

**2002 Faro Annual
Environmental Report
Water Licence QZ95-003**

**prepared for:
Yukon Territory Water Board**

**prepared by:
Gartner Lee Limited**

**on behalf of:
Deloitte & Touche Inc.
(as Interim Receiver for Anvil Range Mining
Corporation)**

Reference: GLL 22943 date: March, 2003

distribution:
6 Yukon Territory Water Board
 (plus electronic)
4 Deloitte & Touche Inc.
4 Gartner Lee Limited



Gartner Lee



Gartner Lee Limited

February 28, 2003

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

Dear Board:

Re: 2002 Faro Annual Environmental Report

We are pleased to submit five bound copies and one unbound original of the report 2002 Faro Annual Environmental Report, Water Licence QZ95-003. Gartner Lee Limited has prepared this report on behalf of Deloitte and Touche Inc., in their capacity as Interim Receiver for Anvil Range Mining Corporation.

Accompanying the above report are five bound plus one unbound copies of the report 2002 Instrumentation Data Review and Performance Review as prepared by BGC Engineering Inc. that describes the geotechnical performance of the Faro mine site according to the provisions of Schedule C of Water Licence QZ95-003.

These reports fulfill the annual reporting requirement for Water Licence QZ95-003 for 2002. I trust that this information is self-explanatory. However, if you have any questions please do not hesitate to contact us.

Yours very truly,
GARTNER LEE LIMITED

Eric Denholm
Senior Mining Consultant

c.c.: Mr. Wes Treleaven, *Deloitte & Touche Inc.*
Mr. Doug Sedgwick, *Deloitte & Touche Inc.*
Mr. Greg Stevens, *Deloitte & Touche Inc.*
Mr. Dana Hagggar, *Anvil Range Mining Corp. (Interim Receivership)*

Executive Summary

Water quality, biological, physical and closure monitoring programs were performed during 2002 in accordance with Water Licence QZ95-003 (the "Licence") and the site water monitoring protocol. This report presents the data that was gathered and an overview interpretation of the information.

Anvil Range Mining Corporation ("ARMC") entered into receivership in April 1998 and, since that time, management of the minesite has been under the direction of Deloitte and Touche Inc. acting as court appointed interim receiver.

Surface water monitoring was conducted in 2002 by ARMC according to or in excess of the requirements of Schedule A of the Licence for "temporary cessation of operations", as appropriate, and the results are presented in this report. The biological monitoring program described in Schedule B of the Licence was completed by Laberge Environmental Services of Whitehorse and their report is appended. The annual geotechnical/physical monitoring program described in Schedule C of the Licence was completed by BGC Engineering Inc. A report describing the annual geotechnical performance review as prepared by BGC Engineering Inc. accompanies this report under separate cover. Seepage and ground water monitoring programs as described in Schedule D of the Licence were performed by ARMC and the results are presented in this report.

The concentrator plant and all milling activities were shut down in February 1998 and remained shut down through 2002. No tailings and process water were deposited into the mined-out Faro Main Pit or into the Down Valley tailings impoundments. 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.

The recycle water system, which was installed to deliver water from the Faro Main pit to the mill for processing purposes or for discharge via the Down Valley tailings impoundments, was used to deliver water from the Faro Main pit for treatment and discharge to Rose Creek. The water level in the Faro Main pit was maintained within the established "safe" range during 2002. The two water treatment systems (mill and Down Valley) were successfully operated to achieve full compliance with the maximum allowable discharge criteria in the Licence. Water quality at the two effluent discharge locations (Cross Valley Pond outflow and Cross Valley Dam seepage) was in full compliance with the Licence.

Ground water quality in the Rose Creek valley generally indicated a continuation of the established trends showing elevated sulphate concentrations that decrease with distance downgradient of the tailings impoundments. Ground water quality in the vicinity of the rock dumps displayed variable sulphate and metal concentrations with some areas elevated.

Maintenance work was completed as required to maintain all works in good condition and to ensure a continued high level of protection to the environment.

Table of Contents

Executive Summary	i
1. Introduction.....	1
2. Water Use	6
2.1 Fresh Water.....	6
2.2 Faro Main Pit Water	6
2.3 Effluent Discharge	8
2.4 Faro Main And Zone II Pits	8
2.5 Rose Creek At X14	10
2.6 North Fork Of Rose Creek At R7	12
3. Water Quality Monitoring (Schedule ‘A’)	13
3.1 Overview Of Water Quality Monitoring Program.....	13
3.2 Faro Pits And Rock Dumps (X22B, X23, X26, BH1, BH2, BH4).....	14
3.3 Intermediate Pond (X4)	18
3.4 Effluent Discharge (X5 And X13).....	20
3.5 Rose And Anvil Creeks	21
3.5.1 North Fork of Rose Creek (R7, FAROCR, R8, R9, R10, X2).....	21
3.5.2 Rose Creek Diversion Channel (X3, X10)	25
3.5.3 Rose Creek Immediately Downstream of Mine Discharges (X14)	26
3.5.4 Rose Creek to Anvil Creek / Anvil Creek (R2, R3, R4, R5, R6).....	27
3.6 Rose Creek Valley Ground Water Quality	28
4. Biological Monitoring (Schedule ‘B’)	35
5. Geotechnical Monitoring (Schedule ‘C’).....	36
6. Closure Monitoring (Schedule ‘D’).....	37
6.1 2002 Surface Seep Survey	37
6.2 2002 Ground Water Seep Monitoring.....	37
7. Site Maintenance.....	40
7.1 Cross Valley Pond	40
7.2 Fresh Water Supply Reservoir	40
7.3 Rose Creek Diversion Canal	41
7.4 Faro Creek Diversion Channel.....	41
7.5 Off Site Contaminated Soil.....	41
7.6 Mill Water Treatment System.....	41
7.7 Mine Access Road	42
7.8 Progressive Reclamation.....	42

Tables

Table 1: Water Quality Monitoring Locations	5
Table 2: Detailed Faro Main Pit Water Balance, 2002	11
Table 3: Total Zinc and Sulphate Concentrations in Rose Creek on July 23/24, 2002	28

Figures

Figure 1: Faro Mine Drainage and Water Monitoring Locations	3
Figure 2: Water Quality Monitoring Locations	4
Figure 3: Faro Main Pit Filling Curve, 1992 to 2002	7
Figure 4: Faro Main Pit Water Elevation, 2002 Detail	7
Figure 5: Faro Zone II Pit Water Elevation, 1997 to 2002	9
Figure 6: Rose Creek at Location X14 Flow Record	11
Figure 7: North Fork Rose Creek at Location R7 Flow Record	12
Figure 8: Faro Main Pit (X22B) Total and Dissolved Zinc	14
Figure 9: Faro Main Pit (X22B) Sulphate	15
Figure 10: Faro Zone II Pit (X26) Total and Dissolved Zinc	16
Figure 11: Faro Rock Dump Seepage (X23) Total Zinc	16
Figure 12: Faro Rock Dump Seepage (X23) Sulphate	17
Figure 13: Intermediate Pond (X4) Total Zinc	19
Figure 14: Intermediate Pond (X4) Sulphate	19
Figure 15: 2002 Effluent (X5, X13) Total Zinc	21
Figure 16: North Fork Rose Creek (R7, R8, FAROCR) Total Zinc	22
Figure 17: North Fork Rose Creek (R8,R9,R10) Total Zinc	23
Figure 18: North Fork Rose Creek (R8,R9,R10) Sulphate	23
Figure 19: North Fork Rose Creek (X2) Total Zinc	24
Figure 20: North Fork Rose Creek (X2) Sulphate	24
Figure 21: Rose Creek Diversion Channel (X3,X10) Total Zinc	25
Figure 22: Rose Creek Diversion Channel (X3,X10) Sulphate	26
Figure 23: Rose Creek Immediately Downstream of Mine Site (X14) Total Zinc	27
Figure 24: Rose Creek Immediately Downstream of Mine Site (X14) Sulphate	27
Figure 25: Ground Water (X21B-96, X21C-96) Dissolved Zinc	29
Figure 26: Ground Water (X21B-96, X21C-96) Sulphate	30
Figure 27: Ground Water (X24A/B/C/D-96) Dissolved Zinc	30
Figure 28: Ground Water (X24A/B/C/D-96) Sulphate	31
Figure 29: Ground Water (X25A-96, X25B-96) Dissolved Zinc	31
Figure 30: Ground Water (X25A-96, X25B-96) Sulphate	32
Figure 31: Ground Water (X16A, X16B) Dissolved Zinc	32
Figure 32: Ground Water (X16A, X16B) Sulphate	33
Figure 33: Ground Water (X18A, X18B) Dissolved Zinc	33
Figure 34: Ground Water (X18A, X18B) Sulphate	34

Appendices

1. 2002 Surface Water Quality Listing
2. 2002 Ground water Quality Listing
3. 2002 Bioassay Results
4. 2002 Biological Monitoring Program for Rose Creek, Laberge Environmental Services, January 2003
5. 2002 Surface Seep Survey Results

1. Introduction

This annual environmental report for the year 2002 has been prepared according to the provisions of Part A, Section 13 of Water Licence QZ95-003 (the "Licence"). This report provides water quantities used during the year and an interpretation of trends and variations in the water quality data. Anvil Range Mining Corporation entered into receivership in April 1998 and, since that time, the mine has been under the management of Deloitte and Touche Inc. as court appointed Interim Receiver of Anvil Range Mining Corp. (the "Interim Receiver"). This report, including all data presentations and interpretations, was prepared by Gartner Lee Limited ("Gartner Lee") based on information provided by Anvil Range Mining Corp. ("ARMC"), BGC Engineering Inc. and Laberge Environmental Services.

Since their appointment in April 1998, the Interim Receiver has successfully maintained compliance with the terms of the water licenses 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 licenses.
- 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 and used oil from the mine sites.
- Physical maintenance of water retention and diversion structures.
- Completion of a comprehensive hydrogeological and geochemical study of the Rose Creek Tailings Facility.
- Initiation of planning for long-term mine reclamation.

This report presents results of water quality monitoring per Schedules A and D of the Licence. All of the field information presented in this report was gathered by ARMC except for the collection of ground water samples, which was conducted by Gartner Lee. The biological monitoring program described in Schedule B of the Licence is scheduled to be performed in every second year and was conducted in 2002 by Laberge Environmental Services and is summarized herein with the full report appended. The physical monitoring program described in Schedule C of the Licence was performed in 2002 by BGC Engineering Inc. and is summarized herein with the full report filed under separate cover as an accompanying document.

No milling and tailings deposition activities took place during 2002 following the suspension of mining and milling activities in February 1998. No freshwater from Rose Creek was required or used for industrial processing during 2002.

The recycle water system, which was installed to provide water from the Faro Main pit to the mill for processing or for discharge, was utilized during 2002 to pump water from the Faro Main pit for treatment and discharge to Rose Creek. The summer pumping program achieved the goal of lowering the water level in the Faro Main pit to a level where no further dewatering was scheduled until spring/summer of 2003. Certain equipment in the mill was converted, in 2001, for use as a lime treatment system for water

2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

pumped from the Faro Main pit with the effluent directed by gravity into either the Intermediate Dam outflow spillway or the Cross Valley Pond prior to release to Rose Creek. This new system presents many potential benefits over the previous treatment methods and was successfully utilized in 2002. Several environmental benefits were realized as a direct result of the success of this new system: effluent zinc concentrations were reduced, the Intermediate and Cross Valley Ponds were managed below overflow elevations, less lime was used and less treatment sludge was generated.

The Interim Receiver, in consultation with Gartner Lee Limited, have established a site-specific water quality monitoring program which provides for:

1. Routine collection of the data specified in the Licence for temporary cessation of operations;
2. Routine collection of data in excess of the Licence requirements that is beneficial for efficiently managing the environmental protection programs and monitoring of local environmental effects; and
3. Flexibility to adapt to immediate information needs through the short-term incorporation of additional sampling locations.

As an example of data collected in excess of the requirements of the Licence, the monitoring program includes routine monthly sampling in Rose Creek downstream of the Rose Creek Tailings Facility (station X14) as a means of monitoring water quality downstream of the effluent mixing zone.

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.

Surface and ground water monitoring locations are illustrated on Figures 1 and 2 and are listed on Table 1. Water quality analytical results for 2002 for all locations sampled and parameters analysed are listed in Appendix 1 for surface water and Appendix 2 for ground water.

Two earthquakes, one centred in Alaska and one centred a few 10's of kilometres north of the town of Faro, took place on November 3rd and 10th. All dams and earth structures were inspected immediately following each event in consultation with the professional geotechnical engineer and no immediate concerns were noted.

An environmental compliance and occupational health and safety review was conducted in the summer of 2002 by Deloitte and Touche Risk Management Services group. The audit resulted in a number of recommendations and an action plan was prepared in response to the recommendations.

A third party professional review of all water retention dams on the mine property, including the Fresh Water Supply Dam, the Intermediate Dam and the Cross Valley Dam, was conducted by Klohn-Crippen following protocols described by the Canadian Dam Association. No issues of critical concern were identified although a number of recommendations were provided including the development of an updated emergency response plan, which was under development at the time of writing of this report.

2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

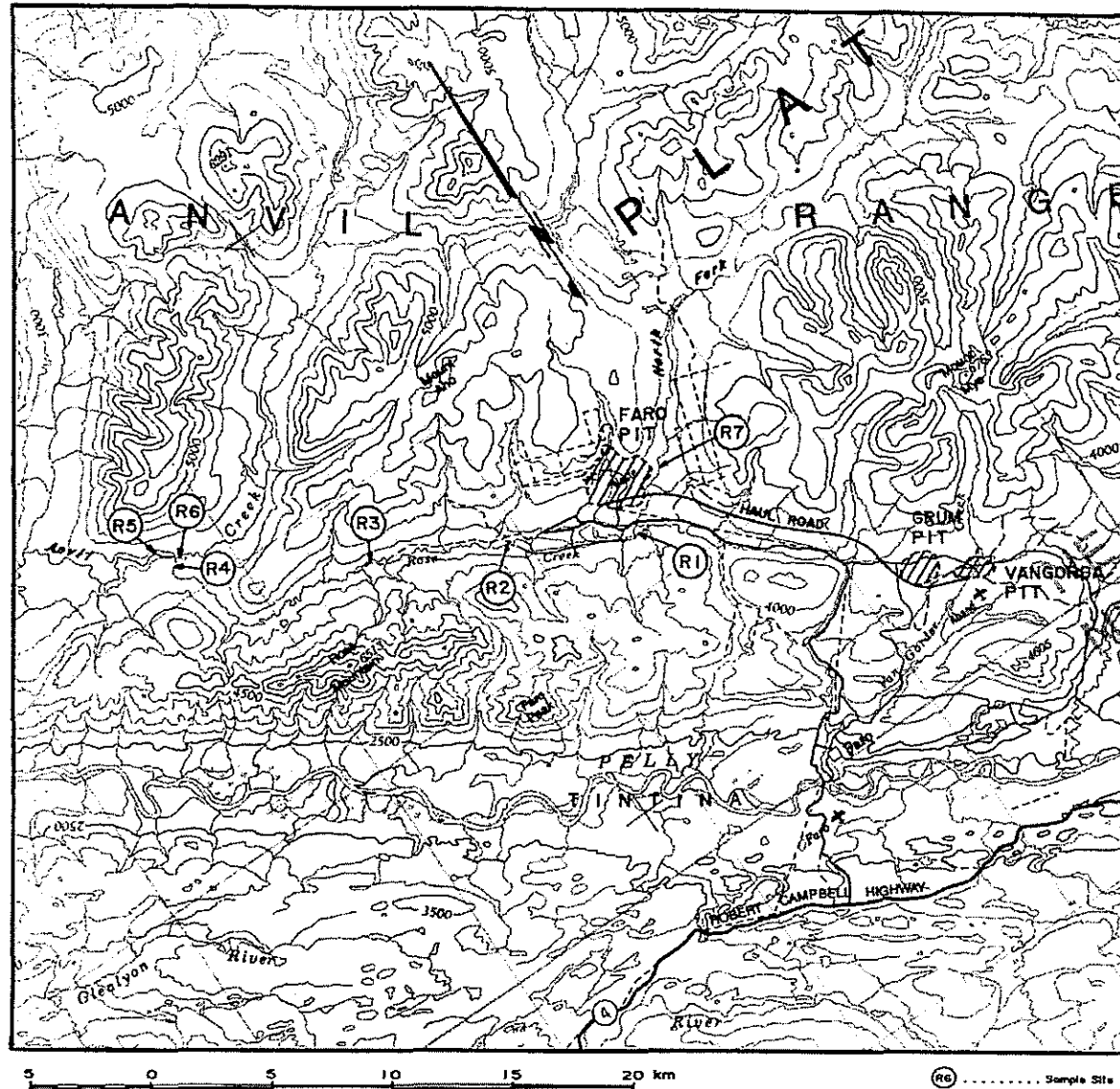


Figure 1: Faro Mine Drainage and Water Monitoring Locations

2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

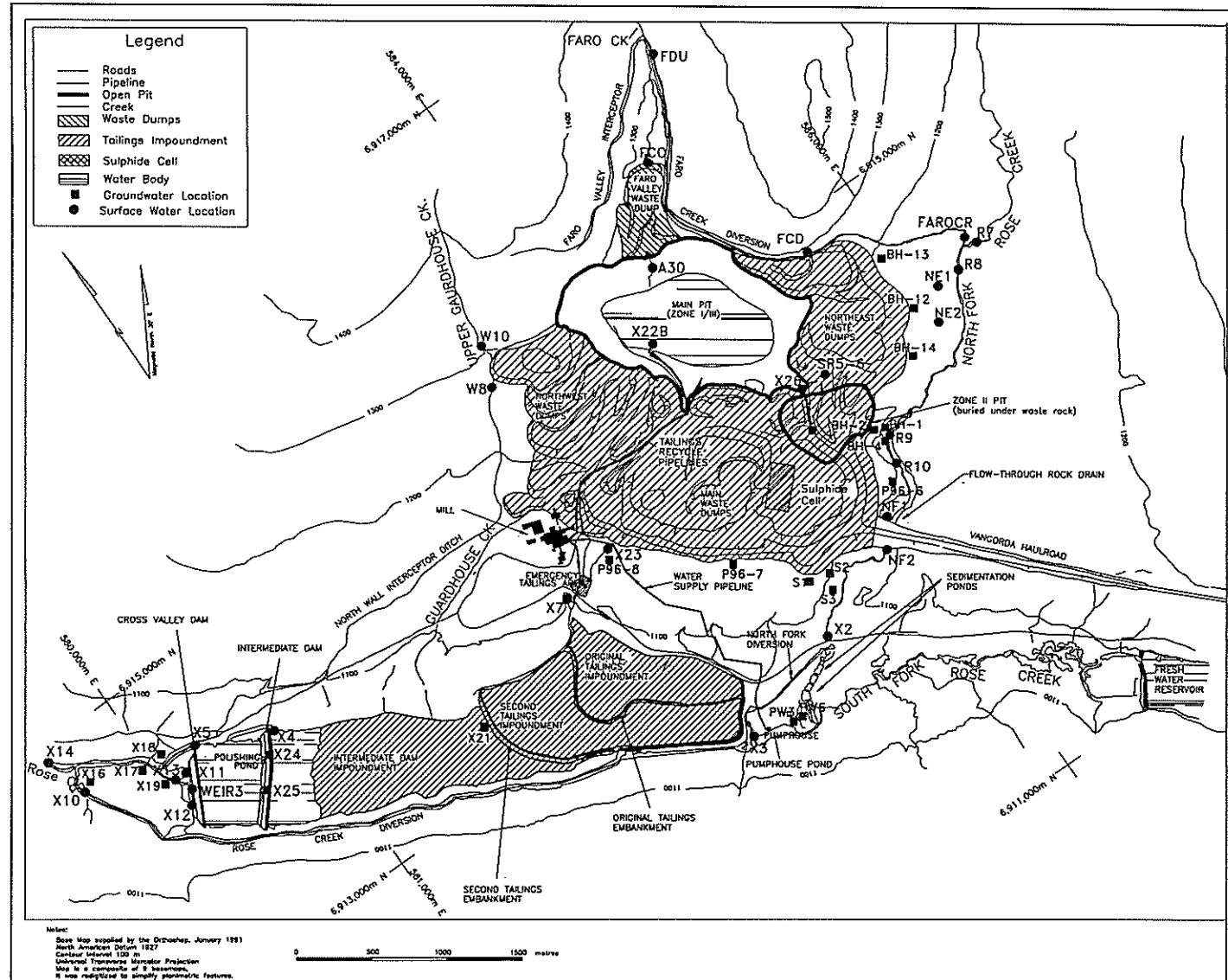


Figure 2: Water Quality Monitoring Locations

2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

Table 1: Water Quality Monitoring Locations

LOCATION	DESCRIPTION
X1	Point of discharge over the second impoundment
X2	North Fork of Rose Creek at road bridge
X3	Rose Creek at freshwater pumphouse
X4	Intermediate dam decant, prior to water treatment
X4a	Intermediate dam decant, below water treatment
X5	Cross Valley dam decant
X10	Rose Creek diversion canal below weirs
X11	Seepage from north toe of the Cross Valley dam
X12	Seepage from south toe of the Cross Valley dam
X13	Combined seepage flows downstream from the culvert and upstream of confluence with the decant
X14	Rose Creek after mixing downstream of the diversion canal confluence
X16a	Ground water monitor well - K1 at depth of 5m
X16b	Ground water monitor well - K1 at depth of 30m
X17a	Ground water monitor well - K2 at depth of 5m
X17b	Ground water monitor well - K2 at depth of 20m
X18a	Ground water monitor well - K3 at depth of 10m
X18b	Ground water monitor well - K3 at depth of 20m
X19a	Ground water monitor well - K4 at depth of 12m
X19b	Ground water monitor well - K4 at depth of 27m
X20	Ground water monitor well - K5
X21a	Ground water monitor well - K6 at depth of 10m
X21b	Ground water monitor well - K6 at depth of 27m
X22b	Main Pit water
X22c	Main Pit at point of discharge
X23	Old Faro Creek channel near the toe of the south west rock dumps
X24a	Ground water monitor well Intermediate Dam, North Abutment-shallow sample
X24b	Ground water monitor well Intermediate Dam, North Abutment-deep sample
X25a	Ground water monitor well Intermediate Dam, South Abutment-shallow sample
X25b	Ground water monitor well Intermediate Dam, South Abutment-deep sample
X26	Zone II pit water
BH-1, BH-2, &BH-4	Boreholes southeast of Zone II pit, west of North Fork of Rose Creek
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
R7	North Fork of Rose Creek upstream of the confluence with the Faro diversion - background sample
R8	North Fork of Rose Creek, 100 metres downstream of confluence with Faro Creek diversion
R9	North Fork of Rose Creek, adjacent to BH-1 & BH-2
R10	North Fork of Rose Creek, at least 100 metres upstream from maximum elevation of water impounded behind North Fork rock drain and 100 metres downstream of R9

2. Water Use

2.1 Fresh Water

The fresh water supply system remained largely in place through 2002, although some pump parts were previously removed for alternate use.

The fresh water supply system was previously used (during mine operations) to supply water to the mill from the Pumphouse Pond located near the confluence of the South and North Forks of Rose Creek. The pond can be supplied from three sources:

1. Water stored in the fresh water reservoir which is recharged from the South Fork of Rose Creek. In previous years, some control of the reservoir has been exercised with the use of stoplogs across the overflow spillway. Withdrawal of water during the winter season is through a low level outlet valve that is buried at the base of the fresh water supply dam;
2. The North Fork of Rose Creek. Flow is through the natural channel into the Pumphouse Pond; and
3. Two ground water wells, PW3 and PW6, located in the Rose Creek valley near the Pumphouse Pond.

During 2002, flow out of the pumphouse pond into the Rose Creek diversion channel was maintained at a rate greater than the minimum requirement in the Licence of 4.5 m³/min.

2.2 Faro Main Pit Water

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 was utilized during 2002 to pump water from the Faro Main pit to the mill for treatment in order to maintain the in-pit water level within the pre-determined range.

The recycle water 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 were utilized in 2002); and
2. 30" scclair 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.

The measured 2002 Faro Main pit water levels are illustrated on Figures 3 and 4. The filling curve 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.

2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

Figure 3: Faro Main Pit Filling Curve, 1992 to 2002

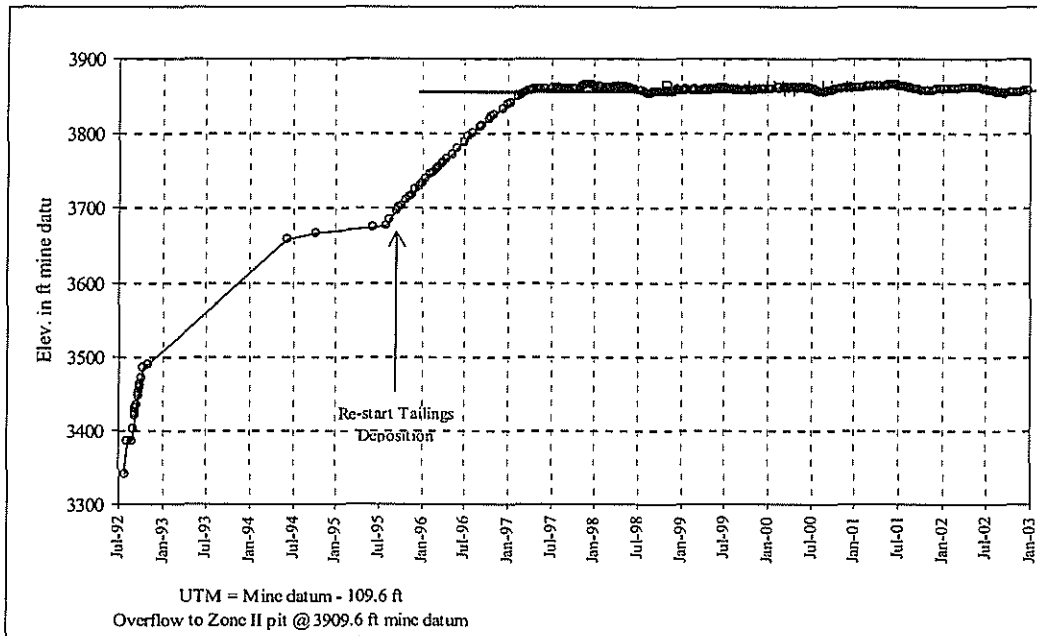
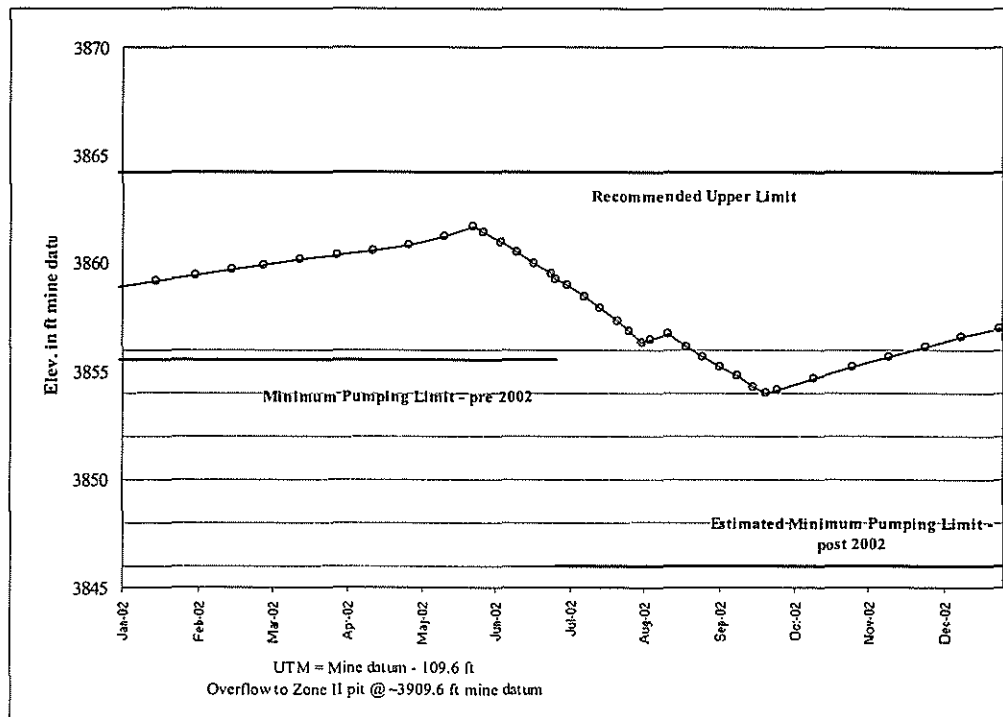


Figure 4: Faro Main Pit Water Elevation, 2002 Detail



2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

The targeted maximum elevation of 3750ft UTM (3859ft mine datum) as illustrated on Figures 3 and 4 is approximately 15.2 metres (approximately 50 feet) below the low point in the pit perimeter where water would overflow from the Main pit into the Zone II pit. This safety margin was incorporated into the design of the recycle water system in order to provide containment for an unexpected breach of the Faro Creek diversion into the pit and to prevent a potential increase in seepage into the Zone II pit through the fractured and faulted wallrock that separates the two pits. Data regarding water volumes pumped from the Zone II pit on an annual basis indicate that there has not been a noticeable increase in the rate of seepage from the Main pit into the Zone II pit (Section 2.4).

In 2002, the pump barge anchor point was physically modified to enable pumping down to a lower elevation (Figure 4) and to allow the barge to swivel. This modification is anticipated to provide for increased emergency storage capacity (by allowing dewatering to a lower water elevation) and allow for easier removal of pumps from the barge (by swiveling to shore).

2.3 Effluent Discharge

Effluent discharge to Rose Creek from the Faro minesite is limited to surface outflow from the Cross Valley pond (monitoring location X5) and seepage from the Cross Valley Dam (monitoring location X13). The surface outflow at location X5 was exclusively via syphon in 2002 (i.e. there was no overflow into the spillway). Ground water quality is monitored and reported on but is not considered an effluent discharge for these reporting purposes.

The primary source of water entering the Cross Valley pond is surface inflow from the Intermediate pond, which may include seepage from the Faro rock dumps, runoff from the plant site and runoff from the local drainage area, and water discharged from the Faro Main pit via the mill treatment system. Other sources of water entering the Cross Valley pond are local area runoff and direct precipitation.

The total volume of effluent that entered Rose Creek via location X13 in 2002 was estimated to be 1.5 million m³ at a rate of flow that varied from 38 to 49 Lps. The total volume of effluent discharged to Rose Creek via location X5 during 2002 was an estimated 4.0 million m³ with the flow rate varying from 0 to 1,000 Lps.

The total estimated effluent discharge to Rose Creek during 2002 (combined X5 and X13) was 5.5 million m³, which is approximately 85% of that reported for 2001 (6.5 million m³). The decrease is considered to be due primarily to the relatively low precipitation experienced in 2002 (81% of the 24-year mean).

2.4 Faro Main And Zone II Pits

A simplified water balance has been described for the Faro Main pit wherein the known parameters are the quantities of: tailings water inflow, tailings solids inflow, Zone II water inflow, net uncontrolled inflows (seepage in/out, runoff, precipitation, etc.) calculated from observed changes in the pit pond water elevation during strategic periods, and net inflow calculated from the net annual change in the Main pit water elevation. The unknown water quantities could be referred to as "water discharged" and would include water pumped from the main pit and discharged to the tailings impoundments. The simplified water balance could be expressed as follows with application of the subsequent notes:

2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

Tailings Water + Tailings Solids + Zone II Water + Net Uncontrolled Inflows - Water Discharged = Net Inflow

therefore the 2002 water balance for the Faro Main pit can be expressed as:

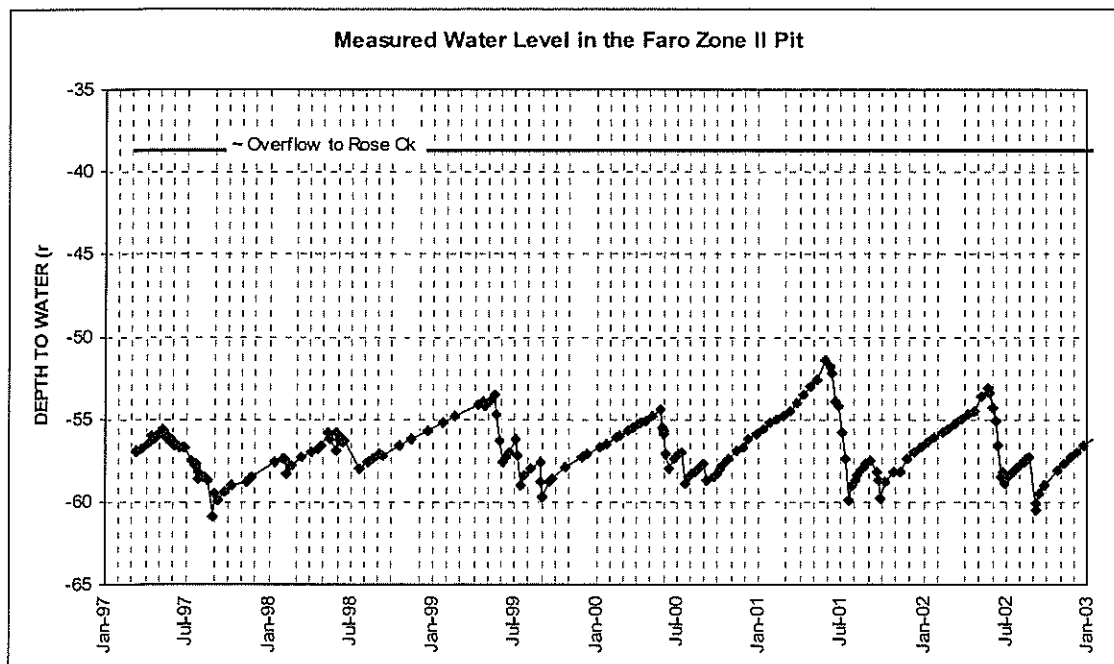
$$0.00 + 0.00 + 0.10 + 1.02 - \text{Water Discharged} = -0.82 \text{ (in millions m}^3\text{)}$$

and the "Water Discharged" for 2002 is estimated at 1.94 million m³

Notes:

1. No mill tailings were discharged into the Faro Pit during 2002.
2. Water was pumped from the Zone II Pit into the Faro Pit during 2002. An open pipe was installed in the pumping well in March 1997 that allowed direct water level measurements. The measured water levels are illustrated on Figure 5. The total volume pumped during 2002 was estimated at 99,500 m³. This volume compares to estimates for recent years as follows:
 - 1995: Zone II volume pumped = 139,000 m³
 - 1996: Zone II volume pumped = 75,000 m³
 - 1997: Zone II volume pumped = 51,000 m³
 - 1998: Zone II volume pumped = 43,070 m³
 - 1999: Zone II volume pumped = 73,457 m³
 - 2000: Zone II volume pumped = 64,282 m³
 - 2001: Zone II volume pumped = 85,000 m³

Figure 5: Faro Zone II Pit Water Elevation, 1997 to 2002



2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

3. The calculated net volume of uncontrolled inflows entering the Main pit from direct precipitation, evaporation, local run off, seepage inflow and seepage losses was 1.02 million m³ for 2002 (avg. 3,807 m³/day). This estimate was developed from direct measurements of the in-pit water level during periods in 2002 where the only inflows/outflows were the uncontrolled water and inflow pumped from the Zone II pit. The estimate of net uncontrolled water inflows for 2002 is just below the range of calculated values from 1995 to 2000 (1.2 to 2.0 million m³). This is attributed to the relatively low precipitation experienced in 2002. Further information regarding this note is provided in Table 2 below.
4. The net inflow of material entering the Main pit (for the year) is accurately tracked via the change in water elevation from January 1 to December 31. The water level elevations relate to a pit volume determined for those elevations from as-built survey information. The total net volume entering the pit includes tailings slurry, tailings solids, Zone II dewatering, direct precipitation, evaporation, local run off, seepage inflow, seepage losses, leakage from the Faro Creek diversion, and water pumped out to the mill or for treatment/discharge. The average filling rate in the Main pit for 2002 was -3,060 m³/day (net average inflow) or -0.82 million m³ total (net inflow) for the year. The detailed filling curve for 2002 is illustrated on Figure 4. Further detail regarding this note is provided in Table 2 below.
5. Water was discharged from the Main pit to the Down Valley via the recycle water system in 2002. Two methods of calculating the volume pumped from the pit can be applied. One method utilizes the measured flow rate in the mill, which was as high as 6,100 USgpm in 2002, to estimate the total volume pumped based on pumping hours and average pumping rates. This method provides an estimate of approximately 2.5 million m³ pumped in 2002 (average 5,000 USgpm for 110 days at 85% utility). The second method, which is reported in the water balance above and in Table 2, utilizes the measured water elevations in the pit and as-built survey information (notes 1 to 4 above) to estimate the volume changes in the pit. This provides an estimate of approximately 1.94 million m³ pumped from the pit, implying an average pumping rate during the period of active pumping of 3,235 USgpm. The apparent discrepancy is the subject of additional data collection and investigation. Further detail regarding this note is provided in Table 2 below.

In addition to the water balance information shown above, Table 2 provides further information regarding individual periods within the year 2002.

2.5 Rose Creek At X14

The water level at location X14 in Rose Creek downstream of the confluence with mine effluent discharged via locations X5 and X13 has been monitored on a continuous basis (excepting brief periods of malfunction or damage) using a pressure transducer and datalogger. A datalogger and transducer were installed in June 1999 by Laberge Environmental Services of Whitehorse as a replacement for the previous unit which had ceased data collection. The pressure transducer was again replaced in 2002.

The X14 flow record is illustrated on Figure 6. Note that a new stage discharge curve was developed and used for calculation of flows post June 1999.

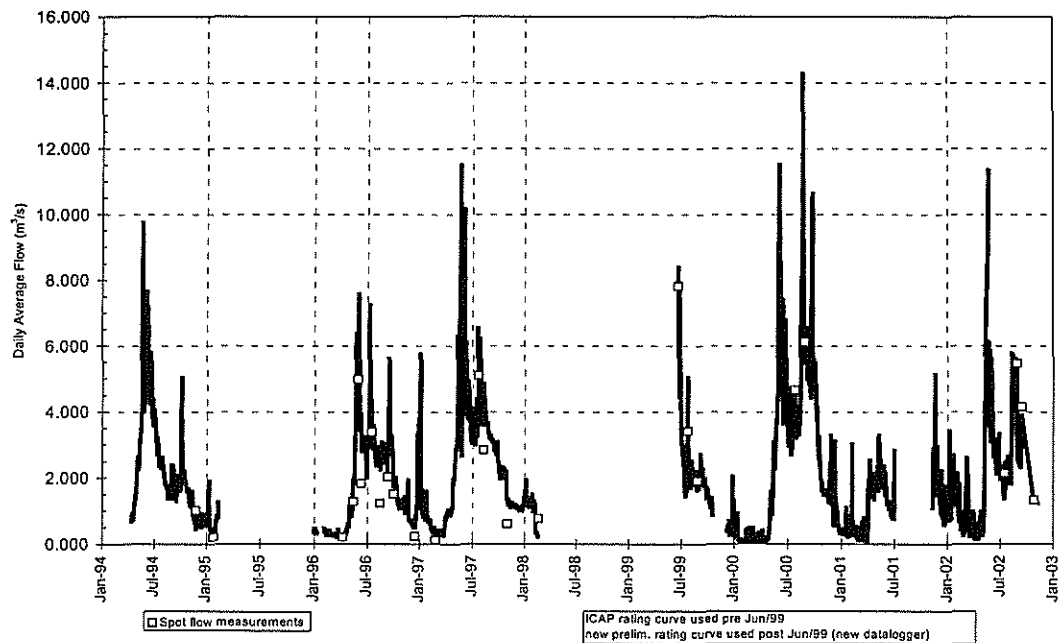
2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

Table 2: Detailed Faro Main Pit Water Balance, 2002

Period	Elevation Change (ft mine dat)	Net Volume Change	Net Uncontrolled Inflows	Tailings (Water&Solids) Inflow	ZoneII Water Inflow	Water Discharged OUT
Jan01- May27 (147)	3858.87 - 3861.66 (+0.23 in/day)	+465,160 m ³ (+3,164m ³ /day)	+465,160 m ³ (+3,164m ³ /day)	nil	nil	Nil
May27- Aug05 (70)	3861.66 - 3856.31 (-0.92 in/day)	-891,973 m ³ (-12,742m ³ /day)	+315,000 m ³ (+4,500m ³ /day) assumed	nil	74,650m ³	-1,281,623 m ³ (-18,308m ³ /day) (-3,359 Usgpm)
Aug05- Aug16 (11)	3856.31 - 3856.67 (+0.39 in/day)	+60,021 m ³ (+5,456m ³ /day)	+60,021 m ³ (+5,456m ³ /day)	nil	nil	Nil
Aug16- Sep25 (40)	3856.67 - 3853.95 (-0.82 in/day)	-453,489 m ³ (-11,337m ³ /day)	+180,000 m ³ (+4,500m ³ /day) assumed	nil	24,850m ³	-658,339 m ³ (-16,458m ³ /day) (-3,019 Usgpm)
Sep25- Dec31 (77)	3853.95 - 3858.87 (+0.27 in/day)	+290,100 m ³ (+3,767m ³ /day)	+290,100 m ³ (+3,767m ³ /day)	nil	nil	Nil
Total 2002	3858.87 - 3853.95 (-0.22 in/day)	-820,282 m ³ (-3,060m ³ /day)	1,020,181 m ³ (+3,807m ³ /day)	nil	99,500m ³ (+371m ³ /day)	-1,939,962m ³ (-7,238m ³ /day) (-1,328 Usgpm)

NOTES : 1. Mill did not operate in 2002.

Figure 6: Rose Creek at Location X14 Flow Record

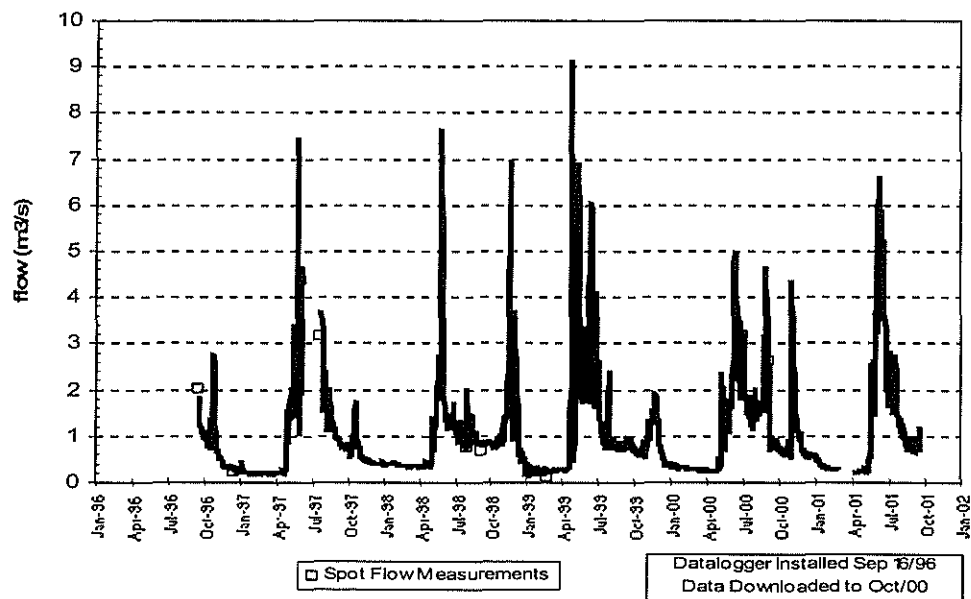


2.6 North Fork Of Rose Creek At R7

The water level at location R7 in the North Fork of Rose Creek upstream of the mine area has been monitored on a continuous basis (excepting brief periods of malfunction or damage) using a pressure transducer and datalogger. A datalogger and transducer were installed in September 1996 by Laberge Environmental Services of Whitehorse.

The R7 flow record is illustrated on Figure 7.

Figure 7: North Fork Rose Creek at Location R7 Flow Record



3. Water Quality Monitoring (Schedule 'A')

3.1 Overview Of Water Quality Monitoring Program

Schedule A of the Licence requires the collection of samples from various locations around the mine, mill and tailings areas. These sites are listed in Table 1 and illustrated on Figures 1 and 2. A modified monitoring program which is to be applied during periods of temporary cessation of operations is described in Schedule A of the Licence. The modified program was generally followed or exceeded in 2002. All samples collected were grab samples with analyses carried out by either Cavendish Analytical Laboratory Ltd. of Vancouver B.C. or ALS Environmental Laboratories of Vancouver B.C.

The Interim Receiver, in consultation with Gartner Lee Limited, have established a site-specific water quality monitoring program which provides for:

1. Routine collection of the data specified in the Licence for temporary cessation of operations.
2. Routine collection of data in excess of the Licence requirements that is beneficial for efficiently managing the environmental protection programs and monitoring of local environmental effects.
3. Flexibility to adapt to immediate information needs through the short-term incorporation of additional sampling locations.

As an example of data collected in excess of the requirements of the Licence, the monitoring program includes routine monthly sampling in Rose Creek downstream of the Rose Creek Tailings Facility (station X14) as a means of monitoring water quality downstream of the effluent mixing zone.

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.

The two surface effluent discharge points from the Faro mine site are locations X5 and X13, Cross Valley Pond outflow and seepage from the Cross Valley Dam, respectively. Surface drainage from the minesite, pre-treated water pumped from the Faro Main pit (location X22B) via the mill treatment system, seepage from the rock dumps (location X23), runoff from areas of exposed tailings in the Intermediate impoundment and other surface runoff water are released via one of these two locations. Location X4 is outflow from the Intermediate Dam and provides information on the quality of surface water in the Intermediate pond.

The receiving water, Rose Creek, was monitored at numerous locations in both the North Fork and the South Fork upstream and downstream of the minesite/tailings areas.

Spring and fall ground water monitoring surveys provided information regarding ground water quality in critical areas within and downstream of the minesite/tailings areas as reported in Sections 3 and 6 of this report. New groundwater monitoring wells were installed in 2001 as part of a comprehensive hydrogeological and geochemical investigation of the Rose Creek tailings impoundments and these investigations are documented and reported elsewhere.

2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

The 2002 water quality data is listed in Appendices 1 and 2. The data listing includes all parameters for which analyses were performed including data collected in excess of the Licence requirements. Surface water quality data is listed in Appendix 1. Ground water quality data is listed in Appendix 2. Annual surface seep surveys and "extra" ground water monitoring that collected additional information around the mine area are described in Section 6 of this report.

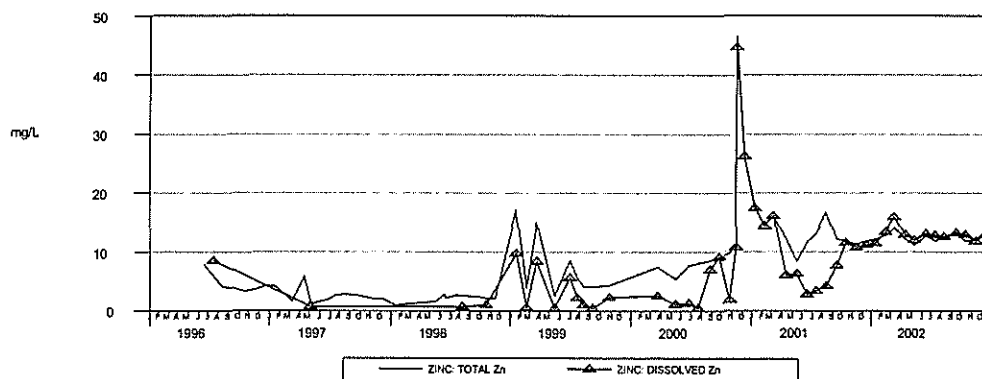
3.2 Faro Pits And Rock Dumps (X22B, X23, X26, BH1, BH2, BH4)

Water chemistry in the near surface zone of the Faro Main Pit is monitored at location X22B. Although sampling at location X22B is not required under the Licence schedule for temporary cessation of operations, 12 samples (monthly) were collected in 2002. Information at this location was considered important to the general understanding of environmental conditions at the mine site and also to management of the annual Faro pit pumping program.

Water quality at location X22B in 2002 was generally indicative of buffered acid rock drainage with elevated metals and sulphate at neutral pH. This was as expected given the presence of mineralized rock dumps and pit walls in the drainage area and the inflow (to February 1998) of lime treated tailings slurry. It was anticipated that the elimination of the substantial inflow of high pH water via the tailings slurry would result in a progressive deterioration of water quality and indication of such a trend has been observed from 1998 to 2002.

The concentrations of total and dissolved zinc at location X22B ranged from 11.2 to 14.1 mg/L and from 11.5 to 15.9 mg/L, respectively, in 2002 with average annual concentrations of 12.5 and 13.0 mg/L, respectively, as illustrated on Figure 8. The concentrations of zinc observed in 2002 appear to be more stable (i.e. less variability) than previous recent years.

Figure 8: Faro Main Pit (X22B) Total and Dissolved Zinc

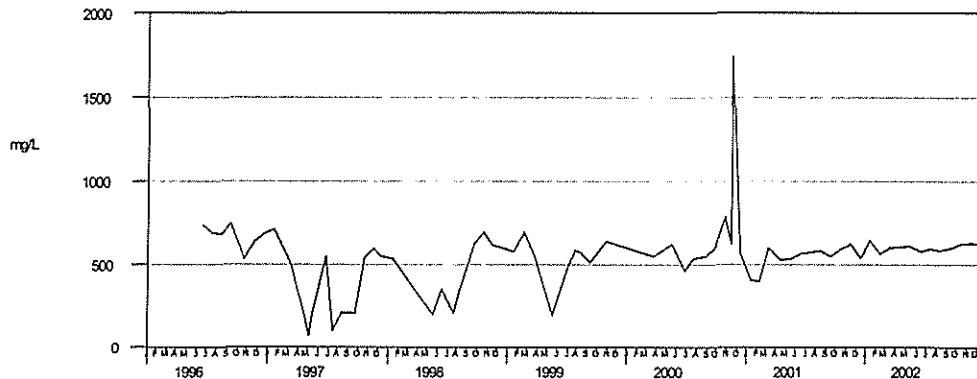


The concentration of sulphate at location X22B ranged from 562 mg/L to 640 mg/L in 2002 with an average for the year of 601 mg/L as illustrated on Figure 9. The 2002 range and average concentration were similar to observed from 1999 to 2001.



2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

Figure 9: Faro Main Pit (X22B) Sulphate



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. Although sampling at location X26 is not required under the Licence schedule for temporary cessation of operations, one sample was collected in 2002, in June. Information at this location can help to identify significant changes in water chemistry that may be related to acceleration in the acid rock drainage process.

Water chemistry at location X26 in 2002 showed elevated metals and sulphate at neutral pH as was observed in the Main Pit; however, water quality was poorer in the Zone II Pit. The concentrations of total and dissolved zinc were 56.1 mg/L and 54.9 mg/L, respectively, in 2002, which were similar to the ranges observed from 1999 to 2001. The available data for the Zone II pit suggests a somewhat consistent range for total and dissolved zinc since 1997 (Figure 10). A detailed analysis of variations in water quality must include the potential influences of changes in the in-pit water level due to pumping as the repeated flushing of rockfill would be expected to release contaminants into the water.

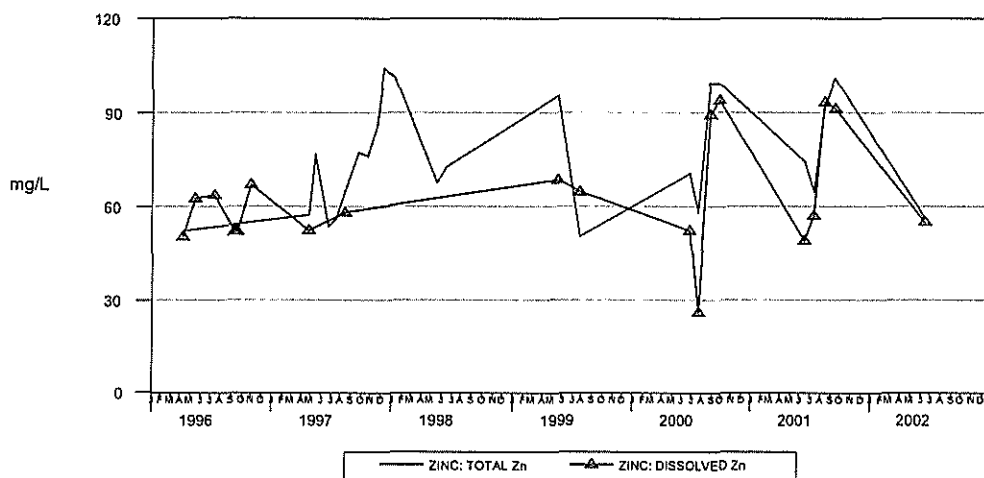
Surface seepage from the toe of the main rock dump area is sampled at location X23 located in the old Faro Creek channel where a large portion of the seepage from the Main and Intermediate rock dumps is assumed to collect. This water is passed into the Intermediate Impoundment and receives treatment prior to discharge. Water quality is typical of buffered acid rock drainage with elevated metals and sulphate at neutral pH. Location X23 is included in the Licence monitoring schedule for temporary cessation of operations and 12 samples were collected in 2002.

The concentrations of total and dissolved zinc ranged from 245 mg/L to 674 mg/L and from 243 mg/L to 680 mg/L, respectively, in 2002. However if the single peak 2002 concentrations of total and dissolved zinc are excluded, then the ranges were less variable from 245 mg/L to 363 mg/L and from 243 mg/L to 355 mg/L, respectively. The concentration of sulphate ranged from 2,989 mg/L to 3,875 mg/L, which was similar to the ranges observed from 1999 to 2001. The concentration of total ammonia was slightly elevated above background (0.06 to 1.0 mg/L in 2002) due, likely, to leaching of residual blasting agents from surrounding rock dumps.



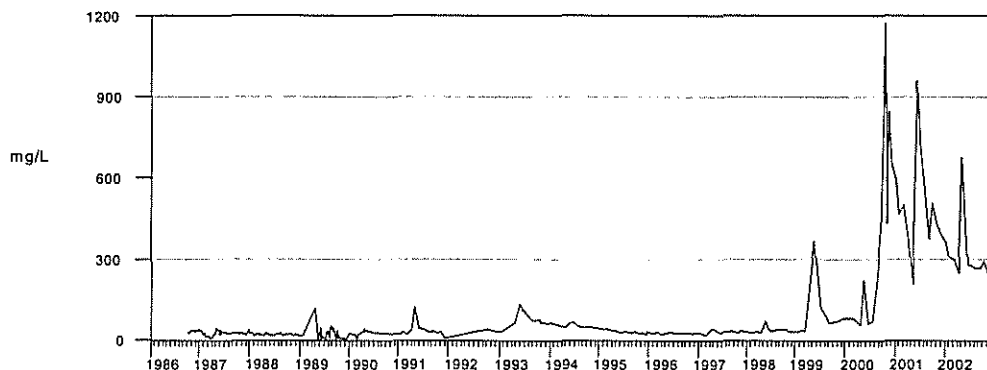
2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

Figure 10: Faro Zone II Pit (X26) Total and Dissolved Zinc



The longer term trend in the concentration of total zinc at X23 is illustrated on Figure 11. The concentration of zinc was generally stable in a range from about 30 to 40 mg/L for two periods from 1986 through 1988 and from 1995 through 1998. During the period from 1989 through 1993, the concentration of zinc was more erratic and high spikes were observed up to about 125 mg/L. Active dewatering of the Faro pit during mine operations may have been the cause of the erratic concentrations. The concentration of zinc increased dramatically through 1999 and 2000 and subsequently has decreased slightly and stabilized at around 300 mg/L in 2002 (i.e. approximately one order of magnitude greater than the typical concentrations observed prior to 1998).

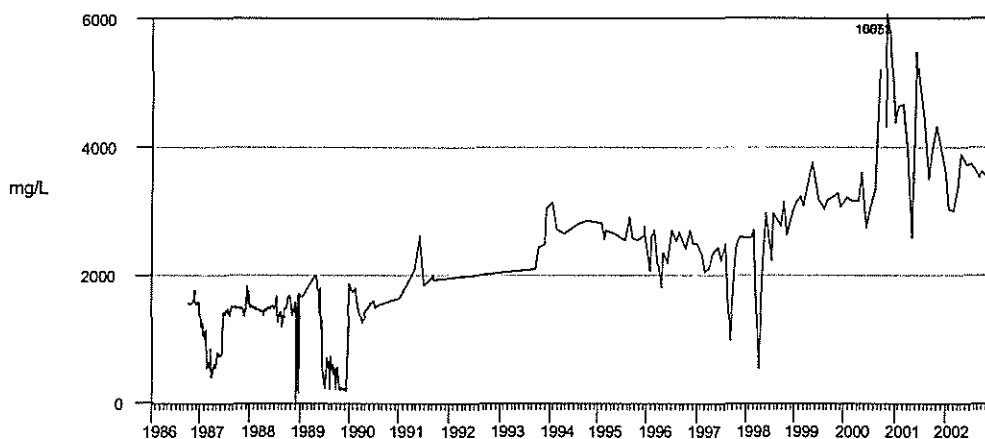
Figure 11: Faro Rock Dump Seepage (X23) Total Zinc



2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

A stepped increase in the concentration of sulphate at location X23 is observed from around 1,500 mg/L during the period from 1986 to 1991 to around 2,500 mg/L from 1993 to 1998 as illustrated on Figure 12. This difference may be attributed to mining and, specifically, dewatering activities in the Faro Main pit. For example, the low 'troughs' in sulphate concentrations during early 1987 and second half 1989 may be related to dewatering of the Faro Main Pit, which could have resulted in some "extra" water passing location X23. An increasing trend was apparent from 1998 through 2001 followed by a subsequent slight decrease and stabilization of concentrations in 2002 at around 3,500 mg/L as illustrated on Figure 12.

Figure 12: Faro Rock Dump Seepage (X23) Sulphate



Shallow ground water seepage between the Zone II Pit and the North Fork of Rose Creek was monitored on two occasions during 2002 (June and September) at piezometers BH1, BH2 and BH4. Piezometer BH2 was the only one of the three that was sampleable on both occasions due to freezing conditions or lack of sufficient water. These piezometers are not included in the Licence schedule for temporary cessation of operations. Piezometer BH3 was damaged at some time in the past and is no longer operable. Piezometer BH2 is closest to the Zone II Pit and BH4 is closest to the North Fork of Rose Creek.

In June 2002, only BH2 was sampled. In September 2002 all three wells were sampled. Water quality is typically poorest in BH2 as compared to BH1 and BH4 and, in September 2002, the concentrations of dissolved zinc in piezometers BH1, BH2 and BH4 were 2.26 mg/L, 11.3 mg/L and 3.47 mg/L, respectively, and the concentrations of sulphate were 286 mg/L, 123 mg/L and 132 mg/L, respectively.

The potential effects of this shallow ground water on the local surface water in the North Fork of Rose Creek is monitored at surface water sampling locations R8, R9 and R10, which are described in a following section of this report.



3.3 Intermediate Pond (X4)

Water quality exiting the Intermediate pond is monitored at location X4, which is outflow from the pond at the outflow spillway. Outflow may be via either surface overflow or syphon. Location X4 is included in the Licence schedule for temporary cessation of operations. A total of 12 samples (monthly) were collected in 2002 representing both periods of outflow (sampled per the Licence) and periods where no outflow was occurring but information was valuable to site management.

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 was the anticipated trend attributed to:

1. the removal of a large inflow of alkalinity that previously entered the pond via the tailings slurry;
2. the continued inflow of contaminated rock dump seepage water via location X23; and
3. the 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 2002. 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.

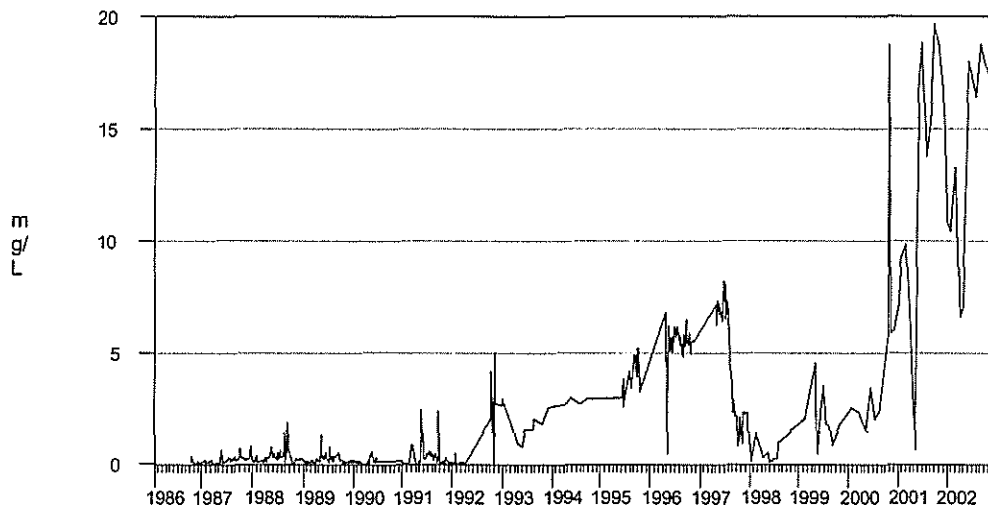
From 1998 to 2000, the Intermediate Pond received inflow of treated water pumped from the Faro Main pit on a seasonal basis and this periodic inflow of a relatively high volume of high pH water resulted in a general improvement in pond water quality. The method for treatment of water pumped from the 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 in 2001 and 2002 (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 water. Addition of mill effluent into the Intermediate Pond spillway assisted with the treatment of water syphoned from the Intermediate pond and reduced the requirement for application of lime directly into the spillway.

In 2002, water was released from the Intermediate Pond exclusively by syphon (i.e. no overflow).

2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

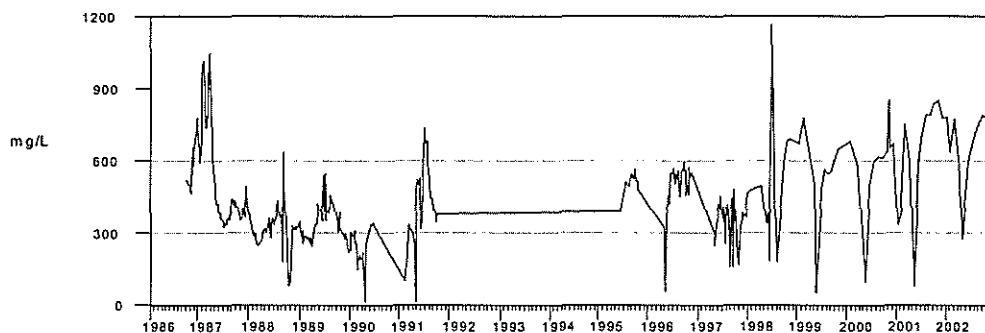
The concentrations of total and dissolved zinc at location X4 ranged from 6.6 mg/L to 19.6 mg/L and from 6.9 to 19.9 mg/L, respectively, during 2002. The long term trend in the concentration of total zinc at location X4 is illustrated on Figure 13.

Figure 13: Intermediate Pond (X4) Total Zinc



The concentration of sulphate at location X4 ranged from 274 to 790 mg/L during 2002. The long term trend in the concentration of sulphate at location X4 is illustrated on Figure 14.

Figure 14: Intermediate Pond (X4) Sulphate



3.4 Effluent Discharge (X5 And X13)

The two surface effluent discharge locations are surface outflow from the Cross Valley Pond (location X5) and seepage discharge at the toe of the Cross Valley Dam (location X13) and these are included in the Licence schedule for temporary cessation of operations during periods of discharge. Additional information regarding flows at these locations is described in Sections 2 and 5 of this report.

Effluent seepage discharge via location X13 was continuous through 2002 and 12 samples (monthly) were collected. The significance of flow rates measured in 2002 at location X13 as regards the geotechnical performance of the Cross Valley dam is described in the accompanying geotechnical inspection report prepared by BGC Engineering Inc.

A total of 12 samples (monthly) were collected from location X5 in 2002 including both periods of effluent discharge (April 24 through September 25) and periods where no discharge was taking place but where the information was valuable to site management. The analytical data listed in Appendix 1 for location X5 includes all of the 2002 data.

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 2002. The individual results are available at the mine site and were reviewed on a regular basis by DIAND Water Resources personnel.

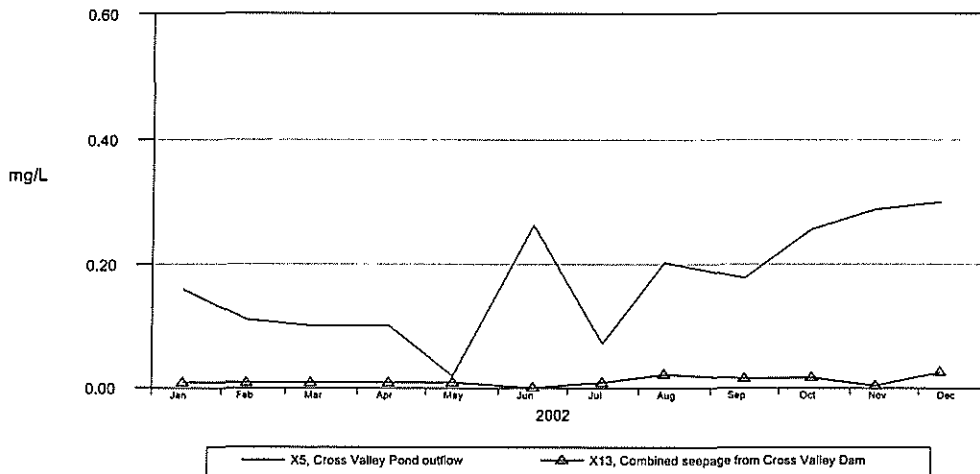
The analytical results received for samples at locations X5 and X13 show that these discharges were within the maximum allowable discharge limits in 2002 and the maximum concentrations of total zinc were 0.30 mg/L and 0.025 mg/L, respectively. Figure 15 shows zinc during 2002 for both location X5 and location X13. The zinc concentrations at location X5 throughout 2002 were improved from previous recent years due to the successful operation of the mill treatment system, which provides more efficient treatment of water pumped from the Faro Main pit as compared to the treatment methods that were employed prior to 2001.

Quarterly bioassay samples for locations X5 and X13 were analysed for acute toxicity using the 96-hour, LC₅₀ method with rainbow trout. All samples returned results of "no mortalities" (i.e. none of the allowable 50% mortality rate was observed) as listed in Appendix 3.

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 collect some seepage from the Cross Valley dam spillway during periods when there is 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 and the implications of the flow information as regards the geotechnical performance of the Cross Valley dam are described in the accompanying geotechnical inspection report prepared by BGC Engineering Inc.

2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

Figure 15: 2002 Effluent (X5, X13) Total Zinc



NOTE: There was no effluent discharge (X5) for the following samples: Jan, Feb, Mar, Oct, Nov, Dec

Locations X11 and X12 are included in the Licence monitoring schedule for temporary cessation of operations and were sampled 12 times in 2002. Location WEIR3 is not included in the Licence schedule but was sampled once in 2002 to provide additional information. All analytical results are listed in Appendix 1.

Water quality at locations X11, X12 and WEIR3 was generally consistent with that at location X13 (combined seepages). Concentrations of total zinc, sulphate and ammonia are typically greatest at location X11. Water quality at location X13 most closely resembles that at contributory location X11 due, presumably, to the greater proportion of flow that originates from location X11.

3.5 Rose And Anvil Creeks

3.5.1 North Fork of Rose Creek (R7, FAROCR, R8, R9, R10, X2)

The potential for impacts on surface water in the North Fork of Rose Creek from the Faro Creek diversion, seepage from the Zone II Pit, and certain rock dumps is monitored at locations R7 through R10 and location X2 in the North Fork of Rose Creek. Location R7 is located upstream of the confluence with the Faro Creek diversion and is representative of background conditions in the North Fork area. Location R8 is located downstream of the confluence of the North Fork with the Faro Creek diversion (location FAROCR) 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 downstream of the Zone II pit area and upstream of the rock drain in the Vangorda ore haul road. Location X2 is located at the crossing of the mine access road downstream of the rock drain and the rock dumps. Location FAROCR is located at the mouth of the Faro



2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

Creek diversion channel where the diversion channel enters the North Fork of Rose Creek between locations R7 and R8.

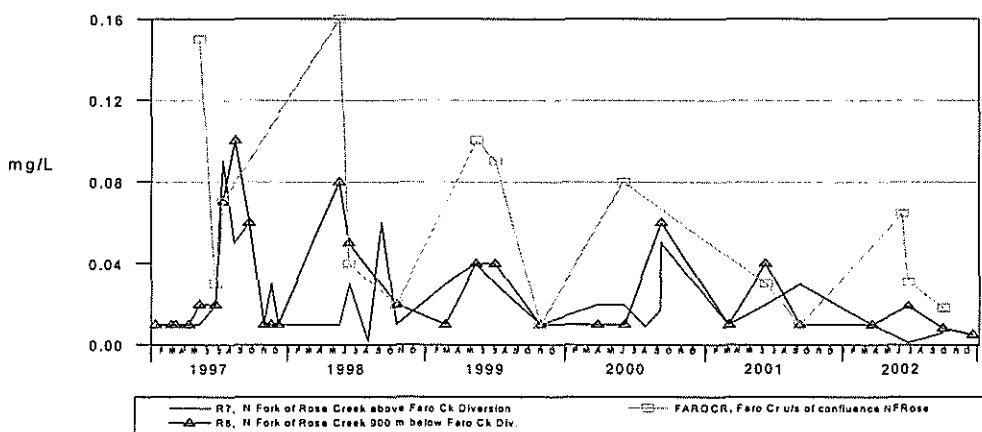
Location X2 is the only one of these locations that is included in the Licence monitoring schedule for temporary cessation of operations and 12 samples (monthly) were collected in 2002. Information from upstream locations R7 through R10 and FAROCR was considered important in identifying possible sources of surface water impacts and these locations were sampled on 4 occasions (quarterly) in 2002.

Water quality information for location R7 suggests that there may be a natural seasonal trend in the concentration of total zinc with higher concentrations (up to approximately 0.05 mg/L) observed in the late summer/fall season. However, this is not clear for all years. The reasons for such a natural trend are not known.

A comparison of water quality at locations R7 and R8 suggests that, in most years since 1997 including 2002, spring spikes in the concentration of total zinc in the Faro Creek diversion caused brief observable responses at location R8, as illustrated on Figure 16. The concentrations of total zinc at locations R7, R8 and FAROCR on June 25, 2002 were <0.001, 0.019, and 0.031 mg/L, respectively. This trend was generally not repeated for sulphate. The concentrations of sulphate at locations R7, R8 and FAROCR on June 25, 2002 were 7, 7 and 5 mg/L, respectively.

A comparison of water quality at locations R8, R9 & R10 suggests that a seasonal (spring) trend has occurred in some years since 1997 wherein a slightly greater concentration of total zinc was observed in spring at downstream locations R9 and R10 than at upstream location R8 (Figure 17). This is attributed to the influence of surface run-off from the local rock dumps. The concentrations of total zinc at locations R8, R9 and R10 on June 25, 2002 were 0.019, 0.006 and 0.012 mg/L, respectively. Sulphate concentrations since 1997 have consistently been slightly greater at downstream locations R9 and R10 than at upstream location R8 with the peak concentrations (up to about 22 mg/L) typically occurring in the winter season (Figure 18). The concentrations of sulphate at locations R8, R9 and R10 on June 25, 2002 were 7, 10 and 9 mg/L, respectively.

Figure 16: North Fork Rose Creek (R7, R8, FAROCR) Total Zinc



2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

Figure 17: North Fork Rose Creek (R8,R9,R10) Total Zinc

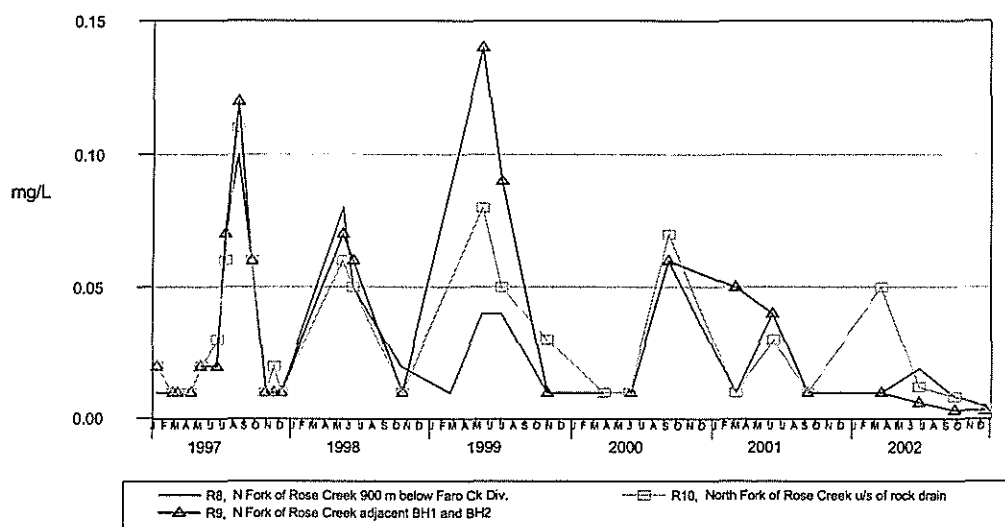
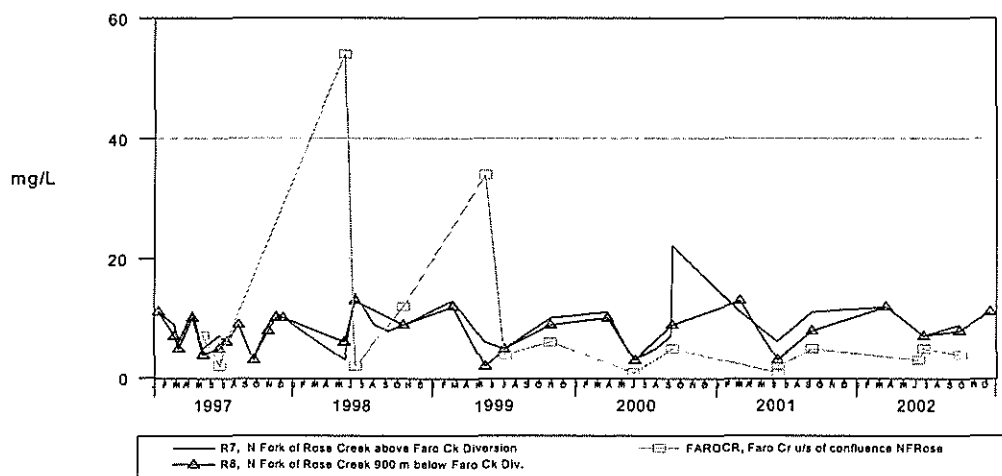


Figure 18: North Fork Rose Creek (R8,R9,R10) Sulphate



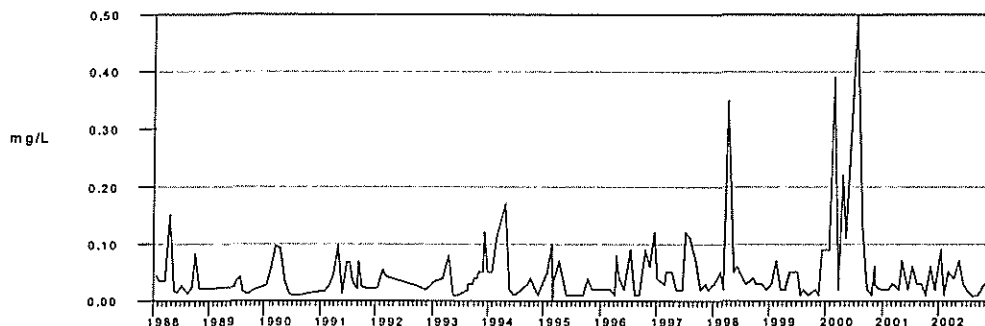
The North Fork of Rose Creek is monitored at location X2 prior to joining with the South Fork. The additional minesite influences at location X2 which may not be present at upstream location R10 are surface run off and seepage from the eastern portion of the main rock dump and the rock drain in the Vangorda ore haul road. The monitoring record for location X2 is more extensive than that for upstream locations R7 through R10.



2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

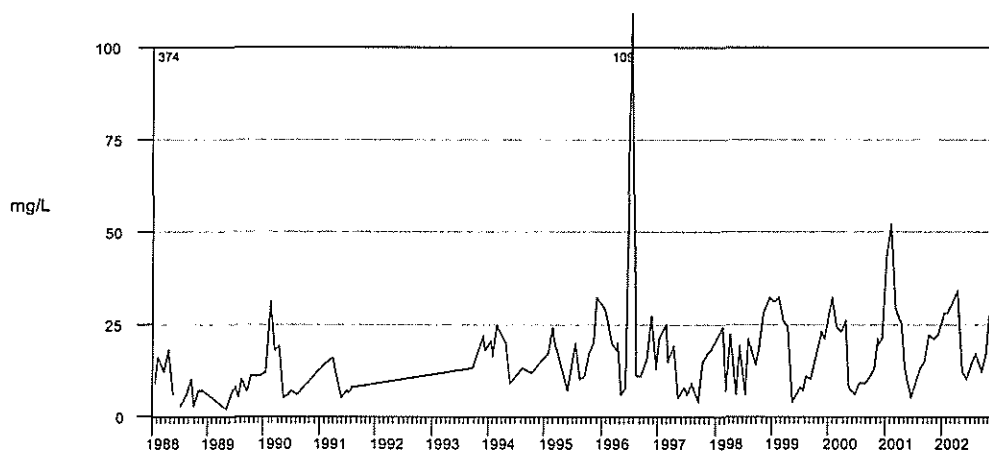
The concentration of total zinc at location X2 has been elevated above “background” with erratic spikes since 1988 as illustrated on Figure 19. The average and peak concentrations of total zinc in 2002 (0.035 mg/L and 0.09 mg/L) were similar to the period of record since 1988 and no temporal trends are apparent. The direct source(s) of total zinc to location X2 have not been clearly identified.

Figure 19: North Fork Rose Creek (X2) Total Zinc



The concentration of sulphate at location X2 ranged from 10 mg/L to 34 mg/L in 2002 and no clear temporal trends are apparent over the period of record from 1988. Sulphate concentrations since 1988, as illustrated on Figure 20, display a general seasonal trend wherein higher concentrations are typically observed in the winter season. This observation suggests the signature of ground water entering the creek, which is masked in the summer season by higher dilution flows.

Figure 20: North Fork Rose Creek (X2) Sulphate



2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

3.5.2 Rose Creek Diversion Channel (X3, X10)

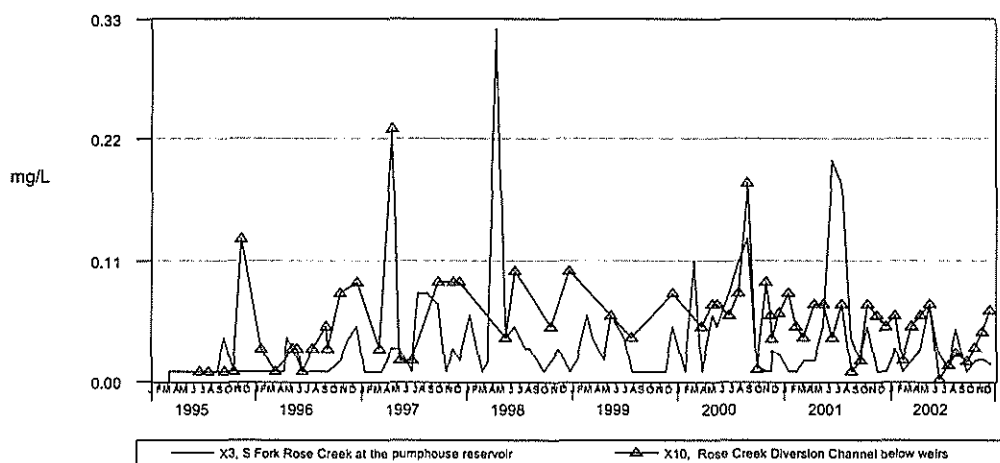
Rose Creek is monitored at the upstream and downstream extents of the constructed diversion channel that passes Rose Creek around the Rose Creek tailings facility at locations X3 and X10, respectively. Although neither location X3 nor location X10 are included in the Licence monitoring schedule for temporary cessation of operations, information at these locations was considered important in assessing environmental conditions at the mine site. Therefore, 12 samples (monthly) were collected at each location in 2002.

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 via the freshwater reservoir and a large portion 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 (primarily during high flow events) bypasses the pumphouse pond via a secondary channel that was constructed in previous years. This "bypass" flow enters the Rose Creek diversion channel immediately downstream of the pumphouse pond.

Water chemistry at location X3 in 2002 was generally similar to that observed in recent years. The concentrations of total zinc ranged from 0.01 mg/L to 0.07 mg/L in 2002. The concentration of sulphate at location X3 in 2002 ranged from 9 mg/L to 33 mg/L. The trends in zinc and sulphate concentrations at location X3 generally mirror that at upstream location X2 at slightly lower concentrations.

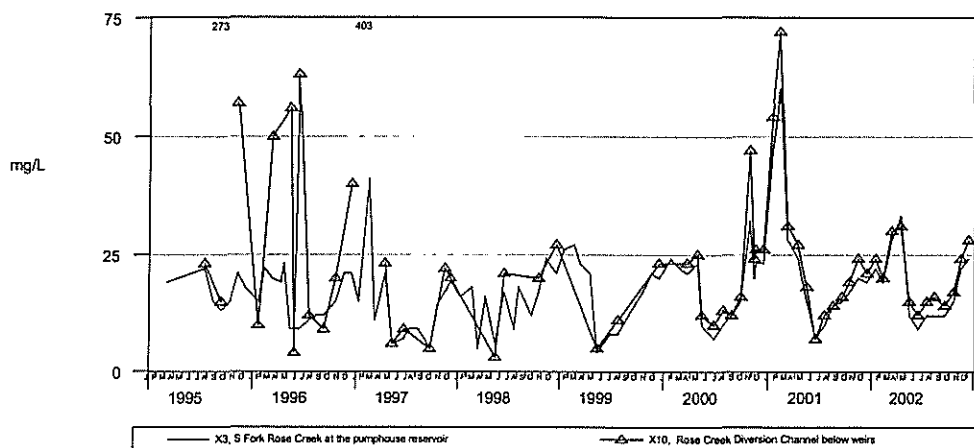
Location X10 is located near the downstream extent of the Rose Creek diversion channel adjacent to piezometer X16. The trends in zinc and sulphate concentrations at location X10 generally mirror that at upstream location X3 but generally at concentrations that are very slightly greater (Figures 21 and 22). The concentrations of total zinc and sulphate at location X10 ranged from 0.002 mg/L to 0.07 mg/L and from 12 mg/L to 31 mg/L, respectively, in 2002.

Figure 21: Rose Creek Diversion Channel (X3,X10) Total Zinc



2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

Figure 22: Rose Creek Diversion Channel (X3,X10) Sulphate



3.5.3 Rose Creek Immediately Downstream of Mine Discharges (X14)

Rose Creek immediately downstream of the confluence with effluent discharges (locations X5 and X13) and downstream of the diversion channel (location X10) is monitored at location X14. Water chemistry at location X14 has typically shown the influence of effluent discharge through concentrations of sulphate and total zinc that have been elevated in concert with periods of effluent discharge. The highest concentrations of these parameters have generally corresponded to periods of peak volume discharge from the Cross Valley Pond. Although location X14 is not included in the Licence monitoring schedule for temporary cessation of operations, information at this location was considered important for assessing the influence of effluent discharge on Rose Creek and, therefore, 12 samples (monthly) were collected in 2002.

The concentration of sulphate at location X14 ranged from 27 mg/L to 211 mg/L in 2002 with an average of 96 mg/L, which continued a decreasing trend that has been apparent since about 1995. The concentrations of total and dissolved zinc at location X14 ranged from 0.02 mg/L to 0.11 mg/L and from 0.02 mg/L to 0.10 mg/L, respectively, in 2002, which are similar to the ranges observed in recent previous years. The average concentration of total zinc was less in 2002 than 2001 (0.04 mg/L versus 0.07 mg/L), which is attributed to the improved (i.e. reduced zinc) in effluent discharge resulting from implementation of the mill water treatment system.

The long-term trends (from 1975) for concentrations of total zinc and sulphate at location X14 are illustrated on Figures 23 and 24, respectively. The information shows a seasonal cycling prior to 1998 with higher concentrations often observed during the winter seasons. The higher winter concentrations are attributed to lower dilution flows in Rose Creek during periods of effluent discharge. Subsequent to 1998, the seasonal (summer) discharge program related to pumping from the Faro Main pit was established and there was generally no effluent discharge (via location X5) during the winter season. The long term information illustrates several significant isolated events over the history of the mine operation including a tailings spill in the mid-1970's.



2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

Figure 23: Rose Creek Immediately Downstream of Mine Site (X14) Total Zinc

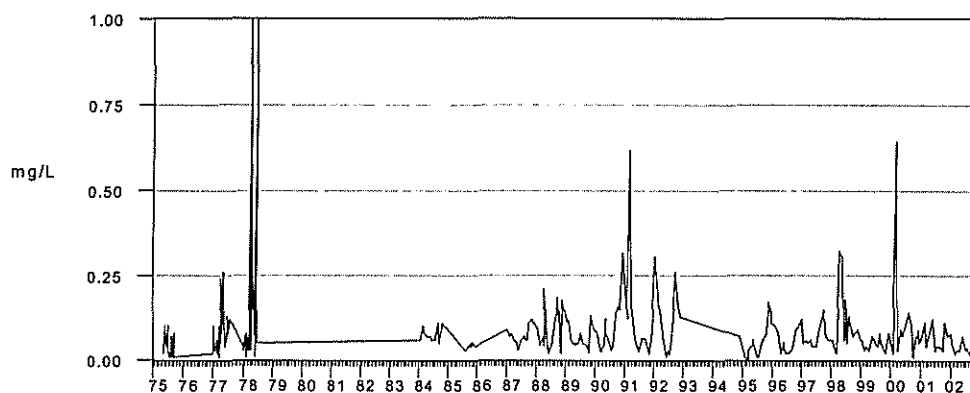
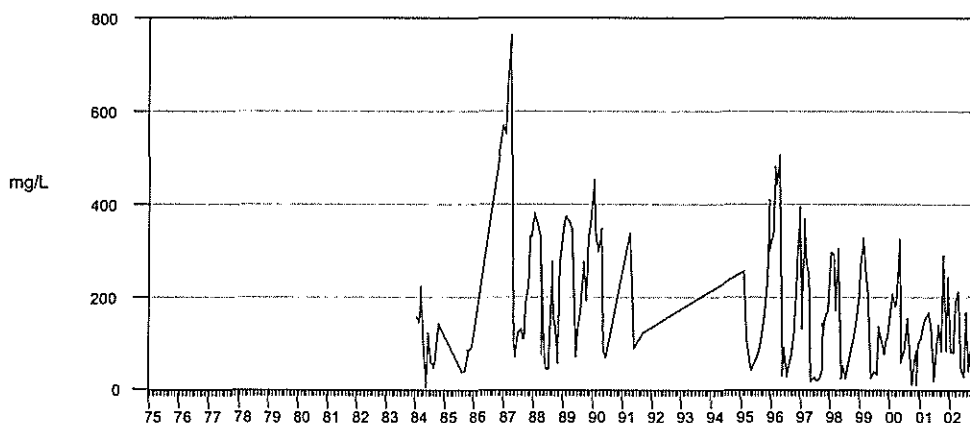


Figure 24: Rose Creek Immediately Downstream of Mine Site (X14) Sulphate



3.5.4 Rose Creek to Anvil Creek / Anvil Creek (R2, R3, R4, R5, R6)

Water sampling at locations R2 through R6 is included in the Licence monitoring schedule for temporary cessation of operations as part of the biological monitoring program that is conducted every second year. The biological program was conducted in 2002 and, therefore, water samples were collected. Two samples were collected at each of locations R2, R3, R5 and R6 (July and September) and one sample was collected at location R4. High flow conditions prevented safe access into the creeks at all locations.



2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

Location R2 approximately coincides with routine monitoring location X14 in Rose Creek below the effluent mixing zone. Location R2 is approximately 100 metres 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 representative of background conditions in the Anvil Creek area.

The concentrations of total zinc and sulphate since 1996 at these locations in Rose Creek 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.

The trends described above are illustrated by 2002 data as listed in Table 3.

Table 3: Total Zinc and Sulphate Concentrations in Rose Creek on July 23/24, 2002

Location	Total Zinc (mg/L)	Sulphate (mg/L)
R2 (near mine)	0.030	258
R3 (mid-Rose Ck)	0.021	217
R4 (mouth Rose Ck)	0.010	50
R6 (Anvil Ck u/s Rose Ck)	0.002	21
R5 (Anvil Ck d/s Rose Ck)	0.006	23

3.6 Rose Creek Valley Ground Water Quality

Ground water within the tailings and in the aquifer underlying and downstream of the Down Valley tailings impoundments was monitored on two occasions in 2002 (spring and fall) at piezometers X16, X17, X18, X21-96, X24-96, and X25-96, per the requirements of the Licence. The "-96" label indicates that these piezometers were installed in 1996 as replacements for previously destroyed installations. These ground water monitoring locations are illustrated on Figure 2. Piezometers X16, X17, X18, X19, X20, X21, X24 and X25 are included in the Licence schedule for temporary cessation of operations. However, piezometer X20 has not been located in the field and is assumed to be destroyed. Piezometer X19 is not sampled because the wells are not open to depth due, presumably, to collapse or blockage.

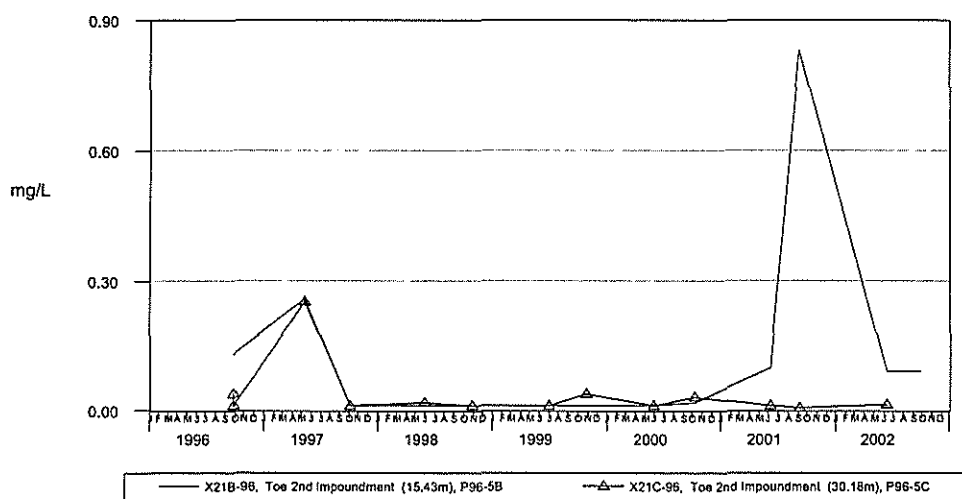
Longer term results and observations for these licenced groundwater monitoring wells is described below. Additional monitoring wells were installed in 2001 as part of a comprehensive hydrogeological and geochemical investigation of the tailings impoundments and these investigations are documented and reported elsewhere.

2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

Piezometers X21-96 (three installations) are located at the toe of the Second tailings impoundment and provide information within and immediately underlying the tailings mass. Piezometer X21A-96 is installed in the tailings mass. Piezometers X21B-96 and X21C-96 are installed in the underlying aquifer with X21C-96 at the greatest depth.

The concentrations of dissolved zinc and sulphate decreased with depth at location X21 in 2002. This is as expected given that tailings porewater is thought to be largely transported laterally in the upper zone of the aquifer underlying the tailings. The concentrations of dissolved zinc in June 2002 were 2.23 mg/L, 0.09 mg/L and 0.015 mg/L in X21A, X21B and X21C, respectively, and the concentrations of sulphate in June 2002 were 2,070 mg/L, 434 mg/L and 10 mg/L, respectively. Concentrations of dissolved zinc and sulphate for piezometers X21B-96 and X21C-96 are illustrated on Figures 25 and 26, respectively. The causes of the isolated spikes in the concentration of dissolved zinc in piezometers X21B-96 and X21C-96 in spring 1997 and the spike in the concentration of sulphate in X21C-96 in fall 1999 are unknown.

Figure 25: Ground Water (X21B-96, X21C-96) Dissolved Zinc



Piezometers X24-96 (four installations) and X25-96 (two installations) are located at the toe of the Intermediate dam and are installed at various depths up to 28 metres into the aquifer. X24 is located towards the north side of the valley and X25 is located near the centre. Ground water chemistry in these piezometers has generally been characterized by neutral pH, moderately elevated sulphate concentration and generally low dissolved zinc concentrations with occasional spikes.

The concentrations of dissolved zinc and sulphate for locations X24-96 and X25-96 are illustrated on Figures 27 through 30. The high spikes in dissolved zinc that occurred in both piezometer nests in spring 2000 were not accompanied by corresponding spikes in the concentration of sulphate. A slight increasing trend with depth continued, in 2002, in both piezometer nests. Ground water quality in the X24



2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

piezometers continued to be slightly poorer, in 2002, than that in the X25 piezometers. The causes of the isolated spikes and lows in the concentrations of dissolved zinc and sulphate are unknown.

Figure 26: Ground Water (X21B-96, X21C-96) Sulphate

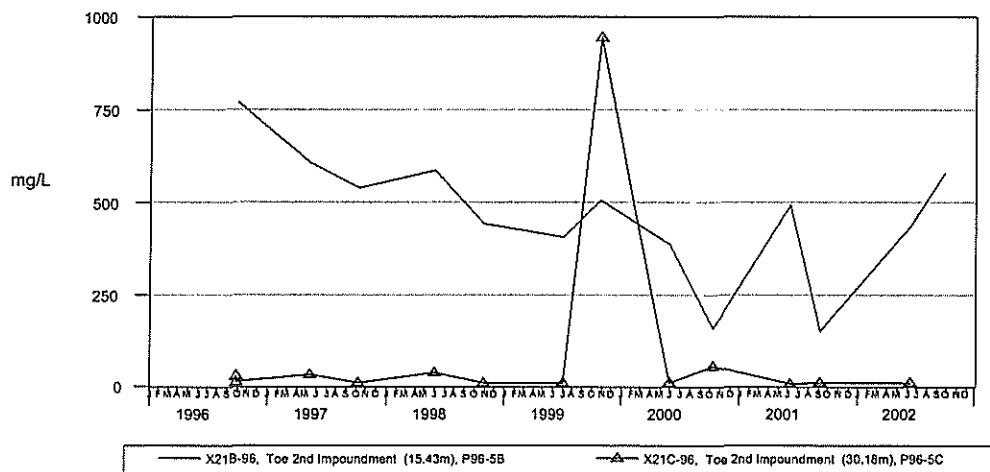
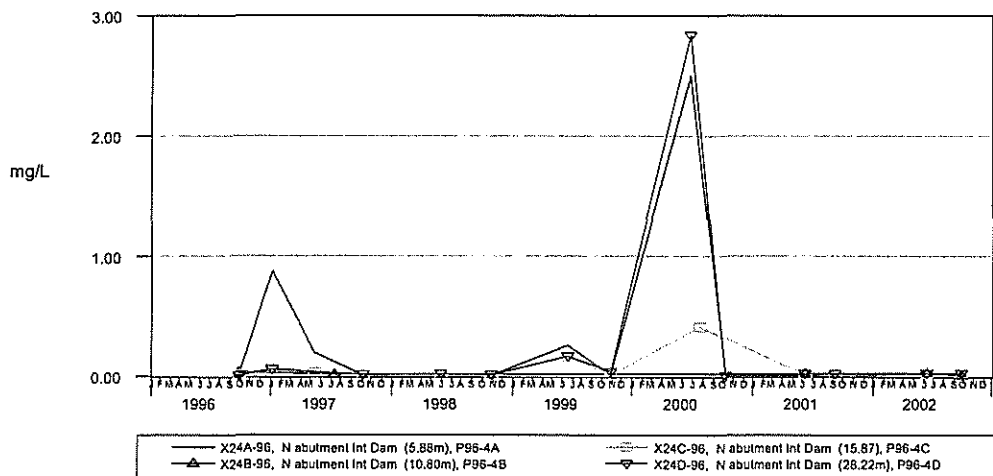


Figure 27: Ground Water (X24A/B/C/D-96) Dissolved Zinc



2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

Figure 28: Ground Water (X24A/B/C/D-96) Sulphate

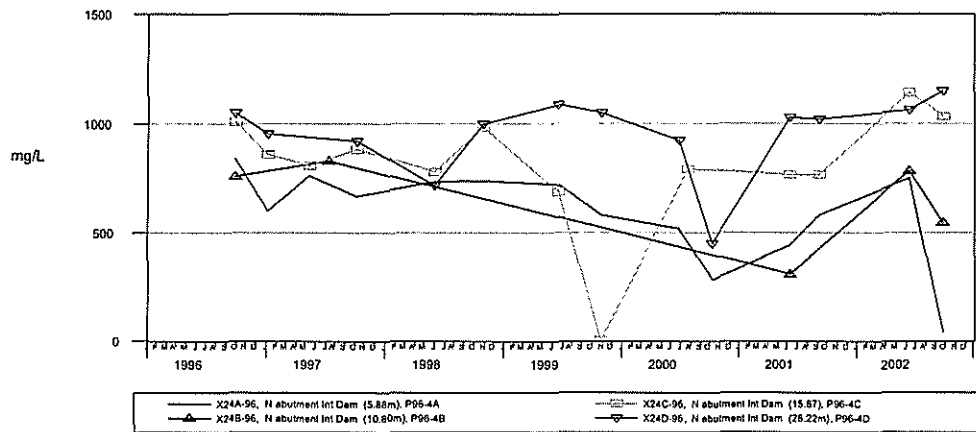
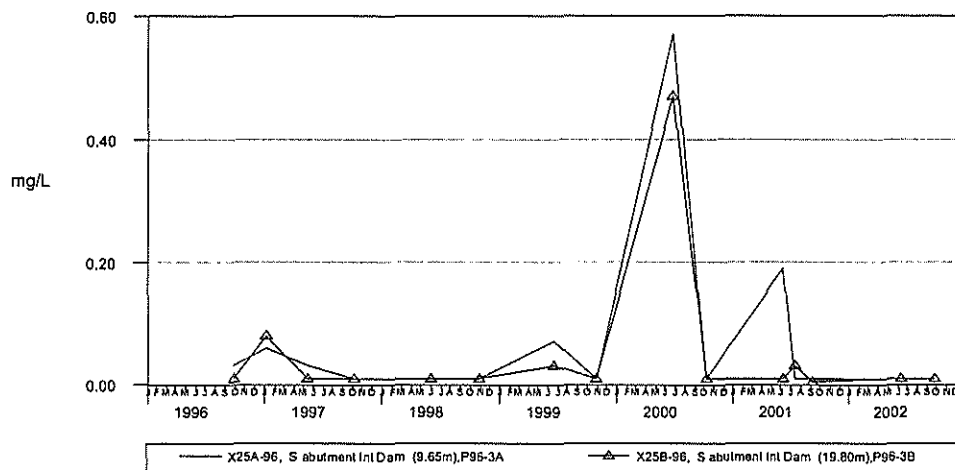
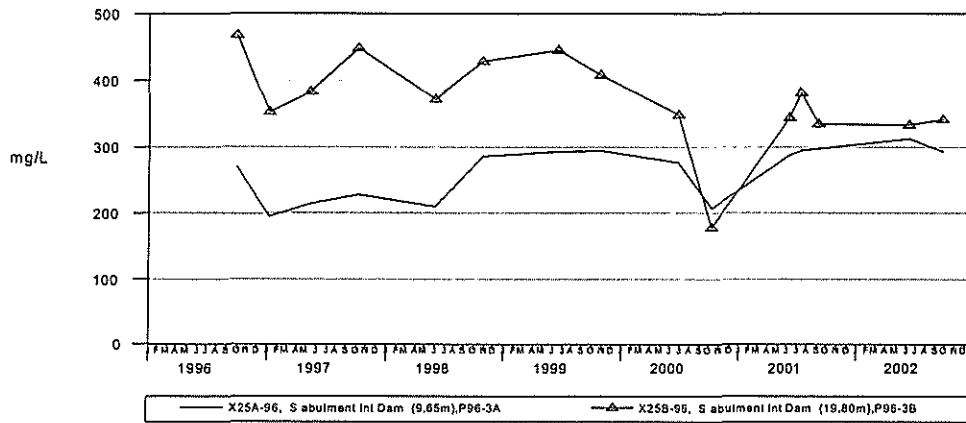


Figure 29: Ground Water (X25A-96, X25B-96) Dissolved Zinc



2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

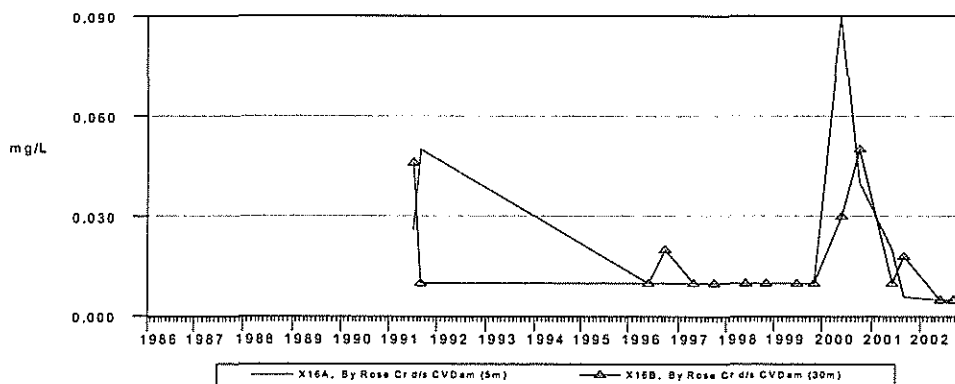
Figure 30: Ground Water (X25A-96, X25B-96) Sulphate



Piezometers X16 and X17 (two installations each) are located downstream of the Cross Valley Dam. Ground water chemistry data from regular monitoring is available since 1987 and one data set is available from 1981. Piezometers X16 and X17 are approximately in the valley centre with X17 closer to the Cross Valley dam and X16 further. Location X16 is considered to be most representative of downstream conditions due to greater depth and location.

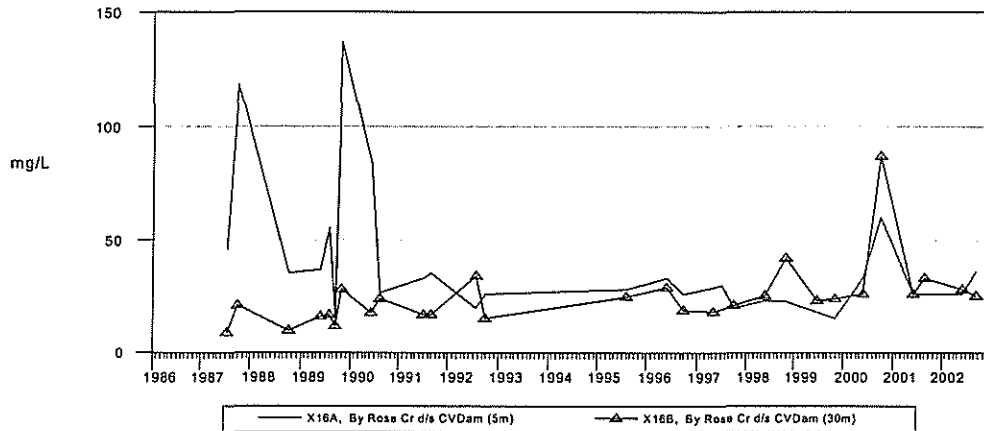
The trends in ground water quality are generally similar in the X16 and X17 piezometers and are characterized by low sulphate concentrations (thought to be near "background") and low zinc concentrations near detection limits. There is a trend of increasing sulphate concentration with time at location X16 that is not apparent at upgradient location X17. Concentrations of dissolved zinc and sulphate at location X16 are illustrated on Figures 31 and 32.

Figure 31: Ground Water (X16A, X16B) Dissolved Zinc



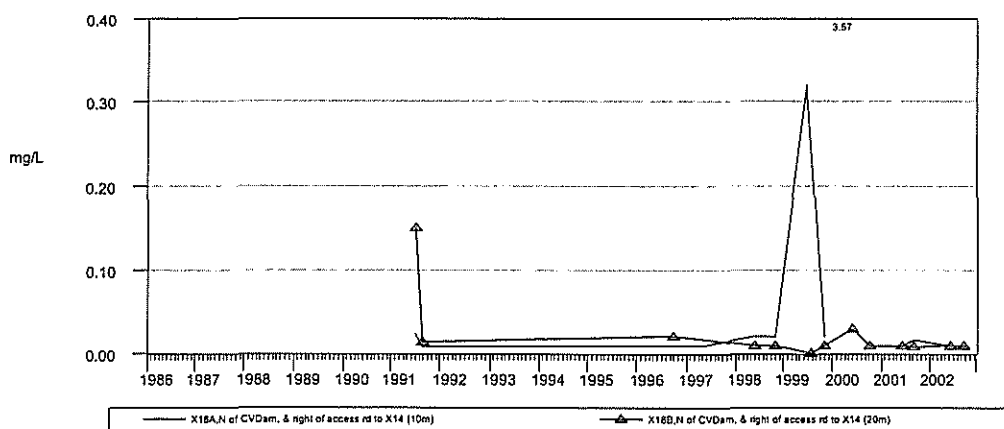
2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

Figure 32: Ground Water (X16A, X16B) Sulphate



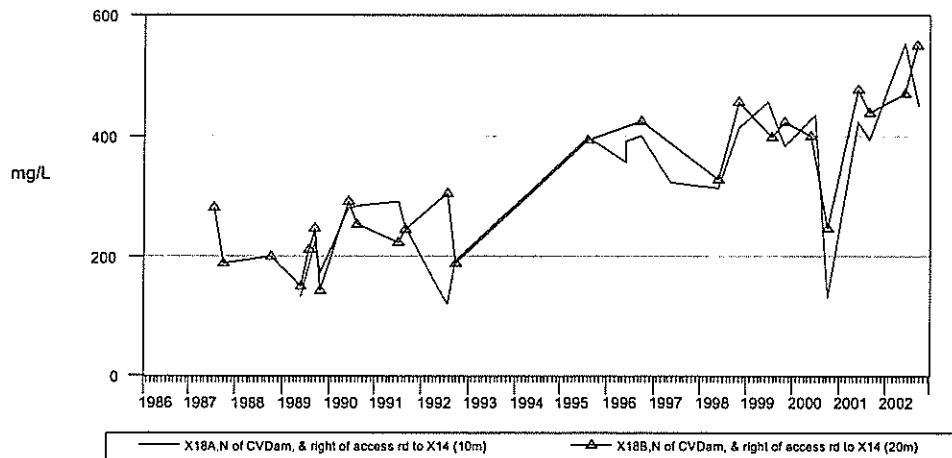
Piezometer X18 is located on the extreme north side of the Rose Creek Valley bottom downstream of the Cross Valley Dam. The off-centre location of this piezometer adds some uncertainty regarding the interpretation of the ground water information. In general, the concentrations of sulphate observed in the X18 piezometers has been greater and has followed different trends over the period of record than that observed in the other downstream piezometers (X16 and X17). For example, sulphate concentrations have increased with time at location X18. The source of the higher sulphate has not been clearly identified. Concentrations of dissolved zinc and sulphate at location X18 are illustrated on Figures 33 and 34.

Figure 33: Ground Water (X18A, X18B) Dissolved Zinc



2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

Figure 34: Ground Water (X18A, X18B) Sulphate



4. Biological Monitoring (Schedule 'B')

The biological monitoring program described under Schedule 'B' of the Licence is required to be performed every second year and was performed in 2002 as a follow-up to the 2000 program. The program was performed by Laberge Environmental Services (LES) of Whitehorse, who have performed this task exclusively in the past. The full report as prepared by LES is included as Appendix 4. The information is summarized below.

The sampling locations used in the macroinvertebrate program coincide with surface water monitoring locations R1 through R7 as described in Section 3 of this report. Location R2, immediately downstream of the tailings impoundments is representative of the most "impacted" location with respect to the aquatic environment.

The creek flows that were experienced during the second field trip (retrieval of colonization baskets) were high and caused the loss of some material during retrieval of the colonization baskets at some locations.

The abundance and diversity of species at all of the monitoring locations was excellent in 2002 as compared to 14 years of monitoring data at these same locations. LES concluded that:

- "The composition of the benthic macroinvertebrate populations at all of the sites appeared healthy and diverse with good representation of pollution sensitive insects.
- Based on data collected in 2002, and comparisons with historic data, it appears that effluent from the tailings system currently has minimal, if any, impact on the receiving environment."

5. Geotechnical Monitoring (Schedule 'C')

The geotechnical monitoring program described under Schedule 'C' of the Licence was performed in 2002 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 Anvil Range Mining Corp. personnel. The raw data and an interpretation of the data are included in the BGC report.

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 (with the exception of the Fresh Water Supply Dam described below), some maintenance work was recommended.

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

- perform routine maintenance on the Rose Creek Diversion Canal dyke crest, backslope and weirs.
- upgrade culverts near the downstream end of the North Wall Interceptor Ditch.
- routine grading maintenance on the crests of Intermediate and Cross Valley Dams.
- replace rip rap along the upstream edge of the crest of the Cross valley Dam.
- fill erosion gullies on the downstream face of Intermediate Dam.
- fill cracks on the FWSD crest with soil/bentonite to prevent further deterioration over the short term.
- provide erosion protection at FWSD spillway culverts.
- perform routine (monthly) inspections.
- improve Emergency Response Plan as regards physical stability.

A third party professional review of all water retention dams on the mine property, including the Fresh Water Supply Dam, the Intermediate Dam and the Cross Valley Dam, was conducted by Klohn-Crippen following protocols described by the Canadian Dam Association. No issues of critical concern were identified although a number of recommendations were provided including the development of an updated emergency response plan, which was under development at the time of writing of this report.

6. Closure Monitoring (Schedule 'D')

6.1 2002 Surface Seep Survey

A surface water sampling campaign was performed in 2002 as continuation of the seep surveys which were performed in previous years. The sampling locations are illustrated on Figure 2 and included Faro Creek Diversion, North Fork of Rose Creek, old Faro Creek channel above the Main pit, Upper Guardhouse Creek and seepage towards the North Fork of Rose Creek. The analytical results are included in Appendix 5.

The following general observations were made from the 2002 surface water chemistry data:

1. Water quality continued to show significant deterioration upon passage through the Faro Valley rock dump (locations FCO to A30) exhibiting increases in the concentrations of sulphate and zinc in June 2002; however, water quality below the rock dump (location A30) continued, in 2002, to show a slight improving trend (i.e. reduced concentrations of sulphate and zinc) since 1997.
2. The concentration of sulphate did not display an increase along the length of the Faro Creek diversion in June 2002, as had been observed in some previous years, although the concentration of zinc (total and dissolved) did display an increase; the concentration of total zinc in June 2002 was 0.01 mg/L at location FDU (above the Faro Valley rock dump), 0.02 mg/L at location FCD (adjacent to the NE rock dumps) and 0.06 mg/L at location FAROCR (above the confluence with the North Fork of Rose Creek).
3. Water quality in Guardhouse Creek upstream of the Intermediate Impoundment contained elevated concentrations of sulphate (642 mg/L), total zinc (4.31 mg/L) and dissolved zinc (4.50 mg/L) in June 2002.
4. Seepage from the toe of the Intermediate Dam near the south toe was sampled at two locations in June 2002; water quality contained slightly elevated concentrations of sulphate (133/151 mg/L); concentrations of total zinc were 0.06/0.02 mg/L and concentrations of dissolved zinc were <0.001/0.01 mg/L; these values are consistent with 2001.
5. Water quality at two small intermittent surface flows below the north east rock dumps (locations NE1, and NE2) sampled in June 2002 did not show elevated concentrations of dissolved zinc at <0.001 mg/L and 0.003 mg/L; the concentrations of sulphate were 129 mg/L and 655 mg/L, which were within the ranges observed since 1996.
6. Water chemistry upstream and downstream of the Vangorda haul road rock drain (locations NF1 and NF2) showed that the rock drain was not impacting on surface water chemistry in June 2002; the concentrations of total suspended solids were very low at less than 7 mg/L at both locations; the concentrations of total zinc decreased slightly from 0.07 mg/L on the upstream side (NF1) to 0.04 mg/L on the downstream side (NF2); the concentrations of dissolved zinc were both 0.01 mg/L.
7. Water quality at location SP5-6 (intermittent surface flow from the north east rock dumps which reports to the main pit) in June 2002 was similar to that observed since 1996; the concentrations of total zinc, dissolved zinc and sulphate were 1.96 mg/L, 1.99 mg/L and 313 mg/L, respectively.

6.2 2002 Ground Water Seep Monitoring

Selected piezometers around the Faro mine site were monitored during 2002 as a continuation of the ground water surveys performed in previous years. The analytical results are included in Appendix 2 and

2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

the piezometer locations are illustrated on Figure 2. The ground water chemistry in some of these piezometers which are referenced in Part B or Schedule A of the Licence is described in Section 3 of this report. Specifically, the 'X' series piezometers in the Down Valley and the 1990 'BH' series piezometers (BH1, BH2 and BH4) are described in Section 3 of this report.

Ground water seepage at the toe of the northeast rock dump above the North Fork of Rose Creek was monitored on two occasions in 2002 (June and September) at piezometers BH12, BH13 and BH14 (two installations each with one installation at BH13 blocked/inaccessible). The concentrations of sulphate at BH12 and BH13 remained generally similar to each other and generally similar to the concentrations observed since 1996 ranging from 340 mg/L to 1,170 mg/L in 2002. The concentration of sulphate at location BH14 continued, in 2002, to be greater than at locations BH12 and BH13 and continued, at location BH14, to follow a general increasing trend that has been apparent since approximately 1997. The concentration of sulphate at location BH14 ranged from 1,700 to 1,980 mg/L in 2002. The concentrations of dissolved zinc at locations BH13 and BH14 in 2002 remained within the range observed since 1994 at equal to or less than 0.05 mg/L, with the exception of two isolated spikes. The concentration of zinc at BH12 continued, in 2002, to be generally greater than at locations BH13 and BH14 and ranged from 0.09 mg/L to 0.19 mg/L. Ground water pH remained neutral in 2002 in a range from 7.2 to 8.1. The potential impact of this ground water flow on surface water was monitored at surface locations R8 and R9 as described in Section 3 of this report.

Ground water seepage from the main and intermediate rock dumps towards the North Fork of Rose Creek was monitored on two occasions in 2002 at piezometer P96-6 (one installation) located immediately above the Vangorda haul road. The concentrations of sulphate were 303 mg/L and 183 mg/L in June and September, respectively, which were within the range observed since 1996. The concentrations of dissolved zinc were 0.68 mg/L and 0.30 mg/L in June and September, respectively, which were within the range of zinc concentrations that have been observed since 1996. Ground water pH continued to be neutral in 2002 at 6.7 and 6.8. The potential impact of this ground water flow on surface water was monitored at surface locations R10 and X2 as described in Section 3 of this report.

Ground water seepage from the main and intermediate rock dumps towards the North Fork of Rose Creek was monitored immediately below the Vangorda haul road at piezometers S1 (two installations), S2 (two installations) and S3 (one installation) on two occasions (June and September) in 2002. The concentrations of sulphate ranged from 1,150 mg/L to 4,420 mg/L in 2002, which continues a general increasing trend that has been taking place since approximately 1997. The concentrations of dissolved zinc ranged from 0.03 mg/L to 39.7 mg/L in 2002, which were greater than in 2001. Dissolved zinc concentrations increased sharply in 2001 and 2002 and further information from 2003 sampling will be required to identify the temporal continuity of this apparent trend. Ground water pH at these locations remained generally neutral in 2002 with a range from 5.7 to 7.1. The potential impact of this ground water flow on surface water was monitored at surface locations R10 and X2 as described in Section 3 of this report.

Ground water seepage from the central portion of the main and intermediate rock dumps was monitored close to the toe of the dumps at piezometer P96-7 (one installation) on two occasions in 2002. The concentrations of sulphate at this location were 1,260 mg/L and 1,960 mg/L in June and September, respectively, and the concentrations of dissolved zinc were both <0.03 mg/L. Sulphate has shown a general increasing trend since approximately 1997. Ground water pH remained neutral in 2002 at 7.5 and 7.6.

2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

Ground water that is assumed to include seepage from the majority of the main and intermediate rock dumps and, possibly, other rock dumps, was monitored on three occasions (June, early September and late September) in 2002 at piezometer P96-8 (two installations) located near the old Faro Creek channel and near surface monitoring location X23. Ground water at this location is of poorer quality than at other locations due to the concentration of seepage flow in the old Faro Creek channel. The concentrations of sulphate ranged from 1,420 mg/L to 4,300 mg/L in 2002 and the concentrations of dissolved zinc ranged from <0.03 mg/L to 218 mg/L. Sulphate continued, in 2002, to show a general increasing trend that has been occurring since approximately 1997. Dissolved zinc concentrations increased sharply in 2001 and 2002 and further information from 2003 sampling will be required to identify the temporal continuity of this apparent trend. Ground water pH remained neutral in 2002 in a range from 6.9 to 7.2.

7. Site Maintenance

The following site maintenance activities were undertaken in 2002:

7.1 Cross Valley Pond

As a result of lime treatment in the Intermediate Dam outflow spillway from 1995 to 2001, a substantial beach of treatment sediments had accumulated at the base of the spillway such that the quality of effluent in the Cross Valley pond was negatively affected by the presence of the sediment. A large portion of the sediment beach was created from 1998 to 2001 as a result of the treatment of water pumped from the Faro Main pit. In order to achieve the desired zinc reduction with the treatment facility that was in place from 1998 to 2001, lime was required to be added in amounts substantially greater than in a typical water treatment plant and, therefore, the sediment that was deposited at the base of the inflow spillway contained more lime and was generated in greater volumes than a typical treatment plant sediment or sludge. An environmental characterization of the sediment was carried out in 2002 by CANMET as part of a larger research project and a report was issued that presents the findings.

An estimated 13,100 m³ of the treatment sediments were excavated from the base of the Intermediate Dam outflow spillway (i.e. in the Cross Valley Pond) to the Faro Main pit in December 2001 and January 2002. The sediments were placed on the ice near the south end of the Faro Main pit such that they were deposited under water at spring break up. Subsequent to excavation of the sediments (in February), an estimated 1,275 m³ of angular rip rap and an estimated 300 m³ of +6" round material was placed in the excavated area such that a rock berm was created that directs inflows into the Cross Valley Pond towards the centre of the pond and reduces the opportunity for short circuiting towards the outflow location. Additionally, a layer of "Quicklime" was spread and pond water was pumped into the excavated area in order to immobilize residual sediments.

7.2 Fresh Water Supply Reservoir

In response to geotechnical concerns regarding the physical stability of the Fresh Water Supply (FWS) dam and, specifically, the low level outlet pipe, a great deal of preventative and maintenance work was conducted in 2002. The water level in the reservoir was maintained below the spillway overflow elevation as much as possible (except during freshet) by the use of the low level outlet pipe, syphons and pumps. This preventative measure was implemented to reduce water pressures acting on the low level outlet pipe.

A geotechnical drill investigation was conducted from December 2001 to February 2002 to gather information necessary for the evaluation and design of a lowering of the FWS dam spillway such that the maximum water level in the reservoir would be lowered. This investigation was carried out by BGC Engineering Inc. and Midnight Sun Drilling Company Ltd. of Whitehorse.

A seepage monitoring system was installed neat the south abutment of the FWS dam as a means of more precisely measuring seepage flows in this area. A geotextile-lined diversion ditch above the south abutment area was constructed which complements the installation of the seepage monitoring system by diverting surface runoff into the reservoir from the toe area.

2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

Riprap rock was produced according to engineering design specifications (provided by Golder Associates) for a proposed lowering of the overflow spillway. A total of 10,000 m³ of rip rap was produced and stockpiled near the FWS dam by Tim Moon Construction of Ross River.

A physical inspection of the low level pipe using an ultrasound was conducted by Klohn-Krippen in December 2002 to gather additional information regarding the physical condition of the pipe. Additionally, the physical condition of the valves and pipe supports at the downstream outlet of the pipe were inspected.

A directive was issued by the Department of Fisheries and Oceans in November 2002 that requires the breaching of the Fresh Water Supply Dam prior to March (freshet) 2004. The required engineering design work was initiated immediately and a work plan was developed to achieve the project schedule.

7.3 Rose Creek Diversion Canal

The canal backslope was repaired at two locations identified by the professional engineer (BGC Engineering Inc.). The backslope was accessed via ice road across the canal. The backslope was regraded as prescribed by the engineer and geotextile and riprap were subsequently placed. The work was completed in January and February by Tim Moon Construction of Ross River.

7.4 Faro Creek Diversion Channel

Ice was cleared from the channel in January, March and April in order to prevent water from breaching the containment berm. This work was completed by Vainio Construction of Faro.

Maintenance to certain sections of the diversion channel were initiated in 2002. The work plan included removal of old and nonfunctional materials, excavation of sloughed soil from the channel, construction of a pilot channel to reduce the risk of winter ice damming, placement of a bentomat liner to reduce leakage from the channel into the Faro Main pit and placement of riprap for erosion protection. The required materials (3,000 m³ of cobble, riprap and bentomat) were produced and stockpiled near the work areas but the in-channel work was not completed due to inclement weather conditions. Completion of the work is scheduled for 2003.

7.5 Off Site Contaminated Soil

Contaminated soil that was excavated from the concentrate trucking yard in Whitehorse (i.e. the "Lomak" terminal) was trucked to the Faro mine site and deposited in the Faro rock dumps. The material was hauled to the mine site to March 2002.

7.6 Mill Water Treatment System

In response to the start up experience gained in 2001, several important modifications were implemented in the mill water treatment system that subsequently allowed the system to operate successfully throughout the treatment season. One of the modifications was an enlargement of the launder and feed box to the primary settling tank (previous zinc thickener). Additionally, sludge was removed (pumped) from the two settling tanks (previous zinc and lead thickeners) to the Intermediate Pond.

2002 FARO ANNUAL ENVIRONMENTAL REPORT
WATER LICENCE QZ95-003

The land anchor for the Faro pit pumping barge was upgraded in 2002. The anchor was lowered to the elevation that was included in the initial (1997) design of the structure. The anchor was also upgraded to with a swivel that allows the barge to be floated to shore for efficient removal of pumps or other maintenance tasks. As part of this work, the pumps were checked and the barge floating chambers were opened and inspected. With the exception of condensation, no buildup of water was found.

7.7 Mine Access Road

Rapidly warming weather in late April and early May caused flooding of the access road and maintenance work was conducted to open culverts and repair minor damage to the driving surface.

7.8 Progressive Reclamation

The Faro Core Shacks (located on the rock dumps) were dismantled and burned in June and the yard area graded. Core boxes were palletized, stacked and protected with plastic. The work was conducted by Tim Moon Construction of Ross River. The core was inventoried by a geologist employed by DIAND.

The "Old Shovel Yard" was cleaned of debris and burnable materials were burned under the issuance of a burning permit. This work was conducted in response to a request from DIAND Land Use Department.

The steel walled used oil/hydrocarbon storage containment area that was located near the mill building was dismantled and disposed of.

Appendices



Appendix 1

2002 Surface Water Quality Listing



2002 Faro Annual Environmental Report, Water Licence QZ95-003
Appendix 1, 2002 Surface Water Quality Listing

Gartner Lee	Station	X2												X3														
	Description	N Fork of Rose Creek u/s of mine access road												S Fork Rose Creek at the pumphouse reservoir														
		Sample Date	15/01/02	12/2/2002	12/3/2002	15/04/02	13/05/02	16/06/02	16/07/02	12/8/2002	16/09/02	15/10/02	12/11/2002	10/12/2002	15/01/02	12/2/2002	12/3/2002	15/04/02	13/05/02	16/06/02	16/07/02	12/8/2002	16/09/02	15/10/02	11/11/2002	12/11/2002	10/12/2002	
Parameter	Units																											
Physical																												
HARD	mg/L																											
TEMP-C	deg C				-0.2							0.5	0				-0.2							0.4		0		
PH-F	pH unit				7.5							8.1	8.1				7.5						7.9			8		
SO ₄ -T	mg/L	28	28	30	34	12	10	14	17	12	17	27	29	22	19	28	33	12	9	12	12	12	15		22	24		
TSS	mg/L	1	2	7	2	3	8	<1	<1	3	3	7	3	1	2	<1	1	4	1	<1	2	3	1		4	1		
NH ₃ -N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05															
CN-T	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01															
FLOW RATE	Us																											
Total Metals																												
AG-T	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.2	<0.2	<0.2	<0.2	0.8	<0.2	1	<0.001	<0.001	<0.001	<0.001	<0.001	0.3	0.6	<0.2	<0.2	1.2		<0.2	<0.2		
AL-T	mg/L	0.06	<0.05	0.08	0.06	0.34	0.174	0.177	0.075	0.075	0.103	0.051	0.065	0.06	<0.05	0.05	0.06	0.31	0.146	0.109	0.139	0.057	0.088		0.06	0.04		
AS-T	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.011	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	0.007		
B-T	mg/L	0.09	0.06	0.06	<0.05	0.06	0.13	0.08	0.09	0.13	0.16	0.16	0.13	<0.05	<0.05	0.06	<0.05	0.06	0.1	0.07	0.1	0.13	0.12		0.22	0.14		
BA-T	mg/L	0.235	0.195	0.326	0.156	0.157	0.203	0.173	0.109	0.16	0.136	0.14	0.158	0.22	0.15	0.261	0.153	0.146	0.189	0.171	0.099	0.147	0.145		0.131	0.146		
BE-T	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.2	0.2	0.2	<0.2	<0.2	<0.2	0.3	<0.001	<0.001	<0.001	<0.001	<0.001	<0.2	0.2	0.3	<0.2	<0.2		<0.2	0.2		
BI-T	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	0.02	<0.01	0.02		0.02	<0.01		
CA-T	mg/L	44	51.4	57.8	56.7	20.9	18.5	29.3	31.2	27	31.3	42	43.9	37.6	37.3	52.9	48.7	23.8	18.7	22.8	24.4	26	29.5		36.6	40.6		
CD-T	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.2	0.2	<0.2	0.3	0.2	0.3	0.5	<0.001	<0.001	<0.001	<0.001	<0.002	<0.2	0.6	<0.2	0.3	0.4		<0.2	0.3		
CO-T	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	0.001	0.001	<0.001	0.002	0.002	0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	0.001	0.001	<0.001	<0.001		0.002	<0.001		
CR-T	mg/L	<0.005	0.007	0.006	<0.005	<0.005	0.006	0.004	<0.001	<0.001	0.005	0.002	<0.001	<0.005	<0.005	<0.005	<0.005	0.006	0.01	0.004	0.004	<0.001	0.004		0.001	<0.001		
CU-T	mg/L	0.005	<0.002	0.004	0.009	0.005	0.011	0.02	0.012	0.028	0.048	0.015	0.024	<0.002	0.002	0.004	0.004	0.006	0.04	0.016	0.016	0.016	0.022		0.013	0.023		
FE-T	mg/L	0.35	0.16	0.2	0.15	0.8	0.276	0.139	0.146	0.221	0.146	0.221	0.134	0.258	0.15	0.06	0.08	0.06	0.84	0.21	0.143	0.199	0.124	0.202	0.133	0.13		
K-T	mg/L	1	1	2	2	2	0.7	0.8	0.8	0.7	0.9	1.1	1.3	1	1	2	2	0.8	0.6	1	0.8	0.9			1	1.2		
LA-T	mg/L	0.01	0.009	<0.005	<0.005	<0.005	0.005	0.006	0.004	0.004	0.003	0.003	0.005	0.009	0.009	<0.005	0.01	<0.005	0.002	0.008	0.003	0.003	0.003		0.003	0.006		
MG-T	mg/L	10	10.8	11.3	12.2	4.4	4.3	6.3	6.5	5.6	6.6	8.6	10.6	7.7	6.9	10.4	10.7	4.9	3.7	4.5	4.5	5.1	5.9		6.9	9.2		
MM-T	mg/L	0.07	0.08	0.1	0.11	0.05	0.025	0.034	0.037	0.026	0.043	0.069	0.095	0.04	0.04	0.07	0.07	0.04	0.017	0.025	0.03	0.023	0.031		0.052	0.058		
MO-T	mg/L	0.005	<0.002	0.004	<0.002	<0.002	<0.001	0.004	<0.001	0.002	0.002	0.003	<0.001	0.003	<0.002	0.003	<0.002	0.004	0.006	0.007	0.001	0.001	0.001		<0.001	<0.001		
NA-T	mg/L	4	6	6	6	4	2	1.5	4	2	3.1	3.8	3.4	3	4	6	5	4	1.6	1.1	4.2	1.6	3		3.7	2.6		
NI-T	mg/L	<0.005	<0.005	<0.005	<0.005	0.005	0.006	0.003	0.005	0.001	0.002	<0.001	0.002	<0.005	<0.005	<0.005	<0.005	<0.005	0.004	0.005	0.007	<0.001	0.003		0.004	<0.001		
P-T	mg/L	<0.01	0.03	<0.01	0.02	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	<0.01	0.03	0.04	0.04	0.26	<0.01	<0.01		0.02	<0.01		
PB-T	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.012	0.014	0.003	0.016	<0.002	0.006	<0.01	<0.01	<0.01	<0.01	0.012	<0.002	0.011	<0.002	<0.002			<0.002	0.004		
S-T	mg/L	9	9	10	11	4	3.2	4.9	5.3	4	5.2	6.9	9.2	7	6	9	10	4	2.9	4	4.2	4	4.8		7.1	8.1		
SB-T	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	0.019	0.023	<0.002	0.005	0.031	0.002	0.023	<0.03	<0.03	<0.03	<0.03	0.013	0.025	0.002	<0.002	0.012			0.002	0.013		
SE-T	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005			
SI-T	mg/L	5.6	6	6.4	6.2	3.7	3.7	4.9	4.3	4.8	5.2	5.9	6.7	5	4.8	5.9	5.8	3.9	3.5	3.9	3.4	4.3	4.5		5	5.9		
SN-T	mg/L	0.02	0.1	0.02	0.02	<0.01	0.007	0.008	0.004	<0.002	0.005	0.005	<0.002	0.03	0.04	<0.01	0.03	0.004	<0.002	<0.002	<0.002	0.003		<0.002	<0.002			
SR-T	mg/L	0.2	0.219	0.24	0.246	0.098	0.078	0.114	0.126	0.103	0.132	0.177	0.189	0.183	0.174	0.23	0.226	0.109	0.083	0.1	0.113	0.111	0.127		0.161	0.183		
TI-T	mg/L	0.005	<0.005	<0.005	<0.005	0.011	0.004	0.002	<0.001	<0.001	0.002	0.001	0.002	<0.005	<0.005	<0.005	<0.005	0.01	0.002	0.002	0.003	<0.001	0.001		0.001	<0.001		
V-T	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001		
W-T	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03		<0.03	<0.03			
ZN-T	mg/L	0.09	0.01																									

2002 Faro Annual Environmental Report, Water Licence QZ95-003
Appendix 1, 2002 Surface Water Quality Listing

Gartner Lee	Station	X4												X5												X5											
	Description	Intermediate Dam decant												Cross Valley Pond outflow												Cross Valley Pond outflow											
		Sample Date	15/01/02	12/2/2002	12/3/2002	15/04/02	13/05/02	16/06/02	16/07/02	12/8/2002	16/09/02	15/10/02	12/11/2002	10/12/2002	15/01/02	12/2/2002	12/3/2002	15/04/02	13/05/02	16/06/02	16/07/02	12/8/2002	16/09/02	29/09/02	15/10/02	12/11/2002	10/12/2002	15/12/02									
Parameter	Units																																				
Physical																																					
HARD	mg/L																																				
TEMP-C	deg C				-0.2							0.6	0.2				-0.2						6.3		0.4	0.2	0.6										
PH-F	pH unit				7.3							7.8	7.5				8.1					8.2		8	7.9	7.8											
SO ₄ -T	mg/L	777	635	771	593	274	587	651	719	764	790	774	789	600	475	528	597	93	577	605	607	632		645	656	635											
TSS	mg/L	7	8	12	8	6	5	2	6	5	8	10	5	<1	3	5	4	2	4	4	5	7		5	6	4											
NH ₃ -N	mg/L	<0.05	0.61	0.68	0.39	0.11	0.34	0.32	0.37	0.36	0.24	0.28	0.3	0.06	1	0.97	1	0.18	0.83	0.79	0.84	0.87		0.71	0.78	0.84											
CN-T	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01											
FLOW RATE	L/s																																				
Total Metals																																					
AG-T	mg/L	<0.001	<0.001	<0.001	0.001	<0.001	0.9	<0.2	0.3	0.4	0.8	<0.2	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.2	1.3	<0.2	0.5		0.4	0.3	0.5											
AL-T	mg/L	0.09	<0.05	<0.05	0.06	<0.05	0.088	0.092	0.08	0.054	0.091	0.023	0.03	<0.05	<0.05	<0.05	<0.05	<0.05	0.116	0.098	0.077	0.075		0.086	0.039	0.032											
AS-T	mg/L	0.016	0.029	0.018	<0.005	0.006	<0.003	0.008	0.024	0.004	0.005	<0.003	0.058	<0.005	0.01	0.007	<0.005	<0.005	<0.003	0.007	0.006	0.005		0.005	0.003	0.028											
B-T	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	0.09	0.06	0.11	0.14	0.14	0.21	0.13	<0.05	<0.05	<0.05	0.07	0.05	0.08	0.06	0.11	0.12		0.15	0.2	0.14											
BA-T	mg/L	0.168	0.098	0.175	0.083	0.099	0.149	0.127	0.08	0.11	0.114	0.072	0.087	0.154	0.124	0.208	0.095	0.097	0.151	0.131	0.078	0.113		0.111	0.079	0.096											
BE-T	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.7	0.7	0.3	<0.2	<0.2	<0.2	0.4	<0.001	<0.001	<0.001	<0.001	<0.001	0.8	0.5	0.5	<0.2		<0.2	<0.2	0.4											
BI-T	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	0.02	0.02	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	0.01	<0.01		0.02	<0.01	<0.01											
CA-T	mg/L	195.9	197.8	207.4	182.8	95.7	139.5	158.1	169.1	188.2	184.8	188.9	180.8	166.6	183.6	192.6	191.4	40.2	175.9	181	170.5	192.3		187.6	205.1	186.2											
CD-T	mg/L	0.002	0.003	0.003	<0.001	0.01	9.3	12.3	8.7	9.6	8.8	7.4	8.6	<0.001	<0.001	<0.001	<0.001	<0.001	<0.2	0.8	<0.2	<0.2		0.3	0.2	0.4											
CO-T	mg/L	0.039	0.036	0.041	0.031	0.017	0.043	0.044	0.045	0.051	0.053	0.05	0.051	0.006	0.006	0.006	0.006	<0.005	0.002	0.005	0.007	0.005		0.007	0.007	0.008											
CR-T	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	0.012	0.008	0.001	<0.001	0.003	0.001	<0.001	<0.005	<0.005	<0.005	<0.005	0.005	0.02	0.012	<0.001	<0.001		0.004	<0.001	<0.001											
CU-T	mg/L	<0.002	<0.002	0.002	0.005	0.025	0.021	0.019	0.035	0.015	0.015	0.021	0.023	0.003	0.004	0.004	0.003	0.003	0.02	0.016	0.011	0.018		0.012	0.015	0.023											
FE-T	mg/L	20.97	16.91	9.03	19.62	2.33	0.36	0.052	0.11	0.702	1.246	2.672	2.268	0.08	0.11	0.05	<0.01	0.01	0.049	0.08	0.109	0.126		0.174	0.215	0.24											
K-T	mg/L	7	7	8	7	2	4	4.4	5	6.3	6	6	6.1	9	7	9	9	1	7.5	8.2	9	10.2		9.4	9.9	9.7											
LA-T	mg/L	0.018	0.007	<0.005	0.007	0.013	<0.001	0.016	0.002	<0.001	0.002	<0.001	0.024	0.008	<0.005	0.008	0.005	<0.001	<0.001	0.002	<0.001	<0.001		0.003	0.001	<0.001											
MG-T	mg/L	50.4	47.8	55.5	37.2	11.8	40.1	46.2	49.5	58.2	59.3	56.1	60.3	44.1	39.6	41.4	45	3.7	38.2	42.8	48.5	47.1		46.5	48.3	49.7											
MN-T	mg/L	12.5	11.81	11.53	11.72	3.65	8.143	8.394	8.696	10.257	10.547	11.585	11.672	4.06	4.76	4.39	3.47	0.42	1.698	1.323	2.694	2.344		3.592	4.45	4.461											
MO-T	mg/L	0.008	0.006	0.008	<0.002	0.007	<0.001	0.008	0.007	0.005	0.009	0.006	0.007	0.004	0.004	0.006	0.002	0.004	0.007	0.016	0.005	0.005		0.005	0.006	0.004											
NA-T	mg/L	22	21	23	17	7	12.7	13.3	18.2	16.9	18.4	19	17.2	31	32	30	29	4	23.1	21.2	27	24.9		27.5	29.9	27.7											
NI-T	mg/L	0.037	0.038	0.039	0.028	0.016	0.04	0.047	0.048	0.048	0.052	0.05	0.054	0.011	0.011	0.007	0.008	0.006	0.005	0.008	0.014	0.005		0.01	0.016	0.01											
P-T	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.07	0.01	<0.01	0.04	0.01	0.02	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	0.07	<0.01	<0.01		<0.01	0.1	<0.01											
PB-T	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.013	<0.002	0.018	0.008	0.014	0.008	0.007	<0.01	<0.01	<0.01	<0.01	<0.01	<0.002	<0.002	0.016	<0.002		0.002	<0.002	0.027											
S-T	mg/L	240	204	231	192	88	182.8	207.1	218.7	245.6	246.3	249.8	256.4	191	147	165	189	28	182.3	188.8	191.2	206.6		199.6	212.8	205.1											
SB-T	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	0.061	0.027	0.006	<0.002	0.004	<0.002	<0.002	<0.03	<0.03	0.04	<0.03	<0.03	0.015	0.005	0.003	<0.002		<0.002	0.008	<0.002											
SE-T	mg/L	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005	<0.005											
SI-T	mg/L	6.3	6	5.6	6.6	2.3	3.5	3.6	3.4	3.8	4.2	4.4	4.8	5.9	6.7	6.1	5	1.4	4.1	3.9	4	4.1		4.7	5.4	5.9											
SN-T	mg/L	0.05	0.07	0.04	0.03	<0.01	0.011	<0.002	0.006	<0.002	0.007	<0.002	0.003	0.04	0.05	0.01	0.02	<0.01	0.008	<0.002	<0.002	<0.002		0.009	<0.002	<0.002											
SR-T	mg/L	0.701	0.645	0.722	0.574	0.265	0.481	0.53	0.585	0.633	0.665	0.676	0.653	0.558	0.521	0.549	0.518	0.104	0.471	0.505	0.531	0.563		0.572	0.604	0.571											
TI-T	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	0.001	0.001	<0.001	<0.001	0.004	0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001		0.001	0.001	<0.001											
V-T	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	0.001	<0.001	<0.001																												

2002 Faro Annual Environmental Report, Water Licence
Appendix 1, 2002 Surface Water Quality Listing

[illegible]

2002 Faro Annual Environmental Report, Water Licence QZ95-003
Appendix 1, 2002 Surface Water Quality Listing

Gartner Lee	Station		X12																				WEIR3						
	Description	Sample Date	Seepage from south toe of Cross Valley Dam																				seepage from central area of X-Valley Dam						
			15/01/02	12/2/2002	12/3/2002	15/04/02	13/05/02	16/06/02	16/07/02	12/8/2002	5/9/2002	12/9/2002	16/09/02	27/09/02	3/10/2002	12/10/2002	15/10/02	21/10/02	29/10/02	5/11/2002	12/11/2002	19/11/02	26/11/02	10/12/2002	11/6/2002	5/11/2002	19/11/02	26/11/02	10/12/2002
Parameter	Units																												
Physical																													
HARD	mg/L				0.6					5.4	5.1	4.8	4.3	4	3.5		3.2	3.2	2.9	2.6	2.6	2.4	1.8		3.3	2.6	2.8	2.5	
TEMP-C	deg C				8					7.4	7.7	7.6	7.4	7.4	7.6		7.6	7.5	7.7	8	7.5	7.5	7.7		7.7	7.3	7.3	7.5	
PH-F	pH unit																												
SO ₄ -T	mg/L	381	334	356	377	237	312	297	306			304				320				309			313	458					
TSS	mg/L	29	3	5	7	10	2	3	6			5				6				8			8	11					
NH ₃ -N	mg/L	<0.05	0.14	0.13	0.08	<0.05	<0.05	<0.05	<0.05			<0.05				<0.05				<0.05			<0.05						
CN-T	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			<0.01				<0.01				<0.01			<0.01						
FLOW RATE	L/s				1																	1						10	
Total Metals																													
AG-T	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.4	1	<0.2			<0.2				2.2				<0.2			0.4	1.4					
AL-T	mg/L	0.24	<0.05	<0.05	0.17	0.11	0.094	0.112	0.105			0.107				0.083				0.043			0.051	0.164					
AS-T	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	0.004	0.005	<0.003			0.006				0.004				0.004			0.022	<0.003					
B-T	mg/L	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	0.06	0.09			0.1				0.14				0.17			0.13	<0.05					
BA-T	mg/L	0.17	0.12	0.217	0.107	0.103	0.191	0.172	0.103			0.14				0.132				0.102			0.115	0.216					
BE-T	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.5	0.7	0.3			<0.2				<0.2				<0.2			0.3	0.7					
BI-T	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	0.01	<0.01	<0.01			<0.01				0.02				<0.01			<0.01	0.01					
CA-T	mg/L	143.6	145.9	155.1	156.8	110.2	140.5	133.4	133.3			137.1				137.5				139.4			139.8	180.9					
CD-T	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.2	2.5	0.7			0.2				0.4				<0.2			0.4	<0.2					
CO-T	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	0.003	0.001			0.001				<0.001				<0.001			<0.001	0.006					
CR-T	mg/L	<0.005	<0.005	<0.005	<0.005	0.008	0.019	0.007	0.007			<0.001				0.002				<0.001			<0.001	0.019					
CU-T	mg/L	0.002	<0.002	0.007	0.008	0.003	0.007	0.015	0.012			0.02				0.015				0.013			0.022	0.138					
FE-T	mg/L	0.35	<0.01	<0.01	0.29	0.18	0.114	0.02	0.033			0.14				0.054				0.028			0.06	1.502					
K-T	mg/L	6	6	6	7	5	5.3	5	5.1			6.2				5.9				6.1			6.3	5.3					
LA-T	mg/L	0.02	0.011	0.011	0.009	0.007	<0.001	0.011	0.004			<0.001				0.004				0.004			0.001	0.002					
MG-T	mg/L	34.7	33.3	32.9	33.8	23.3	29.3	28.6	28.6			29.8				30.3				29.4			32.8	34.5					
MM-T	mg/L	1.13	0.95	1.01	1.39	0.43	0.395	0.132	0.096			0.254				0.153				0.296			0.297	5.705					
MO-T	mg/L	0.003	0.005	0.003	0.006	<0.002	0.005	0.007	0.002			0.002				0.002				0.001			0.002	<0.001					
NA-T	mg/L	27	27	27	26	17	21.5	19.3	22.4			21				21.6				22			21.1	31.4					
NI-T	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	0.002	0.005	0.007			0.002				0.004				0.004			0.004	0.014					
P-T	mg/L	0.02	0.03	<0.01	<0.01	<0.01	<0.01	0.05	0.09			<0.01				<0.01				<0.01			<0.01	<0.01					
PB-T	mg/L	<0.01	0.01	<0.01	<0.01	0.01	0.014	<0.002	0.01			<0.002				0.003				<0.002			<0.002	0.007					
S-T	mg/L	121	102	112	117	77	99.3	98.9	95.3			98.7				98.8				98			107.2	142.8					
SB-T	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	0.015	<0.002	0.003			0.012				0.016				0.01			<0.002	<0.002					
SE-T	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			<0.005				<0.005				<0.005			<0.005	<0.005					
SI-T	mg/L	6.8	6.6	6.5	6.1	5.2	6.5	7	6			6.2				6.3				6.3			7.4	8.9					
SN-T	mg/L	0.05	0.04	<0.01	0.03	0.01	0.005	<0.002	<0.002			<0.002				0.004				0.003			<0.002	0.004					
SR-T	mg/L	0.481	0.456	0.486	0.448	0.34	0.437	0.416	0.429			0.429				0.429				0.434			0.433	0.517					
TI-T	mg/L	0.01	<0.005	<0.005	0.007	<0.005	<0.001	<0.001	<0.001			0.003				0.001				<0.001			0.001	0.004					
V-T	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	0.002	<0.001	<0.001			<0.001				0.002				0.001			<0.001	<0.001					
W-T	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03			<0.03				<0.03				<0.03			<0.03	<0.03					
ZN-T	mg/L	0.01	0.04	<0.01	0.01	<0.01	<0.001	0.001	0.01			0.007				0.011				<0.001			0.013	0.026					
Dissolved Metals																													
AG-D	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.2	0.9	<0.2			<0.2				0.4				0.2			<0.2						
AL-D	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	0.031	0.053	0.067			0.079				0.028				0.042			0.026						
AS-D	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	0.008	0.007			<0.003				0.004				<0.003			0.026						
B-D	mg/L	<0.05	<0.05	0.06	<0.05	0.07	0.07	<0.05	0.06			0.11				0.13				0.13			0.09						

2002 Faro Annual Environmental Report, Water Licence QZ95-003
Appendix 1, 2002 Surface Water Quality Listing

Gartner Lee	Station		X13																				X14																		
	Description	Sample Date	Combined seepage from Cross Valley Dam										Combined seepage from Cross Valley Dam										Rose Cr downstream of the diversion channel																		
			15/01/02	12/2/2002	12/3/2002	15/04/02	13/05/02	16/06/02	16/6/02	12/8/2002	5/9/2002	12/9/2002	16/09/02	27/09/02	29/09/02	3/10/2002	12/10/2002	15/10/02	21/10/02	29/10/02	5/11/2002	12/11/2002	19/11/02	26/11/02	10/12/2002	15/12/02	15/01/02	12/2/2002	12/3/2002	15/04/02	13/05/02	16/06/02	16/07/02	12/8/2002	16/09/02	15/10/02	11/11/2002	12/11/2002	10/12/2002		
Parameter	Units																																								
Physical																																									
HARD	mg/L																																								
TEMP-C	deg C																																								
pH-F	pH unit																																								
SO ₄ -T	mg/L	570	419	513	582	684	541	683	693																																
TSS	mg/L	12	11	14	9	11	8	6	8																																
NH ₃ -N	mg/L	0.06	0.68	0.93	0.87	0.81	0.76	0.71	0.78																																
CN-T	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01																																
FLOW RATE	Us				47																																				
Total Metals																																									
AG-T	mg/L	<0.001	<0.001	<0.001	0.001	<0.001	1.6	1.3	<0.2				0.2				0.6				<0.2				0.4		<0.001	<0.001	<0.001	<0.001	<0.001	<0.2	1.9	<0.2	<0.2	<0.2	0.6		0.5	0.3	
AL-T	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	0.062	0.112	0.115				0.059				0.034				0.033				0.023		0.07	<0.05	0.06	<0.05	0.54	0.14	0.11	0.076	0.062	0.068		0.057	0.042		
AS-T	mg/L	0.011	<0.005	0.008	<0.005	<0.005	<0.003	0.012	0.04				0.005				0.006				0.005				0.041		<0.005	<0.005	<0.005	<0.003	<0.003	0.007	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.006	
B-T	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.08				0.1				0.13				0.15				0.13		<0.05	<0.05	<0.05	<0.05	<0.05	0.05	0.09	0.12	0.14		0.17	0.13			
BA-T	mg/L	0.225	0.188	0.243	0.129	0.134	0.178	0.161	0.113				0.149				0.166				0.147				0.14		0.198	0.163	0.242	0.147	0.17	0.191	0.176	0.103	0.113	0.137		0.126	0.136		
BE-T	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.7	0.6	<0.2				0.3				<0.2				0.3				0.5		<0.001	<0.001	<0.001	<0.001	<0.001	<0.2	0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
BI-T	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01				<0.01				<0.01				<0.01				<0.01		<0.05	<0.05	<0.05	<0.05	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
CA-T	mg/L	199.9	183.8	211.4	212.6	242.4	185.5	237	236.6				234.1				194.1				246.5				220.6		58.1	61.6	108.8	113	35.1	28.1	67.3	38.7	60.9	41.6		55.9	65.9		
CD-T	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.2	<0.2	<0.2				0.2				<0.2				<0.2				<0.2		<0.001	<0.001	<0.001	<0.001	<0.001	<0.2	0.6	0.5	0.3		<0.2	1			
CO-T	mg/L	0.007	<0.005	0.007	0.007	0.011	0.007	0.012	0.012				0.009				0.005				0.012				0.009		<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	0.004	<0.001	0.001	<0.001	0.004	0.003			
CR-T	mg/L	<0.005	<0.005	<0.005	<0.005	0.019	0.016	0.013	0.002				<0.001				0.002				0.001				<0.001		0.008	0.008	0.007	0.007	0.006	<0.001	0.006	<0.001	0.002	0.005	0.003		0.001	0.004	
CU-T	mg/L	0.003	0.009	<0.002	0.003	<0.002	0.009	0.016	0.009				0.014				0.013				0.014				0.023		0.014	0.013	0.004	0.004	0.007	0.008	0.016	0.005	0.023	0.02		0.017	0.022		
FE-T	mg/L	2.31	3.08	2.52	1.95	2.34	1.078	0.819	1.417				2.301				1.359				2.237				2.074		0.8	0.17	0.33	0.18	1.4	0.342	0.19	0.256	0.231	0.272		0.312	0.216		
K-T	mg/L	7	6	6	7	7	5.5	6.5	6.6				8.1				6.3				8.1				7.9		2	2	3	3	2	1	2.5	1	2.5	1.1		1.5	2		
LA-T	mg/L	0.022	0.013	<0.005	0.006	0.013	0.006	<0.001	<0.001				<0.001				0.002				<0.001				<0.001		0.007	0.01	0.006	0.006	0.006	0.001	0.003	0.004	0.003		0.004	0.004			
MG-T	mg/L	42.8	35	39.6	40.2	45.7	37.7	44.6	45.7				46.8				37.8				46.9				48.4		12.1	11.6	20.5	21.8	7.1	6	15.1	7.3	14.2	8.6		11.1	14.9		
MN-T	mg/L	9.36	6.97	9.64	11.35	8.371	9.851	9.939					9.398				7.224				9.938				9.938		0.82	0.83	2.28	2.37	0.42	0.221	0.601	0.344	0.581	0.296		0.581	0.923		
MO-T	mg/L	0.004	0.004	0.003	<0.002	0.006	<0.001	0.01	0.006				0.003				0.003				0.002				0.004		0.002	0.002	<0.002	<0.002	0.005	0.007	0.009	<0.001	0.002	0.002		0.002	<0.001		
NA-T	mg/L	38	35	36	37	37	31.4	32.1	37.5				36.4				33.2				38.9				35.5		7	8	14	15	5	2.8	6.8	4.6	5.7	4.2		5.5	6		
NI-T	mg/L	0.014	0.012	0.011	0.014	0.016	0.01	0.018	0.019				0.01				0.009				0.013				0.013		<0.005	<0.005	0.006	<0.005	0.009	0.002	0.007	0.008	0.002	0.004		0.001	0.002		
P-T	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.05				<0.01				<0.01																								

2002 Faro Annual Environmental Report, Water Licence Q295-003
Appendix 1, 2002 Surface Water Quality Listing

Gartner Lee	Station	X22B													X23													X26	R7				FAROCR		
	Description	Faro Pit water while filling with tailings													Old Faro Creek channel at toe of waste dumps													Zone II Pit water (from well)	N Fork of Rosa Creek above Faro Ck Diversion				Faro Cr u/s of confluence NFRose		
		Sample Date	15/01/02	12/2/2002	12/3/2002	15/04/02	13/05/02	16/06/02	16/07/02	12/8/2002	16/09/02	15/10/02	11/11/2002	12/11/2002	10/12/2002	15/01/02	12/2/2002	12/3/2002	15/04/02	13/05/02	16/06/02	16/07/02	12/8/2002	16/09/02	15/10/02	12/11/2002	10/12/2002		16/06/02	21/03/02	25/06/02	27/09/02	11/6/2002	25/06/02	27/09/02
Parameter	Units																																		
Physical																																			
HARD	mg/L																																		
TEMP-C	deg C				-0.2							0.5		0.2																					
PH-F	pH unit				7.7							7.7		7.7																					
SO ₄ -T	mg/L	640	562	597	600	606	575	591	578	598	617			627	621	3575	3023	2969	3353	3875	3712	3740	3662	3531	3608	3519	3410	1754	12	7	9	3	5	4	
TSS	mg/L	2	3	6	7	11	3	3	5	5	6			9	5	108	108	64	102	96	127	154	160	162	122	18	150	43	2	1	4	<1	<1	2	
NH ₃ -N	mg/L															0.06	1	0.89	0.84	0.5	0.71	0.69	0.78	0.8	0.64	0.75	0.72								
CNT	mg/L																																		
FLOW RATE	L/s																	2																	
Total Metals																																			
AG-T	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.2	0.7	<0.2	<0.2	0.9			2.8	<0.2	0.003	0.005	0.004	0.004	0.001	4.5	3.6	3.2	4.1	3.8	2.5	2.7	5.7	<0.001	<0.2	<0.2	0.8	35.3	<0.2	
AL-T	mg/L	0.06	<0.05	<0.05	<0.05	0.15	0.095	0.079	0.058	0.04	0.067			0.055	0.036	0.13	0.62	<0.05	<0.05	0.08	0.125	0.166	0.103	0.056	0.072	0.063	0.08	0.168	0.06	0.148	0.058	0.301	0.127	0.255	
AS-T	mg/L	<0.005	0.019	0.007	<0.005	<0.005	0.008	0.006	0.008	0.005	<0.003			<0.003	0.036	0.029	0.454	<0.005	<0.005	0.015	0.016	0.038	0.112	0.014	0.017	0.011	0.134	0.012	<0.005	<0.003	<0.003	0.009	0.094	<0.003	
B-T	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.09	0.1	0.14			0.19	0.14	0.08	0.05	0.05	<0.05	0.08	0.06	0.14	0.1	0.15	0.1	0.12	<0.05	<0.05	0.07	0.09	0.1	0.07	0.06		
BA-T	mg/L	0.12	0.116	0.161	0.092	0.14	0.157	0.114	0.079	0.101	0.101			0.086	0.08	0.09	0.782	0.157	0.082	0.102	0.122	0.112	0.076	0.063	0.081	0.062	0.042	0.126	0.167	0.191	0.139	0.17	0.153	0.143	
BE-T	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.4	0.4	<0.2	<0.2	<0.2			<0.2	0.3	<0.001	0.004	<0.001	<0.001	<0.001	1	1.1	0.5	0.5	0.5	0.5	0.8	1.3	<0.001	0.2	<0.2	0.3	0.3	<0.2	
BI-T	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	0.01			<0.01	<0.01	<0.05	0.09	<0.05	<0.05	<0.05	<0.01	0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.05	<0.01	0.02	0.02	<0.01	0.03	
CA-T	mg/L	153	154.7	149.2	145.8	149.5	157.5	147.9	145.4	154.5	148.5			160	151.1	415.1	837.6	435.2	681.2	490.7	639.2	599	653.4	673.4	634.8	626.4	603.3	474.6	50.2	20.8	28.6	3	7.4	6.1	
CO-T	mg/L	0.011	0.012	0.012	0.007	0.012	9.5	15.7	11.2	12.2	11.3			11.1	11.9	0.036	0.108	0.026	0.016	0.517	55.6	38.3	31.8	41.7	38	29.9	31	19.8	<0.001	1.1	<0.2	1	1	<0.2	
CO-T	mg/L	0.049	0.045	0.044	0.044	0.042	0.045	0.047	0.044	0.049	0.046			0.049	0.045	0.536	0.573	0.466	0.422	0.74	0.451	0.448	0.435	0.453	0.367	0.438	0.444	0.469	<0.005	<0.001	<0.001	0.001	0.003	<0.001	
CR-T	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	0.013	0.011	<0.001	<0.001	0.002			<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	0.017	0.004	0.006	<0.001	0.005	<0.001	<0.001	<0.001	<0.005	0.009	<0.001	0.007	0.005	0.002	
CU-T	mg/L	0.012	0.021	0.026	0.012	0.012	0.027	0.029	0.013	0.021	0.024			0.028	0.033	0.007	0.01	0.006	0.007	1.266	0.111	0.071	0.045	0.072	0.048	0.051	0.065	0.013	<0.002	0.011	0.015	0.01	0.02	0.017	
FE-T	mg/L	0.05	0.02	0.05	<0.01	0.45	0.097	0.058	0.055	0.179	0.112			0.146	0.075	68.95	49.12	28.66	33.26	25.63	32.052	43.267	45.47	58.083	34.699	32.935	55.43	20.3	0.05	0.18	0.164	0.307	0.075	0.284	
K-T	mg/L	15	13	13	14	12	11.3	10.4	11	13.6	13.1			14.6	14.2	23	20	24	25	18	20.1	20.7	20.3	25.7	24.7	24.3	25.5	17.2	2	0.7	0.6	0.3	0.5	0.2	
LA-T	mg/L	0.015	0.008	0.007	0.012	0.013	<0.001	<0.001	0.003	<0.001	0.001			0.002	<0.001	0.039	0.114	<0.005	<0.005	0.019	<0.001	<0.001	<0.001	0.009	<0.001	<0.001	<0.001	<0.001	0.01	0.002	0.004	<0.001	<0.001	0.002	
MG-T	mg/L	62.9	62.4	60.8	56.7	57.6	56.5	54.9	53.4	60.8	59.4			61.7	61.8	603.6	680.5	555.8	660.3	583.7	699.6	657.7	657.3	720.5	709.9	688.6	756.2	215.1	9.4	4.5	5.4	0.7	1.8	1.5	
MM-T	mg/L	2.93	2.77	2.67	2.57	2.57	2.693	2.442	2.470	2.749	2.73			2.984	2.764	52.65	58.17	48.01	44.7	46.02	43.861	43.804	44.132	57.159	45.054	45.922	57.996	10.774	0.02	0.015	0.018	0.01	0.003	0.005	
MO-T	mg/L	0.012	0.012	0.012	0.007	0.009	0.017	0.014	0.01	0.011	0.01			0.011	0.009	0.047	0.122	0.039	0.033	0.064	0.042	0.04	0.044	0.039	0.036	0.032	0.035	0.017	0.004	<0.001	0.002	0.002	0.002	0.001	
NA-T	mg/L	28	28	25	25	25	23.8	20	24.6	23.4	24.5			27.2	24.3	61	77	63	61	41	59.1	58.5	62.5	64.8	61.2	60.9	63.7	46.7	5	1.8	1.6	1.4	1.6	1.6	
NI-T	mg/L	0.085	0.084	0.088	0.08	0.078	0.081	0.082	0.087	0.087	0.082			0.085	0.09	0.589	0.57	0.499	0.461	0.799	0.511	0.505	0.509	0.513	0.571	0.497	0.55	1.14	<0.005	0.003	0.001	0.005	0.006	0.003	
P-T	mg/L	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.04	0.03	<0.01	0.02			0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.08	0.03	<0.01	<0.01	0.02	<0.01	<0.01	0.03	0.03	<0.01	<0.01	<0.01	<0.01	
PB-T	mg/L	<0.01	0.03	<0.01	<0.01	0.04	0.011	0.006	0.012	0.003	<0.002			<0.00																					

Gartner Lee	Station	R8				R9				R10				
	Description	N Fork of Rose Creek 900 m below Faro Cr Div.				N Fork of Rose Creek adjacent BH1 and BH2				North Fork of Rose Creek u/s of rock drain				
		Sample Date	21/03/02	25/06/02	27/09/02	15/12/02	21/03/02	25/06/02	27/09/02	15/12/02	21/03/02	25/06/02	27/09/02	15/12/02
			Units											
Physical														
HARD	mg/L				3.9	0.6			3.7	0.5			3.7	0.6
TEMP-C	deg C				8.4	8			8	8			8	8
PH-F	pH unit													
SO ₄ -T	mg/L	12	7	8	11	21	10	10	17	21	9	10	18	
TSS	mg/L	2	<1	3	4	1	1	2	2	1	1	3	3	
NH ₃ -N	mg/L													
CN-T	mg/L													
FLOW RATE	Us													
Total Metals														
AG-T	mg/L	<0.001	<0.2	0.6	<0.2	0.002	6.9	<0.2	<0.2	<0.001	23.7	<0.2	<0.2	
AL-T	mg/L	0.05	0.136	0.09	0.069	0.06	0.198	0.072	0.077	0.05	0.141	0.084	0.061	
AS-T	mg/L	<0.005	<0.003	<0.003	<0.003	<0.005	0.022	<0.003	<0.003	<0.005	<0.003	<0.003	0.006	
B-T	mg/L	<0.05	0.07	0.08	0.18	<0.05	0.07	0.08	0.18	<0.05	0.06	0.07	0.2	
BA-T	mg/L	0.163	0.181	0.137	0.159	0.161	0.159	0.125	0.149	0.17	0.19	0.144	0.155	
BE-T	mg/L	<0.001	0.4	<0.2	<0.2	<0.001	<0.2	<0.2	<0.2	<0.001	0.3	<0.2	<0.2	
BL-T	mg/L	<0.05	<0.01	0.03	<0.01	<0.05	<0.01	0.02	<0.01	<0.05	<0.01	0.03	<0.01	
CA-T	mg/L	49.3	18.2	23	40.7	52.6	21.8	26.6	44.9	51.9	20.6	26.1	45.1	
CD-T	mg/L	<0.001	1.5	<0.2	0.7	<0.001	<0.2	<0.2	0.2	<0.001	5.3	<0.2	6.9	
CO-T	mg/L	<0.005	<0.001	<0.001	<0.001	<0.005	0.002	0.001	<0.001	<0.005	0.002	<0.001	<0.001	
CR-T	mg/L	<0.005	0.01	0.002	0.003	<0.005	0.007	<0.001	<0.001	0.012	0.005	0.002	0.001	
CU-T	mg/L	<0.002	0.02	0.014	0.014	<0.002	0.013	0.016	0.014	0.003	0.028	0.014	0.013	
FE-T	mg/L	0.05	0.215	0.179	0.212	0.04	0.2	0.17	0.151	0.08	0.117	0.175	0.154	
K-T	mg/L	2	0.7	0.5	0.9	2	0.7	0.6	1	2	0.7	0.6	1.1	
LA-T	mg/L	0.008	<0.001	0.004	0.002	0.011	0.002	0.003	0.001	0.01	0.003	0.004	0.001	
MG-T	mg/L	9	4	4.4	7.6	10.4	4.8	5.2	8.6	10.2	4.8	5.2	8.7	
MN-T	mg/L	0.02	0.015	0.018	0.035	0.02	0.136	0.017	0.028	0.02	0.015	0.017	0.03	
MO-T	mg/L	0.004	<0.001	0.001	<0.001	<0.002	0.004	0.001	0.002	0.002	<0.001	<0.001	<0.001	
NA-T	mg/L	5	1.1	1.4	2.5	5	1.1	2.1	2.3	5	2.2	2.1	2.8	
NI-T	mg/L	<0.005	0.003	<0.001	<0.001	<0.005	0.003	<0.001	<0.001	<0.005	0.041	0.004	<0.001	
P-T	mg/L	0.02	<0.01	0.02	<0.01	0.01	0.02	0.01	<0.01	<0.01	<0.01	<0.01	0.01	
PB-T	mg/L	<0.01	<0.002	<0.002	0.013	<0.01	0.047	0.002	<0.002	<0.01	0.004	<0.002	0.006	
S-T	mg/L	4	2.1	2.4	3.5	6	3.2	3.4	5.7	6	3.1	3.4	6	
SB-T	mg/L	<0.03	<0.002	0.027	0.006	<0.03	0.004	0.027	0.008	<0.03	<0.002	0.042	0.003	
SE-T	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
SI-T	mg/L	6.7	4.4	5	5.6	6.8	4.2	5.1	5.8	6.5	4.2	4.9	6	
SN-T	mg/L	0.02	<0.002	0.007	<0.002	0.02	0.005	0.02	0.002	0.01	0.004	0.024	<0.002	
SR-T	mg/L	0.212	0.078	0.089	0.16	0.229	0.088	0.105	0.174	0.228	0.087	0.108	0.177	
TI-T	mg/L	<0.005	<0.001	0.002	0.002	<0.005	0.006	0.002	0.003	<0.005	<0.001	0.001	0.001	
VI-T	mg/L	<0.005	<0.001	<0.001	<0.001	<0.005	<0.001	0.001	<0.001	<0.005	<0.001	<0.001	<0.001	
W-T	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
ZN-T	mg/L	<0.01	0.019	0.008	0.005	0.01	0.006	0.003	0.003	0.05	0.012	0.008	0.004	
Dissolved Metals														
AG-D	mg/L	<0.001	<0.2	<0.2	<0.2	<0.001	<0.2	<0.2	<0.2	<0.001	<0.2	0.2	<0.2	
AL-D	mg/L	<0.05	0.051	0.067	0.063	<0.05	0.048	0.058	0.053	<0.05	0.064	0.067	0.056	
AS-D	mg/L	<0.005	0.029	<0.003	<0.003	<0.005	<0.003	<0.003	<0.003	<0.005	<0.003	<0.003	<0.003	
B-D	mg/L	<0.05	0.07	0.11	0.14	<0.05	0.08	0.1	0.13	<0.05	0.07	0.09	0.12	
BA-D	mg/L	0.191	0.135	0.127	0.163	0.198	0.132	0.132	0.158	0.192	0.136	0.141	0.172	
BE-D	mg/L	<0.001	0.2	<0.2	<0.001	0.4	<0.2	<0.2	<0.001	0.5	<0.2	<0.2	<0.2	
BI-D	mg/L	<0.05	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	
CA-D	mg/L	51.7	20	22.4	41.1	55.2	20.6	26.4	45	55.3	21.2	26.2	42.7	
CD-D	mg/L	<0.001	1.1	0.7	0.7	<0.001	0.4	1.2	<0.2	<0.001	0.3	<0.2	<0.2	
CO-D	mg/L	<0.005	<0.001	<0.001	<0.001	<0.005	0.001	0.001	<0.001	<0.005	0.002	<0.001	<0.001	
CR-D	mg/L	<0.005	0.002	<0.001	<0.001	<0.005	0.004	<0.001	0.002	<0.005	0.001	<0.001	<0.001	
CU-D	mg/L	0.015	0.014	0.023	0.015	0.01	0.013	0.018	0.016	0.009	0.015	0.017	0.014	
FE-D	mg/L	<0.01	0.043	0.081	0.114	<0.01	0.04	0.071	0.128	<0.01	0.044	0.072	0.057	
K-D	mg/L	2	0.7	0.6	1.1	2	0.7	0.7	1.1	2	0.7	0.7	1.1	
LA-D	mg/L	<0.005	<0.001	0.003	0.001	0.007	0.004	0.004	0.002	<0.005	0.003	0.003	0.002	
MG-D	mg/L	9.6	4	4.5	7.8	10.9	4.6	5.3	8.7	10.9	4.8	5.3	8.6	
MN-D	mg/L	0.02	0.013	0.017	0.032	0.02	0.008	0.015	0.025	0.02	0.01	0.016	0.026	
MO-D	mg/L	0.005	<0.001	<0.001	0.002	<0.002	<0.001	0.001	<0.001	<0.002	<0.001	0.002	<0.001	
NA-D	mg/L	6	2.1	2.4	3	6	1.5	2.5	2.8	6	1.7	2.3	3	
NI-D	mg/L	<0.005	0.002	<0.001	<0.001	<0.005	0.004	<0.001	0.002	<0.005	0.002	<0.001	<0.001	
P-D	mg/L	<0.01	0.04	<0.01	0.05	0.03	0.03	<0.01	<0.01	<0.01	0.03	0.01	<0.01	
PB-D	mg/L	<0.01	<0.002	0.002	0.003	0.04	0.014	<0.002	0.004	0.05	<0.002	0.006	0.004	
S-D	mg/L	4	2.4	2.5	3.8	7	3.3	3.6	6	7	3.3	3.6	5.9	
SB-D	mg/L	<0.03	0.002	0.018	0.009	<0.03	<0.002	0.032	0.009	<0.03	<0.002	0.016	<0.002	
SE-D	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
SI-D	mg/L	6.9	4.8	5.1	5.9	6.9	4.6	5.1	6	6.9	4.4	5.1	5.6	
SN-D	mg/L	<0.01	<0.002	0.002	<0.002	<0.01	0.002	<0.002	<0.002	<0.01	<0.002	0.013	<0.002	
SR-D	mg/L	0.224	0.077	0.089	0.163	0.238	0.083	0.107	0.175	0.24	0.087	0.107	0.173	
TI-D	mg/L	<0.005	<0.001	0.001	<0.001	<0.005	<0.001	0.001	<0.001	<0.005	<0.001	0.002	<0.001	
V-D	mg/L	<0.005	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	
W-D	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
ZN-D	mg/L	0.01	0.012	0.011	0.008	0.01	<0.001	0.012	<0.001	0.02	0.003	0.006	<0.001	

Appendix 2

2002 Ground Water Quality Listing



**2002 Faro Annual Environmental Report, Water Licence QZ95-003
Appendix 2, 2002 Ground Water Quality Listing**

 Gartner Lee	Station	BH1	BH2		BH4	BH12A	BH12B		BH13B	BH14A		BH14B		S1-A	
	Description	W of Zone II, by NFR Cr. (5.18m)	W of Zone II, by NFR Cr. (5.55m)		W of Zone II, by NFR Cr. (3.20m)	W of Zone II, by NFR Cr. (2.85m)	W of Zone II, by NFR Cr. (8.05m)		W of Zone II, by NFR Cr. (4.25m)	W of Zone II, by NFR Cr. (6.22m)		W of Zone II, by NFR Cr. (10.00m)		S of Sulphide Waste Dump (12.80m)	
	Sample Date	23/09/02	11/6/2002	23/09/02	23/09/02	11/6/2002	11/6/2002	25/09/02	25/09/02	11/6/2002	25/09/02	11/6/2002	25/09/02	12/6/2002	25/09/02
Parameter	Units														
Physical															
Dissolved Solids	mg/L		533			1800	1820			3470		3160		5860	
Total Hardness	mg/L	480	361	187	194	1370	1280	560	441	2340	2880	2390	2340	3830	4170
Alk-T	mg/L	122	77	97	90	222	222	182	76	401	389	393	389	229	220
Specific Cond	µS/cm		645			2070	2004			3434		3289		4746	
PH-L	pH unit	6.89	6.74	6.78	6.69	7.25	7.31	7.64	8.09	7.89	7.84	7.88	7.53	6.84	7.11
PH-F	ph unit	6.89	7.4	6.78	6.69	7.4	7.4	7.64	8.09	7.2	7.84	7.2	7.53	5.9	7.11
SO ₄ -T	mg/L	286	310	123	132	1170	1060	340	439	1780	1980	1800	1700	4080	3590
SWL	m	3.67		4.81	2.43	2.30	2.34	2.36	2.96	3.64	3.21	4.30	3.87	3.83	3.94
Dissolved Metals															
AG-D	mg/L	<0.00002	<0.00004	<0.0001	<0.00002	<0.0001	<0.0001	<0.00004	<0.00004	<0.0002	<0.0001	<0.0002	<0.0001	<0.0002	<0.0002
AL-D	mg/L	0.04	0.08	0.06	1.34	<0.03	<0.03	0.03	<0.01	<0.05	<0.03	<0.05	<0.03	<0.05	<0.05
AS-D	mg/L	<0.0005	<0.001	<0.003	<0.0005	<0.003	<0.003	<0.001	<0.001	<0.005	<0.003	<0.005	<0.003	<0.005	<0.005
B-D	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1
BA-D	mg/L	0.04	0.06	0.05	0.03	0.09	0.07	0.03	<0.02	<0.02	0.03	<0.02	<0.02	<0.04	0.02
BE-D	mg/L	<0.001	<0.002	<0.005	<0.001	<0.005	<0.005	<0.002	<0.002	<0.01	<0.005	<0.01	<0.005	<0.01	<0.01
BI-D	mg/L														
CA-D	mg/L	140	93.8	50.2	56.1	347	327	136	116	612	730	616	596	639	641
CD-D	mg/L	0.00899	0.0209	0.0135	0.00512	0.0004	0.0004	0.0002	0.0001	<0.0005	<0.0003	<0.0005	<0.0003	0.0041	0.0053
CO-D	mg/L	0.0075	0.0016	<0.002	0.0268	<0.002	<0.002	<0.0006	0.0024	<0.003	<0.002	<0.003	<0.002	0.006	0.006
CR-D	mg/L	<0.001	<0.002	<0.005	<0.001	<0.005	<0.005	<0.002	<0.002	<0.01	<0.005	<0.01	<0.005	<0.01	<0.01
CU-D	mg/L	0.017	0.003	<0.005	0.014	<0.005	<0.005	0.003	0.007	<0.01	<0.005	<0.01	<0.005	<0.01	<0.01
FE-D	mg/L	<0.03	0.14	0.14	0.18	<0.03	<0.03	<0.03	0.03	<0.03	<0.03	<0.03	<0.03	<0.06	<0.03
HG-D	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
K-D	mg/L	3	2	<2	<2	4	4	3	5	3	4	4	3	8	10
LA-D	mg/L														
MG-D	mg/L	32	30.8	15.1	13.2	123	112	53.3	36.8	198	257	207	205	542	624
MN-D	mg/L	1.84	0.0521	0.046	0.334	0.004	0.016	0.0018	0.14	0.005	<0.002	<0.003	0.006	26.8	28.3
MO-D	mg/L	<0.001	<0.002	<0.005	<0.001	<0.005	<0.005	<0.002	0.004	<0.01	<0.005	<0.01	<0.005	<0.01	<0.01
NA-D	mg/L	10	7	4	4	12	11	6	8	25	19	19	22	27	29
NI-D	mg/L	0.019	0.091	0.05	0.037	0.017	0.016	0.009	0.013	<0.01	<0.005	<0.01	<0.005	0.69	0.72
P-D	mg/L														
PB-D	mg/L	0.0024	0.005	0.005	0.0006	<0.003	<0.003	0.005	<0.001	0.007	<0.003	<0.005	<0.003	<0.005	<0.005
S-D	mg/L														
SB-D	mg/L	<0.0005	0.004	<0.003	<0.0005	<0.003	<0.003	<0.001	<0.001	<0.005	<0.003	<0.005	<0.003	<0.005	<0.005
SE-D	mg/L	<0.001	<0.002	<0.005	<0.001	0.009	0.009	0.003	0.005	<0.01	<0.005	<0.01	<0.005	<0.01	<0.01
SI-D	mg/L														
SN-D	mg/L	<0.0005	<0.001	<0.003	<0.0005	<0.003	<0.003	<0.001	<0.001	<0.005	<0.003	<0.005	<0.003	<0.005	<0.005
SR-D	mg/L														
TI-D	mg/L	<0.0002	<0.0004	<0.001	<0.0002	<0.001	<0.001	<0.0004	<0.0004	<0.002	<0.001	<0.002	<0.001	<0.002	<0.002
V-D	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.06	<0.03
W-D	mg/L														
ZN-D	mg/L	2.26	17.7	11.3	3.47	0.19	0.19	0.09	0.01	<0.05	<0.03	<0.05	<0.03	23.2	34.5

**2002 Faro Annual Environmental Report, Water Licence QZ95-003
Appendix 2, 2002 Ground Water Quality Listing**

 Gartner Lee	Station	S1-B		S2-A		S2-B		S3		P96-6		P96-7		P96-8A		
	Description	S of Sulphide Waste Dump (5.37m)		S of Sulphide Waste Dump (8.04m)		S of Sulphide Waste Dump (10.60m)		S of Sulphide Waste Dump (6.56m)		Toe Int Dump above Rock Drain (20.85m)		Toe Main Dump, below Haul Road (9.90m)		Old Faro Cr channel by X23 (4.87m)		
		Sample Date	12/6/2002	25/09/02	12/6/2002	25/09/02	12/6/2002	25/09/02	12/6/2002	25/09/02	11/6/2002	25/09/02	12/6/2002	25/09/02	11/6/2002	5/9/2002
Parameter	Units															
Physical																
Dissolved Solids	mg/L	1760		3300		3140		6170		887		1960		2180		
Total Hardness	mg/L	1160	1240	3030	3390	974	1980	4520	3530	638	515	1530	2220	1640	3650	4580
Alk-T	mg/L	144	87	152	198	57	110	148	178	359	269	267	162	299	230	251
Specific Cond	µS/cm	1844		3850		1267		5070		1123		2082	2910			
PH-L	pH unit	7.39	7.03	6.83	7.08	6.98	6.92	6.83	6.74	7.08	6.69	7.61	7.58	7.87	7.06	7.15
PH-F	ph unit	6.3	7.03	5.7	7.08	6.6	6.92	6.1	6.74	6.8	6.69	7.5	7.58			7.15
SO ₄ -T	mg/L	1170	1150	2190	4120	2250	2550	4420	4350	303	183	1260	1960	1420	3510	4300
SWL	m	3.27	3.10	2.84	3.50	4.23	4.64		2.53	12.03	12.54	8.34	5.43			3.20
Dissolved Metals																
AG-D	mg/L	<0.0001	<0.0001	<0.0001	<0.0002	0.0001	<0.0001	0.0005	<0.0002	<0.00004	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.001
AL-D	mg/L	0.03	<0.03	0.04	0.59	<0.03	<0.03	<0.05	0.06	0.01	<0.03	0.11	<0.03	<0.03	<0.3	<0.3
AS-D	mg/L	<0.003	<0.003	<0.003	<0.005	<0.003	<0.003	0.018	0.026	<0.001	<0.003	<0.003	<0.003	<0.003	<0.03	<0.03
B-D	mg/L	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BA-D	mg/L	<0.04	0.04	0.06	0.03	0.03	0.04	0.07	0.04	0.03	0.02	<0.02	<0.02	0.06	<0.02	0.02
BE-D	mg/L	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.01	<0.01	<0.002	<0.005	<0.005	<0.005	<0.005	<0.05	<0.05
BI-D	mg/L															
CA-D	mg/L	325	350	498	526	237	477	708	507	168	131	437	692	346	437	571
CD-D	mg/L	0.0007	0.0004	0.0036	0.007	0.0008	0.0016	<0.0005	<0.0005	0.0002	<0.0003	<0.0003	<0.0003	0.0014	0.097	0.101
CO-D	mg/L	0.003	<0.002	0.005	0.005	0.003	0.01	0.026	0.027	0.0008	<0.002	<0.002	<0.002	0.005	<0.02	<0.02
CR-D	mg/L	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.01	<0.01	<0.002	<0.005	<0.005	<0.005	<0.005	<0.05	<0.05
CU-D	mg/L	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.01	<0.01	<0.002	<0.005	<0.005	<0.005	<0.005	<0.05	<0.05
FE-D	mg/L	0.23	<0.03	4.43	2.55	7.08	50.1	17.6	12	0.55	0.87	0.17	<0.03	0.06	<0.03	<0.03
HG-D	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
K-D	mg/L	4	4	10	8	4	4	11	9	4	3	6	6	5	14	17
LA-D	mg/L															
MG-D	mg/L	83.4	89.5	433	505	92.6	192	669	550	53.3	45.6	107	120	189	620	767
MN-D	mg/L	0.854	0.016	20.1	27.5	2.59	10.9	17.7	19.9	0.134	0.07	0.008	<0.002	1.6	44	43.8
MO-D	mg/L	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.01	<0.01	<0.002	<0.005	<0.005	<0.005	<0.005	<0.05	<0.05
NA-D	mg/L	47	63	21	22	7	14	24	23	9	6	15	24	14	49	62
NI-D	mg/L	0.01	<0.005	0.391	0.57	0.024	0.08	0.14	0.19	0.023	0.008	<0.005	<0.005	0.019	0.74	0.74
P-D	mg/L															
PB-D	mg/L	<0.003	<0.003	<0.003	<0.005	<0.003	<0.003	<0.005	<0.005	<0.001	<0.003	<0.003	<0.003	<0.003	<0.03	<0.03
S-D	mg/L															
SB-D	mg/L	0.005	<0.003	0.006	<0.005	<0.003	<0.003	<0.005	<0.005	0.003	<0.003	0.006	<0.003	<0.003	<0.03	<0.03
SE-D	mg/L	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.01	<0.01	<0.003	<0.005	<0.005	<0.005	<0.005	<0.05	<0.05
SI-D	mg/L															
SN-D	mg/L	<0.003	<0.003	<0.003	<0.005	<0.003	<0.003	<0.005	<0.005	<0.001	<0.003	<0.003	<0.003	<0.003	<0.03	<0.03
SR-D	mg/L															
TI-D	mg/L	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001	<0.002	<0.002	<0.0004	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01
V-D	mg/L	<0.06	<0.03	<0.03	<0.03	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
W-D	mg/L															
ZN-D	mg/L	0.07	0.03	22.2	39.7	1.1	9.3	17.5	23	0.68	0.3	<0.03	<0.03	<0.03	218	208

2002 Faro Annual Environmental Report, Water Licence QZ95-003
Appendix 2, 2002 Ground Water Quality Listing

 Gartner Lee	Station	P96-8B		X16-A		X16-B		X17-A		X17-B		X18-A		X18-B		X21A-96	
	Description	Old Faro Cr channel by X23 (9.30m)		By Rose Cr d/s CVDam (5m)		By Rose Cr d/s CVDam (30m)		d/s CVDam & u/s of X14 across diversion (5m)		d/s CVDam & u/s of X14 across diversion (20m)		N of CVDam, & right of access rd to X14 (10m)		N of CVDam, & right of access rd to X14 (20m)		Toe 2nd Impoundment (9.22m), P96-5A	
	Sample Date	5/9/2002	25/09/02	10/6/2002	23/09/02	10/6/2002	23/09/02	10/6/2002	23/09/02	10/6/2002	23/09/02	10/6/2002	27/09/02	10/6/2002	23/09/02	12/6/2002	26/09/02
Parameter	Units																
Physical																	
Dissolved Solids	mg/L			185		238		297		403		992		887		2820	
Total Hardness	mg/L	4750	5200	168	227	229	223	275	242	331	285	706	590	634	647	1280	2380
Alk-T	mg/L	356	360	150	146	205	195	233	194	320	251	217	203	222	177	22	18
Specific Cond	µS/cm			314		396		466		599		1205		1074			
PH-L	pH unit	6.82	6.94	8.12	8.13	8.19	8.14	7.97	8.13	7.67	8.11	7.65	7.79	7.67	7.96	5.75	5.5
PH-F	pH unit			8.13		6.7		6.9		8.13		5.1		8.11		7.5	
SO ₄ -T	mg/L	4140	4240	26	36	28	25	46	36	54	39	553	449	470	550	2070	3850
SWL	m			3.10	3.43	3.54	3.77	3.85	2.14	2.07	2.69	2.64	4.03	5.25	3.60	3.76	4.62
Dissolved Metals																	
AG-D	mg/L	<0.001	<0.001	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00004	<0.00004	<0.00004	<0.00002
AL-D	mg/L	<0.3	<0.3	<0.005	<0.005	0.011	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	0.01	<0.01	<0.03
AS-D	mg/L	<0.03	<0.03	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	0.0006	<0.0005	<0.0005	0.009	0.007	<0.001	<0.001	0.005	0.007
B-D	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BA-D	mg/L	0.04	0.04	0.09	0.13	0.14	0.13	0.15	0.13	0.26	0.25	0.21	0.2	0.13	0.13	<0.02	<0.02
BE-D	mg/L	<0.05	<0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.005	<0.01
BI-D	mg/L																
CA-D	mg/L	575	659	48.4	63.6	63.8	62.6	74.7	66.3	90.4	78.3	206	170	183	188	179	302
CD-D	mg/L	0.023	0.024	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.0001	<0.0001	0.0003	0.0001	0.0006	0.0068
CO-D	mg/L	0.09	0.08	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0006	<0.0006	<0.0006	<0.0006	0.019	0.056
CR-D	mg/L	<0.05	<0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.005	<0.01
CU-D	mg/L	<0.05	<0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.005	<0.01
FE-D	mg/L	0.43	0.38	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	1.11	0.68	2.29	2.29	0.04	<0.03	350	763
HG-D	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00005
K-D	mg/L	14	15	<2	<2	<2	<2	<2	<2	2	<2	6	5	6	6	14	18
LA-D	mg/L																
MG-D	mg/L	804	862	11.5	16.4	16.9	16.2	21.5	18.7	25.5	21.8	46.5	40	43.3	43.1	203	394
MN-D	mg/L	43.2	39.8	0.0093	0.0004	<0.0003	<0.0003	0.01	0.006	0.276	0.2	2.55	0.569	1.79	1.76	30.4	59.8
MO-D	mg/L	<0.05	<0.05	0.002	0.002	0.002	0.002	<0.001	0.001	<0.001	0.001	<0.002	<0.002	<0.002	<0.002	<0.005	<0.01
NA-D	mg/L	52	56	<2	<2	<2	<2	3	3	17	10	28	22	24	22	93	82
NI-D	mg/L	0.5	0.5	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	0.011	0.01	0.007	0.02
P-D	mg/L																
PB-D	mg/L	<0.03	<0.03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	0.023	0.198
S-D	mg/L																
SB-D	mg/L	<0.03	<0.03	0.0014	<0.0005	0.0024	<0.0005	0.0013	<0.0005	0.0009	<0.0005	0.002	<0.001	0.004	<0.001	<0.003	<0.005
SE-D	mg/L	<0.05	<0.05	0.002	0.002	0.002	0.002	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.005	<0.01
SI-D	mg/L																
SN-D	mg/L	<0.03	<0.03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.003	<0.005
SR-D	mg/L																
TI-D	mg/L	<0.01	<0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0004	<0.0004	<0.0004	<0.001	<0.002
V-D	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
W-D	mg/L																
ZN-D	mg/L	136	129	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.01	<0.01	2.23	6.72

**2002 Faro Annual Environmental Report, Water Licence QZ95-003
Appendix 2, 2002 Ground Water Quality Listing**

 Gartner Lee	Station	X21B-96		X21C-96		X24A-96		X24B-96		X24C-96		X24D-96		X25A-96		X25B-96	
	Description	Toe 2nd Impoundment (15.43m), P96-5B		Toe 2nd Impoundment (30.18m), P96-5C		N abutment Int Dam (5.88m), P96-4A		N abutment Int Dam (10.80m), P96-4B		N abutment Int Dam (15.87), P96-4C		N abutment Int Dam (28.22m), P96-4D		S abutment Int Dam (9.85m), P96-3A		S abutment Int Dam (19.80m), P96-3B	
	Sample Date	12/6/2002	26/09/02	12/6/2002	26/09/02	12/6/2002	23/09/02	12/6/2002	23/09/02	12/6/2002	23/09/02	12/6/2002	23/09/02	12/6/2002	24/09/02	12/6/2002	24/09/02
Parameter	Units																
Physical																	
Dissolved Solids	mg/L	793		200		1300		1190		1820		1980		727		777	
Total Hardness	mg/L	457	512	198	181	833	860	841	646	1230	1100	1310	1310	504	452	513	497
Alk-T	mg/L	182	157	179		272	273	301	275	322	310	344	338	253	245	282	275
Specific Cond	µS/cm					1497		1475	1270	2003		2076		950		1050	
PH-L	pH unit	7.41	7.08	8.13		7.54	7.59	7.51	7.18	7.25	7.57	7.29	7.76	8.1	7.9	7.88	8.05
PH-F	ph unit	7.5	7.08	8.1	8.19	6.7	7.59	7.6	7.18	7	7.57	7.6	7.76	7.8	7.9	8	8.05
SO ₄ -T	mg/L	434	576	10		750	39	780	542	1140	1030	1060	1150	312	292	333	341
SWL	m	4.66	4.50	4.73	4.54	3.49	3.15	3.41	3.08	3.43	3.10	3.29	3.00	2.72	2.44	2.58	2.30
Dissolved Metals																	
AG-D	mg/L	<0.00004	<0.00004	<0.00002		<0.0001	<0.00004	<0.0001	<0.00004	<0.0001	<0.0001	<0.0001	<0.0001	<0.00004	<0.00004	<0.00004	<0.00004
AL-D	mg/L	<0.01	<0.01	0.699		<0.03	<0.01	<0.03	0.03	0.09	<0.03	<0.03	<0.03	<0.01	<0.01	<0.01	<0.01
AS-D	mg/L	0.004	0.004	0.0187		<0.003	<0.001	<0.003	<0.001	<0.003	<0.003	<0.003	<0.003	<0.001	<0.001	<0.001	<0.001
B-D	mg/L	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BA-D	mg/L	<0.02	<0.02	0.23		0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.03	0.03	0.02	0.03
BE-D	mg/L	<0.002	<0.002	<0.001		<0.005	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002
BI-D	mg/L																
CA-D	mg/L	136	152	62.4		252	260	258	202	369	329	400	399	144	129	160	155
CD-D	mg/L	<0.0001	<0.0001	0.00005		0.0006	0.0007	0.0004	0.0003	0.0004	0.0005	0.0019	0.002	<0.0001	<0.0001	<0.0001	<0.0001
CO-D	mg/L	0.0048	0.0062	<0.0003		0.015	0.0186	0.024	0.0046	0.032	0.035	0.014	0.016	0.0049	0.0052	<0.0006	<0.0006
CR-D	mg/L	<0.002	<0.002	<0.001		<0.005	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002
CU-D	mg/L	<0.002	<0.002	0.002		<0.005	<0.002	<0.005	0.002	<0.005	<0.005	<0.005	<0.005	<0.002	0.003	<0.002	<0.002
FE-D	mg/L	37.2	37	1.02		<0.03	<0.03	0.03	0.05	0.1	0.05	<0.03	<0.03	0.17	0.24	0.48	0.51
HG-D	mg/L	<0.00005	<0.00005	<0.00005		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
K-D	mg/L	3	4	<2		6	5	5	5	6	5	6	6	4	4	3	3
LA-D	mg/L																
MG-D	mg/L	28.5	32	10.2		49.3	51.2	47.9	34.7	74.5	67	74.8	76.2	34.9	31.7	27.6	26.7
MN-D	mg/L	9.12	9.86	0.249		16.4	19.2	18.9	6.02	26.3	27.4	21.9	23.7	6.23	6.49	0.236	0.19
MO-D	mg/L	<0.002	<0.002	0.003		<0.005	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002
NA-D	mg/L	69	66	3		30	28	30	28	39	33	48	44	27	25	54	51
NI-D	mg/L	0.005	0.004	0.001		0.018	0.016	0.032	0.01	0.059	0.061	0.089	0.093	0.004	0.004	<0.002	<0.002
P-D	mg/L																
PB-D	mg/L	<0.001	<0.001	0.0161		<0.003	<0.001	<0.003	<0.001	<0.003	<0.003	0.004	<0.003	<0.001	<0.001	<0.001	<0.001
S-D	mg/L																
SB-D	mg/L	0.003	<0.001	0.0028		0.003	<0.001	0.006	<0.001	<0.003	<0.003	<0.003	<0.003	0.002	<0.001	0.005	<0.001
SE-D	mg/L	<0.002	<0.002	<0.001		<0.005	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002
SI-D	mg/L																
SN-D	mg/L	<0.001	<0.001	<0.0005		<0.003	<0.001	<0.003	<0.001	<0.003	<0.003	<0.003	<0.003	<0.001	<0.001	<0.001	<0.001
SR-D	mg/L																
TI-D	mg/L	<0.0004	<0.0004	<0.0002		<0.001	<0.0004	<0.001	<0.0004	<0.001	<0.001	<0.001	<0.001	<0.0004	<0.0004	<0.0004	<0.0004
V-D	mg/L	<0.03	<0.03	<0.03		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
W-D	mg/L																
ZN-D	mg/L	0.09	0.09	0.015		<0.03	<0.01	<0.03	<0.01	<0.03	<0.03	0.03	0.03	<0.01	<0.01	<0.01	<0.01

Appendix 3

2002 Bioassay Results



CAVENDISH ANALYTICAL LABORATORY LTD.

1650 Pandora Street, Vancouver, B.C. V5L 1L6

Ph: 604-251-4456 Fax: 604-258-9497

www.cavendish.ca info@cavendish.ca

To: Anvil Range Mining

Postal Bag 1000

Faro Yukon Canada

Attention: Mr. Dana Haggar

Project: MAR. 21, 2002

Samples: 7

Date Received: 3/25/2002

Date Out: 4/8/2002

Certificate of Analysis:

020325B

Sample Type: Water Dissolved

BIOASSAY	
SAMPLE NAME	X-5
SAMPLE DATE	March 21, 2002
DATE RECEIVED	March 25, 2002
ANALYSIS	96 HOUR Rainbow trout TOXICITY
96 HOUR RESULTS	100% trout alive in all concentrations. The 96 hour LC50 was greater than 100%
SAMPLE NAME	X-13
SAMPLE DATE	March 21, 2002
DATE RECEIVED	March 25, 2002
ANALYSIS	96 HOUR Rainbow trout TOXICITY
96 HOUR RESULTS	100% trout alive in all concentrations. The 96 hour LC50 was greater than 100%

CAVENDISH ANALYTICAL LABORATORY LTD.

1650 Pandora Street, Vancouver, B.C. V5L 1L6

Ph: 604-251-4456 Fax: 604-258-9497

www.cavendish.ca info@cavendish.ca

To: Anvil Range Mining

Postal Bag 1000

Faro YK Canada

Attention: Mr. Dana Haggar

Project: December Parameters

Samples: 2

Date Received: 12/17/2002

Date Out: 2/27/2003

Certificate of Analysis:

021217B

Sample Type: Water Total

BIOASSAY

SAMPLE NAME	X-5
SAMPLE DATE	Dec 15, 2002
DATE RECEIVED	Dec 17, 2002
ANALYSIS	96 HOUR Rainbow trout TOXICITY
96 HOUR RESULTS	100% trout alive in all concentrations. The 96 hour LC50 was greater than 100%

SAMPLE NAME	X-13
SAMPLE DATE	Dec 15, 2002
DATE RECEIVED	Dec 17, 2002
ANALYSIS	96 HOUR Rainbow trout TOXICITY
96 HOUR RESULTS	100% trout alive in all concentrations. The 96 hour LC50 was greater than 100%

Appendix 4

2002 Biological Monitoring Program for Rose Creek,

Laberge Environmental Services, January 2003



Laberge

ENVIRONMENTAL SERVICES

P.O. BOX 5111
WHITEHORSE, YT
Y1A 4S3

OFFICE PHONE (867) 668-6838
CELL PHONE (867) 668-1043
FAX (867) 667-6956

BIOLOGICAL MONITORING PROGRAM

AT

ROSE AND ANVIL CREEKS, FARO, Y.T.

2002

Submitted to:

DELOITTE & TOUCHE INC

Prepared by:

B.E. Burns

LABERGE ENVIRONMENTAL SERVICES

December 2002

TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	STUDY AREA	2
3.0	METHODS	5
3.1	Water Quality	5
3.1.1	Field Measurements	5
3.1.2	Chemical Analyses	5
3.2	Water Quantity	5
3.3	Benthic Invertebrate Sampling	6
3.3.1	Field Collection	6
3.3.2	Laboratory Analysis	6
4.0	RESULTS AND DISCUSSION	7
4.1	Water Quality	7
4.1.1	Temperature	7
4.1.2	Total Hardness	7
4.1.3	pH and Alkalinity	9
4.1.4	Dissolved Oxygen	9
4.1.5	Sulphate	9
4.1.6	Ammonia	9
4.1.8	Cyanide	9
4.1.9	Total and Dissolved Metals	10
4.2	Water Quantity	11
4.3	Benthic Invertebrates	14
4.3.1	Abundance and Taxonomic Richness	14
4.3.2	Distribution	16
4.3.3	Comparisons with Past Data	19
5.0	SUMMARY	22
6.0	REFERENCES	23

APPENDICES

Appendix A	Water Quality Data
Appendix B	Benthic Invertebrate Data

List of Tables

Table		Page
1	Water Quality Data, 2002	8
2	CCME Recommended Guidelines for the Protection of Aquatic Life	11
3	The Percentage of Composition of Different Taxonomic Orders at Each Station	17
4	Taxonomic Distribution of Benthic Invertebrates	17
5	Presence (+) and Absence (-) of Sensitive Taxa at Rose and Anvil Creeks	18
6	Comparison of Benthic Data over a 14 Year Period	20

List of Figures

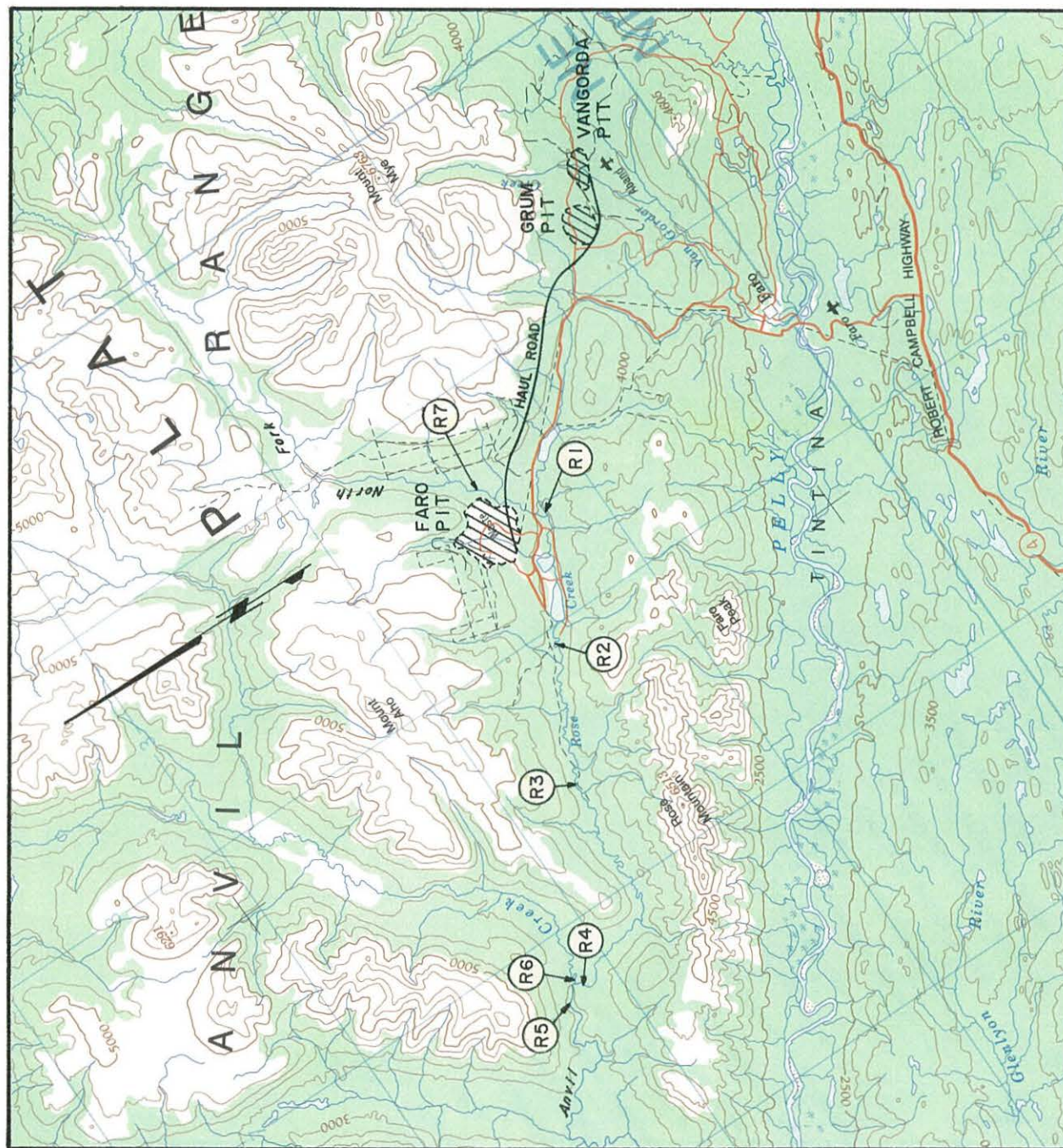
Figure		Page
1	Location of Faro Mine	3
2	Location of Sample Sites	4
3	Water Levels for Rose Creek at R-7, 2002	12
4	Water level at R7 on July 23, 2002	13
5	Water level at R7 on september 4, 2002	13
6	Abundance and Taxonomic Richness at Rose and Anvil Creeks, 2002	15
7	Log Normal Abundance at Rose and Anvil Creeks over a Fourteen Year Period . . .	21

1.0 INTRODUCTION

On August 16, 1994, Anvil Range Mining Corporation (Anvil) was officially assigned Licence Number IN89-001, which was originally issued to Curragh Resources Inc, by the Yukon Territory Water Board. On December 21, 1996, mining temporarily ceased but the mill continued to operate until March 1997. In late August 1997, mining resumed with milling commencing in October. However both operations shut down in late January 1998. Low metal prices (zinc and lead) and financial difficulties experienced by Anvil indicated that this closure had the potential to be long term. An amended water licence, number QZ95-003 was issued to Anvil on January 30, 1998. In April 1998, Deloitte and Touche Inc became the receivers for the Faro Mine property, operations and assets.

To comply with Schedule B of the amended licence, a biological monitoring program is to be undertaken every two years on the Rose Creek system. The Schedule states that three replicate samples of benthic macro-invertebrate fauna are to be collected from seven sites located on Rose and Anvil Creeks. These benthic organisms are to be identified, enumerated and the data evaluated. Water samples are also to be collected.

Deloitte & Touche Inc contracted Laberge Environmental Services (LES) to conduct the biological monitoring survey and this report contains all data collected during the 2002 program.



ANVIL CREEK/ROSE CREEK

FIGURE 2 - LOCATION OF SAMPLE SITES



(R6) Sample Site

3.0 METHODS

The 2002 biological monitoring program consisted of two field surveys conducted on July 23rd and July 24th, and on September 3rd to 5th. Helicopter access was required for the sites situated on the lower mainstem of Rose Creek and the sites on Anvil Creek. The remaining sites were accessed by vehicle and on foot.

3.1 Water Quality

Water quality samples were collected at each site in July and September. The samples were collected in a fast flowing section of the stream upstream of the benthic sampler locations.

3.1.1 Field Measurements

In-situ measurements were taken at each site during both surveys. Conductivity and temperature were determined with an Orion conductivity meter model 126. Dissolved oxygen readings were obtained using an YSI oxygen meter model 550 and pH measurements were taken using an Accumet Portable AP5 pH meter.

3.1.2 Chemical Analyses

All sample bottles were supplied by Cavendish Laboratories of Vancouver, 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 a one litre plastic bottle for sulphates, alkalinity, ammonia and nonfilterable residue. Samples to be analyzed for total metals and dissolved metals were collected in 250 ml plastic bottles. The dissolved metals samples were filtered at the lab. At sites R2, R3 and R4, samples to be analyzed for cyanide were collected in one litre bottles and preserved with sodium hydroxide. Samples were kept cool prior to shipment to the Cavendish laboratory.

3.2 Water Quantity

Discharge was measured at each of the sites, where possible, on both visits. An area with a uniform cross section was chosen and the velocity and depth were measured using a AA Price velocity meter. Ten or more readings were taken across the profile of the stream. Total discharge was calculated as the sum of these individual discharges (area x velocity).

4.1.9 Total and Dissolved Metals

The values in bold in Table 1 indicate that the CCME guideline for the protection of freshwater aquatic life was exceeded for that parameter in that sample. The CCME guideline for copper was exceeded at all sites on both sampling periods. The dissolved copper concentrations were greater than the total copper concentrations for both sampling periods, and this is suspected to be lab error. Samples were filtered at the Cavendish lab rather than in the field, to avoid contamination when samples are to be analyzed for ultra trace levels. The individual bottles may have been labelled incorrectly and thus analyzed incorrectly, or there may have been copper residuals in the filters used for preparing the filtrate. Upon examination of the QA/QC done by the lab it appears that there are minute traces of copper in their blank waters, but no significant increase in the dissolved sample over the total sample (see Appendix A).

Iron met the CCME guideline of 0.3 mg/L in all samples.

Similar to copper, the CCME guideline for lead is dependent upon the hardness of the sampled waters. The toxicity of these two metals on freshwater biota is greater in soft waters than in hard waters. Lead was detected throughout and exceeded the applicable CCME guideline in three samples at R1, two samples at R2, one sample at R4, two samples at R5, two samples at R6 and one sample at R7.

Zinc was detected throughout and all samples met the CCME guideline of 0.03 mg/L.

The above metal concentrations have been discussed in relation to the CCME guidelines. It is important to note that the limits as set out under the Water Licence issued by the Yukon Territory Water Board apply to the discharge point and there is no obligation by Anvil to meet the CCME criteria in the receiving waters at this time. The CCME guidelines pertaining to the metals in question are presented below in Table 2.

As some of these metal concentrations exceeded the guidelines at the background sites also (R1, R6 and R7), it is likely that these levels are a probably a result of natural mineralization of the area. The concentrations at the affected downstream sites (R2, R3 and R4) were not much higher than the upstream site R1 and in several cases, concentrations were actually lower.

TABLE 2
CCME RECOMMENDED GUIDELINES FOR THE PROTECTION OF
AQUATIC LIFE

HARDNESS as CaCO ₃ mg/L	COPPER mg/L	LEAD mg/L	IRON mg/L	ZINC mg/L
0 - 60 soft	0.002	0.001	0.3	0.03
60 - 120 medium soft	0.002	0.002	0.3	0.03
120 - 180 hard	0.003	0.004	0.3	0.03
>180 very hard	0.004	0.007	0.3	0.03

4.2 Water Quantity

Water flow was measured where possible at each of the sites in July and September. These data are presented in Table 1 along with the water quality data. Water levels were low in July but very high in September. High velocities accompanied the high water levels, making wading the creeks challenging and precarious. Flows could not be measured at R4 and R6 in September. Discharge at R5 is a calculated value summing the measured discharge at R4 and R6.

Continuous water level data recorders are located at R7 and at X14 which is just upstream of R2. These recorders have been collecting data for several years. The annual water level graphs were reviewed for these two sites. The cable was damaged at X14 sometime in mid July, and data could not be collected until repairs were made in the fall (see 2002 Annual Report for details). The annual water level graph for R7 is displayed in Figure 3. Significant amounts of precipitation fell during the month of August and the water level was very high on August 27, measuring 1.252 metres. This is slightly over the June 8 freshet where water level was recorded at 1.247 m.

Figures 4 and 5 show the change in water level at R7 in July and in September.

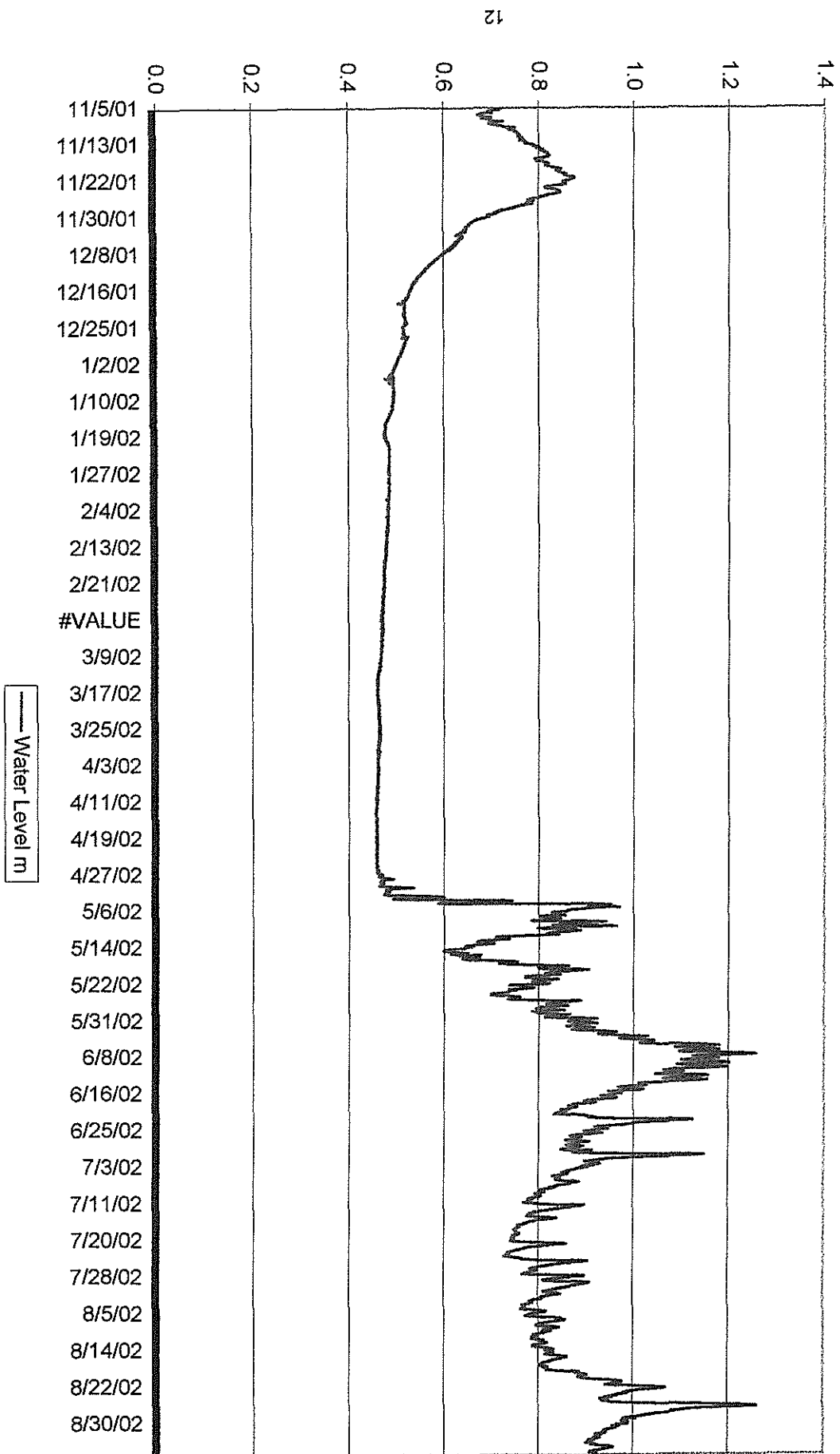


Figure 3
Rose Creek R 7



Figure 4 Water level at R7 on July 23, 2002.



Figure 5 Water level at R7 on September 4, 2002. Note that the large boulder is completely submerged.

4.3 Benthic Invertebrates

Five phyla were found in Rose and Anvil Creeks; Arthropoda, Annelida, Mollusca, Nematoda and Cnidaria (Coelenterata). A total of 87 different taxonomic groups were identified within these five phyla. These data are presented in Appendix B.

4.3.1 Abundance and Taxonomic Richness

The total number of organisms for the triplicates at each site was summed to give a total abundance value for that site. Populations at most of the sites were high. Due to high water encountered in September, retrieval of the artificial substrate samplers at R3 and R6 was difficult. The flow at R3 was very swift and removal of the samplers was challenging. It is suspected that many invertebrates were dislodged and washed away before the screened bucket could safely be placed under the sampler. This was notably the case for sample R3c where only 18 individuals were captured. Both R3a and R3b had approximately 900 organisms, but it is suspected that these numbers also are below the actual numbers of organisms originally present.

Retrieval was also difficult at Anvil Creek, R6. The samplers were installed near the left bank in July and the creek had to be waded to access the samplers in September. Many organisms were subsequently lost during retrieval from the high velocities prevalent at R6. This is evident in samples R6a and R6b where only a few tens of organisms were collected compared to R6c where 1138 organisms were retained. Of all the communities, the lowest population occurred at R6. Lower numbers were also documented at R4. This can likely be attributed to the fact that due to high water events over the course of the previous month, the rope tying the baskets to shore was broken and the samplers were washed into shore. One of the samplers was almost entirely out of the water (R4c) and the remaining two were primarily submerged.

Water levels and velocities were high at the other sites as well in September, but retrieval was more successful. These sites (R1, R2, R5 and R7) had populations that ranged from approximately 10,000 to 16,000 individuals.

Taxonomic richness was determined for each site by enumerating all taxonomic groups identified from species to phylum, as a measure of community diversity. The diversity ranged from a high of 60 at R1, the upstream site on the mainstem of Rose Creek, to a low of 36 at R6, Anvil Creek upstream of Rose Creek.

Abundance and diversity were plotted and are displayed in Figure 7. To aid in interpretation, the stations were arranged on the X-axis to demonstrate where the tributaries, R7 and R6, enter the

SITE	SITE DESCRIPTION	ABUNDANCE	TAXOMONIC RICHNESS
R1	Rose Creek upstream	9,988	60
R7	North Fork of Rose Creek	10,965	37
R2	Rose Creek d/s tailings ponds and diversion canal	11,639	54
R3	Rose Creek midway between R2 and R4	1,808	40
R4	Rose Creek just u/s of Anvil Creek	4,430	52
R6	Anvil Creek just u/s of Rose Creek	1,232	36
R5	Anvil Creek d/s of Rose Creek	15,088	45

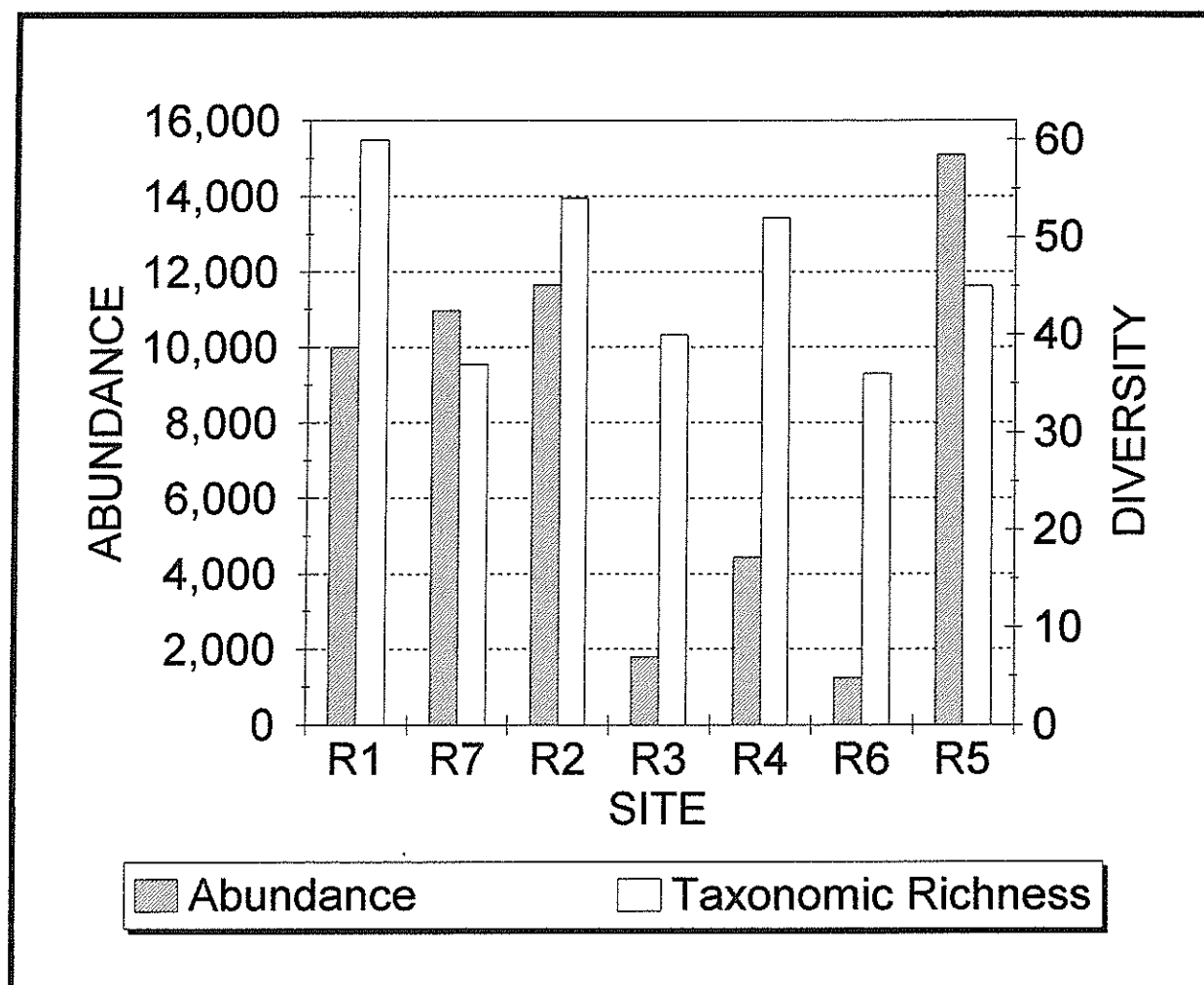


FIGURE 6 Abundance and Taxonomic Richness at Rose and Anvil Creeks, 2002

mainstem of Rose Creek. In general the communities were abundant and diverse although it is obvious that impacts resulting from difficulties in retrieving the samplers are evident at R3 and R6. The site R2 is located below the mixing zone of the Rose Creek diversion canal, seepages from the cross valley dam and the discharge from the tailings pond (X5). As such, R2 has the greatest potential for impacts from the tailings facility. However, the community here was diverse and abundant, indicating a state of health and productivity. The community located furthest downstream of the tailings facility, R5, was also abundant (with the highest population) and diverse. The degradation in population numbers at the communities in between these two sites was a result of problems encountered during the retrieval process of the samplers.

It should be noted that mine tailings have not been deposited into the Rose Creek surface tailings impoundments since 1992. From 1992 to mine shut down in 1998, all tailings were routed to the Faro pit. Any waters entering the tailings ponds are via surface runoff, seepages from X23 and from the rocks dumps, and commencing in the fall of 1997, periodic inflows of pre-treated water from the Faro Main Pit. The water at the discharge point, X5, was below the maximum allowable licensed limit of 0.50 mg/L zinc throughout 2002. The effluent zinc concentrations were lower, on average, in 2002 due to improved treatment in the new mill system (E. Denholm, pers. comm.).

4.3.2 Distribution

The composition of the benthos communities was displayed as a percentage of the major taxonomic orders for each station (Table 3). Based on this, taxa were classified with respect to their dominance within the community (Table 4).

Diptera was the dominant or co-dominant group at each site. Oligochaeta shared dominance at R2 and R3. The dominance of Oligochaeta represents a shift in dominance at these two sites over recent years. Within these two groups, the family Chironomidae formed the majority of Dipterans and the genus Chaetogaster of the family Naididae, formed the majority of Oligochaeta. The genus Chaetogaster is one of a few carnivorous forms, preying on protozoans, insect larvae and other worms (Pennak, 19). Most Oligochaetes obtain nutrition from ingesting substrate, similar to terrestrial earthworms. Environmental Protection, a branch of Environment Canada, maintains a database on aquatic benthic invertebrates in the Yukon. Chaetogaster sp has been documented throughout the Territory from the Whitehorse area to the Old Crow area (Doug Davidge, pers. comm. Nov 22, 2002).

Ephemeroptera was subdominant at R2 and R6 and shared subdominance at R1 and R4. "Other" was also subdominant at R1 with 8.6% of the total population comprised of *Hydra sp.* This genus is a member of the phylum of jellyfishes, Cnidaria. Periodically, *Hydra sp.* has shown up at R1

TABLE 3
THE PERCENTAGE OF COMPOSITION OF DIFFERENT TAXONOMIC
ORDERS AT EACH STATION

TAXONOMIC ORDER	R1	R2	R3	R4	R5	R6	R7
Ephemeroptera (mayflies)	17.2	19.3	6.7	10.7	8.7	10.9	2.4
Plecoptera (stoneflies)	2.0	5.7	3.6	10.9	6.4	4.5	8.0
Trichoptera (caddisflies)	0.6	1.3	1.3	3.4	0.5	3.0	0.7
Diptera (true flies)	63.8	44.5	32.6	51.6	74.6	74.4	85.1
Oligochaeta (aquatic worms)	0.7	25.4	46.9	12.9	5.3	0.1	0.1
Other *	15.7	3.9	9.0	10.6	4.5	7.1	3.7
* Other includes one or more of the following taxonomic groups:							
Coleoptera	Copepoda	Collembola	Aranaea				
Nematoda	Gastropoda	Homoptera	Hydracarina				
Hymenoptera	Lepidoptera	Cladocera					
Cnidara	Hirudinea	Thysanoptera					

TABLE 4
TAXONOMIC DISTRIBUTION OF BENTHIC INVERTEBRATES

SITE	DOMINANT (≥25%)	SUBDOMINANT (10% to 24.9%)	COMMON (1.0% to 9.9%)	RARE (0.1% to 0.9%)
R1	Diptera	Ephemeroptera Other	Plecoptera	Oligochaeta Trichoptera
R2	Diptera Oligochaeta	Ephemeroptera	Plecoptera Other Trichoptera	
R3	Oligochaeta Diptera		Other Ephemeroptera Plecoptera Trichoptera	
R4	Diptera	Oligochaeta Plecoptera Ephemeroptera Other	Trichoptera	
R5	Diptera		Ephemeroptera Plecoptera Oligochaeta Other	Trichoptera
R6	Diptera	Ephemeroptera	Other Plecoptera Trichoptera	Oligochaeta
R7	Diptera		Plecoptera Other Ephemeroptera	Trichoptera Oligochaeta

in relatively large numbers (5.7% of the total population in 1994), however most years it is absent in this system. There were also two other groups that were subdominant at R4, Oligochaeta and Plecoptera. There were no subdominant groups at R3 or R7.

Plecoptera was common at the other sites, along with some of the other insect orders. Oligochaeta was rare at the background sites.

Overall, all communities had good representation of insect orders that are usually present in lotic waters.

The insect orders Ephemeroptera, Trichoptera and Plecoptera are sensitive to most types of pollution (Rosenberg and Resh, 1993). Lehmkuhl (1979) has identified several groups within these insect orders that have very low tolerance to chemical pollution. Ten of these taxa (five taxa within Plecoptera, three taxa within Ephemeroptera and two taxa within Trichoptera) have been identified in the Rose and Anvil Creek study area. Table 5 summarizes the presence or absence of each of these taxa per site. Nine out of ten taxa were present at R4, eight at R1, R2 and R5, seven at R7 and six at R3 and R6. The presence of these sensitive insects indicates that the water quality throughout the system is good.

TABLE 5							
Presence (+) and Absence (-) of Sensitive Taxa at Rose and Anvil Creeks							
Sensitive Taxa	R1	R2	R3	R4	R5	R6	R7
Plecoptera							
Nemouridae	+	+	+	+	+	+	+
Perlodidae	+	+	+	+	+	-	+
Capniidae	+	+	+	+	+	-	+
Taeniopterigidae	+	+	-	+	+	+	+
Chloroperlidae	-	+	-	+	+	-	-
Ephemeroptera							
Epeorus	-	-	-	-	-	+	-
Ephemerellidae	+	+	+	+	+	+	+
Rithrogena	+	-	-	+	+	+	+
Trichoptera							
Brachycentriidae	+	+	+	+	-	-	-
Rhyacophilidae	+	+	+	+	+	+	+
Total # of sensitive taxa:	8	8	6	9	8	6	7
After Lehmkuhl (1979)							

4.3.3 Comparisons with Past Data

Several studies to assess the health of ecosystems have been conducted using benthic macroinvertebrates (Rosenberg and Resh, 1993). Using benthic invertebrates in biomonitoring offers many advantages for the following reasons; they are ubiquitous, they are abundant and easy to collect, there are a large number of species offering a spectrum of responses to environmental stress, they are generally sedentary and therefore are representative of local conditions, and they have long life cycles compared to other groups (i.e. periphyton). As such, benthic macroinvertebrates act as continuous monitors of the water they inhabit. Assessments are often based on taxa richness and the abundance of pollution sensitive insect orders.

Over the years various agencies and companies have collected benthic data using various sampling methods at varying times of the open water season. Summaries of the past fourteen years of Company (Anvil Range and Curragh Resources) monitoring data have been tabulated (Table 6). In each of these eight surveys, artificial substrate samplers were used, the same sample site locations were visited and the sampling personnel were consistent. In addition, the quality of the habitat (riparian vegetation and stream substrate) at each of these sites has changed relatively little over the past fourteen years. Consequently, some temporal and spatial comparisons can appropriately be made.

The populations of the benthic communities at each of the sites fluctuated significantly over the fourteen years examined, with a general trend to an increase in numbers over time. Figure 7 shows the log normal abundance at each site for the eight surveys examined. Populations tended to fluctuate the greatest at R3.

It is apparent from Table 6 that taxonomic richness has increased significantly at all sites since 1994, indicating that communities have become more diverse and thus healthier. However, the background site R7, has become less diverse since 1996.

For the most part, the insect orders Diptera and/or Ephemeroptera have been the dominant groups at all sites over time. R7 has always been dominated by Diptera and appears to be a stable population. There was a shift in dominance from Ephemeroptera to Oligochaeta (aquatic earthworms) at R2 and R3 in 2002. Annelida, the phylum containing Oligochaeta, was documented as the dominant group in 1990. In 1990, Limnotek Research and Development identified the organisms but did not key out the annelids further than phylum. There are only two classes of aquatic annelids found in the Yukon, Oligochaeta and Hirudinae (leeches). Since the numbers were so high, it can be safely assumed that the annelids documented in 1990 were Oligochaetes rather than the less common Hirudinae. However, there is no way of deducing

Table 6

Comparison of Benthic Data over a 14 Year Period

Site	Year	Total Abundance	Taxonomic Richness	Dominant Taxa
R1	1988	128	24	Plecoptera & Ephemeroptera
	1990	1,373	21	Diptera & Ephemeroptera
	1992	1,141	27	Diptera
	1994	5,489	60	Ephemeroptera
	1996	1,629	57	Diptera
	1998	50,808	57	Diptera & Ephemeroptera
	2000	5,368	57	Diptera
	2002	9,988	60	Diptera
R2	1988	115	24	Diptera
	1990	4,564	20	Annelida & Diptera
	1992	400	14	Diptera
	1994	920	47	Ephemeroptera & Diptera
	1996	991	37	Diptera & Ephemeroptera
	1998	1,945	47	Diptera & Ephemeroptera
	2000	6,611	48	Diptera & Ephemeroptera
	2002	11,639	54	Diptera & Oligochaeta
R3	1988	32	8	Diptera
	1990	2,455	20	Annelida & Diptera
	1992	321	12	Diptera
	1994	54,875	49	Ephemeroptera & Plecoptera
	1996	144	25	Diptera
	1998	13,491	39	Diptera
	2000	18,929	42	Ephemeroptera
	2002	1,808	40	Oligochaeta & Diptera
R4	1988	116	15	Diptera
	1990	2,175	20	Diptera
	1992	312	14	Diptera
	1994	2,366	53	Ephemeroptera & Diptera
	1996	666	35	Ephemeroptera
	1998	8,148	48	Ephemeroptera & Diptera
	2000	N.D.	N.D.	N.D.
	2002	4,430	52	Diptera
R5	1988	425	22	Diptera & Plecoptera
	1990	3,470	25	Diptera
	1992	1,263	25	Diptera & Acarina
	1994	4,115	55	Diptera
	1996	2,726	43	Diptera
	1998	7,974	44	Diptera & Ephemeroptera
	2000	66,975	54	Diptera
	2002	15,088	45	Diptera
R6	1988	N.D.	N.D.	N.D.
	1990	3,477	25	Diptera
	1992	3,911	31	Diptera
	1994	15,431	46	Diptera & Ephemeroptera
	1996	2,741	45	Diptera
	1998	26,944	43	Diptera & Ephemeroptera
	2000	39,344	56	Diptera
	2002	1,232	36	Diptera
R7	1988	N.D.	N.D.	N.D.
	1990	2,467	26	Diptera
	1992	1,053	22	Diptera
	1994	14,756	44	Diptera
	1996	7,029	45	Diptera
	1998	39,292	44	Diptera
	2000	4,574	40	Diptera
	2002	10,965	37	Diptera

N.D. = not done

which families were comprised within this class. As mentioned earlier, the family Naidae formed the majority of Oligochaetes at R2 and R3 in 2002. Naidids are common and frequently abundant in creeks with stony substrates. Abundance of Oligochaetes is a result of an increase in organic enrichment (Pennak, 1989). The genus Chaetogaster was the most numerous of the Oligochaetes at these sites. They are atypical in that they are predators and feed on small organisms. It is not known why such an increase in organic inputs occurred in 2002, but it can be speculated that since both the Intermediate and the Cross Valley Ponds were kept 1 to 1.5 metres below the spillway in the summer of 2002 (Dana Hagggar, email comm.), the ponds were generally shallower. This would have allowed the sunlight to warm the smaller volumes causing temperature and productivity to increase. This organic matter would travel downstream to R2 and R3 and may explain a possible source of organic enrichment. However, no obvious increase in biofilm or algae growth was observed in the ponds or at the sites.

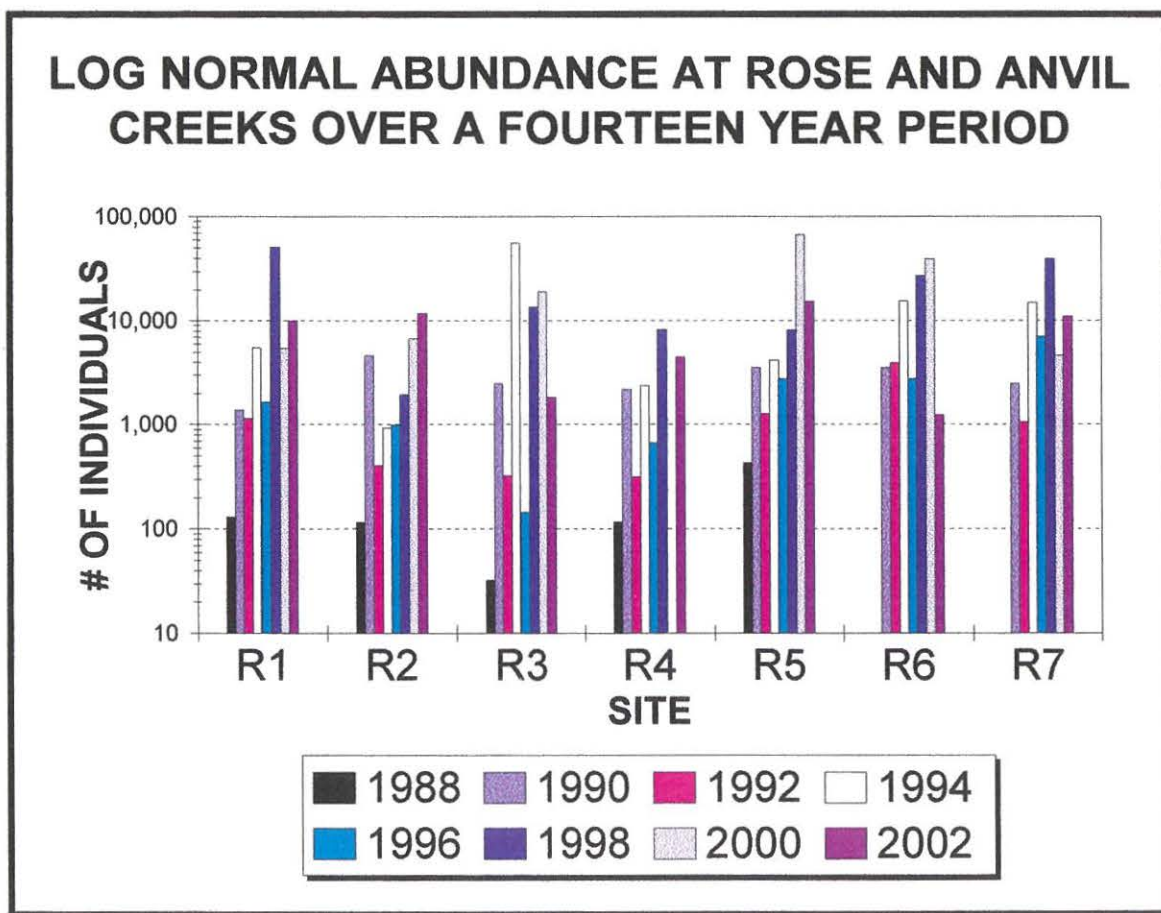


FIGURE 7 Log Normal Abundance at Rose and Anvil Creeks over a Fourteen Year Period

5.0 SUMMARY

Overall, the water samples collected at the sites in this study and analyzed for the selected parameters, indicated good water quality for the support of aquatic life. The waters tested were clear, slightly alkaline and well aerated. Concentrations of total and dissolved metals were generally very low where detected. Copper and lead concentrations exceeded the CCME guidelines at some of the sites. These increases occurred at the background sites (R1, R6 and R7) as well, indicating that these concentrations presumably resulted through natural conditions.

Flows were abnormally high during the September visit and inhibited the collections of some of the data.

The composition of the benthic macroinvertebrate populations at all of the sites appeared healthy and diverse with good representation of pollution sensitive insects.

Based on data collected in 2002, and comparisons with historic data, it appears that effluent from the tailings system currently has minimal, if any, impact on the receiving environment.

- Lehmkuhl, Dennis M. 1979. *How to Know the Aquatic Insects*. University of Saskatchewan. Wm. C. Brown C. Publishers. Dubuque, Iowa.
- Merrit, R.W. and K.W. Cummins. 1988. *An Introduction to the Aquatic Insects of North America, Second Edition*. Kendall/Hunt Publishing Co. ISBN 0-8403-3180
- Pennak, Robert W. 1989. *Fresh-water Invertebrates of the United States, Third Edition*. John Wiley and Sons, New York.
- Rosenberg, David M. and Vincent H. Resh. 1993. *Freshwater Biomonitoring and Benthic Macroinvertebrates*. Chapman & Hall Inc. New York.

APPENDIX A

WATER QUALITY DATA, 2002

APPENDIX A

WATER QUALITY, JULY 2002

CAVENDISH ANALYTICAL LABORATORY LTD.

1650 Pandora Street, Vancouver, B.C. V5L 1L6

Ph: 604-251-4456 Fx: 604-258-9497

www.cavendish.ca metals@cavendish.ca

To: Anvil Range Mining

Postal Bag 1000

Faro, Yukon Canada Y0B-1K0

Attention: Mr. Dana Haggar

Project: 44964

CERTIFICATE OF ANALYSIS :

020729A

Sample Name	ppb Ag	ppb Al	ppb As	ppm B	ppb Ba	ppb Be	ppm Bi	ppm Ca	ppb Cd	ppb Co	ppb Cr	ppb Cu	ppb Fe	ppm K	ppb La	ppm Mg
R-1 D	0.06	73.1	0.9	0.12	57.3	<0.04	<0.002	28.74	0.24	<0.2	0.9	17.6	79.9	0.87	1.8	6.31
R-2 D	0.23	46.8	10.3	0.11	24.5	<0.04	<0.002	79.22	0.12	1.4	<0.2	21.8	63.3	4.54	<0.2	20.66
R-3 D	0.10	48.6	4.6	0.12	22.6	<0.04	<0.002	70.55	0.25	1.3	1.1	19.0	70.3	3.84	<0.2	17.59
R-4 D	<0.04	46.9	<0.6	0.10	43.5	<0.04	<0.002	39.33	0.08	<0.2	0.4	15.9	61.0	1.57	0.3	8.22
R-5 D	0.05	41.2	1.5	0.09	67.2	<0.04	<0.002	38.17	0.05	<0.2	0.5	16.5	62.1	1.36	0.3	9.76
R-6 D	<0.04	48.8	<0.6	0.11	78.1	<0.04	<0.002	38.73	0.13	<0.2	1.1	17.7	69.5	1.40	0.5	10.12
R-7 D	0.06	48.6	0.7	0.09	58.1	<0.04	<0.002	24.53	0.09	<0.2	1.0	15.6	58.7	0.66	2.3	4.88
R-1 T	0.04	77.8	13.6	0.12	65.7	<0.04	<0.002	26.19	0.08	0.3	2.6	10.7	102.8	0.63	2.1	5.63
R-2 T	0.16	86.4	14.4	0.12	71.3	<0.04	<0.002	71.00	0.06	1.4	2.7	13.2	174.1	3.47	<0.2	18.14
R-3 T	0.08	113.2	21.0	0.15	64.0	<0.04	<0.002	65.06	<0.04	1.0	2.4	11.9	140.6	3.00	<0.2	16.33
R-4 T	<0.04	74.8	7.0	0.11	67.8	<0.04	<0.002	36.35	0.27	0.2	2.6	11.5	94.0	1.12	0.5	7.36
R-5 T	<0.04	98.6	9.5	0.09	101.3	<0.04	<0.002	36.73	<0.04	<0.2	2.3	9.2	116.1	1.04	0.5	9.09
R-6 T	0.04	90.0	6.0	0.10	79.5	<0.04	<0.002	36.25	0.27	<0.2	2.2	10.9	115.6	1.01	0.3	9.16
R-7 T	<0.04	91.1	5.6	0.12	60.3	<0.04	<0.002	22.59	0.08	<0.2	2.4	14.6	106.8	0.49	2.4	4.52

Sample Name	ppb Mn	ppb Mo	ppm Na	ppb Ni	ppm P	ppb Pb	ppm S	ppb Sb	ppm Se	ppm Si	ppb Sn	ppb Sr	ppb Ti	ppb V	ppm W	ppb Zn
R-1 D	15.4	1.6	2.60	1.2	0.005	4.9	5.26	<0.4	<0.001	6.53	12.2	121.1	0.5	<0.2	<0.006	8.7
R-2 D	746.7	2.5	11.58	3.0	0.005	0.6	82.23	<0.4	<0.001	3.89	18.4	275.5	<0.2	0.6	<0.006	19.8
R-3 D	463.4	2.7	9.97	2.1	<0.002	2.0	67.45	2.8	<0.001	3.76	20.0	245.6	<0.2	0.4	<0.006	13.9
R-4 D	61.7	1.5	3.79	1.6	0.004	4.0	15.71	<0.4	<0.001	3.84	12.8	146.9	<0.2	<0.2	<0.006	10.1
R-5 D	13.4	1.5	1.96	1.3	0.006	4.6	6.99	<0.4	0.003	4.00	10.2	120.1	<0.2	0.3	<0.006	1.7
R-6 D	9.6	2.2	1.96	1.4	<0.002	4.5	6.37	<0.4	0.002	4.03	11.7	118.7	0.2	0.3	<0.006	4.0
R-7 D	5.7	1.2	1.93	0.7	0.006	7.8	2.47	<0.4	<0.001	4.06	11.6	98.8	<0.2	<0.2	<0.006	1.2
R-1 T	18.2	2.2	1.83	3.9	0.006	4.0	4.65	3.2	<0.001	4.09	9.6	111.5	1.0	<0.2	0.008	17.6
R-2 T	690.4	3.6	10.31	3.9	<0.002	1.2	71.25	8.9	0.008	3.73	23.6	248.2	1.3	0.5	<0.006	29.9
R-3 T	450.1	3.2	9.11	3.0	<0.002	1.6	60.98	1.9	0.007	4.45	22.0	232.9	1.0	0.5	<0.006	21.1
R-4 T	64.8	2.3	3.16	2.1	0.002	3.4	13.84	0.8	<0.001	4.00	11.0	135.2	1.2	<0.2	<0.006	10.5
R-5 T	15.8	3.1	1.74	1.8	0.004	5.1	6.37	3.2	<0.001	3.98	8.8	114.4	1.3	0.3	<0.006	6.0
R-6 T	13.6	2.7	1.57	2.1	0.009	4.8	5.79	0.8	<0.001	4.36	9.3	110.2	1.3	0.3	<0.006	1.8
R-7 T	7.8	2.2	1.66	1.8	0.003	2.2	2.17	1.9	<0.001	4.30	9.0	92.9	1.3	<0.2	<0.006	4.8

APPENDIX A

WATER QUALITY, JULY 2002

QA/QC

CAVENDISH ANALYTICAL LABORATORY LTD.

1650 Pandora Street, Vancouver, B.C. V5L 1L6

Ph: 604-251-4456 Fx: 604-258-9497

www.cavendish.ca metals@cavendish.ca

To: Anvil Range Mining

Postal Bag 1000

Faro, Yukon Canada Y0B-1K0

Attention: Mr. Dana Haggar

Project: 44964

CERTIFICATE OF ANALYSIS :

020729A

Sample Name	ppb Ag	ppb Al	ppb As	ppm B	ppb Ba	ppb Be	ppm Bi	ppm Ca	ppb Cd	ppb Co	ppb Cr	ppb Cu	ppb Fe	ppm K	ppb La	ppm Mg
R-2 D	0.23	46.8	10.3	0.11	24.5	<0.04	<0.002	79.22	0.12	1.4	<0.2	21.8	63.3	4.54	<0.2	20.66
R-2 D/Dup	0.11	50.2	8.8	0.10	19.1	<0.04	<0.002	78.58	0.19	1.5	0.6	19.9	66.3	4.65	<0.2	20.57
R-5 T	<0.04	98.6	9.5	0.09	101.3	<0.04	<0.002	36.73	<0.04	<0.2	2.3	9.2	116.1	1.04	0.5	9.09
R-5 T/Dup	0.06	111.4	5.8	0.12	88.0	<0.04	<0.002	36.26	<0.04	<0.2	2.4	9.0	129.4	1.01	0.3	8.96
STD-KWX.2	4.70	1634.3	66.3	0.35	21.1	5.35	0.087	39.62	19.11	56.5	49.1	99.4	3853.1	22.74	102.1	9.86
c STD-KWX.2	4.60	1600.0	65.0	0.38	22.0	5.60	0.088	40.00	20.00	56.0	50.0	100.0	3800.0	23.00	102.6	10.00
STD Blank D	<0.04	0.3	<0.6	<0.01	<0.2	<0.04	<0.002	<0.02	<0.04	<0.2	<0.2	0.5	<0.4	<0.02	0.2	0.03
STD Blank T	<0.04	0.3	0.6	<0.01	0.3	<0.04	<0.002	0.03	0.04	<0.2	0.6	0.4	0.6	0.04	<0.2	0.02
STD Detection	0.04	0.2	0.6	0.01	0.2	0.04	0.002	0.02	0.04	0.2	0.2	0.2	0.4	0.02	0.2	0.02

Sample Name	ppb Mn	ppb Mo	ppm Na	ppb Ni	ppm P	ppb Pb	ppm S	ppb Sb	ppm Se	ppm Si	ppb Sn	ppb Sr	ppb Ti	ppb V	ppm W	ppb Zn
R-2 D	746.7	2.5	11.58	3.0	0.005	0.6	82.23	<0.4	<0.001	3.89	18.4	275.5	<0.2	0.6	<0.006	19.8
R-2 D/Dup	737.8	2.5	11.72	2.7	<0.002	1.1	80.51	1.8	<0.001	3.80	17.7	270.9	<0.2	0.4	<0.006	19.2
R-5 T	15.8	3.1	1.74	1.8	0.004	5.1	6.37	3.2	<0.001	3.98	8.8	114.4	1.3	0.3	<0.006	6.0
R-5 T/Dup	17.5	2.8	1.77	1.9	0.003	2.5	6.38	1.1	0.003	4.37	11.5	112.2	2.3	0.2	<0.006	3.5
STD-KWX.2	115.1	10.4	20.85	39.7	0.595	103.4	11.02	81.6	0.100	0.70	130.6	101.8	81.4	19.8	0.055	114.4
c STD-KWX.2	116.0	10.6	20.00	40.0	0.600	106.0	11.20	84.0	0.094	0.70	139.7	100.0	80.0	20.0	0.050	115.0
STD Blank D	<0.2	<0.2	<0.02	<0.2	<0.002	<0.4	0.05	0.6	<0.001	<0.02	<0.4	<0.2	0.3	<0.2	<0.006	0.3
STD Blank T	<0.2	0.6	<0.02	0.3	0.004	0.5	0.06	0.9	<0.001	<0.02	<0.4	<0.2	0.5	<0.2	<0.006	0.6
STD Detection	0.2	0.2	0.02	0.2	0.002	0.4	0.02	0.4	0.001	0.02	0.4	0.2	0.2	0.2	0.006	0.2

APPENDIX A

WATER QUALITY, JULY 2002

CAVENDISH ANALYTICAL LABORATORY LTD.

1650 Pandora Street, Vancouver, B.C. V5L 1L6

Ph: 604-251-4456 Fax: 604-258-9497

www.cavendish.ca inorganics@cavendish.ca

To: Anvil Range Mining

Postal Bag 1000

Faro Yukon Canada

Attention: Mr. Dana Haggar

Project: 217123

Samples: 7

Date Received: 7/29/02

Date Out: 8/2/02

Certificate of Analysis: 020729A

Sample Type: Water Ultratrace

Units	ug/ml	ug/ml	ug/ml	ug/ml	ug/ml	ug/ml
Sample Name	Alkalinity	CN-tot	NH3-N	TSS	Hardness	SO4
R-1 D	83	n/a	<0.05	1	105	16
R-2 D	82	<0.01	0.31	4	331	258
R-3 D	82	<0.01	0.20	3	296	217
R-4 D	92	<0.01	<0.05	2	148	50
R-5 D	98	n/a	<0.05	3	157	23
R-6 D	127	n/a	<0.05	1	158	21
R-7 D	78	n/a	<0.05	<1	92	8
Alkalinity Method APHA 2310B			Hardness Method APHA 2340C			
CN-tot Method EPA 335.3			SO4 Method EPA 6010			
NH3-N Method APHA 4500						
TSS Method APHA 2540B						

QA/QC**CAVENDISH ANALYTICAL LABORATORY LTD.**

1650 Pandora Street, Vancouver, B.C. V5L 1L6

Ph: 604-251-4456 Fax: 604-258-9497

www.cavendish.ca inorganics@cavendish.ca

To: Anvil Range Mining

Postal Bag 1000

Faro Yukon Canada

Attention: Mr. Dana Haggar

Project: 217123

Samples: 6

Date Received: 7/29/02

Date Out: 8/2/02

Certificate of Analysis: 020729A

Sample Type: Water Ultratrace

Units	ug/ml	ug/ml	ug/ml	ug/ml	ug/ml	ug/ml
Sample Name	Alkalinity	CN-tot	NH3-N	TSS	Hardness	SO4
R-2 D	82	<0.01	0.31	4	331	258
R-2 D/Dup	82	<0.01	0.27	3	333	261
STD	122	9.00	1.75	n/a	695	168
STD Certified	127	10.00	1.70	n/a	706	168
STD Blank	n/a	<0.01	<0.05	<1	<1	<1
STD Detection	5	0.01	0.05	1	1	1
Alkalinity Method APHA 2310B			Hardness Method APHA 2340C			
CN-tot Method EPA 335.3			SO4 Method EPA 6010			

APPENDIX A

WATER QUALITY, SEPTEMBER 2002

CAVENDISH ANALYTICAL LABORATORY LTD.

1650 Pandora Street, Vancouver, B.C. V5L 1L6

Ph: 604-251-4456 Fx: 604-258-9497

www.cavendish.ca metals@cavendish.ca

To: Anvil Range Mining

Postal Bag 1000

Faro, Yukon Canada Y0B-1K0

Attention: Mr. Dana Haggard

Project: NONE

CERTIFICATE OF ANALYSIS :

020909A

Sample Name	ppb Ag	ppm Al	ppm As	ppm B	ppm Ba	ppb Be	ppm Bi	ppm Ca	ppb Cd	ppm Co	ppm Cr	ppm Cu	ppm Fe	ppm K	ppm La	ppm Mg
R-1D	<0.2	0.060	<0.003	0.19	0.114	0.6	<0.01	20.5	0.2	<0.001	<0.001	0.015	0.097	0.6	<0.001	4.4
R-2D	<0.2	0.058	0.019	0.19	0.112	<0.2	0.02	28.1	0.4	<0.001	0.002	0.015	0.135	0.9	<0.001	6.4
R-3D	<0.2	0.063	0.043	0.18	0.112	<0.2	0.01	26.4	<0.2	<0.001	<0.001	0.015	0.104	0.9	<0.001	5.8
R-4D	<0.2	0.042	0.036	0.16	0.125	<0.2	<0.01	28.5	<0.2	0.002	<0.001	0.014	0.071	0.9	<0.001	6.4
R-5D	<0.2	0.042	0.009	0.15	0.127	0.6	0.02	34.7	0.2	<0.001	<0.001	0.016	0.068	1.1	<0.001	9.5
R-6D	<0.2	0.050	0.015	0.15	0.133	<0.2	<0.01	35.3	<0.2	<0.001	<0.001	0.014	0.056	1.1	<0.001	9.6
R-7D	<0.2	0.081	0.031	0.16	0.117	0.3	<0.01	21.1	<0.2	0.001	0.001	0.014	0.058	0.6	<0.001	4.4
R-1T	0.4	0.099	0.037	0.28	0.125	0.3	0.01	19.9	<0.2	<0.001	0.007	0.010	0.242	0.6	<0.001	4.2
R-2T	0.4	0.090	<0.003	0.19	0.147	0.7	<0.01	25.7	0.2	0.003	0.002	0.007	0.234	0.8	<0.001	5.9
R-3T	<0.2	0.119	0.056	0.20	0.137	0.3	0.02	26.6	<0.2	<0.001	0.002	0.014	0.210	0.8	<0.001	5.8
R-4T	<0.2	0.103	0.028	0.17	0.146	0.3	<0.01	27.2	0.5	0.001	0.002	0.009	0.239	0.9	<0.001	6.1
R-5T	<0.2	0.107	0.027	0.17	0.141	0.3	<0.01	32.9	<0.2	<0.001	0.003	0.007	0.201	0.9	<0.001	8.9
R-6T	<0.2	0.103	0.018	0.16	0.133	0.3	<0.01	33.7	<0.2	<0.001	0.002	0.007	0.206	0.9	<0.001	9.0
R-7T	1.6	0.107	0.043	0.16	0.128	0.3	<0.01	20.1	<0.2	<0.001	0.002	0.007	0.163	0.5	<0.001	4.1

Sample Name	ppm Mn	ppm Mo	ppm Na	ppm Ni	ppm P	ppm Pb	ppm S	ppm Sb	ppm Se	ppm Si	ppm Sn	ppm Sr	ppm Ti	ppm V	ppm W	ppm Zn
R-1D	0.013	<0.001	1.1	<0.001	0.01	<0.002	3.3	<0.002	<0.005	5.4	<0.002	0.090	<0.001	<0.001	<0.03	0.006
R-2D	0.158	0.002	1.2	0.005	0.03	0.004	8.2	0.003	<0.005	4.9	<0.002	0.115	<0.001	<0.001	<0.03	0.016
R-3D	0.102	<0.001	1.2	0.002	0.02	0.002	6.8	0.002	<0.005	4.9	0.003	0.103	<0.001	<0.001	<0.03	0.017
R-4D	0.075	0.001	1.4	0.003	0.02	0.003	8.0	<0.002	<0.005	5.0	0.002	0.113	<0.001	<0.001	<0.03	0.013
R-5D	0.021	0.001	1.4	0.004	0.02	<0.002	6.0	<0.002	<0.005	4.8	0.002	0.102	<0.001	<0.001	<0.03	0.003
R-6D	0.017	0.004	1.2	0.007	<0.01	0.004	5.9	0.015	<0.005	4.9	<0.002	0.099	<0.001	<0.001	<0.03	0.010
R-7D	0.013	0.002	1.7	0.003	<0.01	<0.002	2.5	0.015	<0.005	4.9	<0.002	0.083	<0.001	<0.001	<0.03	0.002
R-1T	0.015	0.004	1.3	0.007	<0.01	0.008	3.3	<0.002	<0.005	4.9	<0.002	0.082	0.003	0.002	<0.03	0.017
R-2T	0.155	0.001	1.4	0.005	0.03	0.005	8.0	<0.002	<0.005	4.6	<0.002	0.105	0.002	<0.001	<0.03	0.021
R-3T	0.117	0.001	1.7	0.008	0.03	<0.002	7.0	0.004	<0.005	4.9	<0.002	0.107	0.003	<0.001	<0.03	0.014
R-4T	0.103	0.001	2.4	0.006	<0.01	<0.002	7.7	<0.002	<0.005	4.7	<0.002	0.105	0.003	0.002	<0.03	0.013
R-5T	0.028	0.003	2.1	0.002	<0.01	<0.002	5.7	<0.002	<0.005	4.6	0.002	0.093	0.003	<0.001	<0.03	0.008
R-6T	0.022	0.002	1.5	0.002	<0.01	<0.002	5.7	0.008	<0.005	4.7	<0.002	0.093	0.003	<0.001	<0.03	0.005
R-7T	0.018	0.003	1.9	0.003	0.01	<0.002	2.5	0.004	<0.005	4.5	<0.002	0.078	0.002	<0.001	<0.03	<0.001

APPENDIX A

WATER QUALITY, SEPTEMBER 2002

CAVENDISH ANALYTICAL LABORATORY LTD.
 1650 Pandora Street, Vancouver, B.C. V5L 1L6
 Ph: 604-251-4456 Fx: 604-258-9497
 www.cavendish.ca metals@cavendish.ca

To: Anvil Range Mining
 Postal Bag 1000
 Faro, Yukon Canada Y0B-1K0
 Attention: Mr. Dana Haggar

QA/QC

Project: NONE

CERTIFICATE OF ANALYSIS :

020909A

Sample Name	ppb Ag	ppm Al	ppm As	ppm B	ppm Ba	ppb Be	ppm Bi	ppm Ca	ppb Cd	ppm Co	ppm Cr	ppm Cu	ppm Fe	ppm K	ppm La	ppm Mg
R-2 D	<0.2	0.058	0.019	0.19	0.112	<0.2	0.02	28.1	0.4	<0.001	0.002	0.015	0.135	0.9	<0.001	6.4
R-2 D/Dup	<0.2	0.050	0.018	0.15	0.128	0.3	0.02	27.6	0.5	<0.001	<0.001	0.014	0.110	0.9	<0.001	6.4
R-5 T	<0.2	0.107	0.027	0.17	0.141	0.3	<0.01	32.9	<0.2	<0.001	0.003	0.007	0.201	0.9	<0.001	8.9
R-5 T/Dup	<0.2	0.122	0.025	0.17	0.125	0.2	0.02	33.3	<0.2	<0.001	0.002	0.009	0.201	0.9	<0.001	9.1
STD-KW	23.2	8.087	0.338	1.84	0.107	27.6	0.44	198.2	97.6	0.284	0.243	0.495	19.324	115.6	0.499	49.2
c STD-KW	23.0	8.000	0.325	1.90	0.110	28.0	0.44	200.0	100.0	0.280	0.250	0.500	19.000	115.0	0.513	50.0
STD Blank D	<0.2	<0.001	<0.003	<0.05	<0.001	<0.2	<0.01	<0.1	<0.2	<0.001	<0.001	0.002	<0.002	<0.1	<0.001	0.1
STD Blank T	0.3	0.002	<0.003	<0.05	<0.001	<0.2	<0.01	0.1	<0.2	<0.001	0.002	0.002	0.003	0.1	0.002	0.1
STD Detection	0.2	0.001	0.003	0.05	0.001	0.2	0.01	0.1	0.2	0.001	0.001	0.001	0.002	0.1	0.001	0.1

Sample Name	ppm Mn	ppm Mo	ppm Na	ppm Ni	ppm P	ppm Pb	ppm S	ppm Sb	ppm Se	ppm Si	ppm Sn	ppm Sr	ppm Ti	ppm V	ppm W	ppm Zn
R-2 D	0.158	0.002	1.2	0.005	0.03	0.004	8.2	0.003	<0.005	4.9	<0.002	0.115	<0.001	<0.001	<0.03	0.016
R-2 D/Dup	0.157	<0.001	1.1	0.008	0.01	<0.002	8.4	0.004	<0.005	4.6	<0.002	0.111	<0.001	<0.001	<0.03	0.016
R-5 T	0.028	0.003	2.1	0.002	<0.01	<0.002	5.7	<0.002	<0.005	4.6	0.002	0.093	0.003	<0.001	<0.03	0.008
R-5 T/Dup	0.029	0.002	1.5	0.002	0.02	<0.002	6.0	<0.002	<0.005	4.7	<0.002	0.096	0.003	<0.001	<0.03	0.004
STD-KW	0.583	0.055	104.8	0.193	3.00	0.518	56.0	0.412	0.473	3.3	0.692	0.509	0.407	0.098	0.25	0.557
c STD-KW	0.580	0.053	105.0	0.200	3.00	0.530	56.0	0.420	0.469	3.5	0.699	0.500	0.400	0.100	0.25	0.575
STD Blank D	<0.001	<0.001	<0.1	<0.001	0.01	<0.002	<0.1	<0.002	<0.005	<0.1	<0.002	<0.001	<0.001	<0.001	<0.03	0.003
STD Blank T	<0.001	0.002	0.2	<0.001	0.02	<0.002	<0.1	<0.002	<0.005	0.1	<0.002	<0.001	0.001	<0.001	<0.03	<0.001
STD Detection	0.001	0.001	0.1	0.001	0.01	0.002	0.1	0.002	0.005	0.1	0.002	0.001	0.001	0.001	0.03	0.001

WATER QUALITY, SEPTEMBER 2002

CAVENDISH ANALYTICAL LABORATORY LTD.
1650 Pandora Street, Vancouver, B.C. V5L 1L6
Ph: 604-251-4456 Fax: 604-258-9497
www.cavendish.ca inorganics@cavendish.ca

To: Anvil Range Mining
Postal Bag 1000
Faro Yukon Canada
Attention: Mr. Dana Hagggar
Project: NONE

Samples: 7
Date Received: 9/9/02
Date Out: 9/16/02

Certificate of Analysis: 020909A

Sample Type: Water Total

Units	ug/ml	ug/ml	uS	ug/ml	ug/ml	ug/ml	ug/ml
Sample Name	Alkalinity	CN-tot:conductivity	NH3-N	TSS	Hardness	SO4	
R-1 D	56	n/a	127	<0.05	3	65	10
R-2 D	66	<0.01	175	<0.05	2	92	24
R-3 D	63	<0.01	166	<0.05	3	87	21
R-4 D	68	<0.01	178	<0.05	4	96	23
R-5 D	95	n/a	235	<0.05	5	122	18
R-6 D	97	n/a	230	<0.05	4	125	17
R-7 D	57	n/a	123	<0.05	5	68	7
Alkalinity Method APHA 2310B				Hardness Method APHA 2340C			
CN-tot Method EPA 335.3				SO4 Method EPA 6010			
Conductivity Method APHA 2510B							
NH3-N Method APHA 4500							
TSS Method APHA 2540B							

QA/QC

CAVENDISH ANALYTICAL LABORATORY LTD.
1650 Pandora Street, Vancouver, B.C. V5L 1L6
Ph: 604-251-4456 Fax: 604-258-9497
www.cavendish.ca inorganics@cavendish.ca

To: Anvil Range Mining
Postal Bag 1000
Faro Yukon Canada
Attention: Mr. Dana Hagggar
Project: NONE

Samples: 6
Date Received: 9/9/02
Date Out: 9/16/02

Certificate of Analysis: 020909A

Sample Type: Water Total

Units	ug/ml	ug/ml	uS	ug/ml	ug/ml	ug/ml	ug/ml
Sample Name	Alkalinity	CN-tot:conductivity	NH3-N	TSS	Hardness	SO4	
R-2 D	66	<0.01	175	<0.05	2	92	24
R-2 D/Dup	67	<0.01	175	<0.05	1	92	25
STD	128	9.10	1410	1.69	n/a	715	169
STD Certified	127	10.00	1412	1.70	n/a	706	168
STD Blank	n/a	<0.01	<2	<0.05	<1	<1	<1
STD Detection	5	0.01	2	0.05	1	1	1
Alkalinity Method APHA 2310B				Hardness Method APHA 2340C			
CN-tot Method EPA 335.3				SO4 Method EPA 6010			
Conductivity Method APHA 2510B							
NH3-N Method APHA 4500							
TSS Method APHA 2540B							

APPENDIX B

BENTHIC INVERTEBRATE DATA, 2002

APPENDIX B

BENTHIC MACRO-INVERTEBRATE DATA, 2002

Sample Number: Fine fraction split to:	R1a 1/2	R1c 1/4	R1b 1/8	R2a 1/16	R2b	R2c 1/4	R3a	R3b 1/4	R3c	R4a 1/2	R4b 1/4	R4c
PHYLUM ARTHROPODA												
Class Insecta												
Order Ephemeroptera												
Family Baetidae												
Baetis sp	802	469	326	1722	1	74	86	31		107	242	8
Family Heptageniidae												
Cinygmula sp	2			132	3					15	22	3
Epeorus (Iron) sp						11						
Heptagenia sp	10			1								
Rhithrogena sp	3		1							12	18	19
Family Ephemerellidae												
Drunella doddsi	10	3	3	295			1		3	7	2	7
Drunella grandis	36	15	19									
Ephemerella sp		15	6				1			8	5	
Seratella tibialis				1		1						
Order Plecoptera												
Family Nemouridae												
Amphinemoura sp	1											
Zapada sp	84	44	43	415	8	153	38	23		208	184	22
Family Capniidae												
Capnia sp	1			3		2	1			7	5	4
Family Perlodidae												
Isoperla sp	4	1	9	33	4	32	3				4	
Skwala curvata				3								1
Skwala paralella				8		4				4	1	
Family Taeniopterygidae												
Taenionema sp	5	1	3	2		1				19	25	
Family Chloroperlidae												
Sweltsa sp gp						1					1	
Order Trichoptera												
Trichoptera Pupae												
Trichoptera Unid J	1		8	32	1	4						
Family Hydropsychidae												
Arctopsyche sp	2	1	11	44	5	12				29	39	7
Family Brachycentridae												
Brachycentrus sp	2	1		1			11	1		22	4	2
Micrasema sp							7			1		1
Family Limnephilidae												
Dicosmoecus sp	1				1	4				1		
Family Glossosomatidae												
Glossosoma sp	1											
Family Rhyacophilidae												
Rhyacophila sp J										6	20	1
Rhyacophila acropedes or vao	13	8	7	10		32	3	1		5	9	
Rhyacophila hyalinata	1	2								1	3	
Rhyacophila vepulsa												
Order Diptera												
Diptera Unid A												
Diptera Unid L	1				2	2	2					
Family Ceratopogonidae												
Bezzia sp	2		24	86		32		1				
Culicoides sp										1		
Family Chironomidae												
Chironomidae Unid L	254	752	336	3	113	342	146	168		198	394	42
Chironomidae P	12	17		3		2	2	4		2	4	1
Chironomidae A												
Sub Family Orthocladiinae												
Cardiocladius sp	48	51	55	57	27	80	2	2		65	67	5
Corynoneura sp						4						
Cricotopus sp	62	44	182	63	41	171	28	1	8	69	42	4
Eukiefferiella sp	574	775	994	684	15	293	40	72	1	292	533	19
Euryhopsis sp	8	8				4						
Heterotrissocladius sp	2					8				2	4	

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

APPENDIX B

BENTHIC MACRO-INVERTEBRATE DATA, 2002

Sample Number: Fine fraction split to:	R1a 1/2	R1c 1/4	R1b 1/8	R2a 1/16	R2b	R2c 1/4	R3a	R3b 1/4	R3c	R4a 1/2	R4b 1/4	R4c
Rheotanytarsus sp	234	128	264	1737	117	758	5	28		42	57	1
Thienemaniella sp			16									
Sub Family Tanypodinae												
Thienemannimyia sp	2		9	198	4	136						
Sub Family Diamesinae												
Diamesa sp	352	688	419	64	5	12	32	4		61	199	14
Sub Family Chironominae												
Cyphomella sp												
Micropsectra sp	6		9	48	1	16						
Family Empididae												
Chelifera sp				17			2				4	
Weidemannia sp						4						
Family Psychodidae												
Pericoma sp	5		2	11		9	8	5		25	23	
Family Simuliidae												
Cnephia sp L										1		
Simulium sp P		1								1	1	
Simulium sp L	3	17	8			1	16	8	3	38	21	16
Prosimulium sp P				1								
Prosimulium sp L	3	4					1			10	22	4
Family Tipulidae												
Dicranota sp	3					4	1					
Tipula sp												
Order Collembola												
Isotomurus sp								2		12	8	1
Order Coleoptera												
Family Staphylinidae A								1				
Order Homoptera												
Family Aphididae	2	4	8			4	3					
Family Cicadellidae	1		3			3	2				1	
Order Hymenoptera A	1									1		
Order Lepidoptera L							1					
Order Thysanoptera A	1											
Class Arachnida												
Order Aranaea	1			1			2	1	1			1
Order Hydracarina												
Hydracarina Unid J		4	8	80		20	3	8		6	24	1
Lebertia sp	8		16	17	2	44				6	4	
Neumannia sp												
Sperchonia sp			1	22	3	33	2			4	16	
Torrenticola sp	2	4	8									
Unioncola sp	64	156	153	64	12	33	21	4		51	68	9
Oribatei				16								
Class Crustacea												
Order Cladocera												
Alona sp		4				4	1					
Bosmina longirostris	38	32	32				1			2		
Chydorus gibbus	4											
Daphnia sp	3											
Eurycercus (Bullatifrons) sp											1	
Sub Class Copepoda												
Sub Order Calanoida	1											
Sub Order Cyclopoida							1					
Sub Order Harpacticoida				64		4				2		1

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

APPENDIX B

BENTHIC MACRO-INVERTEBRATE DATA, 2002

Sample Number: Fine fraction split to:	R1a 1/2	R1c 1/4	R1b 1/8	R2a 1/16	R2b	R2c 1/4	R3a	R3b 1/4	R3c	R4a 1/2	R4b 1/4	R4c
PHYLUM ANNELIDA												
Class Hirudinea												
Pisicola sp	1											
Class Oligochaeta												
Family Enchytraeidae	2	1	2	32		8	2				4	1
Family Naididae												
Naididae Unid J/D												1
Chaetogaster sp	16	28	16	2497	146	268	376	468		214	344	3
Nais sp										4		
Family Tubificidae Unid J					1		1	1				
PHYLUM MOLLUSCA												
Class Gastropoda												
Limacidae (terrestrial)												
PHYLUM NEMATODA												
	28	50	76		13		19	84	2	98	137	7
PHYLUM CNIDARIA												
Class Hydrozoa												
Order Hydroida												
Hydra sp	316	158	384		4	8		1		2		
Total per sample:	3041	3486	3461	8468	529	2642	871	919	18	1661	2562	207
Total per site:	9988			11639			1808			4430		
Taxonomic Richness per sample:	54	32	35	39	23	43	36	23	6	42	39	30
Taxonomic Richness per site:	60			54			40			52		

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

APPENDIX B

BENTHIC MACRO-INVERTEBRATE DATA, 2002

Sample Number: Fine fraction split to:	R5a	R5b 1/16	R5c 1/16	R6a	R6b	R6c 1/4	R7a 1/8	R7b 1/32	R7c 1/4
PHYLUM ARTHROPODA									
Class Insecta									
Order Ephemeroptera									
Family Baetidae									
Baetis sp	57	626	532	3	2	85	26	140	8
Family Heptageniidae									
Cinygmula sp	3	1	32		2		11	33	26
Epeorus (Iron) sp				1	2	1			
Heptagenia sp									
Rhithrogena sp		1		3	6	4	8	1	4
Family Ephemerellidae									
Drunella doddsi	8		1	3	8	2	4		2
Drunella grandis		5							
Ephemerella sp	2	3	33			12	1		4
Seratella tibialis	4								
Order Plecoptera									
Family Nemouridae									
Amphinemoura sp									
Zapada sp	26	502	364	2	6	45	205	367	263
Family Capniidae									
Capnia sp	1	16	16						20
Family Perlodidae									
Isoperla sp								5	1
Skwala curvata									
Skwala parallela	2								1
Family Taeniopterygidae									
Taenionema sp			34		1	1	11	2	
Family Chloroperlidae									
Sweltsa sp gp		1							
Order Trichoptera									
Trichoptera Pupae									
Trichoptera Unid J									
Family Hydropsychidae									
Arctopsyche sp	4	17	34	3	2	30	33	7	34
Family Brachycentridae									
Brachycentrus sp									
Micrasema sp									
Family Limnephilidae									
Dicosmoecus sp							2		
Family Glossosomatidae									
Glossosoma sp									
Family Rhyacophilidae									
Rhyacophila sp J			16						
Rhyacophila acropedes or vao	2		2				1	1	
Rhyacophila hyalinata				1		1			
Rhyacophila vepulsa									
Order Diptera									
Diptera Unid A									
		1						1	1
Diptera Unid L									
		1							
Family Ceratopogonidae									
Bezzia sp		17							
Culicoides sp									
Family Chironomidae									
Chironomidae Unid L	64	1228	1317		2	202	189	774	542
Chironomidae P	5	1	1		1	4	6	36	3
Chironomidae A	2			1	1				
Sub Family Orthocladiinae									
Cardiocladius sp	30	138	50	3	2	24	60	106	32
Corynoneura sp									
Cricotopus sp	187	433	384	4	4	26	115	558	56
Eukiefferiella sp	28	3525	3078	2	3	541	1249	3510	260
Euryhopsis sp	4							32	
Heterotrissocladius sp	1	16						32	4

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

APPENDIX B

BENTHIC MACRO-INVERTEBRATE DATA, 2002

Sample Number: Fine fraction split to:	R5a	R5b 1/16	R5c 1/16	R6a	R6b	R6c 1/4	R7a 1/8	R7b 1/32	R7c 1/4
Rheotanytarsus sp	4	146				9	146	1193	96
Thienemaniella sp		16							
Sub Family Tanypodinae									
Thienemannimyia sp			16			4		2	5
Sub Family Diamesinae									
Diamesa sp	23	145	144	2		40	72	162	16
Sub Family Chironominae									
Cyphomella sp						1			
Micropsectra sp									
Family Empididae									
Chelifera sp	2						1	1	
Weidemannia sp									
Family Psychodidae									
Pericoma sp		35	138				9	1	1
Family Simuliidae									
Cnephia sp L									
Simulium sp P				1					
Simulium sp L	4	67	5	5	3	24	16	2	5
Prosimulium sp P				2	1			1	1
Prosimulium sp L		1					32	1	
Family Tipulidae									
Dicranota sp	1	2				4		1	
Tipula sp						1			
Order Collembola									
Isotomurus sp	3				1	8			
Order Coleoptera									
Family Staphylinidae A						1			
Order Homoptera									
Family Aphididae	4					4	1		
Family Cicadellidae					3				
Order Hymenoptera A									
Order Lepidoptera L									
Order Thysanoptera A	3					1			
Class Arachnida									
Order Aranaea									
Order Hydracarina									
Hydracarina Unid J	2	15							
Lebertia sp	1						16	4	13
Neumannia sp									
Sperchon sp	5	17		2		1	29	4	9
Torrenticola sp									
Unioncola sp	37	224	112		5	28	106	34	64
Oribatei									4
Class Crustacea									
Order Cladocera									
Alona sp						4			
Bosmina longirostris									
Chydorus gibbus									
Daphnia sp									
Eurycercus (Bullatifrons) sp									
Sub Class Copepoda									
Sub Order Calanoida									
Sub Order Cyclopoida									
Sub Order Harpacticoida									

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

APPENDIX B

BENTHIC MACRO-INVERTEBRATE DATA, 2002

Sample Number: Fine fraction split to:	R5a	R5b 1/16	R5c 1/16	R6a	R6b	R6c 1/4	R7a 1/8	R7b 1/32	R7c 1/4
PHYLUM ANNELIDA									
Class Hirudinea									
Pisicola sp									
Class Oligochaeta									
Family Enchytraeidae									
		1	58		1				8
Family Naididae									
Naididae Unid J/D									
Chaetogaster sp									
	6	401	336						
Nais sp									
Family Tubificidae Unid J									
PHYLUM MOLLUSCA									
Class Gastropoda									
Limacidae (terrestrial)									
						1			
PHYLUM NEMATODA									
		114	144			29	10	98	14
PHYLUM CNIDARIA									
Class Hydrozoa									
Order Hydroida									
Hydra sp									
Total per sample:	525	7716	6847	38	56	1138	2359	7109	1497
Total per site:	15088			1232			10965		
Taxonomic Richness per sample:	31	31	23	16	20	30	27	30	29
Taxonomic Richness per site:	45			36			37		

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

Appendix 5

2002 Surface Seep Survey Results



2002 Faro Annual Environmental Report, Water Licence QZ95-003
Appendix 5, 2002 Surface Seep Survey Results

 Gartner Lee	Station	A30		FCO	FDU	FCD	FARO CR			GHSCR1	IDSEEP	IDSEEP2	NE1	NE2	NF1	NF2	SP5-6
	Description	Upper Pit Wall Zone MPA6 Sump		Old Faro Creek U/S Valley Dump	Faro Creek Diversion U/S Valley Dump	Faro Creek Diversion adjacent NE Waste	Faro Cr u/s of confluence NFRose			Guardhouse Creek below Waste Dump	Int. Dam Seep near west abutment	Int. Dam Seep near West Abutment	flow to N.Fork from NE Dumps (closer to R7)	flow to N.Fork from NE Dumps (mid NE1&3)	North Fork Rose Creek Site 1 u/s of Haul Road	North Fork Rose Creek Site 2 d/s of Haul Road	Ditch to Main pit from NE Dumps
	Sample Date	9/6/2002	11/6/2002	11/6/2002	11/6/2002	11/6/2002	11/6/2002	25/05/02	27/09/02	11/6/2002	11/6/2002	11/6/2002	11/6/2002	11/6/2002	11/6/2002	11/6/2002	11/6/2002
Parameter	Units																
Physical																	
ALK-T	mg/L	38	38	12													
HARD	mg/L																
COND-Lab	µS/cm	300															
TEMP-C	deg C									4.4							
PH-Field	pH unit									8.2							
SO ₄ -T	mg/L	112	112	28	2	2	3	5	4	642	133	151	129	655	7	6	313
TSS	mg/L	1	1	5	<1	1	<1	<1	2	1	11	4	<1	13	2	1	2
NH ₃ -N	mg/L																
CN-T	mg/L																
FLOW RATE	L/s																
Total Metals																	
AG-T	mg/L		2.4	1.5	<0.2	0.2	0.8	35.3	<0.2	<0.2	1	0.7	0.7	1.1	1.2	0.3	3.5
AL-T	mg/L		0.34	0.593	0.276	0.241	0.301	0.127	0.255	0.088	0.391	0.449	0.611	0.248	0.189	0.513	0.811
AS-T	mg/L		0.009	0.003	<0.003	<0.003	0.009	0.004	<0.003	0.007	0.012	0.005	0.007	0.012	0.004	<0.003	0.009
B-T	mg/L		0.09	0.08	0.08	0.09	0.1	0.07	0.06	0.08	0.07	0.07	0.07	0.06	0.06	0.05	0.06
BA-T	mg/L		0.167	0.197	0.169	0.167	0.17	0.153	0.143	0.183	0.198	0.187	0.17	0.24	0.184	0.192	0.161
BE-T	mg/L		0.6	0.4	0.2	0.3	0.3	0.3	<0.2	0.7	0.5	0.3	0.5	0.6	0.2	0.5	0.4
BT-T	mg/L		0.01	<0.01	<0.01	0.01	0.02	<0.01	0.03	0.02	<0.01	<0.01	<0.01	0.02	<0.01	0.01	0.01
CA-T	mg/L		34.7	9.8	3.1	3.1	3	7.4	6.1	221.3	73.1	80.4	64.7	156.8	15.2	88.1	106.7
CD-T	mg/L		6.7	0.8	<0.2	<0.2	1	1	<0.2	1.4	<0.2	<0.2	<0.2	1.5	<0.2	1.4	2.3
CO-T	mg/L		0.005	0.004	0.003	0.002	0.001	0.003	<0.001	0.004	0.004	0.003	0.004	0.003	0.004	0.003	0.004
CR-T	mg/L		0.008	0.008	0.02	0.007	0.007	0.005	0.002	0.025	0.009	0.01	0.073	0.042	0.011	0.018	0.02
CU-T	mg/L		0.049	0.082	0.064	0.008	0.01	0.02	0.017	<0.001	0.08	0.005	0.114	0.048	0.006	0.009	0.167
FE-T	mg/L		0.177	0.577	0.256	0.2	0.307	0.075	0.284	0.071	0.247	0.252	1.164	0.417	0.245	0.498	0.301
K-T	mg/L		1.1	0.6	0.3	0.3	0.3	0.5	0.2	5.1	2.3	2.8	2.7	4.9	0.8	1.4	4.1
LA-T	mg/L		0.008	0.003	<0.001	0.002	<0.001	<0.001	0.002	0.003	0.008	0.008	0.012	0.007	0.003	0.008	0.006
MG-T	mg/L		14	3.3	0.7	0.7	0.7	1.8	1.5	52.4	15.5	16.4	18.4	103.7	2.8	2.9	60.1
MN-T	mg/L		0.068	0.088	0.007	0.005	0.01	0.003	0.005	0.076	0.025	0.031	0.035	0.047	0.02	0.043	0.105
MO-T	mg/L		0.004	0.002	<0.001	<0.001	0.002	0.002	0.001	0.005	0.003	0.006	0.005	0.005	0.005	<0.001	0.006
NA-T	mg/L		2.6	2	1.3	1.4	1.4	1.6	1.6	13.4	4.9	6	4.5	9.8	2	2.5	6.6
NI-T	mg/L		0.023	0.005	0.023	0.003	0.005	0.006	0.003	0.011	0.006	0.008	0.04	0.034	0.008	0.006	0.035
P-T	mg/L		0.08	0.28	0.02	0.05	<0.01	<0.01	<0.01	<0.01	0.17	0.12	0.41	0.04	0.16	0.08	0.14
PB-T	mg/L		<0.002	<0.002	0.026	0.025	0.031	0.007	0.01	0.015	0.015	0.009	0.128	0.006	0.004	0.014	0.016
S-T	mg/L		34.3	9.1	0.7	0.6	0.9	1.6	1.3	196.9	40.4	46.1	42.2	206	2.2	53.4	97.9
SB-T	mg/L		0.002	0.013	<0.002	<0.002	0.004	0.011	0.034	0.047	0.008	<0.002	0.006	0.006	<0.002	<0.002	0.035
SE-T	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.009	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	0.01
SI-T	mg/L		7.5	6.3	5.4	5.2	5.4	5.6	6.3	7.2	4.1	4.1	5.2	6.8	3.8	4.9	6.2
SN-T	mg/L		<0.002	0.004	0.008	0.003	0.01	<0.002	0.016	0.01	0.009	0.002	<0.002	0.007	0.005	0.007	0.006
SR-T	mg/L		0.139	0.052	0.016	0.016	0.016	0.039	0.034	0.878	0.23	0.246	0.299	0.793	0.057	0.232	0.405
TI-T	mg/L		0.002	0.009	0.007	0.004	0.008	<0.001	0.008	0.001	0.006	0.005	0.031	0.006	0.004	0.01	0.007
V-T	mg/L		<0.001	0.002	0.001	0.001	0.002	<0.001	<0.001	0.003	0.002	0.002	0.004	0.003	0.002	0.001	<0.001
W-T	mg/L		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
ZN-T	mg/L		7.94	1.105	0.013	0.021	0.064	0.031	0.018	4.313	0.06	0.015	0.189	0.038	0.066	0.04	1.963

2002 Faro Annual Environmental Report, Water Licence QZ95-003

Appendix 5, 2002 Surface Seep Survey Results

 Gartner Lee	Station	A30		FCO	FDU	FCD	FARO CR			GHSCR1	IDSEEP	IDSEEP2	NE1	NE2	NF1	NF2	SP5-6
	Description	Upper Pit Wall Zone MPA6 Sump		Old Faro Creek U/S Valley Dump	Faro Creek Diversion U/S Valley Dump	Faro Creek Diversion adjacent NE Waste	Faro Cr u/s of confluence NFRose			Guardhouse Creek below Waste Dump	Int. Dam Seep near west abutment	Int. Dam Seep near West Abutment	flow to N.Fork from NE Dumps (closer to R7)	flow to N.Fork from NE Dumps (mid NE1&3)	North Fork Rose Creek Site 1 u/s of Haul Road	North Fork Rose Creek Site 2 d/s of Haul Road	Ditch to Main pit from NE Dumps
	Sample Date	9/6/2002	11/6/2002	11/6/2002	11/6/2002	11/6/2002	11/6/2002	25/06/02	27/09/02	11/6/2002	11/6/2002	11/6/2002	11/6/2002	11/6/2002	11/6/2002	11/6/2002	11/6/2002
Parameter	Units																
Dissolved Metals																	
AG-D	mg/L		<0.2	0.9	<0.2	0.8	0.4	<0.2	0.3	0.5	<0.2	0.8	<0.2	1	<0.2	<0.2	<0.2
AL-D	mg/L		0.072	0.197	0.144	0.159	0.18	0.103	0.2	0.042	0.057	0.053	0.046	0.043	0.091	0.088	0.061
AS-D	mg/L		0.011	0.011	0.009	<0.003	0.004	<0.003	<0.003	0.01	0.009	0.01	0.007	0.019	0.013	<0.003	0.016
B-D	mg/L		0.05	<0.05	<0.05	<0.05	0.05	0.08	0.08	<0.05	0.05	0.05	<0.05	<0.05	<0.05	<0.05	0.05
BA-D	mg/L		0.109	0.145	0.124	0.13	0.132	0.144	0.127	0.069	0.11	0.1	0.092	0.108	0.144	0.128	0.062
BE-D	mg/L		0.5	0.5	0.5	0.7	0.7	0.4	<0.2	0.8	0.4	0.7	0.7	0.6	0.3	0.5	0.7
BI-D	mg/L		0.03	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
CA-D	mg/L		36	9.7	2.2	2.3	2.6	6.5	5.7	222.7	77	84.9	67.3	174.3	13.8	13.6	103.6
CD-D	mg/L		0.8	<0.2	0.2	<0.2	0.9	0.5	<0.2	1.9	<0.2	0.3	<0.2	1.7	<0.2	<0.2	2.5
CO-D	mg/L		0.002	0.003	0.003	0.003	0.004	0.001	<0.001	0.004	0.002	0.002	0.003	0.002	0.002	0.003	0.004
CR-D	mg/L		0.003	0.003	0.001	<0.001	<0.001	0.002	<0.001	0.008	<0.001	0.001	0.003	<0.001	0.002	0.002	0.002
CU-D	mg/L		0.011	0.029	0.002	0.003	0.005	0.017	0.018	<0.001	<0.001	0.005	0.007	0.001	<0.001	0.001	<0.001
FE-D	mg/L		0.103	0.226	0.063	0.095	0.153	0.036	0.13	0.012	0.014	0.002	0.005	<0.002	0.095	0.089	<0.002
K-D	mg/L		1.2	0.6	0.3	0.3	0.4	0.6	0.3	5.8	2.5	3.1	2.9	5	0.7	0.6	4.4
LA-D	mg/L		0.009	0.004	<0.001	0.001	0.001	0.001	0.002	<0.001	0.002	0.005	0.009	<0.001	0.004	0.005	0.007
MG-D	mg/L		14.4	3.2	0.6	0.6	0.7	1.7	1.3	54.7	16.2	17.6	18.5	113.9	2.8	2.7	61.4
MN-D	mg/L		0.069	0.072	0.002	0.003	0.008	0.004	0.004	0.069	0.02	0.021	0.018	0.026	0.009	0.008	0.099
MO-D	mg/L		0.003	0.006	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	0.005	0.008	0.004	0.006	0.003	<0.001	0.006
NA-D	mg/L		3.4	2.6	1.4	1	1.4	2.1	1.7	13.7	4.8	5.6	4.6	9.9	1.8	1.1	5.8
NI-D	mg/L		0.024	0.008	<0.001	<0.001	<0.001	0.005	<0.001	0.01	<0.001	<0.001	0.001	0.005	<0.001	<0.001	0.015
P-D	mg/L		<0.01	<0.01	<0.01	<0.01	0.08	<0.01	0.01	<0.01	<0.01	0.02	<0.01	0.08	0.04	<0.01	<0.01
PB-D	mg/L		0.01	<0.002	0.009	0.009	0.017	0.008	0.009	0.007	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	<0.002
S-D	mg/L		37.7	9.2	0.4	0.6	0.9	1.8	1.4	207.5	45.2	49.7	44.6	211.7	2.1	2	98.3
SB-D	mg/L		<0.002	0.005	<0.002	<0.002	<0.002	0.007	0.022	<0.002	<0.002	<0.002	<0.002	<0.002	0.007	0.005	0.008
SE-D	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	0.006	<0.005	<0.005	<0.005
SI-D	mg/L		7.8	6.2	5.4	5.4	5.4	6.7	6.6	7.5	4.3	4.7	5.2	7.2	3.9	3.9	6.4
SN-D	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.008	0.004	0.003	<0.002	0.006	<0.002	<0.002	0.007
SR-D	mg/L		0.143	0.051	0.013	0.013	0.014	0.035	0.031	0.906	0.239	0.261	0.3	0.82	0.055	0.051	0.414
TI-D	mg/L		0.001	0.002	0.001	0.002	0.002	<0.001	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001
V-D	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	0.001	<0.001	0.002	0.001	0.002
W-D	mg/L		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
ZN-D	mg/L		8.553	1.129	<0.001	0.019	0.066	0.018	0.013	4.501	<0.001	0.012	<0.001	0.003	0.014	0.01	1.993

