducted during the summer and fall of 2004 and the winter of 2004-2005. A project report for Phase I activities was produced and circulated to the working group members.

154. The objectives of the Terrestrial Effects Study are defined as:

i. definition of the spatial distribution of elevated elemental concentrations, including definition of the distance to background levels;

ii. determination of whether airborne deposition is ongoing or historic;

iii. improved characterization of reference concentrations;

iv. investigation of elemental levels in vegetation species of importance to humans and wildlife; and

v. investigation of elemental levels in wildlife tissue, including species of importance to humans.

155. Furthermore, two additional objectives were added to the Phase II Study:

i. determination of ambient air elemental concentrations: defined through interpretation of needs of the human health and ecological risk assessment (Terrestrial Effects Project Review, minutes from conference call on May 11, 2005); and

ii. identification of potential sources of deposition: originally identified as an objective during conceptual planning of the Terrestrial Effects Project (Technical Memorandum from GLL dated December 2, 2003) and identified as a requirement of the Water Licence (Interim Receiver and GLL 2003).

156. This expansion in scope resulted in the need to increase the budget originally allocated to this study in the order of $100,000. Phase II of the Terrestrial Effects Study includes all activities conducted between spring 2005 and the completion of the study in March 2006. It is recognized that the findings of the Terrestrial Effects study are to be submitted under the requirements of the Water Licence by December 2005. However, given that the timing of final community meetings and the finalization of the ambient air sampling program will extend beyond December 2005, a supplementary report will be filed with the Water Board.

157. There will be two deliverables for this study, namely:

i. final report for Phase II of the Terrestrial Effects Study (for the purposes of submission to the Water Board, including all project components with the exception of those listed below for inclusion in the report addendum); and

ii. addendum to the final report for Phase II of the Terrestrial Effects Study (including the analysis, interpretation and write-up of data collected in October 2005 as part of the consolidated air sampling program and input received during community meetings conducted in January and February following the release of

the findings of Phase II of the Terrestrial Effects Study), anticipated to be delivered in March 2006.

158. As was contemplated in the 2004-2005 study, progress updates will continue to be provided to affected First Nations (Ross River and Selkirk First Nation) as well as to Faro.

Project 23B - Continue to Develop Site-Specific Water Quality Objectives

159. In 2004-2005, a project was carried out to derive Preliminary Site-Specific Water Quality Objectives ("WQO's"). To date, the project has progressed through interpretation of data and initial derivations that have been reviewed by the technical working group. One of the objectives for the 2004 work plan was to have the initial derivations resolved with the technical working group such that they were ready to be presented to a broader audience related to the FCRP. However, the data interpretation was more technically complex than anticipated and required extra research to resolve some unanticipated results of the site-specific toxicity tests. As a result of these complexities, the interpretations and preliminary derivations remain under discussion with the technical working group at this time.

160. The primary goal for the 2005-2006 work plan is to provide a final recommendation of WQOs based on technical derivations and broader consultations. Specific tasks to be completed during the Operating Year include the following:

i. finalize the recommended Preliminary WQOs with the technical working group;

ii. conduct and incorporate any follow up testing that may be recommended through the working group;

iii. prepare a project consultation plan for approval by the FMCPO;

iv. conduct consultations on the project recommendations; and

v. provide a project completion report by January 2006.

161. The data analysis is continuing and a report is expected later this year.

Project 23C - Complete Social Economic Studies

162. This project is to be funded and completed by the Yukon Type II Office and FMCPO.

Project 23D - Prepare Level 2 Ecological Risk Assessment

163. The HHERA is an extension to the screening level assessment which was originally carried out for the aquatic pathways for the current conditions existing at the Mine in 2002 by Senes Consultants. The HHERA builds on the information used in the previous assessment but uses measured data for the aquatic and terrestrial environments from recent studies conducted by GLL at the Mine.

164. The HHERA also uses less conservative and more realistic assumptions than the screening level assessment. The HHERA was divided into the three different components associated with such assessments: (i) an Aquatic Ecosystem Assessment; (ii) a Terrestrial Ecosystem Assessment; and (iii) a Human Health Risk Assessment.

165. A report is currently being prepared which will detail the data used, the approach taken to carry out the HHERA, the rationale behind the selection of the ecological and human receptors and exposure pathways, and the results for the range of loadings carried through the HHERA. The report is expected to be completed later this year.

Project 23E - Initiate Environmental Assessment

166. The FCRP will be referred to the *Yukon Environmental and Socio-Economic Assessment Act ("YESAA")* process at the end of 2006 upon filing of the FCRP with the Water Board. It is anticipated that the timeframe for the Environmental Assessment ("EA") and regulatory approval of the FCRP will be at least two years. To provide the best opportunity to achieve the approvals within the two year timeframe, the required EA documentation must be ready for submission at that time. The EA process is being managed by the FMCPO.

(xxiv) **Additional Field Investigation To Develop Soil Contamination Remediation Plan**

167. An initial investigation was carried out as a Phase II EA for soils across the Mine during the summer and fall of 2004. The investigation focused on hydrocarbon contamination with some preliminary evaluation of metals contamination. It was determined that a second phase utilizing drilling equipment would be necessary to gain a better understanding of the extent and volume of contaminated hydrocarbon soils existing at the

Mine. The field investigation and drilling program was carried during the Operating Period and a report will be issued later this year.

(xxv) **Water Licence Related Studies**

168. An investigation including establishment of water monitoring wells was carried out in 2004-2005 relating to the impact of the Vangorda Creek on Faro's drinking water wells. It was determined that further monitoring of the wells would be required during the Operating Year. The monitoring work has been completed and an engineering report will be issued later this year. In addition, there will be a full report based on the two year investigation included in the annual report to the Water Board, which is anticipated to be filed at the end of February 2006. This project work is a requirement under the terms of the Water Licence.

(xxvi) **Develop Draft FCRP Closure Methods**

169. Significant progress has been made in completing numerous technical studies which will provide the necessary data to support the development of the FCRP for the Mine. Primary alternatives are being developed and will be reviewed by the Oversight Committee in January 2006. This matter is addressed in greater detail in paragraphs 55-61 above.

5. Projects Related to Site Remediation

(xxvii) **Grum Pit Bio-Treatment**

170. An extensive Grum Pit insitu biological test program was carried out during the summer of 2004. Based on the success of the project, SRK recommended that a formal ongoing insitu treatment take place at the Grum Pit. The purpose of the insitu treatment is to reduce the metal concentrations in the Pit water through bioremediation and prepare the Pit for a flow through system when the water level reaches the appropriate elevation for discharge from the Pit. This would eliminate the long term requirement for pump and treatment of the Grum Pit lake water. The treatment program was successfully carried out during the Operating Period and a report will be issued later this year.

(xxviii) **Building Removal/Disposition**

171. There was a need to identify potential management support with the required experience for supervising the planned demolition program of the lead and zinc concentrate load out

building. Impact Demolition of Vancouver was retained in June to provide the oversight and expertise relating to the building dismantling program. In addition, there was a two week training program put on by Yukon College in mid June prior to the start of the dismantling operation.

172. During the summer of 2004, the Interim Receiver retained the services of Yukon College to train six Ross River residents on the techniques of building dismantling.

173. Five of the six Ross River personnel utilized from last year returned to the Mine this summer to dismantle the large ore concentrate load out facility. Although progress was being made, the program was shut down before completion due to elevated lead levels in the workers' blood. The remaining portion of the structure will be taken down next year.

(xxix) **Reagent Removal and Disposition**

174. Large quantities of reagents were removed from the Mine over the past several years. It was noted there was a small quantity of reagents remaining that should be removed and disposed of in a proper manner. In addition, there was a large storage container located at the Faro waste dump containing Xanthate that required proper removal and disposal. The work was carried out during the Operating Period.

(xxx) **Management of Oxide Fines**

175. An oxide fines relocation study was carried out during the 2004-2005 operating year. From that extensive study it was determined that there was a requirement to confirm the volume of material that would be handled relating to relocation and disposition. It was also intended that the project would include the moving of a portion of the materials during the Operating Year as part of the ongoing remediation program. A cover design was also included in the scope of work. It was determined in the spring of 2005 that the program's scope of work would only cover the confirmation of the material volumes. Any relocation of the oxide fines would be considered as part of the FCRP. A drilling program was carried out during the Operating Period to enable a determination of the volumes for relocation and a report will be issued later this year.

(xxxi) **Removal of Zinc Concentrate**

176. In the Thirty-Eighth Report, the Interim Receiver stated that the remainder of the zinc concentrate not shipped in 2004 would be shipped to Teck Cominco's smelter in Trail,

B.C. this year. All but half of one truckload (of 58) was delivered when a labour strike began at the Trail smelter in early July. This final load of 14 bags will be shipped as soon as their operations resume.

(xxxii) **Initiate Biocell Hydrocarbon Treatment**

177. During the 2004-2005 operating year, an application was made for a permit to carry out the remedial activities of hydrocarbon contaminated soils identified at the Mine. One approach was the use of a bio cell for insitu treatment of the contaminated soils. It was proposed that a program be initiated to create a hydrocarbon bio cell remediation site as an initial full scale test of this approach. Based on the results gained from the bioremediation cell, it could then be determined whether additional cells should be created or alternative remedial methods be considered. It was further determined in the spring of 2005 that the bio cell remediation approach was a proven method for remediation and a full scale test was not required. In addition, it was also noted that the significant quantity of metals in the contaminated soils could inhibit the bioremediation performance. For these reasons, this test program was not carried out and only a minimal amount of the budgeted dollars were utilized.

(xxxiii) **Collection of Scrap Tires and Re-Grind Program**

178. A large number (approximately 300) of heavy duty vehicle tires are stored in various areas of the Mine. It was intended to collect these tires and if possible relocate them offsite in a proper manner. While some tires were suitable for retread and then sold, as described in paragraph 35 above, most of the tires cannot be sold and the relocation program will be completed next year.

(xxxiv) **Scrap Steel Recovery Program**

179. The Interim Receiver engaged in another scrap steel program over the summer, utilizing eight residents of Ross River to prepare marketable scrap steel (small pieces suitable for the melting furnaces) from the large pieces of old equipment abandoned by Anvil Range and its predecessors.

180. The Interim Receiver attended at the Mine in April to plan the scrap metal recovery program and arranged for personnel to carry out the work and assessed the type of equipment to be used for scrap metal cutting and further training requirements.

181. Several Euclid haul truck boxes, two shovels and other units were cut up and piled awaiting shipment south. As the price of scrap steel, which had been high for the past two years, dropped this summer due to a decrease in demand, a decision was made to wait until next year to sell the scrap as the price is expected to return to 2004 levels.

(xxxv) **Progressive Reclamation Relating to Emergency Tailings Area**

182. During the 2004-2005 operating year, studies were conducted to determine the quantity of the emergency tailings present in the valley below the Faro Mill. In addition, there were initial studies as to the impact of these tailings on the surrounding environment relating to groundwater contamination etc. The project activities included confirmation of the volume of tailings in the valley, consideration of various methods and equipment to efficiently remove the tailings, and the approximate cost for removal and transfer to an acceptable location for disposition and storage. The investigation was carried out during the summer of 2005 and included site drilling. The volume of material was confirmed and a removal method with approximate associated costs was determined. This information will be available when considering future disposition of the emergency tailings from the valley area.

(xxxvi) **Remediation of Tailings Outside of the Tailings Storage Areas**

183. Throughout the operating life of the Mine, there were events that resulted in the deposit of tailings outside of the tailings storage area. A field evaluation was carried out during the 2004-2005 operating year to determine the volume of these tailings at these locations. Based on the results, it was decided that a portion of these tailings could be easily relocated back into the tailings impoundment. This work was carried out during the Operating Period.

(xxxvii) **Abandoned Tank, Dismantle and Removal**

184. This project was intended to have several redundant old fuel storage tanks cleaned, dismantled and or cut up for proper disposal at the Mine. Due to competing priorities and the workload relating to other projects, this program was postponed to next year.

(xxxviii) **Waste Oil Collection/Disposal**

185. The program was intended to clean up remaining waste oil stored on the Faro waste dump using the waste oil filtering system. The waste oil would be utilized in the heating system at the Mine. The collection work was carried out during the Operating Period and a waste oil burn permit was received in October.

(xxxix) **Obsolete Electrical Dismantling Program**

186. During the 2004-2005 operating year, a multi-year program was initiated to remove several redundant electrical transmission components located at the Mine. The work includes removal of transmission poles and lines and associated switch gear. Any material recovered is sold for scrap or utilized elsewhere at the Mine. The work was carried out during the summer of 2005 under the direction of the Mine electrician.

(xl) **Design/Build Clean Waste Dump**

187. As described in paragraph 90 above, during the 2004-2005 operating year an application was prepared and submitted for a permit to construct a clean waste dump. The clean waste dump would be used to dispose of the unusable, non-hazardous, structural materials that accumulate due to the ongoing building dismantling at the Mine. The cost estimate included the establishing of the actual dump. A dump operations plan was prepared and submitted with the application for the operation of the current dump and the future dump. A permit was issued during the summer of 2005 for both dumps. It was determined that it was not necessary to construct the new dump at this time.