GOLDCORP CANADA LTD. - EQUITY DIVISION

ENVIRONMENTAL REPORT

2012

Prepared by:
Goldcorp Canada Ltd. - Equity Division
Mike Aziz
and
Cody Meints

March 2013

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

This report has been prepared in support of the Ministry of Environment permit P.E.4475 and the Ministry of EMNG reclamation permit M-114. This report focuses on the environmental performance of Goldcorp Canada Ltd – Equity Division during 2012. Historical data is referenced to previous annual reports. Included in appendices are historical water quality tables that date back to 1980 for some sites. Water quality parameters have been graphed to evaluate trends at some sites for the period 1989 to 2012.

The Equity mine (a.k.a. Equity Silver) is currently owned and operated by Goldcorp Canada Ltd. All costs associated with the operation of the Equity mine and funding of the financial security are provided by Goldcorp Canada Ltd. The financial security has been established as a requirement of the Ministry of EMNG reclamation permit M-114 to provide sufficient funds for the long term operation of the site which would be used if Goldcorp Canada Ltd. was unable to meet their financial obligations (section 6.1).

The Equity mine was a surface and underground mining complex with a 9000 tonne per day capacity mill located in the central interior of British Columbia. The property lies 35 km southeast of the community of Houston and approximately 575 km north-northwest of Vancouver. Mining and milling operations ceased in early 1994 due to a lack of economic ore. The economic elements (copper, silver and gold) were extracted from ore by conventional crushing, grinding, and flotation circuits. Additional gold and silver was recovered from concentrator tailings using carbon-in-leach technology. Cyanide in tailings was reduced using the Inco $S0_2$ destruction process as well as natural degradation in the tailings impoundment.

In 1981, acid rock drainage (ARD) was found to be occurring from the oxidization of sulphides contained in the mined waste rock. To date waste rock piles are comprised of approximately 83 million tonnes of waste rock. The ARD from the minesite is collected and processed in one of two lime treatment plants to neutralize acid and remove metals prior to discharging treated water back to the environment.

In August of 1994, Equity in conjunction with Ritchie Brothers held an auction in which all of the assets on the property were sold with the exception of items required for environmental control. The final building teardown and removal was completed in the summer of 1996.

The Equity Mine Public Advisory Committee (EMPAC) consists of the following stakeholders: Ministry of Environment, Ministry of Energy, Mines and Natural Gas, Environment Canada, Office of the Wet'Suwet'en, Natural Resources Canada, District of Houston, local landowners, and Goldcorp Canada Ltd. There was one 2012 EMPAC meeting held in Smithers in November. Topics discussed during the November meeting included: review of the 2011 annual report, 2012 status update (freshet, lime consumption, discharge), lime costs, acidity load to HDS, Main Pond metal trends, Southern Tail Pit update, sediment testing for removal at Bessemer Siltcheck, Upper Buck creek site water quality, groundwater work plan, geotechnical structures, and action items from the previous meeting. The presentation for the meeting was emailed to the EMPAC. The minutes from the 2012 meeting are included in Appendix V.

During the freshet period in 2012, weekly reports were provided to stakeholders to update on the lime delivery, treatment operations, and water balance on the site. The weekly reports began on April 13th and were completed on June 15th. The reports were distributed to the EMPAC, Goldcorp, and Lhoist.

In 2012 five reports were distributed to the EMPAC including the following:

- Tailings Impoundment and Water Management Structures – 2011 Annual Review – Equity Silver Mine, Houston, British Columbia – Submitted by AMEC Earth and Environmental, March 2012. (hard copy)
- Fish Monitoring Studies in Buck and Foxy Creeks and Goosly Lake 2011 – prepared by David Bustard and Associates Ltd., January 2012. (hard copy)
- Environmental Report 2011 – prepared by Goldcorp Canada Ltd. – Equity Division, March 2012. (hard copy and electronic)
- Equity Silver Mine Waste Rock Dump – Willowstick Geophysical Investigation – Final Report, January 6, 2012 (hard copy and CD).
- An updated revision of the Equity OMS was emailed to the EMPAC in September.

Payment was made for several Equity claims that are being retained. Thirty seven claims plus the existing three mining leases are being retained to cover the ARD collection system, waste rock dumps, tailings pond, and open pits. The CART limestone property was also retained for another year. In 2012 there was a lot of correspondence with the Ministry of EMNG and Mineral Titles to try to determine why the Equity claim shape file on the Ministry website appears to be shifted and compressed in some areas. An old inspection report from 2001 was emailed to Mineral Titles to support the original claim locations.

A fact sheet has been added to the report to assist with some historical background on site configuration and operations.

There were several site tours/presentations completed in 2012 including the following:

- Tour and presentation for Smithers Secondary grade 12 chemistry class on June 13th (14 people) and September 25th (16 people)
- NWCC workforce exploration skills training (WEST) students and leaders on June 12th (25 people) and July 18th (29 people).
- NWCC ML/ARD course on August 30th (35 people).
- Site tour for Harold Luddit and Russell on May 14th.
- Site tour for two tourists from Vancouver Island looking for rocks to collect on May 31st.
- Bill Price, his daughter, and a friend toured the site on November 7th.

Scott Parker (Ministry of EMNG) completed a site inspection on May 24th. Toured the site, shop and HDS.

Environment Canada (Deb Portman, Marco Goluza, and Manon Bombardier) were on site May 28th to collect water samples from the Main Zone pit discharge and Lu diversion before Foxy Creek. The water samples were collected for water quality and Ceriodaphnia toxicity testing.

An annual compliance report for the neutron probe was submitted to CNSC on April 17th.

An annual review and update of the Equity EMS (Environmental Management System) was completed in the first quarter of 2012.

Environment Canada presented the Equity mine with the Morley K. Thomas award for providing over 30 years of weather data.

Fact Sheet for Annual Report

Main Zone Pit

- During mining discharged pit water through settling pond to Bessemer Creek (March 1983 – December 1991)
- No discharge from Main Zone pit from December 1991 until November 2000
- Maintaining water level around 1260 m – discharge excess pit water to environment (Buck and Foxy Creeks) starting November 2000
- ARD sludge pumped to Main Zone pit since 1993
- All treated ARD and tailings decant water directed through Main Zone pit starting in July 2002

Southern Tail Pit

- During mining discharged to Bessemer Creek (April 1980 – May 1984)
- Backfilled pit with Main Zone pit waste rock from September 1985 to 1986 to 1268 m level then continued with backfill until 1990 to cover high wall – 5 million tonnes PAG under water in STP
- Resloped and covered with till cap 1990/1991
- Pit filled and discharged through spillway (el 1268 m) starting in May 1987
- STP discharged to environment until May 1994; after May 1994 directed to collection system

Waste Rock Dumps

- Three waste rock dumps (Main, Bessemer, Southern Tail Pit) – total 118 Ha
- Main dump built between 1980 to 1994, Bessemer dump between 1986 to 1994
- Intermediate till layer built in Main dump at 1310 m horizon in winter of 1984-85
- Main and Bessemer resloped in 1991 and compacted till covers placed between 1991 and 1994
- Plantsite compacted till cover completed between 1995 and 1997
- Entire waste rock dump cover and plantsite cover aerially fertilized in 2008 (250 kg/Ha)

Tailings Impoundment

- 120 Ha in size with three dams – Dam #2 (south), Diversion Dam (west), #1 Dam (north)
- Final tailings pumped to impoundment by early 1994 ~ total 35 million tonnes
- ARD treatment sludge pumped to southwest corner of impoundment from 1986 to 1992
- # 1 Dam seepage ARD pumped to northeast corner of impoundment until 1994; after 1994 pumped to Storage Pond for treatment
- During the early phases of mining, the mill process was modified to include a plant to leach arsenic and antimony from the concentrate. From 1985 to 1987 a portion of the leach plant was used to convert molybdenum trioxide concentrate from the Endako mine from technical to chemical and catalytic grade. The residue from the arsenic and antimony leach and the molybdenum plant was presumably placed in the tailings impoundment.
- In 1984, a cyanide scavenger circuit (CIL) was constructed to extract additional gold and silver.
- In 1987, 2,500 t of sodium sulphate was encapsulated by till along the east side of impoundment
- Bulk sulphide stockpile (30,000 t) located in the southwest corner of the tailings pond that is surrounded by a waste rock perimeter dyke and covered with tailings
- Water cover through operations and into closure – minimum 1.5 metres in closure
- Started decanting excess tailings water from the impoundment in March 1997 (to Diversion Pond or Main Zone pit)

#1 Dam Seepage

- PAG waste removed from road along Berzelius Diversion (October 1982) and placed in the waste dump.
- Portion of #1 Dam toe constructed from PAG waste rock – seepage collected by #1 Dam Seepage
- Freshwater diversion constructed in 1998 for east side of catchment
- Lower bench of #1 Dam tilled and revegetated in 1999
- Additional pump added in 1996 (3^{rd})
- Lower section of pipe line double walled in 2008 to protect incase of rupture.

ARD Collection System

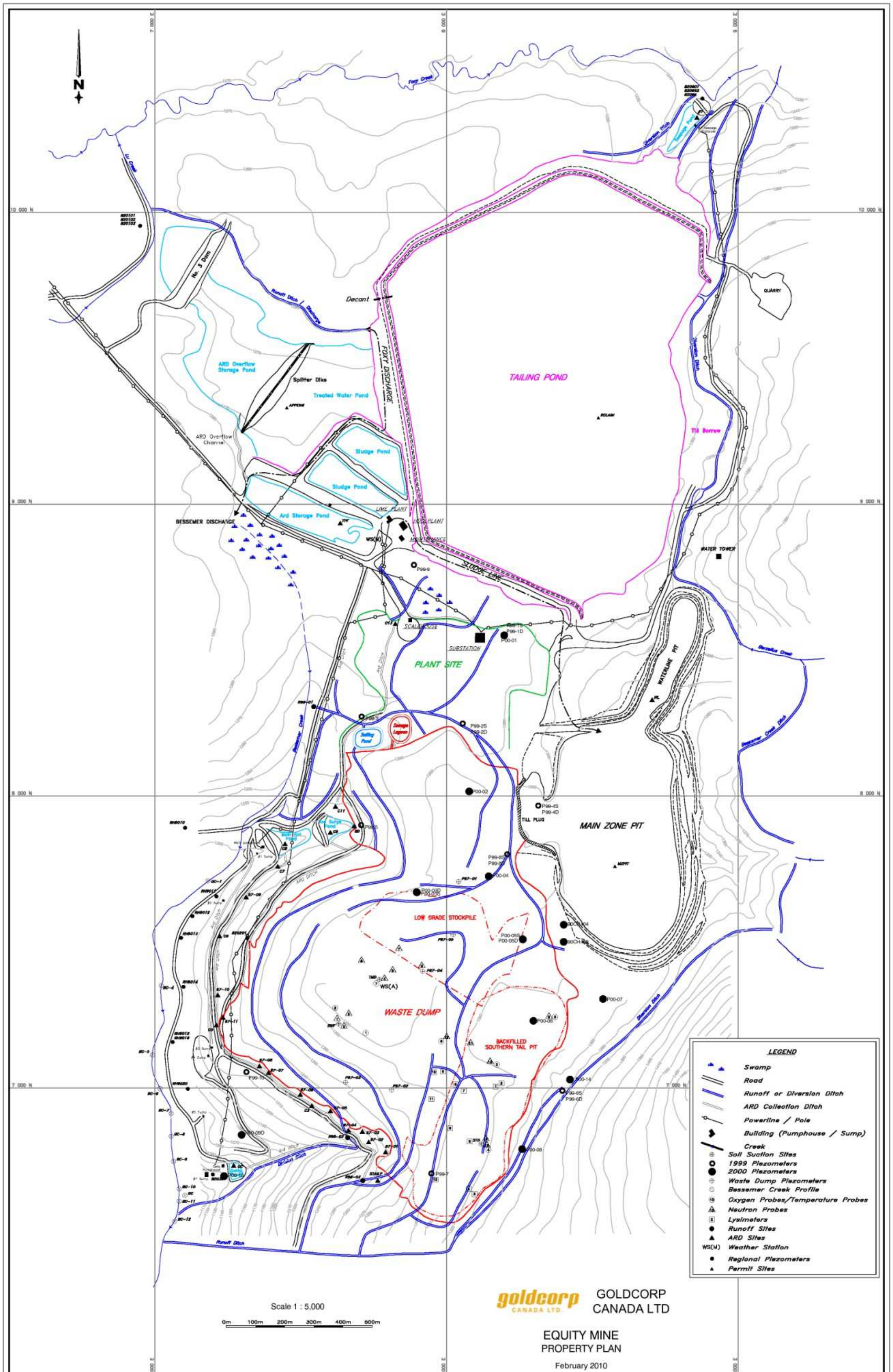
- First ARD collection system established in April 1982 (fragile system)
- Getty Creek pond established in fall 1984 to pump back to primary ARD ditch.
- Collection system pumping increased at Main Pond (1986) and Storage Pond constructed (1985)
- Surge pond constructed in 1988
- ARD pipelines and the fresh water pipeline installed prior to 1988 were bedded in tailings sand. In some areas the flanges have been corroded while other areas there is no effect.
- In 1989 constructed the secondary ARD ditch, installed sumps 2, 3, 4 and installed 18" pipeline in SW corner of Main ditch
- In 1990 constructed sumps 5, 6, and 7
- Current Getty pumphouse and expanded pond constructed in 1991, additional pipeline
- Improved sumps 3, 4, and 5 in 1993 – installed concrete block structures
- Additional 150 HP pump and emergency genset installed in Main Pond in 1994
- Sediment first cleaned out of Main Pond in 1994 to clear intakes (~annual since 1994)
- Additional pump added to Getty pumphouse (3^{rd})
- Diversion ditches constructed in 1998 for shedding clean water from area west of the swamp and area east of ARD pipeline containment
- Main Pond slope failure occurred in 2001 and remediation completed by the end of 2001
- Second pumphouse built at Main Pond in 2002 with additional 6,000 USG/m pumping capacity
- Emergency ARD pond created in 2008 with splitting of Diversion Pond

ARD Treatment

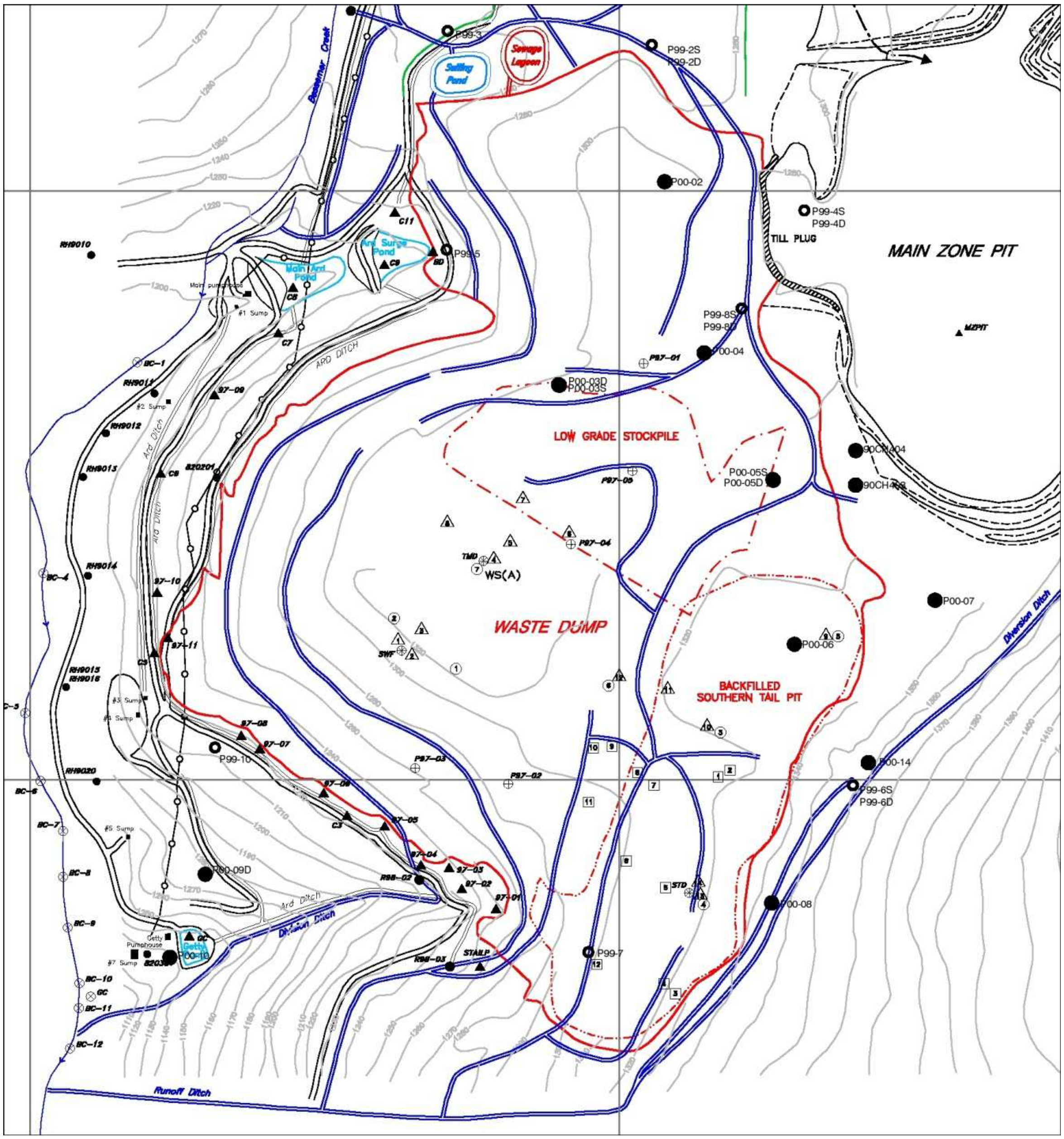
- Initial treatment plant within tailings impoundment and used sodium hydroxide (April 1982 to May 1983) – upgraded to use slaked lime in May 1983
- First treated ARD discharge to the environment was in 1983 (Foxy)
- Current LDS plant commissioned in January 1988; third reaction tank added in 1991
- Under-treated ARD contaminated treated water in the Diversion Pond in 2002 which required re-treatment of water in 2002 (1,091,454 m^3), 2003 (253,534 m^3), and 2004 (203,795 m^3) – to re-treat the Diversion Pond water was mixed with ARD and treated through LDS (2002, 2003) and HDS (2004)
- HDS plant commissioned in December 2003 and used as main ARD treatment plant

Miscellaneous

- Bessemer Siltcheck dam built in 1984 at current location (previously at Getty Pond location)
- The old Getty Siltcheck PAG rock was removed in 1991
- Treated water discharged from Diversion Pond to Foxy Creek from 1983 to June 2002 and to Buck Creek from 1985 to June 2002; after June 2002 all discharge from Main Zone pit to Buck and Foxy creeks
- Poor ground conditions in the North Zone underground resulted in an area of subsidence to surface North of the Waterline pit and East of the tailings impoundment. The subsidence was filled with PAG and NAG rock to surface in 1993, but not capped. The area drains into the underground and ultimately into the Waterline pit.



N
TAILING POND
FOXY DISCHARGE
Decant
QUARRY
Till Borrow
ARD Overflow Storage Pond
Splitter Dike
Treated Water Pond
ARD Overflow Channel
Sludge Pond
Sludge Pond
Ard Storage Pond
BESSEMER DISCHARGE
LIME PLANT
WATER TOWER
SCALEHOUSE
SUBSTATION
PLANT SITE
MAIN ZONE PIT
WATERLINE PIT
TILL PLUG
LOW GRADE STOCKPILE
WASTE DUMP
BACKFILLED SOUTHERN TAIL PIT
Runoff Ditch
LEGEND
Swamp
Road
Runoff or Diversion Ditch
ARD Collection Ditch
Powerline / Pole
Building (Pumphouse / Sump)
Creek
Soil Suction Sites
1999 Piezometers
2000 Piezometers
Waste Dump Piezometers
Bessemer Creek Profile
Oxygen Probes/Temperature Probes
Neutron Probes
Lysimeters
Runoff Sites
ARD Sites
Weather Station
Regional Piezometers
Permit Sites
Scale 1 : 5,000
0m 100m 200m 300m 400m 500m
goldcorp CANADA LTD.
GOLDCORP CANADA LTD
EQUITY MINE
PROPERTY PLAN
February 2010



MAIN ZONE PIT
WASTE DUMP
LOW GRADE STOCKPILE
BACKFILLED
SOUTHERN TAIL PIT
TILL PLUG
Settling Pond
Sewage Lagoon
Main Ard Pond
Ard Surge Pond
Getty Pond
ARD DITCH
Ard Ditch
Diversion Ditch
Runoff Ditch
Bessemer Creek
Main pumphouse
Getty Pumphouse
#1 Sump
#2 Sump
#3 Sump
#5 Sump
#7 Sump
P99-3
P99-2S
P99-2D
P00-02
P99-4S
P99-4D
P99-5
P99-8S
P99-8D
P00-04
P00-03D
P00-03S
P00-05S
P00-05D
P00-07
P00-06
P00-14
P99-6S
P99-6D
P00-08
P99-7
P99-10
P00-09D
P00-10
MZPIT
RH9010
RH9011
RH9012
RH9013
RH9014
RH9015
RH9016
RH9020
BC-1
BC-4
BC-6
BC-7
BC-8
BC-9
BC-10
BC-11
BC-12
GC
C3
C5
C6
C7
C8
C11
SD
820201
97-01
97-02
97-03
97-04
97-05
97-06
97-07
97-08
97-09
97-10
97-11
R98-02
R98-03
P97-01
P97-02
P97-03
P97-04
P97-05
TMD
WS(A)
SWF
STD
STAILP

2.0 SUMMARY

Precipitation for 2012 was 690.9 which was 6.1% above the average of 650.9 mm (1985 to 2000). The July to June precipitation of 761.1 mm was well above the average of 652.8 mm for 85/86 to 99/00 and ranked sixth highest in the site records.

ARD collection at the Main Pond in 2012 peaked during the week of May 25th to June 1st with a pumped volume of 74,234 m^3 which was less than half of the peak flows observed in 2011. The peak daily flow was on May 28th with 11,532 m^3 of ARD pumped in 24 hours. The ARD collection system handled the pumping of the peak flows without any problems. The HDS plant treated the winter ARD in March and then ran a few short batch treatments to keep the Storage Pond level low. The main freshet treatment period started on April 14th and ran through to June 18th. The HDS plant then shut down for a few days and ran for one more week between June 22nd and June 30th. The cooler weather in the spring allowed for a more gradual melt so the HDS plant easily kept the Storage Pond at low levels throughout the freshet period. A total of four b-trains of lime were shipped directly to the site during the freshet when the rail cars had delays.

Water quality at the Bessemer Creek Siltcheck in 2012 was consistent with the historical trends since closure of the site. Dissolved copper in 2012 increased slightly from 2011, but remained in the lower part of the historic operations range. Dissolved zinc decreased slightly in 2012 and remained within the lower level of the historical operations range. Dissolved cadmium levels in 2012 decreased from the 2011 levels. Total suspended solids decreased and there were two exceedances of the permit limits during high flows in May. Dissolved sulphate levels were lower than the 2011 levels as a result of a reduced discharge period.

Water quality for Lower Buck Creek in 2012 remained similar to the historic trends since closure of the site. Dissolved copper averages remained low for both the Upper and Lower Buck Creek sites in 2012. Dissolved zinc remained unchanged at the Upper site and decreased slightly at the Lower site. Dissolved cadmium remained at the detection limit at the Upper site and decreased slightly at the Lower site to average 0.00010 mg/L. Dissolved aluminium levels increased at the Upper site and decreased at the Lower site while continuing the trend of higher levels at the Upper site than at the Lower site. Dissolved sulphate decreased at the Lower site compared to 2011 as a result of a shorter discharge period. Cadmium and zinc loading from the Main Zone pit to Buck Creek were higher in 2012 while copper, arsenic, and sulphate loading were lower in 2012.

Water quality in Foxy Creek remained at averages observed since the historical operations for both the Upper and Lower sites in 2012. Dissolved copper and zinc levels for the Upper and Lower sites remained relatively unchanged from 2011 and were on the low end of the historical operations range. Sulphate levels decreased at the Lower site in 2012 as a result of a shorter discharge period. Zinc loading from the Main Zone pit to Foxy Creek was higher in 2012 while copper, cadmium, arsenic, and sulphate loadings were lower.

In 2012 a total of 2,383,746 m^3 was discharged to the environment from the Main Zone Pit and the Emergency ARD Pond. Buck Creek received 1,754,496 m^3 while Foxy Creek received 629,250 m^3 which represents 73.6% and 26.4%% respectively of the water discharged from Equity. The Main Zone pit discharge began in April and continued to the end of July. There was no fall discharge period due to low creek levels. The Emergency ARD Pond runoff and precipitation discharge period was between June 11th and July 12th for a total of 145,041 m^3 that was discharged to Buck Creek via Bessemer Creek.

In 2012 the tailings pond pH was higher than the 2011 average and was slightly above 7.0 so lime slurry was not required during the year to maintain the pH levels. During 2012dissolved copper remained very

low with an average of 0.009 mg/L. Dissolved zinc decreased from 2011 and was the lowest on record at 0.047 mg/L. Dissolved cadmium, ammonia, and sulphate levels decreased from the 2011 averages. The volume of water pumped from the tailings pond to the Main Zone pit in 2012 was above average at 538,642 m^3.

The water quality in the Southern Tail Pit continued to show higher metal levels, reduced alkalinity, increased acidity, and increased sulphate. The change in the water quality become obvious in May 2011 as the freshet flows were peaking and flushing the pit. In 2012 the copper, zinc, cadmium, acidity, and sulphate concentrations and loadings increased. Alkalinity, pH, and iron levels decreased in 2012.

Lime consumption for 2012 was 4,025 tonnes to treat 1,065,257 m^3 of ARD with an average acidity of 6,527 mg/L. The HDS treatment plant efficiency averaged 99.6% using a 10% grit factor. Based on the ARD treated and total lime consumed, 2012 was 14.7% below average compared to lime consumption from 1990-2005 that averaged 4,720 tonnes. July to June lime consumption for 11/12 was above average at 5,378 tonnes compared to the 89/90 to 04/05 average of 4,752 tonnes. In 2012 the HDS treatment plant was used for 100% of the ARD treatment. The LDS plant was used for pumping water from the Diversion Pond to the Main Zone pit.

Upgrades to the ARD collection and treatment systems continued in 2012. The key upgrades for the ARD collection system included the replacement of all three power transformers at the Getty Creek pumphouse, replacement of the 18” HDPE culvert in the SW corner of the main ARD ditch, construction of a peaked roof on the Lower pumphouse at the Main ARD Pond, upgrading of the #1 Dam Seepage pumphouse header to 8” stainless steel, replacement of an isolation valve at the Getty Creek pumphouse, modifications to the intake and discharge of the Emergency Pond stainless steel Cornell pump, replacement of a second Lu lake freshwater pump, installation of a new power pole by the shop for the Equity radio repeater, and the replacement of 87 power line insulators on the Equity power line. In the HDS plant there were normal repair and maintenance issues plus the replacement of a 90 degree elbow from the LDS plant that joins into the discharge line from the HDS plant, the repair of a blower that showed signs of metal wear, and replacing broken bolts on top of the agitator in reaction tank #1.

No triggers on the financial security were exceeded in 2012, but some were quite close by the end of the year.

Environmental costs for 2012, as well as 2005 to 2011, and the 2013 budget can be found in Appendix IV.

3.0 ENVIRONMENTAL CONTROL

Since identifying ARD on the minesite, considerable work has been completed in the way of collection and treatment of contaminated runoff. Details of steps taken to contain the problem have been chronologically discussed within past annual reports dating back to 1985 (Equity Annual Reports 1985-2011).

3.1 ARD Collection and Treatment

Precipitation for 2012 was above average with a total of 690.9 mm versus an average of 650.9 mm for the period 1985 – 2000. The first, second and fourth quarters of 2012 all received higher than average precipitation, while the third quarter received less than average. The highest precipitation month was October with 104.5 mm of precipitation consisting of 72.8 cm of snow and 31.7 mm of rain. The lowest precipitation month was September with only 18.8 mm of precipitation. The snow pack at both of the manual monitoring stations (4B-14 and 4B-15) remained well above average from late February to late April with rankings of 3rd or 4th highest of 26 years of readings. The snow pack at the automatic snow pillow station near Lu Lake showed that the snow pack remained well above average for the duration of the winter and was above the 2011 snowpack until the melt began in late April and throughout May (Figure 4-3). The melt in 2012 started in the third week of April, but then slowed down in the first week of May with cooler temperatures. The melt resumed in the second week of May with moderate flows and then increased for the second half of May. Overall, for a large snowpack year the melt was fairly stretched out which led to reduced peak flows from those observed the previous year. The July to June precipitation of 761.1 mm was well above the average of 655.3 mm for 85/86 to 99/00 and ranked sixth highest in the site records.

ARD collection at the Main Pond in 2012 peaked during the week of May 25th to June 1st with a pumped volume of 74,234 m^3 which was less than half of the peak flows observed in 2011. The peak daily flow was on May 28th with 11,532 m^3 of ARD pumped in 24 hours. The ARD collection system handled the pumping of the peak flows without any problems. Pumping from the Main ARD pond during the freshet was shared between the Upper and Lower pump houses with both pump houses not at full capacity. ARD was pumped directly to the HDS plant from the Lower pump house from May 17th to June 6th and June 22nd to June 30th for a total volume of 61,501m^3 directly to the plant.

On August 20th a localized severe thunderstorm settled over the site which resulted in 39.2 mm at the Main waste rock dump weather station and 51.5 mm at the Environment Canada manual station in 1 hour and 40 minutes. There were pools of water and runoff across the site and several pumps were called into service for a short period to handle the sudden increases in the ARD ponds. Two culverts in the boneyard area were at capacity and there was evidence that the overflow swales were used. The elevated flows were gone shortly after the storm passed by and the site was back to dry conditions the following day. The following week sediment and debris that had washed into the Main ARD collection ditch partially blocked the culvert below the C7 weir and the flow built up within the ditch and flowed over the swale into the Main Pond. The blockage was cleared with a pipe and a hoe was used to clear the debris from the intake of the culvert and deepen the swale. AMEC ranked the event as a 500 year return period based on the precipitation intensity over a short period (Table 2.2 of 2011 Hydraulic Structures Review).

The HDS plant treated the winter ARD in March and then ran a few short batch treatments to keep the Storage Pond level low. The main freshet treatment period started on April 14th and ran through to June 18th. The HDS plant then shut down for a few days and ran for one more week between June 22nd and

June 30th. The cooler weather in the spring allowed for a more gradual melt so the HDS plant easily kept the Storage Pond at low levels throughout the freshet period. A total of four b-trains of lime were shipped directly to the site during the freshet when the rail cars had delays.

Work completed on the ARD collection system in 2012 included the following:

- There were nine unplanned power outages in 2012. Only one of the unplanned power outages was related to broken insulators and eight were related to snow load or wind causing line slap. Six of the power outages only affected the #1 Dam Seepage and Lu Lake portion of the property. The broken insulator took 4 hours to repair since contractors from Smithers were required with a bucket truck. The other outages were short in duration, only requiring a reset at the main.
- There was one planned power outage in 2012 to replace power line insulators. From October 15th to 17th the power was shut off during the day to allow the replacement of 87 insulators. All insulators from the Equity Mine to kilometre 23 have now been replaced which has reduced the number of power outages due to broken insulators.
- The transformers at the Getty Creek pumphouse were replaced in August with the help of Glacier Electric. The old transformers were mismatched and getting quite old. A larger breaker trip block was also installed to better protect the power line feeding sumps 3, 4, and 5 from the Getty transformers.
- Modifications were made to the Emergency Pond stainless steel pump (Cornell) on the intake and discharge sides to match the configuration of the freshwater pump for the Emergency Pond. The stainless pump was tested in May by pumping water to the Storage Pond and it achieved a flow rate of 1,950 USG/m which was within the design criteria.
- The Emergency Pond stainless pump was tested at #1 Dam Seepage to see if it could handle the higher head for that pond. The pump only achieved a flow rate of 160 USG/m which was very low. The head required for pumping from the #1 Dam Seepage pond exceeds the design head of the impellor of the Cornell pump. A different Cornell pump with a higher head design was discussed as an alternative, but it was decided to purchase another vertical pump that could replace an existing pump in the pumphouse.
- All of three pumps at the #1 Dam Seepage pumphouse were back-flushed to remove any built up sediment. The flow rates for each pump increased after the back-flush.
- The discharge header at the #1 Dam Seepage pumphouse was replaced with an 8" stainless header that has a better configuration for maximizing the flow rate. The header was replaced by Black Fox Contracting in December.
- The 18" HDPE culvert in the south west corner of the main ARD ditch has been building up with scale over several years which has required the use of the overflow ditch during high flow periods. In the summer of 2012 the entire culvert was replaced with a new 18" HDPE culvert and the retaining berm was reshaped to remove one high spot and provide sufficient freeboard in case of future blockages of the culvert.
- An isolation valve at the Getty Creek pumphouse that separates the emergency line from the main line was replaced with a butterfly valve after the old valve was found to be leaking.
- The ditch entering sump #4 was cleared of rock and mud debris to allow unobstructed flow to the sump.
- Hansma Construction Ltd. constructed a peaked tin roof over the Main Pond pumphouse and added insulation on top of the old concrete slab roof. The roof was starting to leak and was a major heat loss so the new roof has been a big improvement.

- Accumulated sediment was removed from the Main Pond in September using the Sala slurry pump and the excavator. The sediment was pumped to the holding pond above the Surge Pond and will be stored in the landfill behind the shop after it has dewatered (will be moved in summer 2013). This is an annual procedure.
- A second new pump was installed at the Lu Lake pump station. Now there are two new pumps and one original pump that is still operational.
- Repairs were completed on the lime scale Lynx unit by Northern Scale.
- A new power pole was installed behind the shop for the Equity radio repeater. The repeater was moved to this pole so that in the event of a power outage the emergency generator will be able to power the Equity radios.

Lime consumption for 2012 was 4,025 tonnes to treat 1,065,257 m^3 of ARD with an average acidity of 6,527 mg/L. The HDS treatment plant efficiency averaged 99.6% using a 10% grit factor (Appendix III). Based on the ARD treated and total lime consumed, 2012 was 14.7% below average compared to lime consumption from 1990-2005 that averaged 4,720 tonnes (Figure 3-1). July to June lime consumption for 11/12 was above average at 5,378 tonnes compared to the 89/90 to 04/05 average of 4,752 tonnes. In 2012 the HDS treatment plant was used for 100% of the ARD treatment. The LDS plant was used for pumping water from the Diversion Pond to the Main Zone pit.

The ARD statistics for 2012 include the collection and treatment of the #1 Dam Seepage flow and Southern Tail Pit flow. By the end of the year, 174,749 m^3 were collected from #1 Dam Seepage and 49,487 m^3 were collected from the Southern Tail Pit with average acidities of 908 mg/L and 122 mg/L respectively. When the additional flows are subtracted, the 2012 treated ARD flows equal 841,022 m^3 which is 11.6% higher than the 1990-2011 average of 753,941 m^3 (Table 3-1 and Figure 3-5).

As discussed in previous years the use of normalizing to precipitation and looking at the period July to June assists with the evaluation of the lime trend. Normalizing is a method that helps compare lime consumption from years with variable precipitation. Using the period July to June, in addition to the calendar year, puts the entire precipitation cycle into the trend. Often the heaviest snowfall accumulations occur in November and December. If the calendar period is used the snowmelt from the November and December precipitation is not accounted for in the year that the snow accumulated. If the July to June period is used then all snow accumulated during that period also melts during that period and gives a more accurate indication of ARD production and treatment. When the annual lime consumption figures for 2012 were normalized to 650.9 mm precipitation the lime consumption decreased from 4,025 tonnes to 3,792 tonnes which was 17.3% lower than the 1990 to 2005 normalized average of 4,583.5 tonnes (Figure 3-3). For the July to June period the normalized lime consumption decreased from 5,378 tonnes to 4,630 tonnes based on an average precipitation of 655.3 mm compared to the 11/12 precipitation rate of 761.1 mm (Figure 3-4).

Approximately 69,945 m^3 of high density sludge was pumped to the Main Zone pit in 2012 from the HDS plant. The sludge was mixed with 10% dilution water for pumping and had an average density of 17.9% solids with a range between 11.9 to 26.6% solids.

Pumping of the runoff water from the Diversion Pond to the Main Zone Pit started on July 13th and was completed on September 12th. A total of 227,244 m^3 of water was pumped from the Diversion Pond to the

Main Zone in 2012. Pumping from the Emergency ARD Pond to Buck Creek in 2012 occurred from June 11th to July 12th for a total of 145,041 m^3.

3.1.1 Treatment Related Upgrades in 2012

The HDS treatment plant was used for all of the ARD that was treated in 2012. Gypsum build-up on the reaction tanks and the clarifier was average compared to other years. The reaction tanks and clarifier were cleaned of gypsum between December 2012 and early 2013.

There were several improvements and maintenance issues in the LDS and HDS plants in 2012 including:

- The HDS plant was shut down between June 18th and 22nd to repair the agitator in reaction tank #1. A large piece of gypsum fell off the agitator during operation which made it unbalanced and broke some of the bolts on top of the agitator. The shut down included draining the tank, cleaning the remaining gypsum from along the length of the agitator, and replacing the broken bolts.
- Black Fox Contracting repaired a blower that was showing signs of metal wear in the oil. This is the first blower to be repaired as opposed to replaced. The blower has not been put back into service yet, but is ready as a spare.
- Gypsum was cleaned off the agitator in reaction tank #2 when the agitator seemed to be slightly off balance.
- The 90 degree elbow coming from the LDS plant that joins into the discharge line from the HDS plant was replaced in September when it was found to be leaking. D&M Industrial fabricated a new elbow made of steel.

3.2 Diversion Structures

All of the site diversion structures performed as designed for the year. In the Berzelius diversion the excess gravel and sediment was removed from the ditch on one occasion (July) between the Waterline pit and Gordon's Hole.

Prior to the 2012 freshet, snow was cleared from the site ditches on one occasion using the site excavator and two contractor hoes. An additional contractor hoe was required in 2012 because the site hoe broke down in mid April when there was still quite a bit of snow removal required. The ditches that were cleared included the waste dump runoff ditches, the plantsite runoff ditches, the diversion ditch on the west side of #1 Dam Seepage, the tailings spillway, the Berzelius diversion from above the Waterline pit to past the tailings pond spillway, the Main Zone pit diversions, and the Main Zone canal to past the culverts.

During the work on the Berzelius culverts (section 6.3.2.1) a small pond on the uphill side of the Berzelius diversion ditch and access road was decreased in depth. The small pond had been created several years ago when the access road was built and it appeared that the water was seeping through the road bed and possibly causing some instability in the sidewall of the ditch. The water level was reduced

by 1 metre to decrease the seepage through the road.

3.3 Tailings Pond

In 2012 all of the water removed from the tailings pond was directed to the Main Zone Pit to be discharged with the treated water. Only the Cornell freshwater pump was used for pumping tailings water in 2012. The pumping started on April 24th and was completed by July 17th. A total of 538,642 m^3 was pumped to the Main Zone pit in 2012. There was significant evaporation during the summer so no fall pumping was required and the final water elevation on October 9th was 1291.78 m.

AMEC continued as the site consultants in 2012 and completed the annual geotechnical inspection in September. A contract survey company (Steve Howard & Associates of Smithers) was used to survey the tailings dam stability monitors in July. Work was completed clearing trees and shrubs around the survey stations by the Diversion Pond and Bessemer road to assist the surveyors.

In 2012 the Equity OMS was revised to include the Emergency ARD Pond and update the contact information. The updated OMS was sent to the EMPAC electronically on September 13th.

On October 27th a 7.7 magnitude earthquake off Haida Gwaii was felt in Houston and lasted about 45 seconds. The site was checked the following day for any signs of disturbance to pipelines or dams, but no evidence was found. AMEC was notified of the earthquake and the follow up.

3.4 Main Zone Pit

Groundwater studies including Saretzky (1998), Golder (1998), and URS (2000) identified the Main Zone Pit as a future potential source of groundwater inflow to the waste dumps, specifically the Bessemer waste dump. The conclusions from the URS groundwater study have indicated that the ARD flow from the Bessemer waste dump to the Surge Pond could increase by up to 10 times if the Main Zone Pit water level is allowed to exceed the elevation of the groundwater divide between the pit and the waste dump. URS approximated the elevation of the divide to be 1265 metres based on the data from the 1999 piezometers. As a result of these findings Equity personnel thought it would be prudent to maintain the water level of the Main Zone below 1265 m. A pump station was installed in the Main Zone pit in 2000 to maintain the water level below 1265 m elevation.

Prior to the discharge period water samples were collected from the Main Zone Pit to determine the water quality at the 20 meter discharge depth. During the discharge period sampling occurred once per week to ensure water quality was not changing due to the large influx of water from the treatment plants.

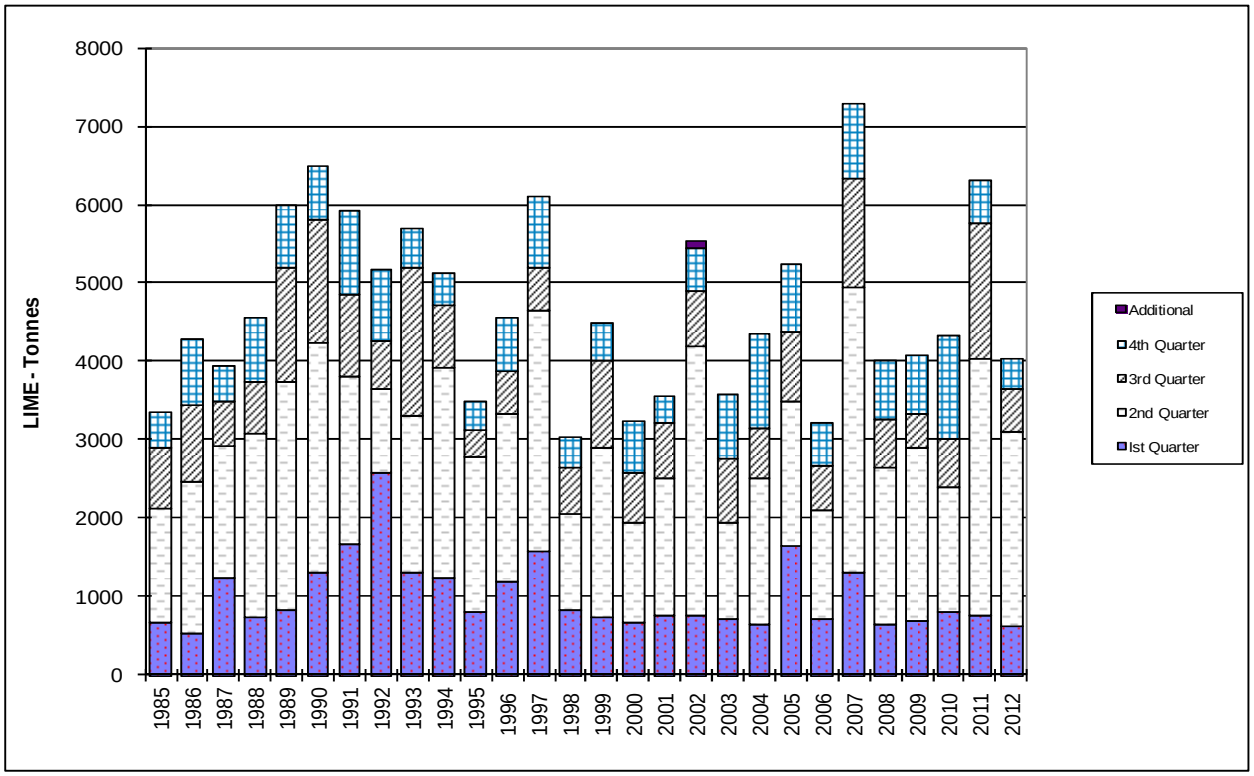


Figure 3-1: Lime consumption for calendar year (quarterly)

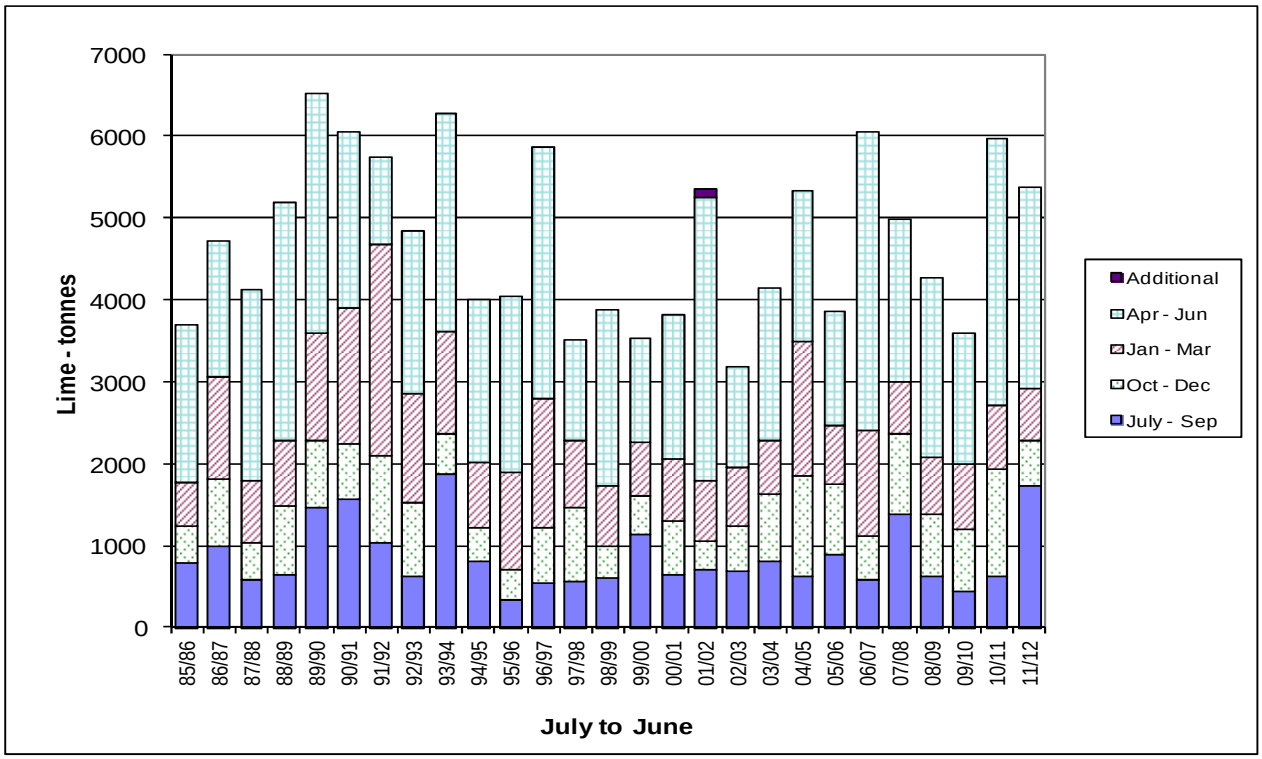


Figure 3-2: Lime consumption for July to June period (quarterly)

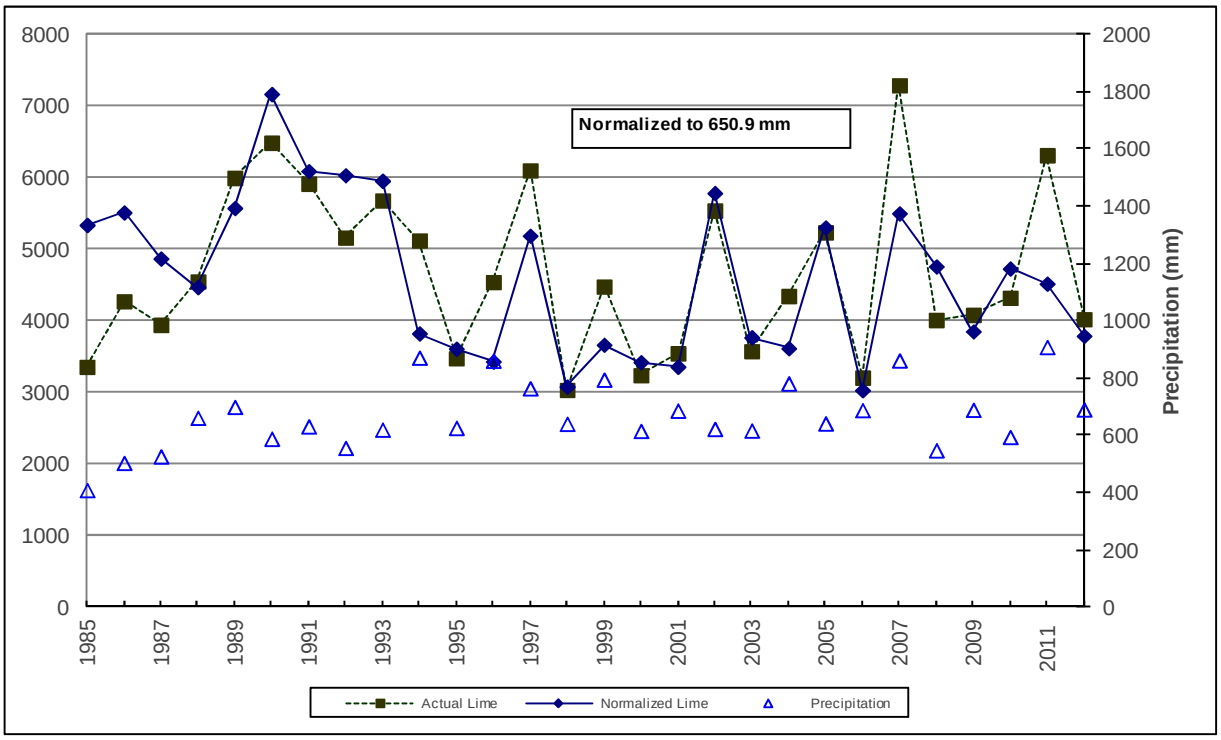


Figure 3-3: Actual and normalized lime consumption for calendar year

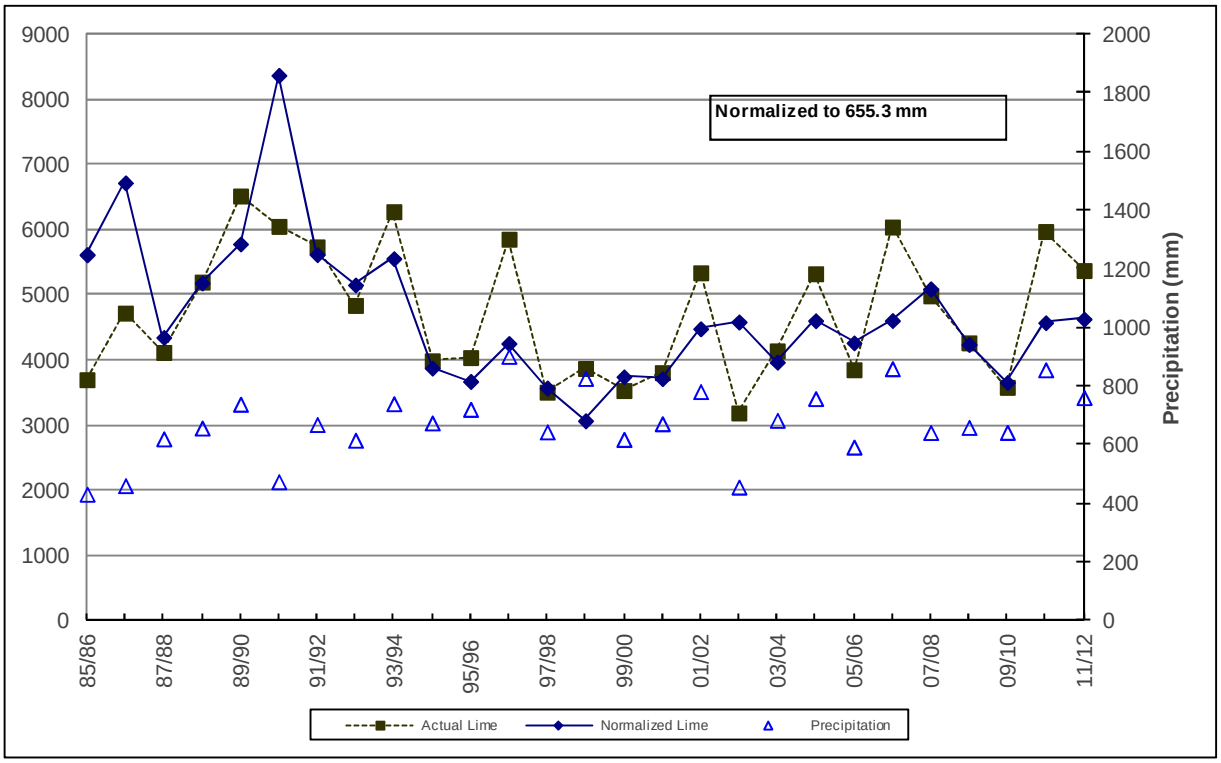


Figure 3-4: Actual and normalized lime consumption for July to June period

Table 3-1 Treated ARD Normalized to Precipitation for Calendar Period

Year	Volume Treated m^3	Southern Tail Pit m^3	#1Dam Seepage m^3	Diversion Pond m^3	Emergency Pond m^3	Net Volume m^3	Actual Precipitation mm	Normalized to avg. ppt. m^3
1985	596365					596365	409.5	970781
1986	909939					909939	504.4	1202542
1987	834626					834626	527.2	1055308
1988	840719					840719	662.1	846428
1989	637878					637878	700.0	607439
1990	1001810					1001810	589.1	1133598
1991	767643					767643	632.1	809536
1992	817880					817880	557.0	978808
1993	897843					897843	620.8	964077
1994	970648	49900	99100			821648	871.9	628177
1995	840706	66234	125605			648867	627.0	689844
1996	1135459	120159	183656			831644	861.4	643570
1997	1213812	83061	194022			936729	765.1	816129
1998	680233	78685	147784			453764	641.2	471736
1999	938879	100790	140133			697956	795.3	585006
2000	711452	82239	111925			517288	616.3	559504
2001	707515	70142	108772			528601	687.2	512752
2002	2083198	75501	105760	1091454		810483	623.4	866643
2003	940024	81734	104429	253534		500327	617.7	539932
2004	1085623	133984	118833	203795		629011	782.1	536116
2005	966677	117263	125061			724353	642.5	733868
2006	604527	45208	104672			454647	659.5	459539
2007	1629420	106955	175311			1347154	862.4	1041289
2008	793459	41500	139734			612225	548.8	743636
2009	915486	53461	133509			728516	690.0	703806
2010	878118	54573	123903			699642	594.9	783962
2011	1506377	63255	185885		148400	1108837	909.2	812964
2012	1065257	49487	174749			841022	690.9	811437
AVG:(to '11)	959493	79147	134894			753941	666.6	766555

lime/ARDtreat

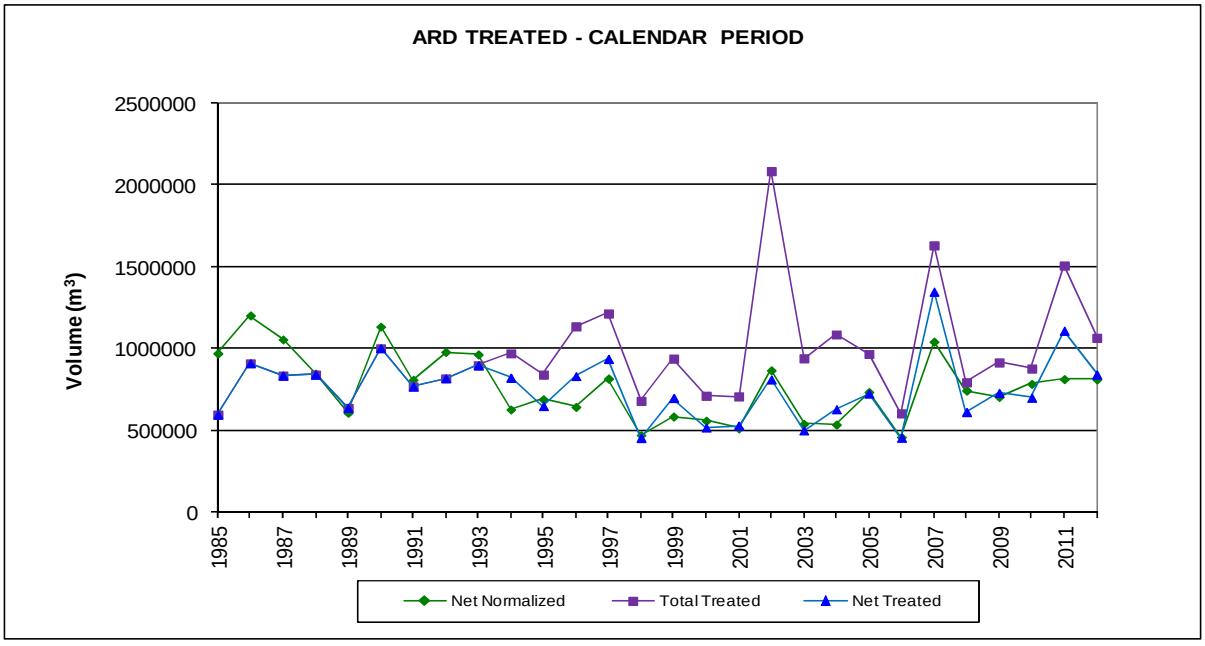


Figure 3-5: Treated ARD volumes: 1985 – 2012

Table 3-2 Treated ARD Normalized to Precipitation for July to June Period

Period	Volume Treated m^3	Southern Tail Pit m^3	#1Dam Seepage m^3	Diversion Pond m^3	Emergency Pond m^3	Net Volume m^3	Actual Precipitation mm	Normalized to avg. ppt. m^3
85/86	674501					674501	431.4	1051395
86/87	989195					989195	460.5	1444494
87/88	843827					843827	620.4	914630
88/89	568890					568890	656.8	582450
89/90	909376					909376	738.5	828050
90/91	887582					887582	474.0	1259197
91/92	877617					877617	669.0	882150
92/93	780987					780987	615.5	853256
93/94	1011104	15591	48760			946753	740.1	860220
94/95	959887	83750	134046			742091	674.3	740061
95/96	996657	83549	141189			771919	721.0	719946
96/97	1193048	102713	209281			881054	901.9	656913
97/98	820698	88480	166202			566016	643.7	591301
98/99	851213	89239	138147			623827	826.8	507373
99/00	713741	88550	116570			508621	618.5	552991
00/01	800138	81473	114646			604019	671.9	604518
01/02	853035	99942	101919			651174	781.4	560386
02/03	1957193	52241	99196	1254239		551517	455.7	813848
03/04	1123840	112082	116797	303403		591558	683.7	581829
04/05	1002720	147813	124506			730401	757.8	648142
05/06	760337	77005	118081			565251	592.1	641963
06/07	1207405	56214	146877			1004314	860.7	784660
07/08	1138399	91715	155020			891664	642.0	933963
08/09	901727	46901	141276			713551	659.4	727678
09/10	798033	48336	123870			625827	642.3	655210
10/11	1127335	54665	170460			902210	855.8	708923
11/12	1544967	59927	177137		148400	1307903	761.1	1155573
AVG:	973832	77905	133894			767098	**672.5**	787449

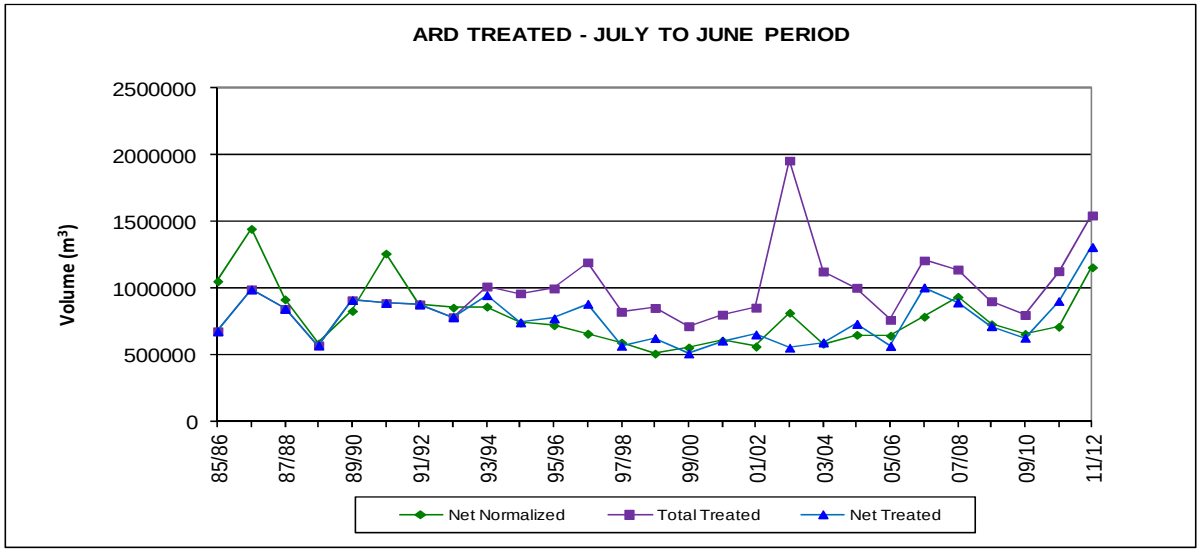


Figure 3-6: Treated ARD Volumes (July to June) 85/86 to 11/12

Discharge from the Main Zone Pit remained important in 2012 as all treated water and tailings pond decant water was channelled through the pit. Discharge from the Main Zone Pit started on April 23rd to Buck Creek and May 8th to Foxy Creek. The Buck Creek and Foxy Creek discharges were shut down on July 27th when the Main Zone pit water level was at the bottom of the operating range and the creek levels were low. The Main Zone barge and pipelines were pulled from the pit in mid October.

3.5 ARD Dam Structures & Bessemer Creek Siltcheck

In 2012, AMEC continued as the engineers on record for the responsibility of the annual geotechnical reviews, including the review of the ARD related dam structures. The dams reviewed, other than the tailings dams, included the Main Pond, Surge Pond, #1 Dam Seepage, Getty Creek, #1 Sump, Bessemer Siltcheck, Splitter Dyke, #3 Dam, Lu Lake, and Storage Pond.

The bulge at the base of the Siltcheck Dam spillway that was repaired in October 2011 remained unchanged in 2012. The spillway was closely examined by AMEC during the annual review and was found to be performing satisfactorily with no changes since the repairs were completed. Samples of the sediment wedge on the inflow side of the Siltcheck pond were collected and analyzed for metals and ABA analysis.

During the 2012 geotechnical review AMEC recommended that the water level in Lu Lake be decreased to allow for more freeboard on the dam. In September, when the lake level was quite low due to evaporation, two boards were removed from the Lu Lake spillway to decrease the lake level by 0.1 metres. The lake level at the time was below the level of the two boards that were removed.

The final 2012 report on the ARD structures has not been received yet from AMEC. Copies of the final report will be submitted in March 2013.

3.5.1 Main Pond Slope

The slope at the Main Pond was measured in 2012. The inclinometer wells were measured once in 2012 and did not show any significant movement (Figures 3-6 and 3-7). An RST probe was used in 2012 because the AMEC probe was not available. The 2012 readings were found to be very similar to past readings. The survey of the monuments around the Main Pond area showed little variation from previous readings. The vibrating tip piezometers were measured once during the year. The piezometer wells that AMEC installed on the slope in 2003 remained artesian and were measured occasionally through 2012.

3.6 Special Wastes

Waste oil was stored in a waste oil tank located within a bermed containment throughout the year. The volume of waste oil produced at the site over a year is greatly reduced from the operating years of the mine.

3.7 Recycle

In 2012 the Houston Recycling Depot started accepting cardboard and paper as well as #2 plastics and batteries. Equity has begun to send all of these items to the recycle depot.

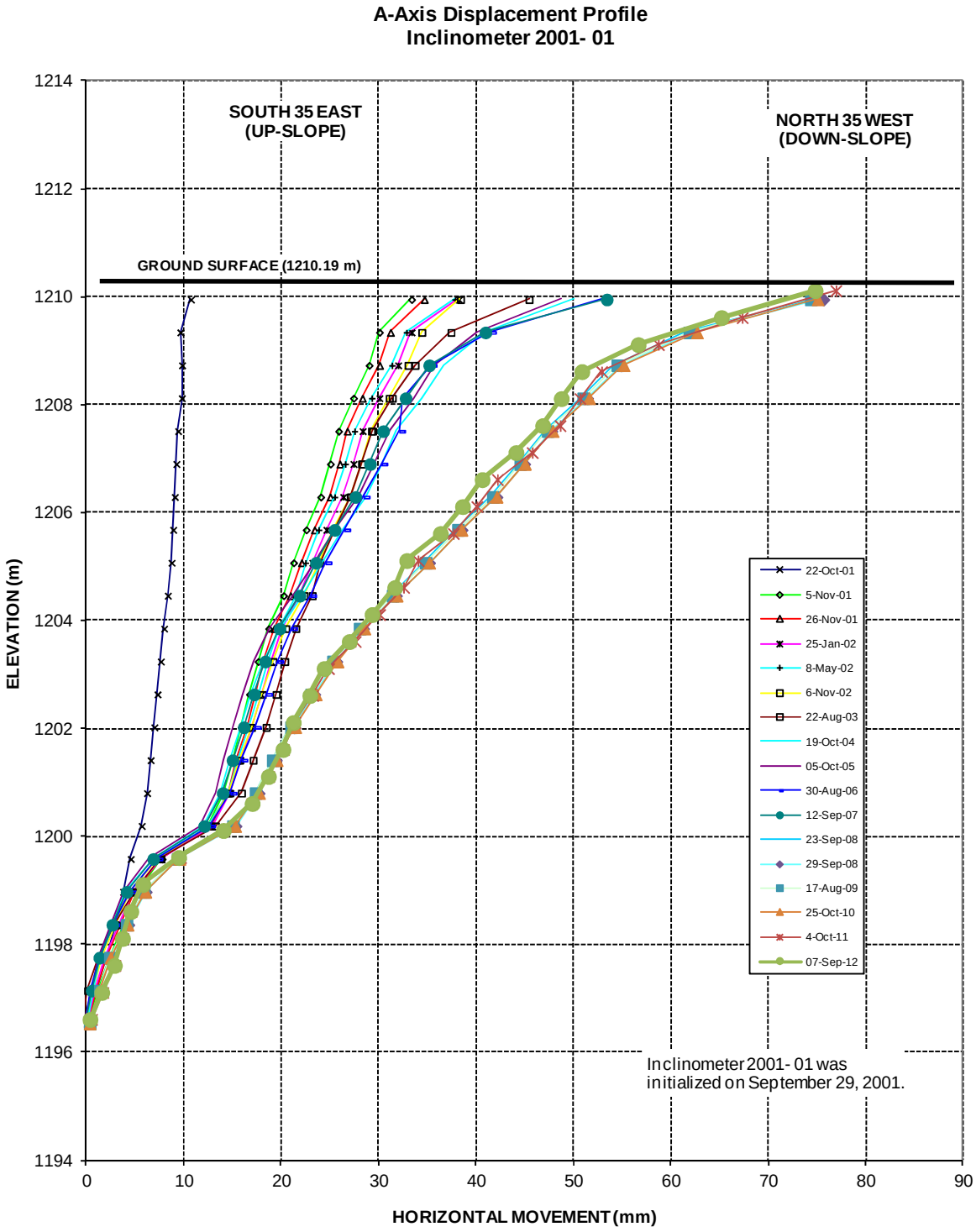


Figure 3-7 Inclinometer 2001-01 A-axis

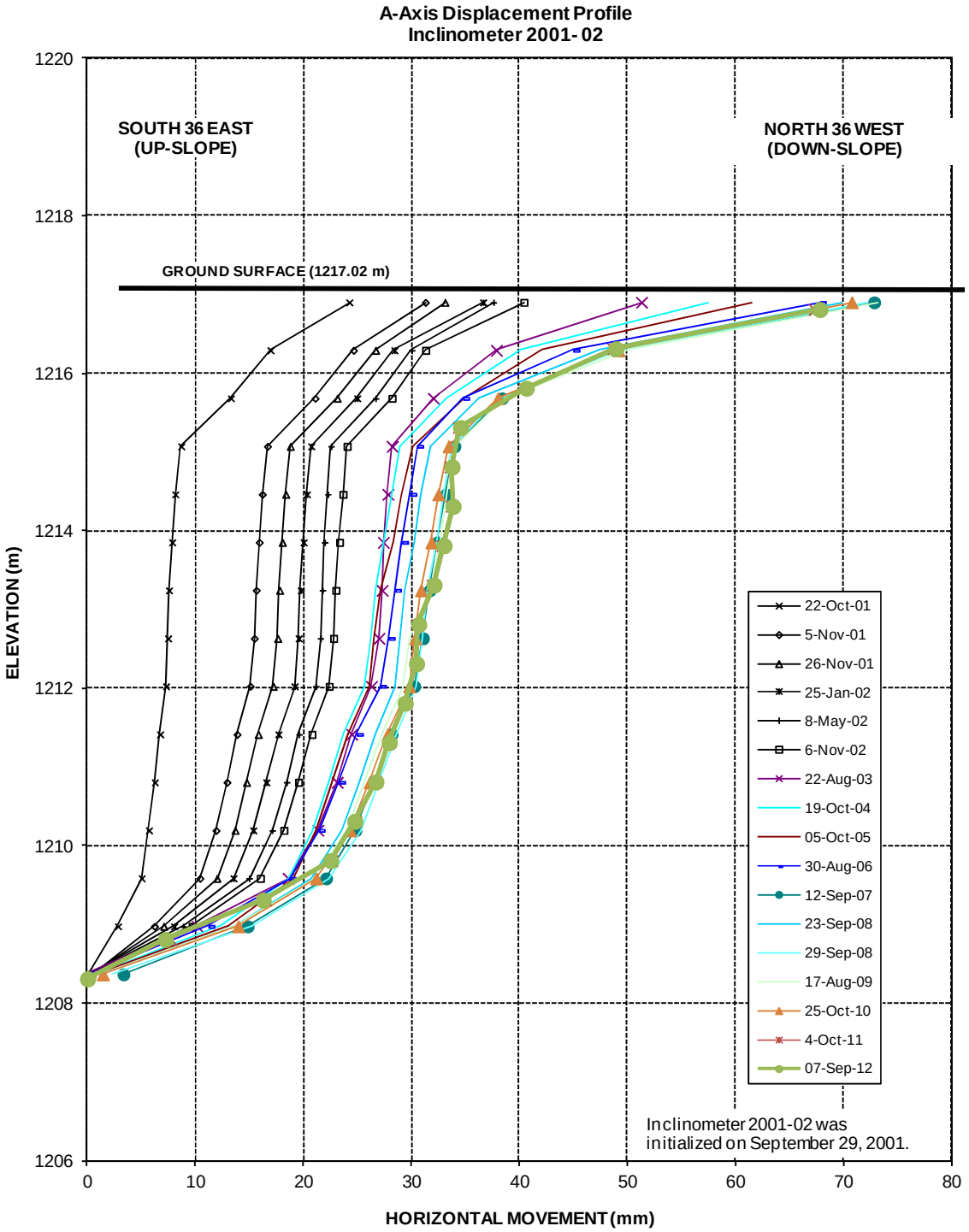


Figure 3-8 Inclinometer 2001-02 A-axis

4.0 SITE HYDROLOGY

An average annual unit runoff value of 10.9 L s^{-1} km^{-2} has been used for estimating runoff and stream flows in the vicinity of Equity (K.P.A. 1992). The average annual unit runoff value is different than the short duration high intensity rainfall events used for spillway evaluations (AMEC 2010, Appendix F).

4.1 Weather and Precipitation Records

Daily records of temperature (max., min., and mean) are recorded on site and submitted weekly to Environment Canada (CoolTap Climate Data Reporting System). Table 4-1 summarizes monthly temperatures, precipitation and snowpack along with water equivalents for the period 2001-2012 (earlier weather data back to 1983 can be found in previous annual reports). Water equivalent of the snowpack is useful for predicting the volume of water expected from the spring freshet. Snowpacks are sampled monthly from the end of February to the end of April to give an indication of how the snowpack is developing prior to the freshet. Snowpack survey stations are located at Lu Lake southeast of the spillway and above the Main Zone pit within forest shelter. Average annual temperature and precipitation records dating back 29 years are presented in figures 4-1 and 4-2. Even though the average maximum temperatures were slightly higher in 2012 the average temperature data indicate that 2012 was overall cooler than 2011.

Total precipitation for 2012 was 690.9 mm. The 2012 total precipitation was 6.1% higher than the historical average of 650.9 mm (1985 to 2000). The first, second and fourth quarters of 2012 all received higher than average precipitation, while the third quarter received less than average. The lowest precipitation month in 2012 was September with only 18.8 mm of rain. October had the most precipitation with 31.7mm of rain and 72.8cm of snow. For the July to June period the total precipitation was 761.1 mm which was 16.6% above the historical average of 652.8 mm. The 2012 weather data presented in Table 4-1 was calculated from data collected at the Equity climate monitoring station. Refer to Table 4-1 and Figures 4-2 & 4-3 for rain and snow amounts.

The 2012 snow pack above the Main Zone Pit (4B-14) was 37.9 - 43.3% above average for the period of late February to late April, while the Lu Lake station (4B-15) was 39.5 - 62.5% above average for the same period. The snow pack at the automatic snow pillow station near Lu Lake showed that the snow pack remained above average for the entire season (Figure 4-4). The melt in 2012 began in mid May with warming temperatures. The majority of the melt was completed by the end of the first week of June. The water equivalent of the Lu Lake (4B-15) snow pack at the end of April was 62.5% above average (ranked 3rd of 26 years) while the Above the Main Zone (4B-14) station was 43.3% above average and ranked as the 4th highest water equivalent based on 25 years of surveys.

PERIOD	TEMPERATURE -C			HEATING	PRECIPITATION				SNOW PACK			
					RAIN	SNOW	TOTAL	TOTAL	LU LAKE SITE		EQUITY SITE	
	MAX.	MIN.	AVG.	DEG. DAYS	MM.	CM.	CALENDAR YEAR MM	JUNE TO JULY MM	SNOW PACK CM.	WATER EQUIV CM	SNOW PACK CM.	WATER EQUIV CM
2001												
JAN	-3.8	-9.9	-7.3		7.0	55.4	62.4					
FEB	-6.2	-14.5	-12.0			28.3	28.3		71.4	17.4	98.2	27.2
MAR	-1.0	-9.1	-7.0			44.1	44.1		82.8	22.2	111.2	33.2
APR	3.1	-5.9	-3.8		15.7	2.2	17.9		68.8	21.0	93.2	28.4
MAY	4.9	-1.8	-0.1		50.2	41.0	91.2					
JUNE	10.8	1.9	4.5		60.7		60.7	673.9				
JULY	15.4	5.7	7.9		42.0		42.0					
AUG	15.5	5.9	7.8		68.8		68.8					
SEPT	9.7	2.6	3.4		60.0		60.0					
OCT	2.9	-2.2	-1.5		11.8	44.7	56.5					
NOV	-4.3	-7.8	-6.0		15.0	89.6	104.6					
DEC	-5.7	-11.5	-8.4			50.7	50.7					
Avg/Tot	3.4	-3.9	-1.9		331.2	356.0	687.2					
2002												
JAN	-4.7	-9.3	-7.4			63.3	63.3					
FEB	-3.7	-10.4	-9.3			40.1	40.1		105.6	30.0	127.6	41.0
MAR	-4.7	-14.2	-10.7			76.7	76.7		117.2	35.2	139.2	45.8
APR	1.6	-6.9	-5.0			52.4	52.4		120.4	42.6	148.4	56.0
MAY	5.9	-1.8	0.5		70.7	34.9	105.6					
JUNE	12.8	4.5	8.0		60.7		60.7	781.4				
JULY	14.3	6.1	7.0		38.2		38.2					
AUG	15.4	6.7	8.6		5.7		5.7					
SEPT	8.6	2.4	4.0		97.0		97.0					
OCT	5.9	-0.9	-0.7		45.8		45.8					
NOV	0.3	-3.0	-2.1		2.2	14.6	16.8					
DEC	-4.0	-7.4	-6.4			21.1	21.1					
Avg/Tot	4.0	-2.9	-1.1		320.3	303.1	623.4					
2003												
JAN	-2.9	-7.9	-6.4		8.5	52.5	61.0					
FEB	-1.4	-10.2	-7.7			26.6	26.6		53.0	12.2	81.2	19.0
MAR	-3.1	-10.3	-6.3			23.6	23.6		61.6	16.2	94.0	25.8
APR	3.4	-4.4	-1.2		12.2	13.8	26.0		46.4	14.4	77.6	24.2
MAY	8.1	-0.5	2.5		22.3	2.5	24.8					
JUNE	13.9	5.4	8.2		69.1		69.1	455.7				
JULY	16.2	6.2	9.9		64.1		64.1					
AUG	15.1	6.3	8.3		50.3		50.3					
SEPT	10.0	2.9	3.5		77.7	3.4	81.1					
OCT	6.1	-0.6	0.6		75.9	30.7	106.6					
NOV	-3.3	-10.3	-7.7			71.0	71.0					
DEC	-4.3	-10.3	-7.8			13.5	13.5					
Avg/Tot	4.8	-2.8	-0.3		380.1	237.6	617.7					
2004												
JAN	-9.1	-14.7	-12.5			53.5	53.5					
FEB	-2.4	-7.9	-5.8			33.7	33.7		69.6	16.8	86.2	21.8
MAR	0.6	-7.1	-4.3		1.4	35.9	37.3		83.6	22.2	96.6	28.2
APR	6.7	-2.7	-0.3		25.8	6.5	32.3		53.6	16.0	66.8	23.6
MAY	11.1	1.5	4.4		43.0	14.5	57.5					
JUNE	17.5	6.4	10.9		82.8		82.8	683.7				
JULY	16.6	7.6	10.9		83.2		83.2					
AUG	17.2	7.2	10.2		58.8		58.8					
SEPT	7.9	1.4	2.5		71.4	9.5	80.9					
OCT	4.0	-2.0	-0.7		47.3	32.0	79.3					
NOV	-1.6	-6.8	-4.7		15.4	88.5	103.9					
DEC	-4.7	-8.7	-7.0		7.7	71.2	78.9					
Avg/Tot	5.3	-2.2	0.3		436.8	345.3	782.1					
2005												
JAN	-7.1	-13.3	-11.1		18.7	30.6	49.3					
FEB	-1.5	-9.5	-7.9			36.4	36.4		84.0	21.6	101.4	30.4
MAR	0.7	-6.8	-4.6		9.8	29.5	39.3		85.4	21.4	111.6	31.4
APR	6.0	-2.9	-0.4		6.6	49.6	56.2		76.4	23.8	92.8	31.6
MAY	12.8	2.6	6.0		28.5		28.5					
JUNE	14.2	5.9	8.2		63.1		63.1	757.8				
JULY	13.9	6.0	8.1		121.1		121.1					
AUG	15.3	6.4	8.9		55.8		55.8					
SEPT	9.8	2.2	3.5		43.9	4.0	47.9					
OCT	4.0	-1.4	0.0		34.1	31.3	65.4					
NOV	-1.3	-5.3	-4.0		9.0	32.5	41.5					
DEC	-3.4	-7.8	-5.9		1.9	36.1	38.0					
Avg/Tot	5.3	-2.0	0.1		392.5	250.0	642.5					
2006												
JAN	-2.8	-8.5	-5.6			59.8	59.8					
FEB	-3.8	-13.4	-8.6			28.0	28.0		54.4	13.4	91.8	26.4
MAR	-2.1	-12.1	-7.1			35.9	35.9		74.8	19.6	112.6	31.4
APR	5.0	-4.9	0.0			6.9	6.9		49.4	16.8	85.2	28.8
MAY	10.6	-0.1	5.3		42.5	2.4	44.9					
JUNE	16.6	4.8	10.7		46.9		46.9	592.1				
JULY	17.5	6.9	12.2		108.1		108.1					
AUG	15.1	4.6	9.9		32.6		32.6					
SEPT	13.5	3.0	8.2		55.6	0.5	56.1					
OCT	6.6	-2.7	1.7		17.0	100.5	117.5					
NOV	-6.9	-14.2	-10.6			71.0	71.0					
DEC	-2.6	-8.6	-5.5			81.0	81.0					
Avg/Tot	5.6	-3.8	0.9		302.7	386.0	688.7					

PERIOD	TEMPERATURE -C MAX.	MIN.	AVG.	HEATING DEG. DAYS	PRECIPITATION RAIN MM.	SNOW CM.	TOTAL CALENDAR YEAR MM	TOTAL JUNE TO JULY MM	SNOW PACK LU LAKE SITE SNOW PACK CM.	WATER EQUIV CM	EQUITY SITE SNOW PACK CM.	WATER EQUIV CM
2007												
JAN	-2.7	-12.0	-7.3			46.5	46.5		115.8	35.2	134.5	45.8
FEB	-2.9	-10.2	-6.5		0.6	48.5	49.1		138.2	41.2	161.0	54.6
MAR	-0.5	-8.7	-4.6		0.6	50.1	50.7		141.8	50.4	168.6	57.2
APR	1.7	-5.8	-2.0		30.3	38.0	68.3		137.8	52.8	165.0	69.0
MAY	8.3	-1.2	3.6		14.6	15.0	29.6					
JUNE	12.0	3.2	7.6		150.2		150.2	860.7				
JULY	16.5	7.6	12.1		97.1		97.1					
AUG	14.9	5.6	10.3		93.5		93.5					
SEPT	10.4	2.2	6.3		29.6		29.6					
OCT	3.7	-1.5	1.1		43.7	43.3	87.0					
NOV	-1.9	-9.3	-5.6		7.8	79.0	86.8					
DEC	-6.2	-13.9	-10.0			74.0	74.0					
Avg/Tot	4.4	-3.7	0.4		468.0	394.4	862.4					
2008												
JAN	-6.0	-13.3	-9.6			38.7	38.7					
FEB	-1.3	-10.6	-5.9			33.5	33.5		94.0	24.0	116.0	33.0
MAR	-0.5	-8.9	-4.7			32.4	32.4		111.8	29.6	139.5	38.3
APR	1.2	-6.5	-2.7			11.6	11.6		86.4	24.0	118.6	40.0
MAY	10.0	2.9	6.4		25.9		25.9					
JUNE	11.7	4.7	8.2		31.9		31.9	642.0				
JULY	14.9	6.7	10.8		44.5		44.5					
AUG	15.9	7.6	11.7		106.4		106.4					
SEPT	12.3	4.0	8.2		39.0		39.0					
OCT	3.8	-1.8	1.0		20.9	33.0	53.9					
NOV	0.1	-4.6	-2.3		13.7	74.5	88.2					
DEC	-7.8	-13.8	-10.8		1.2	41.6	42.8					
Avg/Tot	4.5	-2.8	0.9		283.5	265.3	548.8					
2009												
JAN	-3.7	-11.3	-7.5			76.0	76.0					
FEB	-5.1	-13.9	-9.5			31.2	31.2		95.8	27.2	126.0	38.6
MAR	-3.5	-11.2	-7.3			38.1	38.1		112.4	33.6	142.0	44.2
APR	2.3	-3.9	-0.8		14.5	41.3	55.8		113.2	37.8	142.8	46.2
MAY	7.7	-0.2	3.8		34.2	11.5	45.7					
JUNE	14.5	3.4	8.9		37.8		37.8	659.4				
JULY	20.2	5.9	13.0		82.1		82.1					
AUG	17.2	3.6	10.4		21.1		21.1					
SEPT	12.0	2.2	7.1		75.1	1.0	76.1					
OCT	3.0	-2.4	0.3		36.5	54.2	90.7					
NOV	-1.1	-5.9	-3.5		7.0	70.9	77.9					
DEC	-6.6	-8.7	-7.6			57.5	57.5					
Avg/Tot	4.7	-3.5	0.6		308.3	381.7	690.0					
2010												
JAN	-3.2	-6.6	-4.9		4.4	53.4	57.8					
FEB	-0.3	-7.8	-4.1			27.7	27.7		88.6	24.0	110.6	32.4
MAR	1.7	-5.4	-1.8			11.0	11.0		82.8	24.6	105.4	35.0
APR	5.0	-6.3	-0.6		22.8	11.3	34.1		67.4	22.2	92.4	34.0
MAY	9.4	-1.3	4.1		44.7	23.5	68.2					
JUNE	13.0	2.6	7.8		38.1		38.1	642.3				
JULY	18.7	6.0	12.3		17.6		17.6					
AUG	16.9	6.2	11.6		37.9		37.9					
SEPT	10.3	0.6	5.4		123.6		123.6					
OCT	6.2	-2.0	2.1		41.2	28.3	69.5					
NOV	-2.7	-10.0	-6.3		0.6	63.0	63.6					
DEC	-4.3	-12.3	-8.3			45.8	45.8					
Avg/Tot	5.9	-3.0	1.4		330.9	264.0	594.9					
2011												
JAN	-7.0	-12.3	-9.7		14.5	90.8	105.3					
FEB	-6.1	-15.6	-4.1			45.7	45.7		98.5	25.8	115.6	33.8
MAR	-2.0	-12.0	-1.8			69.8	69.8		108.6	33.2	135.8	42.0
APR	2.7	-10.6	-0.6			84.3	84.3		132.6	42.4	152.2	52.4
MAY	7.6	-0.8	4.1		71.1	50.5	121.6					
JUNE	12.9	3.3	7.8		71.1		71.1	855.8				
JULY	12.8	5.1	12.3		113.5		113.5					
AUG	15.0	4.1	11.6		24.9		24.9					
SEPT	13.4	3.5	5.4		66.2		66.2					
OCT	4.8	-2.8	2.1		13.6	9.0	22.6					
NOV	-1.4	-10.3	-6.3		3.0	115.5	118.5					
DEC	-1.4	-11.5	-8.3			65.7	65.7					
Avg/Tot	4.3	-5.0	1.0		377.9	531.3	909.2					
2012												
JAN	-7.6	-15.6	-11.6			69.4	69.4					
FEB	-2.3	-10.1	-6.2			74.8	74.8		132.6	35.8	160.0	47.0
MAR	-0.2	-9.9	-5.1			27.7	27.7		129.4	45.6	148.4	55.6
APR	4.5	-5.7	-0.6		40.7	26.1	66.8		108.8	44.0	130.2	55.0
MAY	6.9	-2.4	2.2		10.1	14.0	24.1					
JUNE	11.2	3.0	7.1		86.9		86.9	761.1				
JULY	19.4	7.7	13.5		32.1		32.1					
AUG	18.0	5.8	11.9		67.3		67.3					
SEPT	15.8	2.3	9.0		18.8		18.8					
OCT	3.1	-4.6	-0.8		31.7	72.8	104.5					
NOV	-3.1	-9.4	-6.2		3.3	50.2	53.5					
DEC	-5.9	-14.2	-10.0			65.0	65.0					
Avg/Tot	5.0	-4.4	0.3		290.9	400.0	690.9					

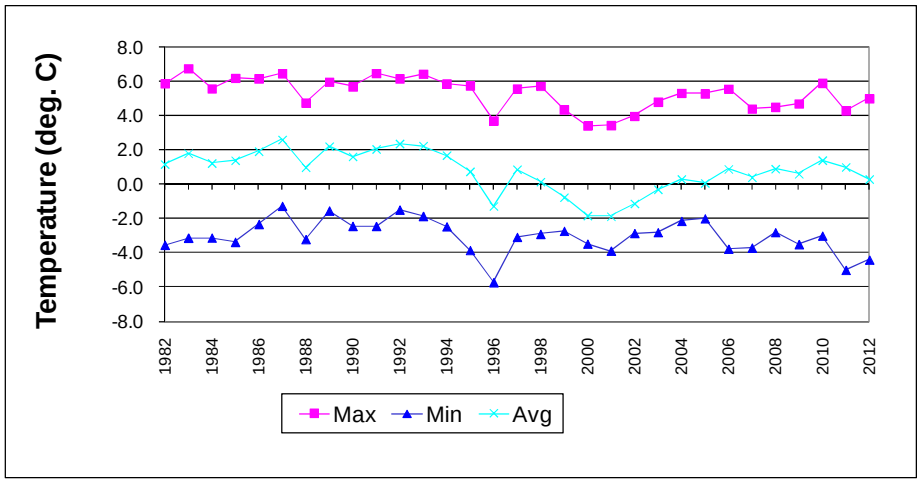


Figure 4-1: Average temperature (min, max, mean) for last 30 years.

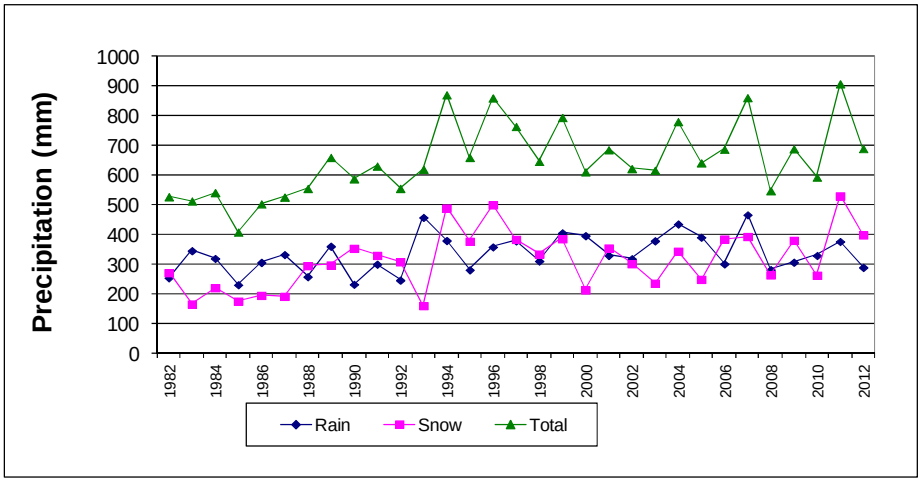


Figure 4-2: Precipitation trends for last 30 years.

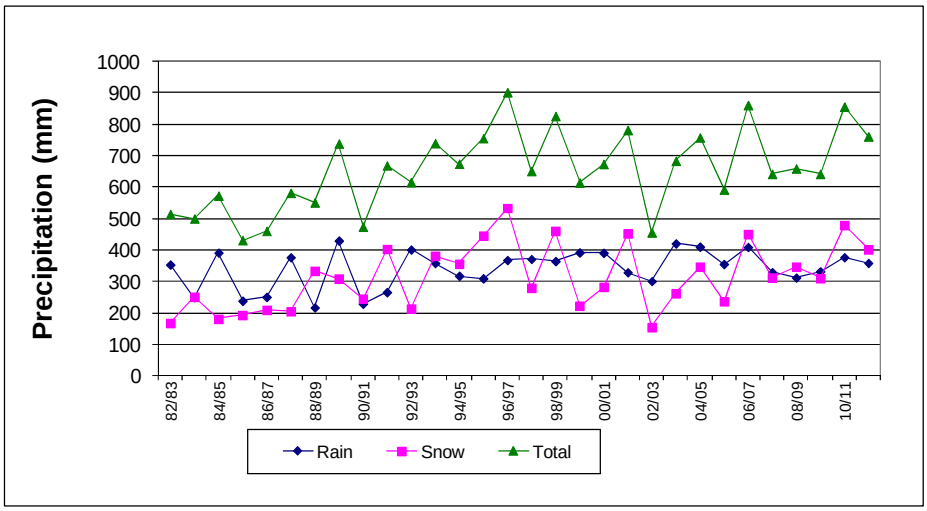


Figure 4-3: July-June precipitation for last 29 years.

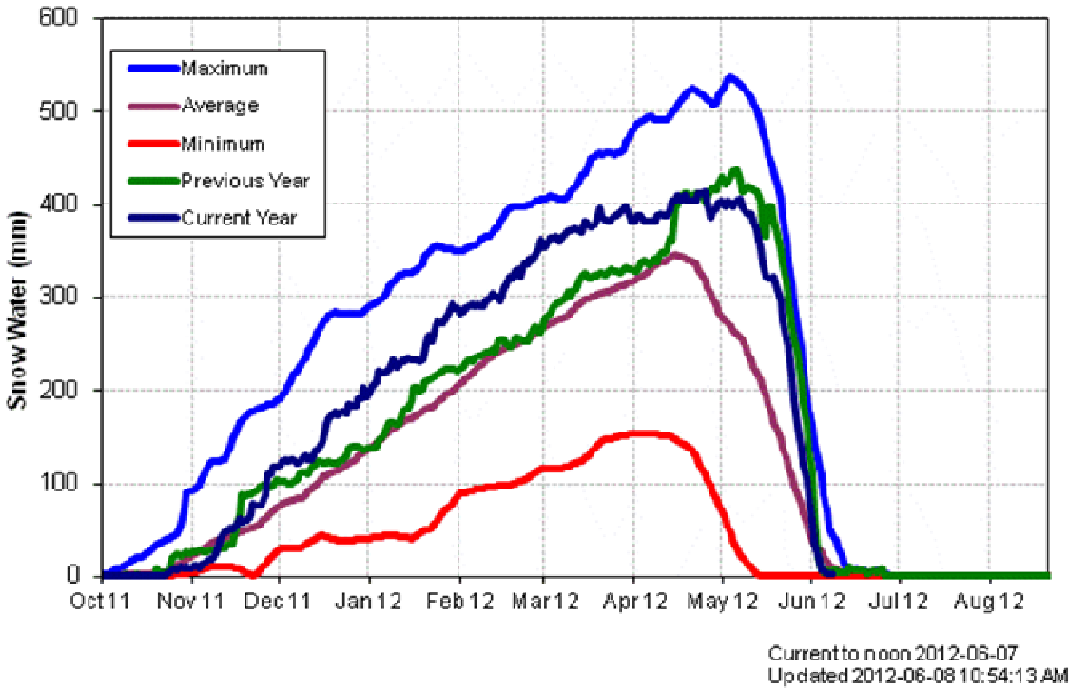


Figure 4-4: Snow water equivalents for the 2011/2012 winter season recorded at the Lu Lake Snow Pillow site.

4.2 Stream Flows

Collection of hydraulic data for the Foxy Creek and Buck Creek watersheds is restricted to the spring to fall period. Data is collected for the purpose of setting water discharge rates and for comparing the relationship of flow in the creek systems.

Collection of data through the winter periods is difficult to perform due to ice and snow cover on streams. Due to the difficulty in monitoring, an average runoff factor of 10.9 L s^{-1} Km^{-2} is applied to estimate flows in the system. Watershed flows feeding Foxy Creek and Buck Creek are summarized in Table 4-2. The average runoff factor is taken from the mean monthly flows (Figure 4-5).

Table 4-2: Watershed Areas and Daily Flows in cubic metres

Site	Area ($km^{2)}$	Flow (L/sec)	Flow (m^3/day)
Foxy Creek above Lu Div.	13.8	150	12,996
Foxy Creek below Berzelius Div.	26.0	283	24,486
Foxy Creek @ confluence with Maxan Creek	89.0	970	83,817
Berzelius Creek Div.	4.55	50	4,285
Foxy Creek below Berzelius Div less Berzelius Div	21.45	234	20,201
Buck Creek at site (0400765)	55.0	600	51,797
Bessemer Creek at Siltcheck (0700081)	8.1	88	7,628
Buck Creek at Goosly Lake	64.0	698	60,273
ARD collection system	1.7	19	1,601
Southern Tail Pit	0.4	4	377

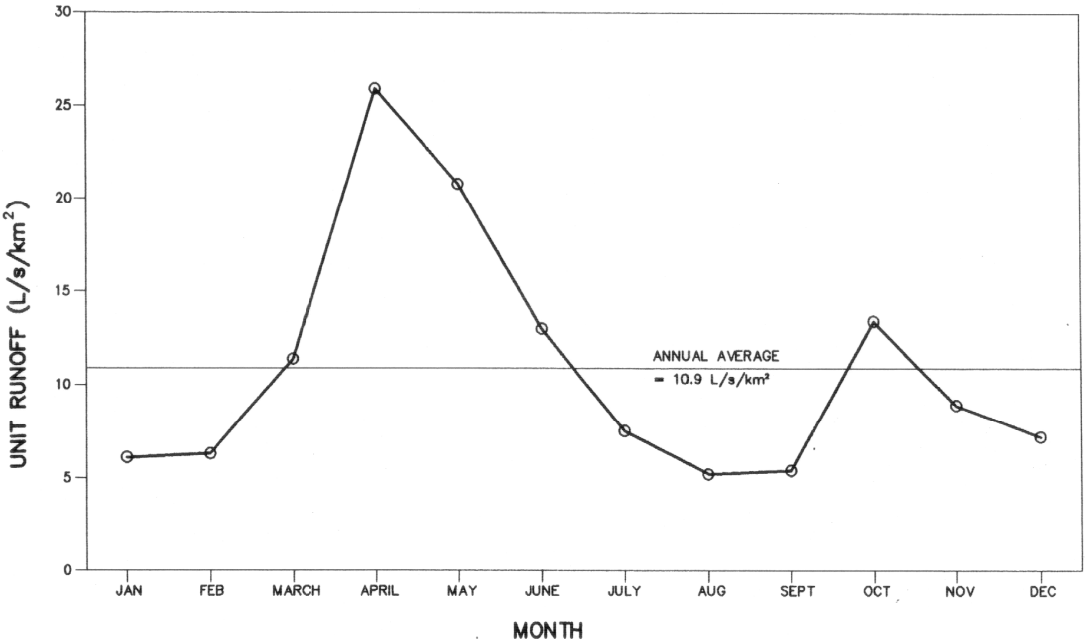


Figure 4-5 Mean monthly hydrograph for the area around Equity Mine.

Flow monitoring stations and staged curves have been developed for Foxy Creek and Buck Creek. The flow at Buck creek was measured twice in 2012 to fill out the higher flows on the curve (Figure 4-6). Foxy Creek flows were measured four times in 2012 after the damaged staff gauge had to be removed and replaced (Figure 4-7). Beaver activity was again present in the Buck system, but did not interfere with flow measurements in 2012, but a dam was constructed below the staff gauge in the fall raising the water level at the staff gauge. The beaver dam was removed once in the fall, but was promptly rebuilt. The dam will be removed again in the spring of 2013 so that flow measurements at the Buck station will be applicable.

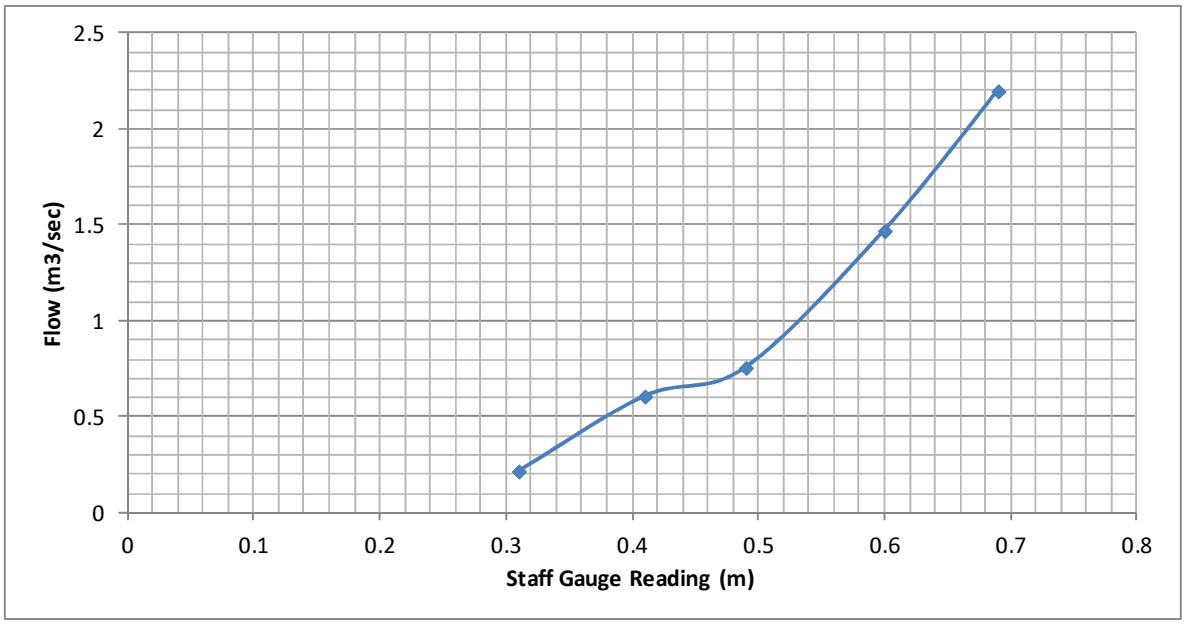


Figure 4-6: Buck Creek Staff Gauge Discharge Curve

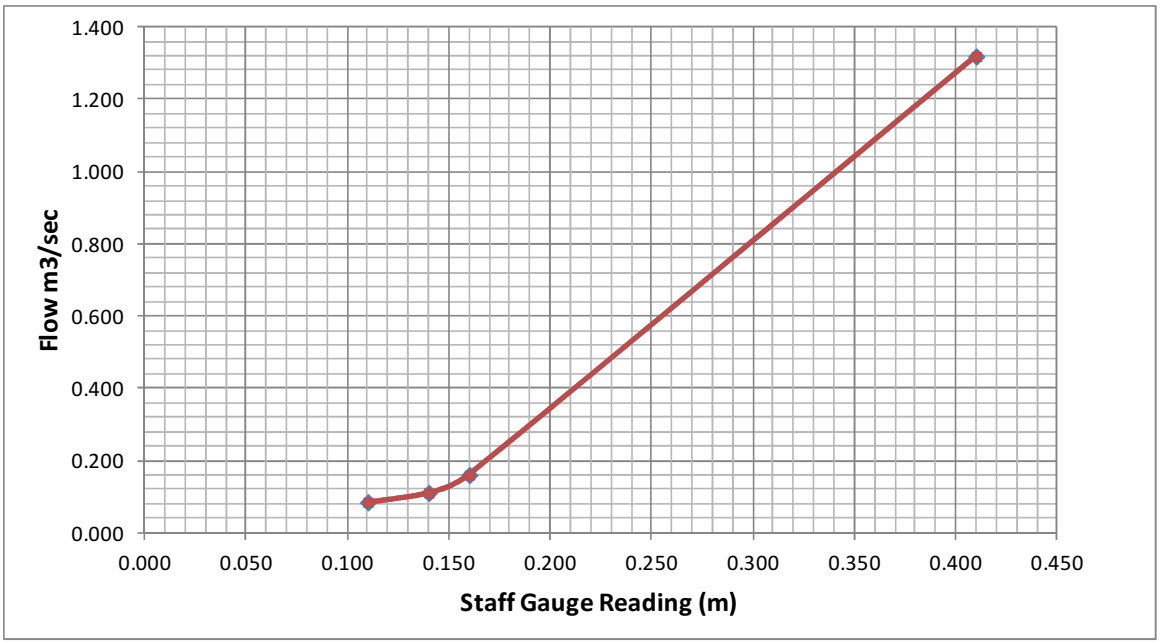


Figure 4-7: Foxy Creek Staff Gauge Discharge Curve

4.3 ARD Collection

Monthly volumes of ARD collected from the waste rock dump and plantsite along with volumes from #1 Dam seepage are summarized annually for the periods 1983 through to 2012 (Table 4-3). The years 1987 to 2012 for the waste rock dump flow and 1988 to 2012 for the #1 Dam seepage recovery are used for the purpose of evaluating trends.

A mean monthly index hydrograph of ARD collection statistics for the waste rock dump and plantsite is illustrated as an average 1987-2012 (Figure 4-8). Figure 4-9 represents a similar cumulative distribution for #1 Dam seepage from 1988 to 2012. The trend for both graphs shows the freshet starting in March, peaking in April and May, and then dropping off to lows in August and September. A much smaller secondary peak occurs in October due to increased precipitation and reduced evaporation during the fall.

The 2012 ARD collection system hydrograph (Figure 4-8) shows above average ARD collection volumes for May and June with the rest of the year close to or below average. The flow volume was less than average in April due to cooler temperatures delaying the snow melt. The collection rate increased to above average as warmer temperatures came in May with above average flows extending into June. The total volume of ARD collected in 2012 at the Main Pond was 860,426 m^3 was just above the average of 851,009 m^3 for the period 1987 to 2012.

The 2012 #1 Dam hydrograph (Figure 4-9) represents average collection volumes for most months except June and July which were significantly higher than average. Flow volumes remained close to average for January to May. The peak collection volume in June was above average at 60,428 m^3 and was one of the highest pump volumes on record for any month. Despite the high flow in June there were no issues with pumping due to a relatively constant melt rate over the month. The emergency booster pump was moved to #1 Dam in case it was required, but it was not used as the existing pumps handled the flow. Flows remained below average for the remainder of the year. The total ARD flow volume collected at the #1

Dam in 2012 was 174,747 m^3 as compared to a historical average flow volume of 139,518 m^3 for the period 1988 – 2012.

ARD flows were measured throughout 2012 at the weirs with greater frequency during the freshet (Figure 4-10). The highest flows were measured at Bessemer Dump and C-7 in 2012. Flows at C-7 can show large variability in response to pumping from the Getty Creek pump house, but the flows shown in Figure 4-10 have been compensated to remove the Getty flow. Flows are generally taken when Getty Creek pumps are not pumping, but occasionally the flow cannot be measured without the influence of Getty Creek. Flows at C-7, C-11, and Bessemer Dump started to increase mid April with peaks in late May and gradually decreasing through August. Flows at the Southern Tail weir increased in mid May and remained elevated to mid August. The highest flow rate recorded at C-7 was 46.36 L s^{-1} on May 28th with Getty Creek pumps running and was corrected to 26.26 L s^{-1}. The highest flow at the Bessemer weir was 31.94 L s^{-1} recorded on May 28th, the C-11 high flow was 17.88 L s^{-1} recorded on May 27th, and the Southern Tail high flow was 5.28 L s^{-1} recorded on June 29th.

Flows at the ARD toe seeps peaked around mid May with a few seeps (97-01 & 97-04) peaking through June due to influence from the Southern Tail pit. All of the seeps decreased throughout the rest of the summer. The flows of the individual seeps varied depending on the aspect of the area feeding the seep (Figure 4-11).

ARD acidity concentrations and flow volumes are presented in Table 4-4 for the ARD sampling stations and the Treatment Plant Feed (TPF). Stations with the greatest acidity concentrations are Main Pond (C-8), C-7, and TPF. ARD acidity values at C-8 and TPF were similar to historical values, although they were significantly lower than the levels observed in 2011 (Figure 4-11). The lower acidity concentrations and loadings for C-8 and TPF in 2012 compared to 2011 were interesting since both years had higher than average flows indicating that additional acidity was not flushed from the waste rock dumps during the second consecutive high flow year in 2012. Acidity values for TPF increased to their peak in March, then dropped to their lowest point in June due to dilution from the freshet and continued to increase until the end of the year. C-8 acidity values followed a similar trend increasing from January to May, then dropping to the lowest value in June and then increasing through the end of the year.

Tables 4-5 and 4-6 show volumes of ARD collected from #1 Dam Seepage, Getty Creek, Southern Tail Pit, and the Main Pond for calendar and July to June periods back to 1997. The associated trends are shown in Figures 4-13 and 4-14. The figures include a plot of the precipitation for the period. The flow volumes for #1 Dam, Getty Creek and the Main pond were decreased from 2011, but were still higher than the historical site averages for the calendar year and July to June period. Southern Tail Pit discharge was below average for both the calendar year and July-June.

TABLE 4-3 SUMMARY OF ARD PUMP RECORDS (M^3)

MAIN POND - Waste dumps and Plantsite

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1982						86700	64500	25200	23000	42900	33800	27200	303300
1983	20000	19100	31600	141400	67600	95300	107700	23500	41900	27200	40200	26600	642100
1984	22900	25900	71400	141000	181000	68300	35000	63400	85700	52900	25000	20000	792500
1985	18700	16000	20000	122700	207200	51400	31000	18300	41700	40200	18800	20000	606000
1986	19000	19000	42500	95700	192000	154400	39700	26700	72200	92000	41800	32000	827000
1987	20300	20500	50500	247000	215000	57000	52700	65300	45600	41200	73300	26400	914800
1988	28000	18600	39600	182600	107900	184900	50600	43000	45000	54900	39600	31500	826200
1989	38500	15100	25600	285000	138900	40000	57300	52200	17900	56400	66700	40500	834100
1990	41700	50300	80000	184000	137160	106350	144000	63970	61900	79000	51600	43850	1043830
1991	39300	35500	43400	206500	129500	45100	69500	34200	42300	64600	49200	49000	808100
1992	35800	73720	192000	186470	77590	47405	34794	18670	32085	57410	46665	28969	831578
1993	19766	49677	38291	185698	124194	179726	105280	111030	39144	21377	34436	19383	928002
1994	25504	26967	79250	259523	206502	67866	75077	80709	31138	49862	25683	27676	955757
1995	27454	25601	40714	166466	270808	41014	28622	34911	20312	24700	21760	20135	722497
1996	29352	27335	64567	237967	331306	101942	51391	37995	76802	58441	59525	42711	1119334
1997	35821	30875	39221	162361	421368	124017	40468	26872	48794	79960	51143	27152	1088052
1998	21051	36813	45380	88776	264502	44407	47448	34731	16218	34990	26179	18485	678980
1999	20180	24099	52745	119999	187472	129242	109933	39035	36527	33597	25114	21450	799393
2000	32781	18611	19711	78835	126450	82076	40654	27315	33435	55198	69287	25128	609481
2001	19072	17557	29239	71742	157027	135161	54978	27486	24551	26866	29956	31917	625552
2002*	24877	23430	18673	79168	451778	189936	57451	25513	34930	29353	28600	26209	989918
2003	18058	14412	33426	99907	80971	48495	71070	28216	36221	68878	50301	41422	591376
2004	29322	25984	40900	109674	142114	59024	46909	34633	63588	63369	93368	91656	800542
2005	62722	42166	70857	133656	138186	40227	34757	50982	38601	88383	73465	45411	819414
2006	30506	25428	27384	44654	108726	79862	42398	41497	33767	29206	26864	39878	530170
2007	47403	31552	55265	90132	367223	308364	144318	97099	51335	68893	71760	47633	1380977
2008	28391	26163	33638	46553	208091	60638	39059	33327	32234	32283	38963	52758	632097
2009	30215	26643	29284	49539	229140	154075	70930	32544	34531	37573	56223	32041	782737
2010	23369	29683	38786	90115	155595	82796	34777	31419	58794	56845	79498	44299	725976
2011	40996	32495	35589	38283	374459	264293	142818	108928	54792	50539	39069	44674	1226935
2012	33490	22019	21731	93851	235974	178329	80358	61101	29738	37816	33076	32943	860426
Avg (87-12)	30920	29663	47913	136095	207228	109702	66446	47796	40009	50063	48513	36661	851009

Note: 2002 data includes diverted flows for May (111,618 m^3) and June (21,364 m^3) that was not pumped to the Storage Pond

#1 DAM SEEPAGE RETURN

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1981						68400	66300	39700	9600	4700	4500	5300	198500
1982	2500	5000	27300	7200	44600	8400	5900	11800	9600	17400	2100	3700	145500
1983	4600	3100	6800	21000	33800	28200	13600	59500	43800	33500	16800	5000	269700
1984	700	4300	5000	11400	25400	23700	13700	7200	8500	10200	4800	5400	120300
1985	700	1400	2900	5700	32700	12700	8900	3700	8200	6100	3300	5300	91600
1986	1700	3500	7600	13500	26700	9500	6000	2800	6200	12600	8400	3500	102000
1987	3000	3300	3400	9600	25200	5300	4300	6400	5200	4000	12600	4500	86800
1988	4400	4100	11000	22300	20400	11800	5300	6700	7000	9200	8560	7460	118220
1989	5400	5700	5600	20000	27300	8300	10800	5200	11600	6600	12800	10900	130200
1990	7800	4000	7700	21600	26500	14500	12800	10880	7180	9000	8100	8300	138360
1991	6450	5700	6550	26800	12600	6600	14200	7000	8700	9800	9400	9800	123600
1992	7580	10470	13400	28080	26890	13905	8940	8620	10850	14006	13450	8774	164965
1993	6936	7986	8273	22201	24232	26264	13002	20454	8202	7916	11482	7848	164796
1994	7023	6579	8256	20946	37160	11600	9893	8482	6777	10636	7950	6573	141875
1995	6341	7834	5830	13200	41591	8939	7704	9130	6020	5959	6961	6095	125604
1996	7411	6348	8270	19438	37875	19977	14257	11373	21075	18927	9753	8952	183656
1997	8127	7350	8318	16611	53434	33286	10186	9143	12777	19102	9509	8361	196204
1998	6727	6139	7070	11723	55647	9818	10207	8196	6855	10463	8264	6675	147784
1999	5911	5464	6664	12645	33148	23655	11764	13131	9155	7254	5741	5600	140132
2000	5650	4627	4870	7966	20952	19859	9391	5491	7173	9864	9682	6400	111925
2001	5291	5223	5059	7627	18418	25027	10890	5964	6146	6700	6436	5991	108772
2002	4900	4646	4436	6745	9239	29827	10746	5584	8305	7602	7480	6252	105762
2003	5114	4943	5598	10825	17693	9055	11309	5018	9000	12727	7098	6050	104430
2004	4746	4319	5693	11964	26427	12446	9155	6418	11491	9182	8927	8066	118833
2005	6334	5291	6880	15816	26882	10064	6646	10500	7193	13896	9150	6409	125059
2006	5141	5734	5523	5807	25902	16180	7459	6730	5980	6730	6171	7316	104672
2007	7896	3893	5986	7802	29430	51484	26936	11336	5948	11164	7089	6348	175312
2008	3577	6404	5532	6811	42234	21641	12187	9324	9831	6736	6866	8591	139734
2009	5250	4296	5332	5877	24152	42834	13900	5059	5850	6273	8782	5905	133509
2010	3934	4364	5134	10112	38966	15591	5941	5564	10684	10066	8134	5414	123903
2011	5018	4473	4398	4425	51252	55091	23288	9273	7424	8018	6198	7028	185886
2012	5100	5209	5386	9298	30486	60428	25079	6443	4234	7598	7943	7543	174747
Avg (88-12)	5922	5644	6670	13865	30352	22327	12079	8441	8618	9817	8477	7306	139518

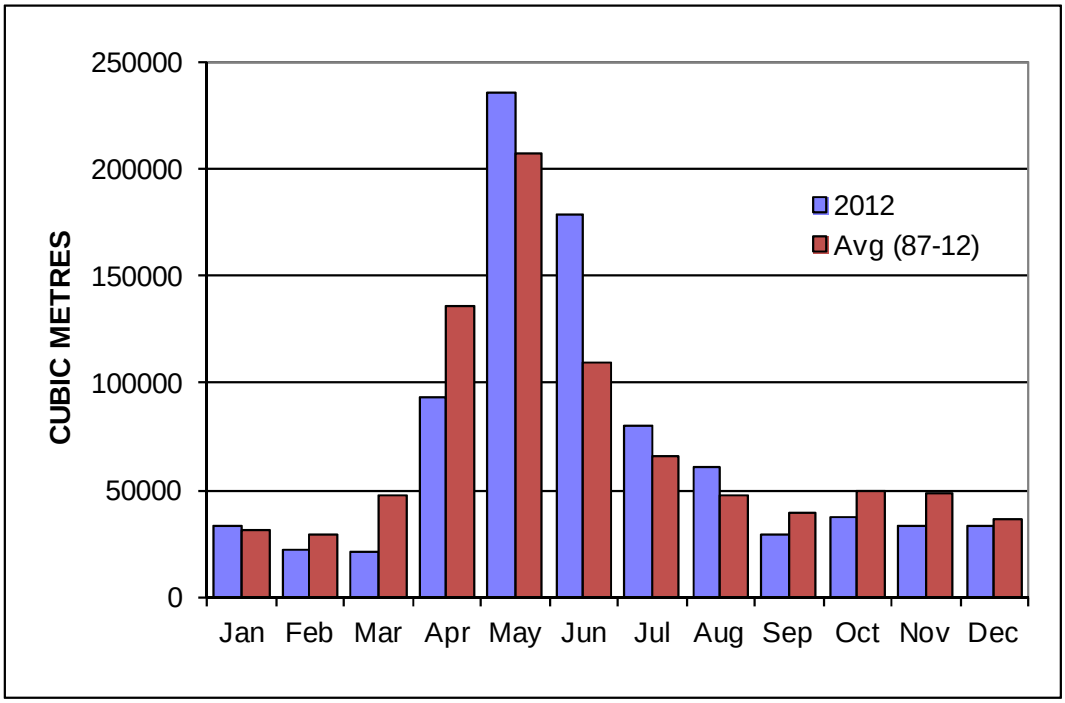


Figure 4-8: ARD Collection System Hydrograph

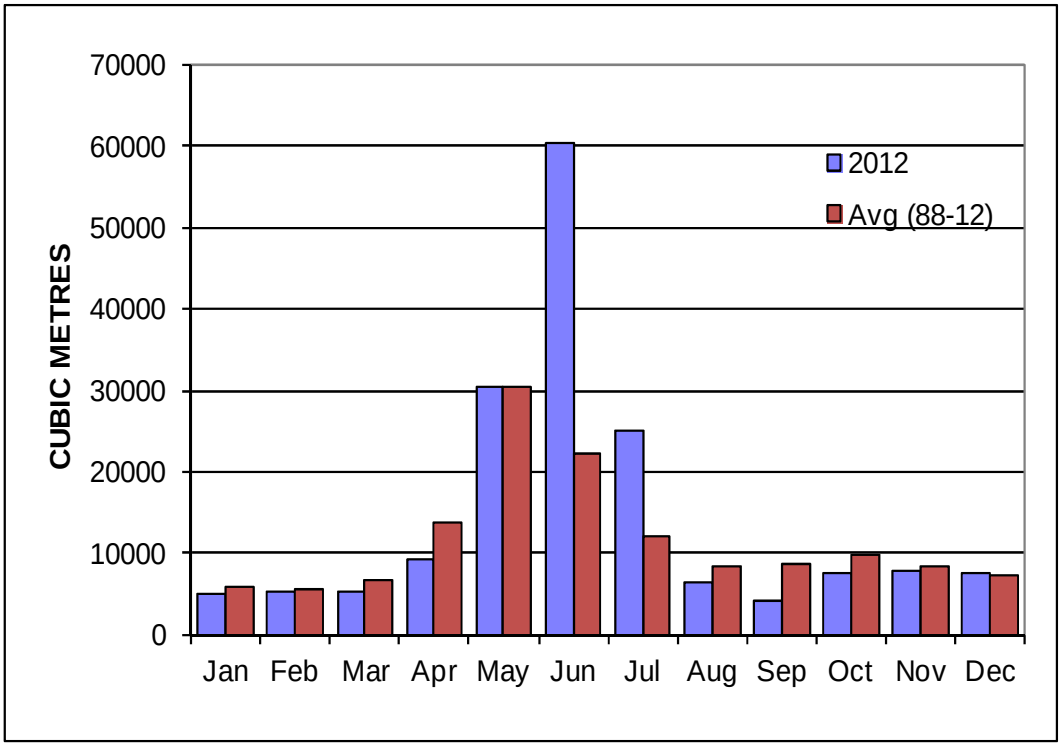


Figure 4-9: #1 Dam Seepage Hydrograph

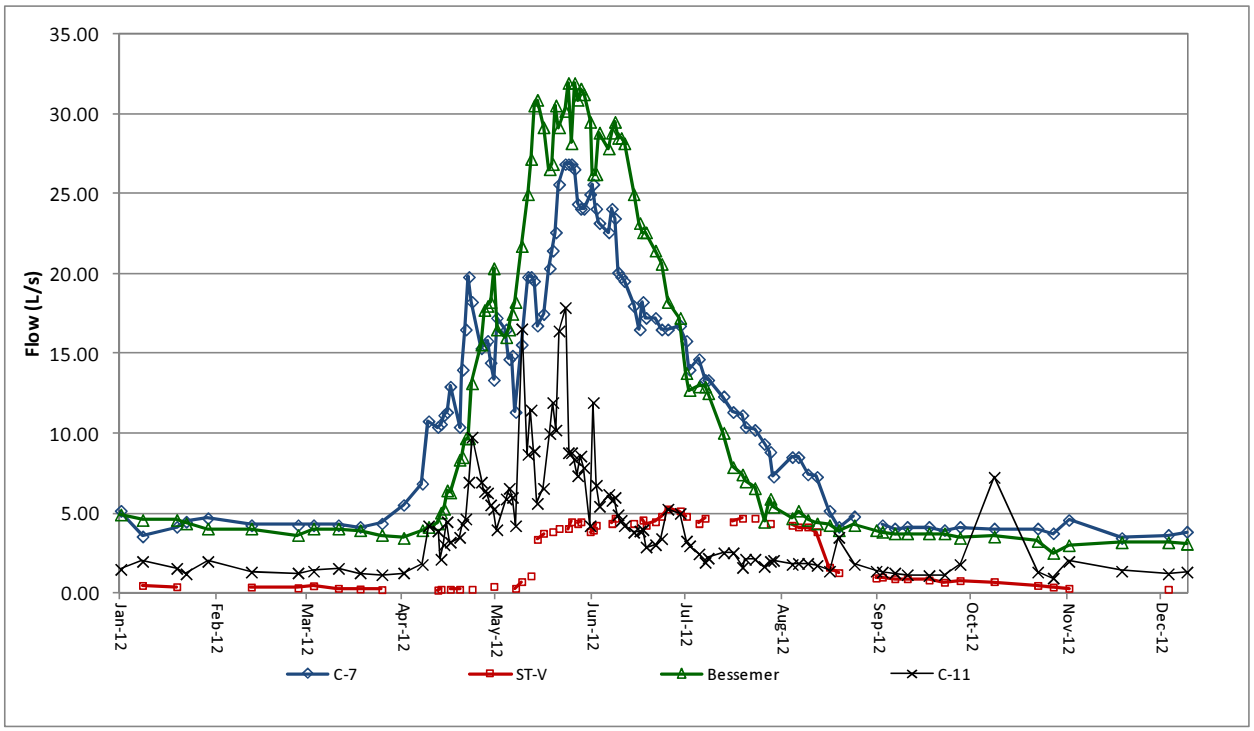


Figure 4-10: Property ARD Flows (BD, ST, C-7, C-11)

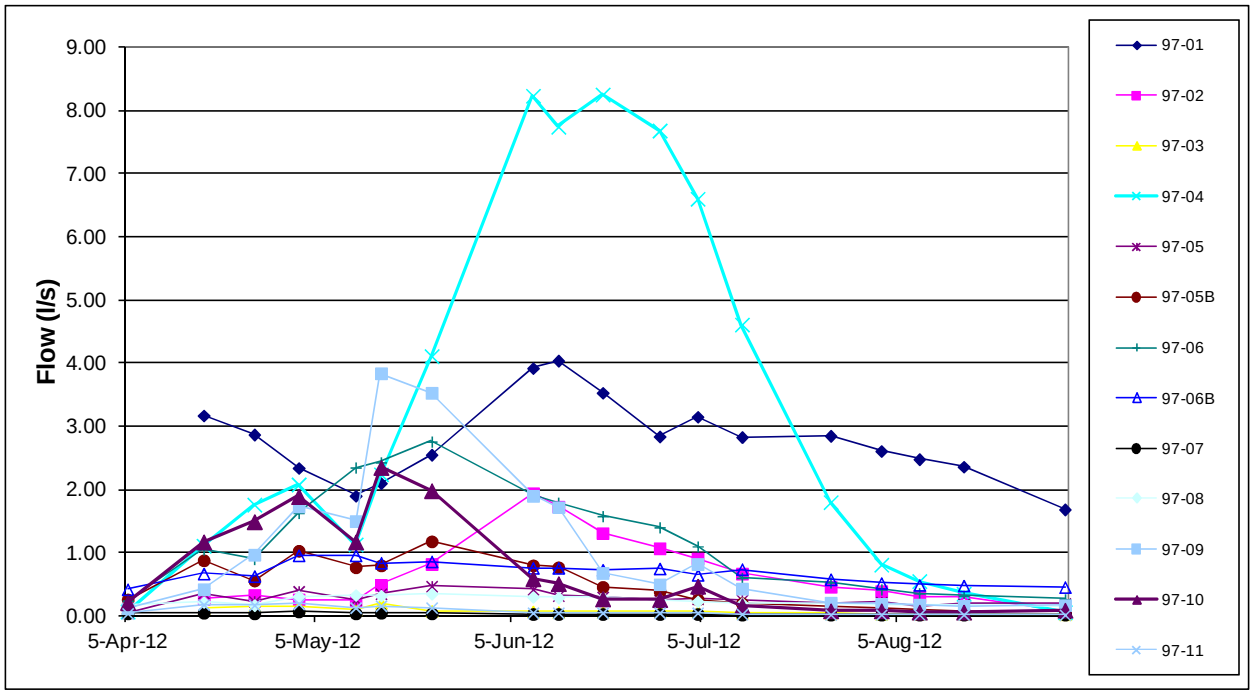


Figure 4-11: ARD Seep Flows 2012

Table 4-4: ARD Pump and Flow Records for 2012

Monthly ARD Volumes and Acidity Concentrations (2012)

	January-12		February-12		March-12		April-12		May-12		June-12	
Location	volume (m^3)	acidity	volume (m^3)	acidity	volume (m^3)	acidity	volume (m^3)	acidity	volume (m^3)	acidity	volume (m^3)	acidity
Main Pond (C-8)	33490	11095	22019	11900	21731	12700	93851	8340	235974	12850	178329	4960
#1 Dam	5100	1000	5209	1040	5386	1035	9298	819	30486	688	60428	778
Getty Creek	1539	227	1310	219	1221	199	29331	553	31071	115	9968	452
C-7	11598	11245	10820	14900	11393	16150	33015	13100	51634	9105	53967	8100
C-11	4176	89	3998	69	3537	64	11122	115	23163	169	14008	151
Bessemer Dump	12347	14300	9783	13200	10347	13950	19234	12100	65809	12430	68007	7630
Southern Tail Pit	1205	96	952	67	857	55	622	36	7392	106	11509	109
Treatment Plant Feed	-	-	-	-	106413	9705	119370	8900	291522	7248	290655	4279
	July-12		August-12		September-12		October-12		November-12		December-12	
	volume (m^3)	acidity	volume (m^3)	acidity	volume (m^3)	acidity	volume (m^3)	acidity	volume (m^3)	acidity	volume (m^3)	acidity
Main Pond (C-8)	80358	5780	61101	5730	29738	8230	37816	8200	33076	8890	32943	9600
#1 Dam	25079	588	6443	1175	4234	979	7598	999	7943	909	7543	881
Getty Creek	6023	588	3374	441	1315	294	1204	700	1457	1110	972	979
C-7	34066	3920	18443	9285	10645	11700	10698	11700	10410	12100	10023	12300
C-11	6773	487	5341	294	3103	98	7569	100	4357	202	3382	196
Bessemer Dump	28009	7930	12658	10015	9749	10600	8558	12100	8011	13700	8394	13700
Southern Tail Pit	12562	158	9053	196	2281	123	1580	250	804	153	670	109
Treatment Plant Feed	79516	5000	68168	4995	11948	-	-	-	97655	6560	-	-

Quarterly ARD Volumes and Acidity Concentrations (2012)

	1Q 2012		2Q 2012		3Q 2012		4Q 2012		Total	Average
Location	volume (m^3)	acidity	volume (m^3)	acidity	volume (m^3)	acidity	volume (m^3)	acidity	Volume (m^3)	Acidity
Main Pond (C-8)	77240	11898	508154	8717	171197	6580	103835	8897	860426	9023
#1 Dam	15695	1025	100212	762	35756	914	23084	930	174747	908
Getty Creek	4070	215	70370	373	10712	441	3633	930	88785	490
C-7	33810	14098	138616	10102	63154	8302	31131	12033	266710	11134
C-11	11711	74	48294	145	15216	293	15308	166	90529	170
Bessemer Dump	32477	13817	153050	10720	50416	9515	24963	13167	260906	11805
Southern Tail Pit	3014	73	19523	84	23896	159	3053	171	49487	122
Treatment Plant Feed	106413	9705	701547	6809	159632	4998	97655	6645	1065247	6670

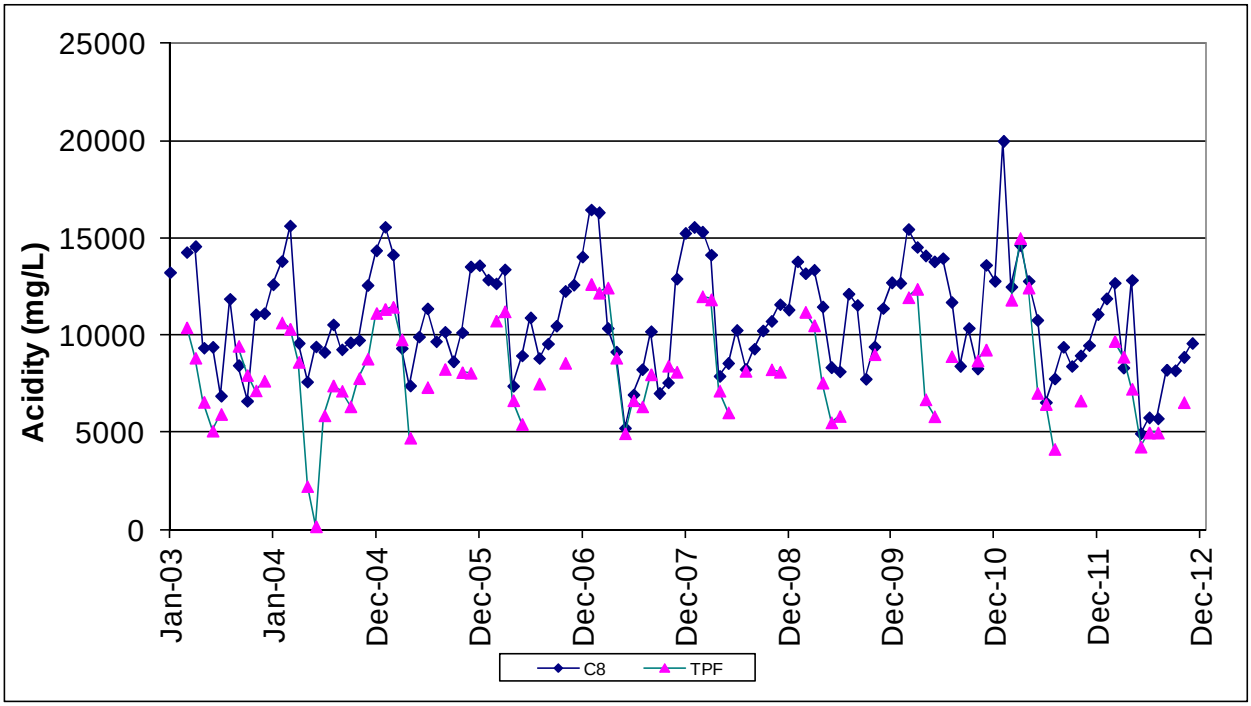


Figure 4-12: ARD acidity at Main Pond (C8) and Treatment Plant Feed (TPF) 2003 – 2012.

Table 4-5: Calendar Year ARD Collection

Year	#1 Dam m^3	Getty Creek m^3	STP m^3	Main Pond m^3	Main/10 m^3 x 10	Precip mm
1997	194022	73809	83061	1088051	108805	765.1
1998	147784	57817	78685	678983	67898	641.2
1999	140133	81180	100790	796262	79626	795.3
2000	111925	66795	82239	609484	60948	616.3
2001	108772	52955	70142	625552	62555	687.2
2002	105760	35168	102245	852503	85250	623.4
2003	104430	53575	81786	531057	53106	617.7
2004	118833	80921	133984	682603	68260	782.1
2005	125061	73130	117263	819413	81941	642.5
2006	104672	37029	45208	530170	53017	688.8
2007	175312	125267	106955	1380976	138098	862.4
2008	139734	46830	41500	632097	63210	548.8
2009	133510	68017	53461	782737	78274	690.0
2010	123903	62935	54573	725976	72598	594.9
2011	185885	96549	63255	1226935	122694	909.2
2012	174748	88785	49487	860425	86043	690.9
avg	137155	68798	79040	801452	76685	697.2

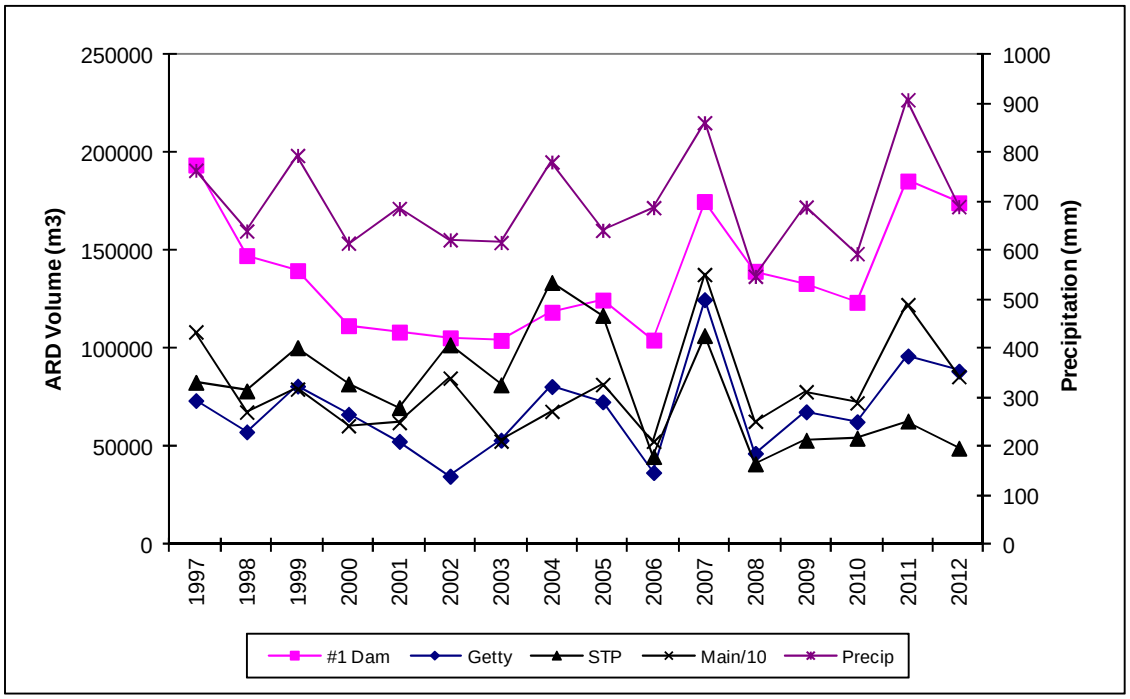


Figure 4-13: ARD Flow Collected for Calendar Year

Table 4-6: July to June ARD Collection

Period	#1 Dam m^3	Getty Creek m^3	STP m^3	Main m^3	Main/10 m^3 x 10	Precip mm
97/98	166202	58637	88480	775318	77532	643.7
98/99	138147	76639	89239	708658	70866	826.8
99/00	116570	66838	85958	624124	62412	618.5
00/01	114646	61050	81110	680815	68082	673.9
01/02	101919	37353	99942	846202	84620	781.4
02/03	99196	49327	52241	449940	44994	455.7
03/04	116797	62748	112082	572251	57225	683.7
04/05	124506	89243	147813	881338	88134	757.8
05/06	118079	49608	77005	648159	64816	592.1
06/07	146877	87168	56214	1113549	111355	860.7
07/08	155020	79297	90040	884511	88451	642.0
08/09	141276	64789	46901	747520	74752	659.4
09/10	123870	60778	48336	684186	68419	642.3
10/11	170460	90343	54665	1091747	109175	855.8
11/12	177137	100051	59927	1026803	102680	761.1
avg	130969	66701	80716	764880	76488	697.0

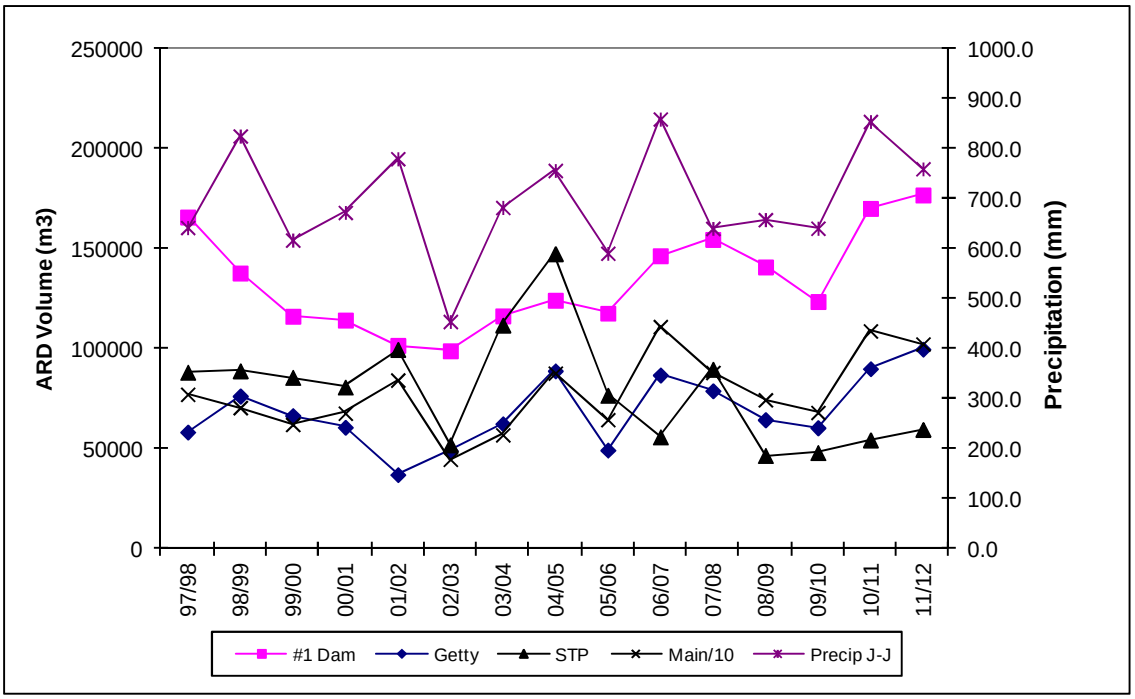


Figure 4-14: ARD Flow Collected for July to June Period

4.4 Treated Water and Main Zone Discharges

Standard operating procedure is for all ARD collected and treated from the property to be discharged back to the environment during the spring and early summer of each year when creek flows are at a maximum. Treated water discharged to Foxy Creek and Buck Creek is monitored weekly to establish water quality and permitted dilution ratios. These ratios are based on dissolved copper values as illustrated in Table 4-7. As a safety precaution Equity uses a secondary dilution table based on dissolved zinc values at certain dissolved copper levels (Table 4-8). The dilution ratios based on copper are increased if zinc loading exceeds the receiving water objective of 0.03 mg/l at downstream sites. The primary bioassay for the discharge is the *Ceriodaphnia dubia* seven day toxicity test. The Ceriodaphnia tests are completed weekly for the discharge water and every two weeks in the receiving environment throughout the discharge period (see 7.2) Pass/fail fish bioassays are also conducted on the treated water during the discharge period.

For 2012 the majority of water including treated water, Tailings Pond water, Diversion Pond water, and Main Zone Pit water were pumped from the Main Zone Pit to the environment. In 2012 the Emergency ARD Pond was also operational so accumulated melt water and precipitation was discharged directly from the Emergency Pond to Bessemer Creek after passing a Ceriodaphnia test and water quality testing. A permit amendment was received in 2011 from MoE to route water sources through the Main Zone Pit and discharge at a minimum dilution rate of 3:1 based on Ceriodaphnia survival and reproduction.

In 2012 a total of 2,383,746 m^3 was discharged to the environment from the Main Zone Pit and the Emergency ARD Pond (Table 4-9). The discharge period to Buck Creek from the Main Zone pit was April 23rd to July 27th for a total of 1,609,455 m^3. The Foxy Creek discharge period from the Main Zone pit was May 8th to July 27th for a total volume of 629,250 m^3. The Emergency ARD Pond runoff and precipitation discharge period was between June 11th and July 12th for a total of 145,041 m^3 that was discharged to Buck Creek via Bessemer Creek. Overall in 2012 Buck Creek received 1,754,496 m^3 while Foxy Creek received 629,250 m^3 which represents 73.6% and 26.4%% respectively of the water discharged from Equity.

The highest flow rate to Buck Creek in 2012 from the Main Zone pit, of 3610 USG/m, was used from April 25th to July 9th. During the remaining discharge periods, the flow was adjusted between rates of 900 USG/m to 1900 USG/m in response to closely monitored creek flows. The highest flow rate to Foxy Creek in 2012 from the Main Zone pit was 1650 USG/m from May 14th to July 16th while for the remaining discharge period the flow rate was maintained between 500 and 1000 USG/m depending on the creek dilution. The discharge from the Emergency ARD Pond was kept between 840 and 1950 USG/m based on the total volume discharged to Buck Creek and the available dilution at a 3:1 dilution ratio.

TABLE 4-7 Treated ARD Dilution Ratios for Foxy and Buck Creeks

	Receiving Stream: Discharge	
Cu (d) mg/L	**Foxy Creek**	**Buck Creek**
0.05	20:1	33:1
0.04	16:1	26:1
0.03	12:1	19:1
0.02	7:1	12:1
0.01	3:1	3:1 to 5:1

TABLE 4-8

Dilution Guide for Copper and Zinc Discharge to Foxy Creek

Cu(d) mg/l	DILUTION RATIO FOR COPPER	ZINC VALUES IN TREATED WATER MG/L						
		0.10	0.15	0.20	0.25	0.30	0.35	0.40
		PREDICTED DOWNSTREAM ZINC VALUES MG/L						
0.01	3:1	0.029	**0.041**	**0.054**	**0.066**	**0.079**	**0.091**	**0.104**
0.02	7:1	0.017	0.023	0.029	**0.036**	**0.042**	**0.048**	**0.054**
0.03	12:1	0.012	0.016	0.020	0.024	0.028	**0.032**	**0.035**
0.04	16:1	0.011	0.014	0.016	0.019	0.022	0.025	0.028
0.05	20:1	0.010	0.012	0.014	0.017	0.019	0.021	0.024
		BASED ON BACKGROUND ANALYSIS OF 0.005 MG/L						

Dilution Guide for Copper and Zinc Discharge to Buck Creek

Cu(d) mg/l	DILUTION RATIO FOR COPPER	ZINC VALUES IN TREATED WATER MG/L						
		0.10	0.15	0.20	0.25	0.30	0.35	0.40
		PREDICTED DOWNSTREAM ZINC VALUES MG/L						
0.01	5:1	0.022	0.030	**0.038**	**0.047**	**0.055**	**0.063**	**0.072**
0.02	12:1	0.013	0.017	0.021	0.025	0.029	**0.032**	**0.036**
0.03	19:1	0.011	0.013	0.016	0.018	0.021	0.023	0.026
0.04	26:1	0.009	0.011	0.013	0.015	0.017	0.019	0.021
0.05	33:1	0.009	0.010	0.012	0.013	0.014	0.016	0.018
		BASED ON DOWNSTREAM ANALYSIS OF 0.006 MG/L						

Note: If predicted zinc values exceed 0.03 mg/L increase dilution until 0.03 mg/L is achieved

TABLE 4-9 Equity Water Discharges 2003 –2012

	to Buck Creek				to Foxy Creek			Treated	Emergency Pond	Main Zone	Total Discharged
	Treated Water	Emergency Pond	Main Zone	Total	Treated Water	Main Zone	Total	Discharged	Discharged	Discharged	to Environment
	m^3	m^3	m^3	m^3	m^3	m^3	m^3	m^3	m^3	m^3	m^3
Apr-03			126328	126328		10193	10193			136521	136521
May-03			610500	610500		138568	138568			749068	749068
Jun-03			322667	322667						322667	322667
Jul-03			117764	117764						117764	117764
Aug-03											
Sep-03			61691	61691						61691	61691
Oct-03			242968	242968						242968	242968
Nov-03			174034	174034						174034	174034
2003 sum			1,655,952	1,655,952		148,761	148,761			1,804,713	1,804,713
Apr-04			337576	337576		80955	80955			418531	418531
May-04			480362	480362		224386	224386			704748	704748
Jun-04			231671	231671		163134	163134			394805	394805
Jul-04											
Aug-04											
Sep-04			179976	179976						179976	179976
Oct-04			236550	236550						236550	236550
Nov-04			215278	215278						215278	215278
Dec-04			49123	49123						49123	49123
2004 sum			1,681,413	1,681,413		468,475	468,475			2,149,888	2,149,888
Apr-05			203660	203660		30786	30786			234446	234446
May-05			572409	572409		263275	263275			835684	835684
Jun-05			211894	211894		184503	184503			396398	396398
Jul-05											
Aug-05											
Sep-05			13701	13701		9375	9375			23076	23076
Oct-05			267838	267838		243245	243245			511083	511083
Nov-05			161488	161488		125361	125361			286849	286849
2005 sum			1,430,991	1,430,991		856,545	856,545			2,287,536	2,287,536
Apr-06			96177	96177		7838	7838			104015	104015
May-06			551373	551373		227669	227669			779043	779043
Jun-06			252302	252302		171357	171357			423659	423659
Jul-06											
2006 sum			899,853	899,853		406,864	406,864			1,306,716	1,306,716
Apr-07			314,381	314,381		0	0			314,381	314,381
May-07			716,521	716,521		81,900	81,900			798,421	798,421
Jun-07			596,414	596,414		254,209	254,209			850,623	850,623
Jul-07			446,048	446,048		250,309	250,309			696,357	696,357
Aug-07			138,413	138,413		258,744	258,744			397,157	397,157
Sep-07			0	0		74,883	74,883			74,883	74,883
Oct-07			124,411	124,411		46,082	46,082			170,493	170,493
Nov-07			282,806	282,806		251,726	251,726			534,532	534,532
2007 sum			2,618,994	2,618,994		1,217,853	1,217,853			3,836,847	3,836,847
Apr-08			16,235	16,235		0	0			16,235	16,235
May-08			574,380	574,380		175,125	175,125			749,505	749,505
Jun-08			268,099	268,099		224,098	224,098			492,197	492,197
Jul-08			12,457	12,457		22,936	22,936			35,393	35,393
Aug-08			35,341	35,341		35,341	35,341			70,682	70,682
Sep-08			49,373	49,373		63,409	63,409			112,782	112,782
2008 sum			955,884	955,884		520,909	520,909			1,476,793	1,476,793
Apr-09			73,688	73,688						73,688	73,688
May-09			579,440	579,440		170,156	170,156			749,596	749,596
Jun-09			406,903	406,903		267,525	267,525			674,428	674,428
Jul-09			134,543	134,543		184,424	184,424			318,967	318,967
Sep-09		62,062		62,062					62,062		62,062
Oct-09		42,277	50,913	93,190					42,277	50,913	93,190
2009 sum		104,339	1,245,488	1,349,827		622,105	622,105		104,339	1,867,593	1,971,932
Apr-10			232,767	232,767		34,381	34,381		0	267,148	267,148
May-10		96,582	583,364	679,946		230,952	230,952		96,582	814,316	910,898
Jun-10		962	286,023	286,985		219,188	219,188		962	505,211	506,173
Jul-10				0			0			0	0
Aug-10				0			0			0	0
Sep-10				0			0			0	0
2010 sum		97,544	1,102,154	1,199,698		484,521	484,521		97,544	1,586,675	1,684,219
Apr-11			31,875	31,875			0			31,875	31,875
May-11		47,316	531,295	578,611		67,763	67,763		47,316	599,058	646,374
Jun-11			476,420	476,420		270,000	270,000			746,420	746,420
Jul-11			568,165	568,165		288,000	288,000			856,165	856,165
Aug-11			335,347	335,347		215,393	215,393			550,740	550,740
Sep-11			200,950	200,950		144,718	144,718			345,668	345,668
Oct-11			153,832	153,832		117,170	117,170			271,002	271,002
2011 sum		47,316	2,297,884	2,345,200		1,103,044	1,103,044		47,316	3,400,928	3,448,244
Apr-12			129,062	129,062			0			129,062	129,062
May-12			610,418	610,418		189,102	189,102			799,520	799,520
Jun-12		121,381	590,727	712,108		270,000	270,000		121,381	860,727	982,108
Jul-12		23,660	279,248	302,908		170,148	170,148		23,660	449,396	473,056
2012 sum		145,041	1,609,455	1,754,496		629,250	629,250		145,041	2,238,705	2,383,746

5.0 MONITORING PROGRAM

5.1 Introduction

This section will be devoted to the discussion and interpretation of surface and groundwater data. Historic operations and current data for each of the monitoring sites can be found within tables in Appendix I and previous annual reports. Where the information is available trend graphs have been plotted from the beginning of 1990 to the end of 2012 and include the following parameters: dissolved copper, dissolved zinc, and alkalinity. Data collected for the 2012 freshet can be found in Appendix III.

5.2 Water Quality Objectives

Permit effluent quality and discharge rates have been established on the basis of receiving water objectives. Equity uses the objectives set by McNeely rather than objectives set by Pommen. One difference between the two is with copper levels, where McNeely used 0.005 mg/L Pommen suggests 0.002 mg/L with existing water hardness. Using the lower limit of 0.002 mg/L background sources in Foxy Creek and Buck Creek would not meet the objective on occasion.

Table 5-1 illustrates periods when receiving water objectives were exceeded in Foxy and Buck creeks for the period 1991 to 2012. Water quality objectives were exceeded for cadmium on a couple of occasions in 2012 at Buck Creek below Bessemer Creek and Foxy Creek below Berzelius Diversion.

5.3 Buck and Foxy Creek Water Analysis

Buck and Foxy Creek monitoring data, as with past years, has been summarized as an annual mean, minimum, maximum, and standard deviation. These summary tables can be found in Appendix I. Water quality was sampled on a weekly basis during discharge periods, and on a monthly basis when not discharging. As mentioned previously some data will be displayed in trend graphs.

5.3.1 Foxy Creek - Upper and Lower Sites (0400763) & (0400764)

The site designated as Foxy Creek above Lu Diversion (Upper Foxy) is a background site with no water quality influence from the mine site. The sample site designated as Foxy Creek below Berzelius Diversion (Lower Foxy) has several external influences including natural runoff, treated water discharges to Lu Creek Diversion, Tailings Pond groundwater recharge (minimal), and surface runoff from up slope of the open pits channelled into Berzelius Creek Diversion. Several of these sources have the capacity to alter water quality at the Lower Foxy site.

Water quality in Foxy Creek during 2012 was similar to the preceding seven years. In 2012 Foxy Creek received a total of 629,250 m^3 of Main Zone Pit discharge during one discharge period. The discharge period took place May 8th to July 27th, with pumping rates between 500 and 1650 USG/m. This discharge represented 26.4% of the total site discharge in 2012.

TABLE 5-1
SUMMARY OF DATES WHEN HEAVY METALS IN BUCK AND FOXY CREEKS EXCEEDED RECEIVING WATER OBJECTIVES (1991-2012)

HEAVY METAL	SITE 0400765 BUCK CR ABOVE BESSEMER CR		SITE 0400766 BUCK CR. BELOW BESSEMER CR.		SITE 0400763 FOXY CR. ABOVE LU DIVERSION		SITE 0400764 FOXY CR. BELOW BERZELIUS DIV.		SITE 0700108 FOXY CR. ABOVE MAXAN CR.	
	DATE	mg/l	DATE	mg/l	DATE	mg/l	DATE	mg/l	DATE	mg/l
COPPER	Jan 25/93	0.009	Jan 25/93	0.011	Mar 24/91	0.009	Apr 26/93	0.008	Jun 02/02	0.029
	Feb 22/93	0.018	Mar 29/93	0.006	Jun 17/02	0.022	Jun 27/97	0.006	Jun 09/02	0.008
	Mar 29/93	0.007	Apr 26/93	0.011	Mar 29/04	0.006	May 8/00	0.007	Jun 16/02	0.006
	Nov 29/93	0.006	May 31/93	0.007			May 24/02	0.062		
	Apr 11/94	0.009	Jun 07/93	0.006			May 27/02	0.040		
	Feb 27/95	0.011	Jan 30/95	0.006			May 30/02	0.059		
	Mar 27/95	0.006	Feb 27/95	0.008			Jun 03/02	0.080		
	Dec 27/95	0.024	Mar 27/95	0.021			Jun 06/02	0.052		
	Jan 29/96	0.007	Jan 29/96	0.006			Jun 08/02	0.013		
	Feb 26/96	0.006	Feb 26/96	0.018						
	May 22/02	0.080	Mar 31/97	0.013						
	Oct 31/05	0.007	May 20/97	0.007						
			Mar 30/98	0.011						
			Feb 22/98	0.030						
			Aug 31/99	0.006						
			May 22/02	0.007						
			May 24/02	0.006						
			May 27/02	0.012						
			May 30/02	0.035						
			Jun 03/02	0.097						
			Jun 04/02	0.006						
			Jun 06/02	0.056						
			Jun 08/02	0.037						
			Jun 10/02	0.020						
			Jun 13/02	0.011						
			Jun 17/02	0.008						
			Jun 20/02	0.007						
			Jun 27/11	0.005						
ZINC	May 22/02	0.045	Jan 29/96	0.031			May 24/02	0.139	Jun 02/02	0.037
			Feb 26/96	0.070			May 27/02	0.100		
			Mar 31/97	0.031			May 30/02	0.140		
			May 20/97	0.046			Jun 03/02	0.224		
			Mar 30/98	0.041			Jun 06/02	0.141		
			Feb 22/99	0.031						
			May 24/02	0.034						
			May 27/02	0.094						
			May 30/02	0.262						
			Jun 03/02	0.568						
			Jun 06/02	0.261						
			Jun 08/02	0.221						
			Jun 10/02	0.099						
			Jun 13/02	0.057						
			Jun 17/02	0.040						
			Jun 20/02	0.035						
			Jun 24/02	0.033						
			Jul 04/02	0.037						
			Jul 15/02	0.034						
			Aug 01/02	0.031						
			Aug 06/02	0.034						
			Aug 12/02	0.033						
			Aug 15/02	0.031						
			Sept 03/02	0.032						
			Sept 05/02	0.031						
			Sept 19/02	0.033						
CADMIUM	Oct 30/95	0.0007	Jan 25/93	0.0004	May 24/02	0.0007	Jun 17/97	0.0004	Sept 29/03	0.0070
	Jul 03/01	0.0005	Apr 26/93	0.0003	May 30/02	0.0003	May 3/99	0.0003		
	Jan 06/03	0.0016	May 31/93	0.0005			May 17/99	0.0003		
			Jan 30/95	0.0006			May 23/00	0.0003		
			Feb 27/95	0.0004			May 29/00	0.0003		
			Jan 27/97	0.0003			Jun 5/00	0.0003		
			May 20/97	0.0005			Oct 30/00	0.0003		
			Jun 16/97	0.0003			Nov 13/00	0.0006		
			Dec 15/97	0.0004			May 22/01	0.0006		
			Dec 22/97	0.0003			Jun 04/01	0.0003		
			Dec29/97	0.0003			Jun 11/01	0.0003		
			Mar 30/98	0.0003			Jun 18/01	0.0004		
			Jun 8/98	0.0006			Jun 25/01	0.0006		
			03-Jul-01	0.0005			May 24/02	0.0013		
			May 24/02	0.0003			May 27/02	0.0009		
			May 27/02	0.0007			May 30/02	0.0012		
			May 30/02	0.0021			Jun 03/02	0.0021		
			Jun 03/02	0.0046			Jun 06/02	0.0013		
			Jun 06/02	0.0024			May 05/03	0.0014		
			Jun 08/02	0.0018			May 20/03	0.00030		
			Jun 10/02	0.0008			Aug 26/11	0.00029		
			Jun 13/02	0.0005			Sep 6/11	0.00032		
			Jun 17/02	0.0004			Sep 12/11	0.00031		
			Jun 20/02	0.0004			July 16/12	0.00028		
			Jun 24/02	0.0006						
			Jul 02/02	0.0006						
			Jul 04/02	0.0005						
			Jul 08/02	0.0007						
			Jul 11/02	0.0006						
			Jul 11/02	0.0006						
			Jul 15/02	0.0008						
			Jul 18/02	0.0006						
			Jul 22/02	0.0007						
			Jul 25/02	0.0007						
			Jul 29/02	0.0008						
			Aug 1 - Nov 25/02	0.0003 to 0.0009						
			Apr 21/03	0.0004						
			Jun 16/03	0.0003						
			Jun 23/03	0.0003						
			Oct 25/04	0.0006						
			Apr 23/07	0.0003						
			Jul 11/11	0.0003						
			Aug 8/11	0.0003						
			Oct 11/11	0.0003						
			Oct 17/11	0.0003						
			July 3/12	0.00022						
			July 9/12	0.00027						

HEAVY METAL OBJECTIVE Cu(d) 0.005 mg/l
Zn(d) 0.030 mg/l
Cd(t) 0.0002 mg/l

Average dissolved copper concentrations at the Upper Foxy site were very similar to 2012 at 0.0005 mg/L. The average annual dissolved copper level at the Lower Foxy site remained at normal levels with an average of 0.0016 mg/L for 2012. The highest dissolved copper value at the lower site was 0.0027mg/L which occurred on May 22nd (Figure 5-1).

Dissolved zinc concentrations were lower than the 0.005 mg/L detection limits at the Upper Foxy and Lower Foxy sample stations for most of 2012. Dissolved zinc concentrations at the Upper Foxy sample station were below the detection limits except for April 30th when it was 0.0076, while at the Lower Foxy station dissolved zinc concentrations were greater than the detection limit for part of May. The maximum dissolved zinc concentration of 0.0085 mg/L was sampled on May 14th for Lower Foxy (Figure 5-2).

In 2012, the dissolved aluminium in Foxy Creek continued to show higher values at the background site than at the Lower Foxy site. The dissolved aluminium levels for the Upper Foxy site averaged 0.108 mg/L compared to 0.079 mg/L for the Lower Foxy site. The swampy meadows above the Upper Foxy sample site are a possible source for the elevated aluminium values observed in the data.

Dissolved cadmium concentrations at the Upper Foxy site and Lower Foxy site remained at historic operations levels in 2012 with most values below the detection limit. The total cadmium concentrations for both sites showed a decrease from 2011, but an increase compared to historic operations.This is a result of a higher detection limit used for the total metals ICP analysis that is completed during the discharge period.

Alkalinity and sulphate continued to be higher at the Lower Foxy site than at the Upper Foxy site. The alkalinity trend graph (Figure 5-3) shows that the Upper and Lower Foxy concentrations followed the same trend, but the Lower Foxy site showed elevated concentrations in comparison to the Upper Foxy site. Average sulphate concentrations at the Lower site were close to average with a value of 130.0 mg/L, but were significantly lower than 2011 due to a much shorter discharge period in 2012.

5.3.2 Foxy Creek above Maxan Creek (0700108)

Water quality at this site is monitored periodically when access is available. The purpose of this program is to evaluate the impact on downstream water quality. Two samples were collected from the Maxan site in 2012, once during the discharge period and once after the discharge period was over.

In 2012 average dissolved copper concentrations at the Maxan site were similar to the historic operations average with a concentration of 0.0012 mg/L. Dissolved zinc was below the detection limit of 0.005 mg/L at the Maxan site in 2012. Dissolved cadmium remained below the 0.00005 mg/L detection limit. Sulphate was 26.3 mg/L in 2012 which was significantly lower than the 2011 value. Alkalinity levels averaged 41.3 mg/L in 2012 which was slightly higher than the average historic operations values. Total suspended solids averaged 10.4 mg/L for the two samples of 2012 which was higher than the historic operations average (Appendix I).

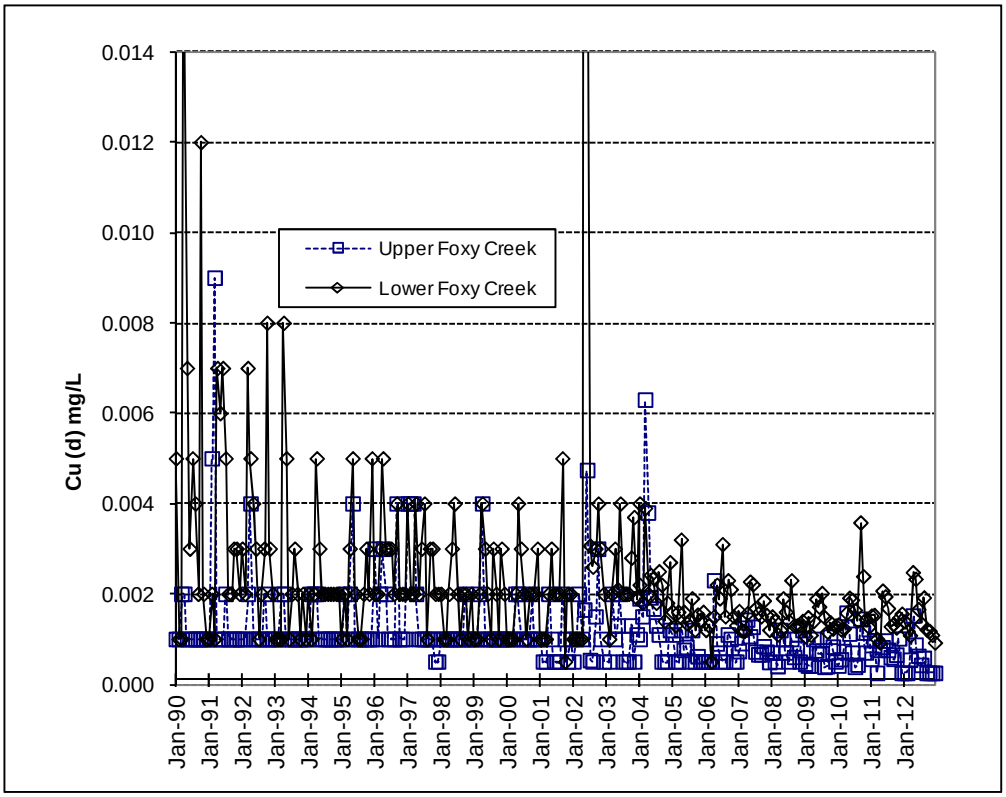


Figure 5-1 Foxy Creek Dissolved Copper

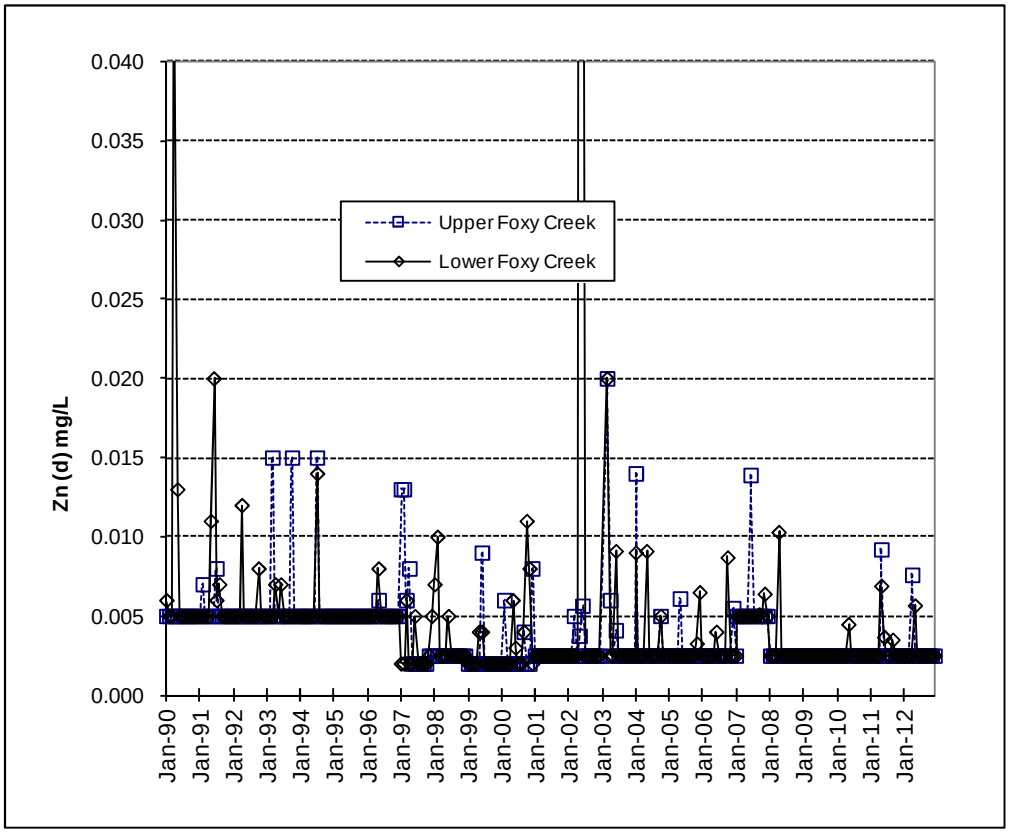


Figure 5-2 Foxy Creek Dissolved Zinc

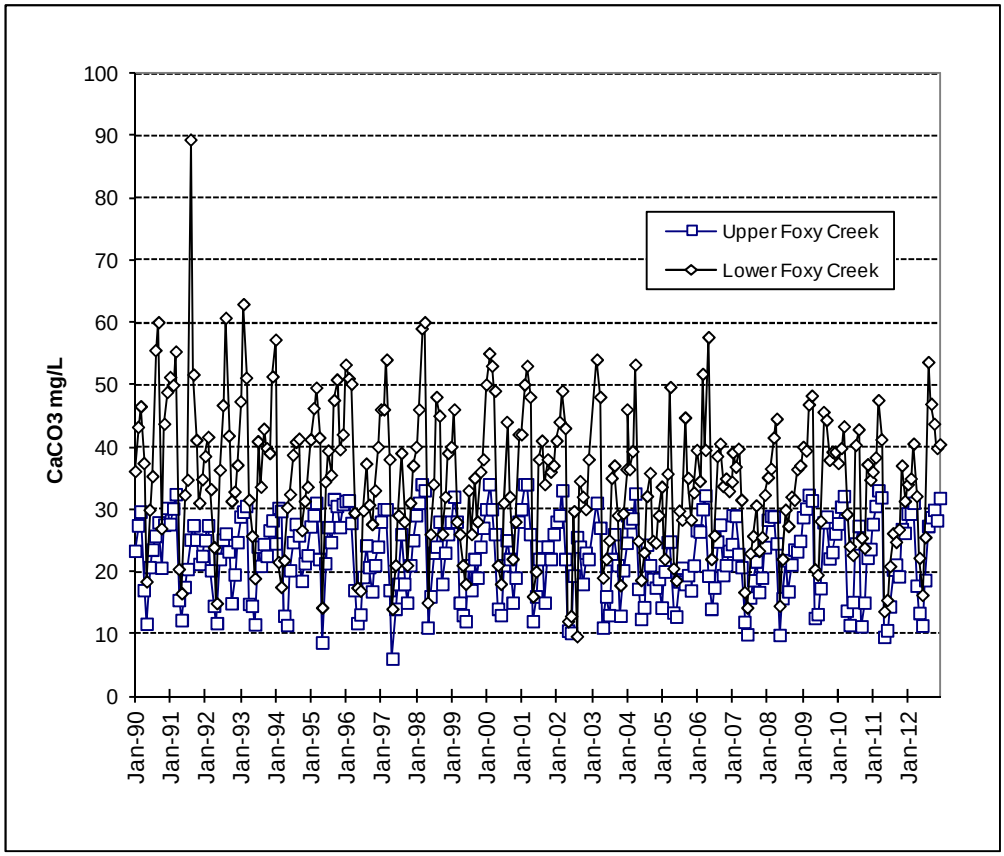


Figure 5-3 Foxy Creek alkalinity

5.3.3 Bessemer Creek at the Siltcheck (0700081)

The annual dissolved copper average for the Bessemer Siltcheck in 2012 was 0.0077 mg/L which was slightly above the 2011 average of 0.0071 mg/L. The dissolved copper values were highest throughout April and May with a range between 0.0126 to 0.0137 mg/L (Figure 5-4). The annual dissolved zinc average for 2012 was 0.0146 mg/L, which was a decrease from the 2011 average of 0.0197 mg/L. The dissolved zinc values were greatest in May with a maximum of 0.0371 mg/L on May 14th (Figure 5-5).

The average dissolved cadmium level in 2012 was 0.00040 mg/L which was a decrease from the 2011 average of 0.00053 mg/L. The dissolved cadmium monthly average peaked in July with a value of 0.00101 mg/L and a daily peak of 0.00110 mg/L on July 9th (Figure 5-6).

The average dissolved aluminium concentration was similar to the historic operations average in 2012 with a value of 0.054 mg/L. The greatest dissolved aluminium concentrations were observed in April with a maximum value of 0.347 mg/L on April 23rd (Appendix I).

The total suspended solids (TSS) at the Siltcheck pond were lower in 2012 than the average of the last 10 years with an average of 7.4 mg/L. The permit limit of 50 mg/L was exceeded on two occasions in May because of the high stream flows associated with freshet. The maximum TSS value occurred on May 7th with a value of 66.3 mg/L (Figure 5-8). The greatest monthly average was 52.8 mg/L in May.

The annual average pH value for the Bessemer Creek Siltcheck pond in 2012 was 7.17, which was lower than historic operations average of 7.29. Alkalinity (Figure 5-7) levels in the Siltcheck pond were higher in 2012 than for 2011. The alkalinity in 2012 ranged from 16.7 to 73.2 mg/L with an average of 44.1 mg/L.

The average sulphate level for 2012 decreased to 557.2 mg/L from the 2011 average of 812.72 mg/L in response to a reduced volume water discharged from the site in 2012 compared to the above average discharge period in 2011. The months with the highest average sulphate concentrations corresponded to the Main Zone pit discharge months (May to July).

Bessemer Creek profile sampling was performed on March 7th, 2012 during a low flow, non discharge period. Dissolved copper, zinc, and aluminium concentrations were within the lower end of the historical ranges for each of the stations during the March sampling date and showed no significant increases in metal concentrations in samples taken farther downstream (Figures 5-9, 5-10, 5-11).

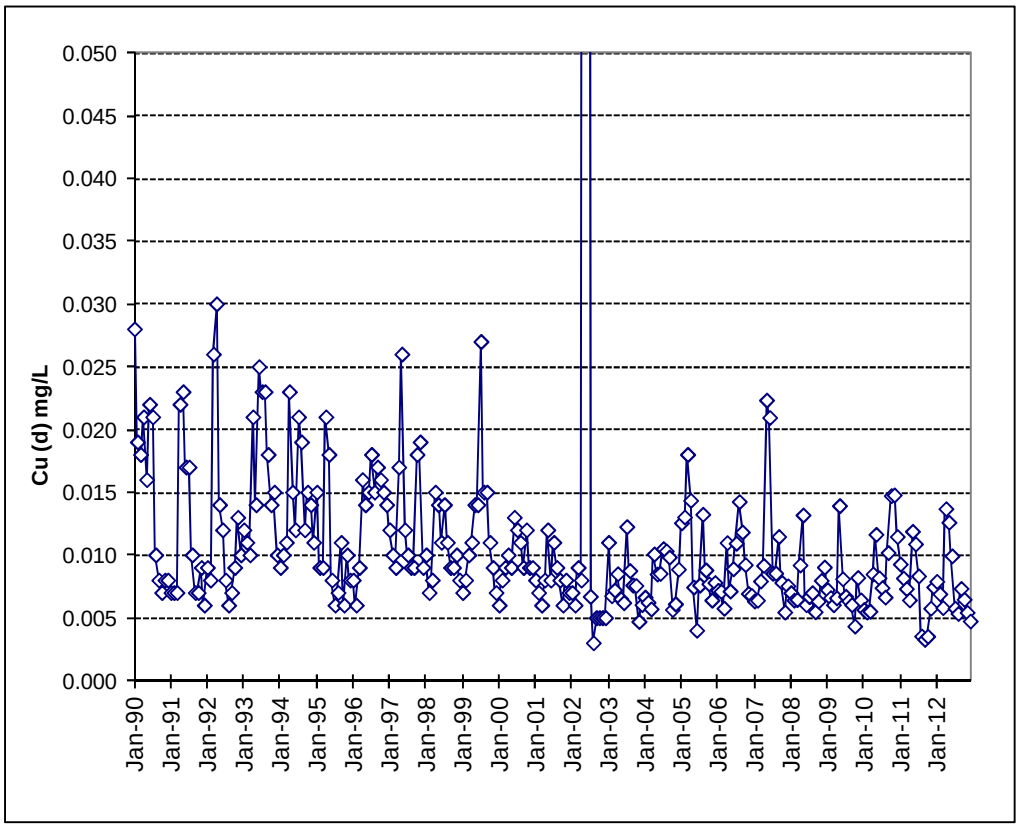


Figure 5-4 Bessemer Creek Siltcheck dissolved copper average.

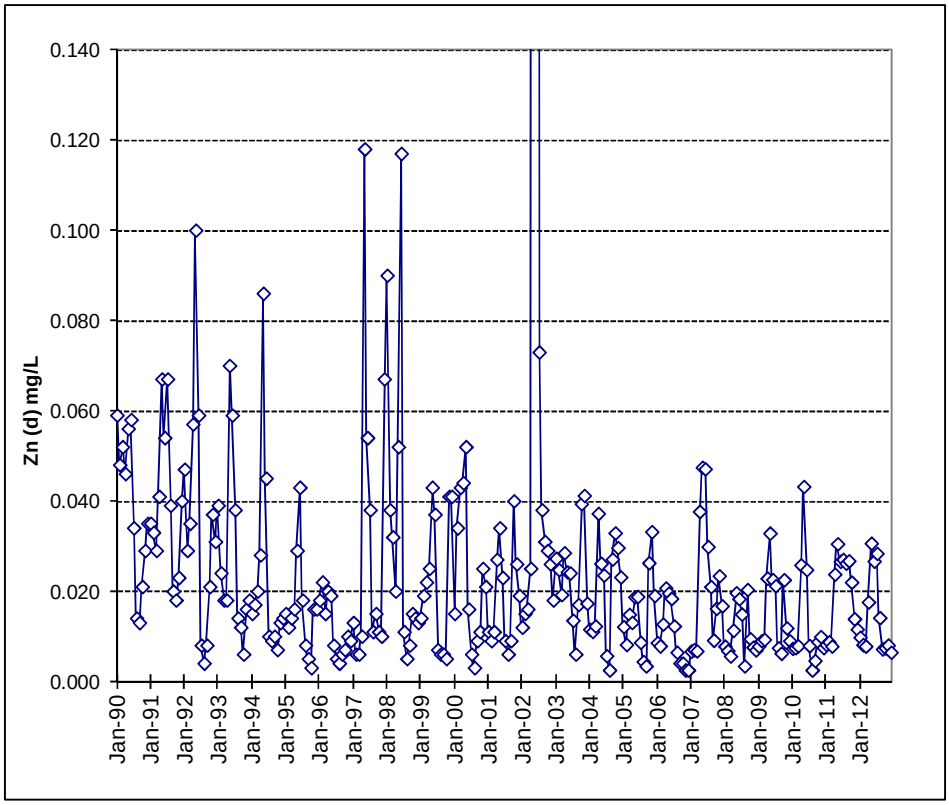


Figure 5-5 Bessemer Creek Siltcheck dissolved zinc average

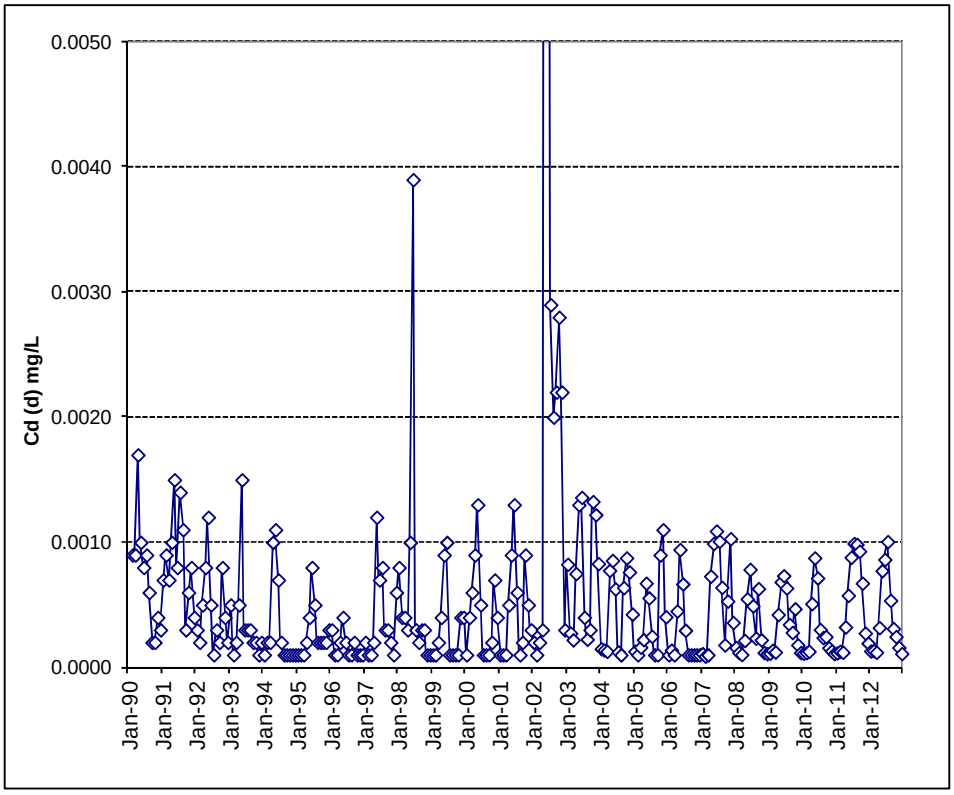


Figure 5-6 Bessemer Creek Siltcheck dissolved cadmium average

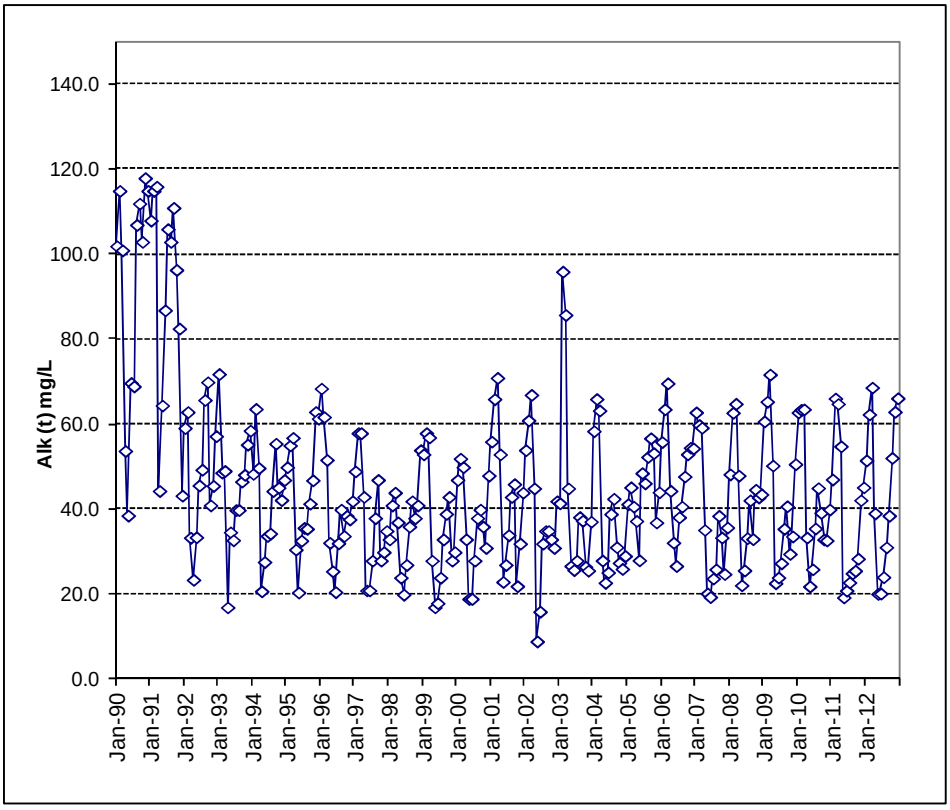


Figure 5-7 Bessemer Creek Siltcheck alkalinity average

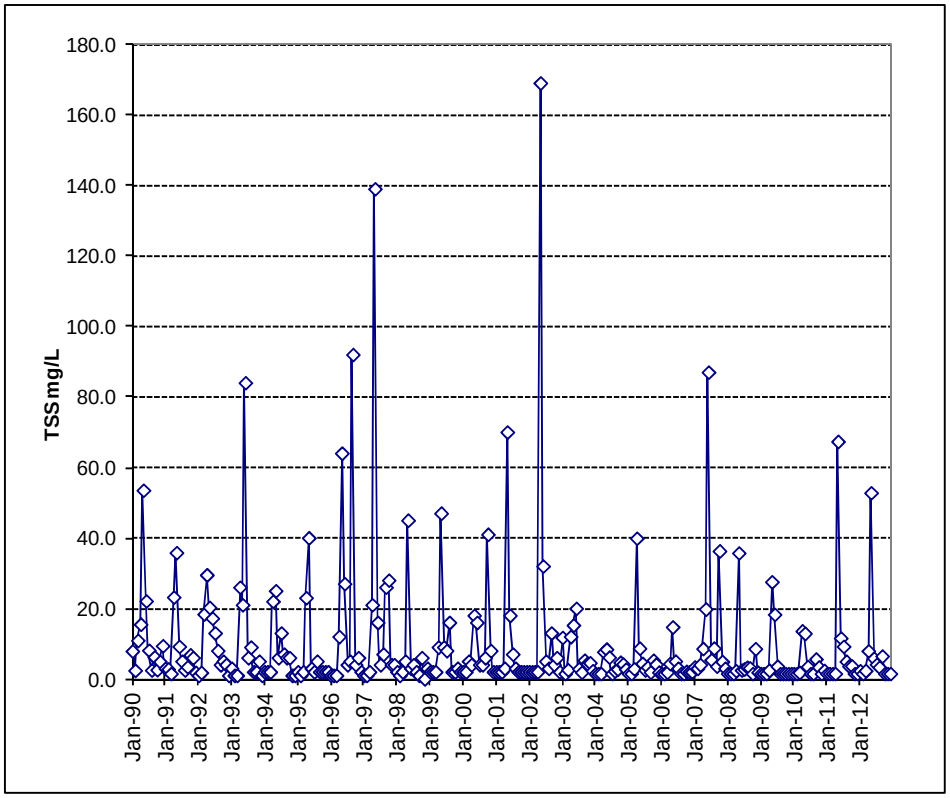


Figure 5-8 Bessemer Creek Siltcheck total suspended solids (TSS)

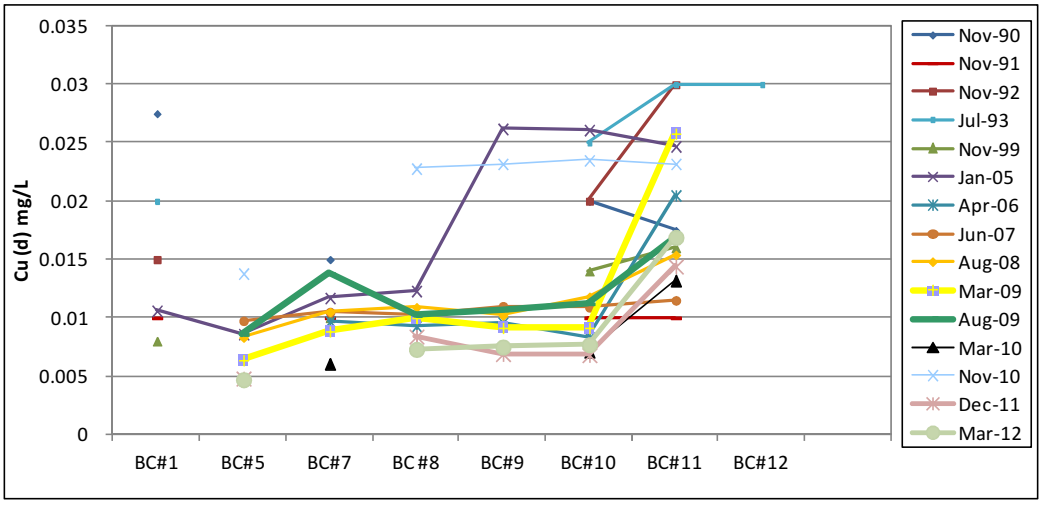


Figure 5-9 Bessemer Creek profile – dissolved copper

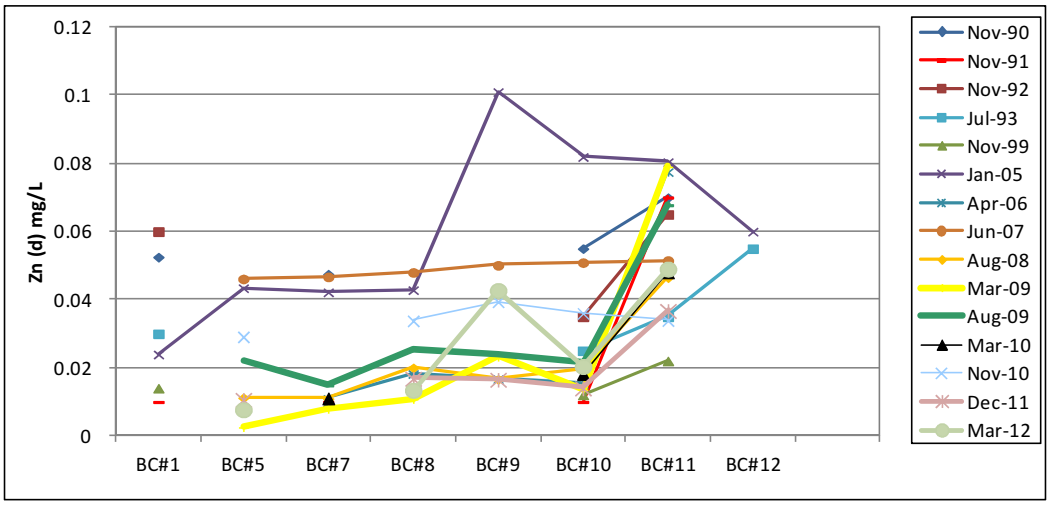


Figure 5-10 Bessemer Creek profile – dissolved zinc.

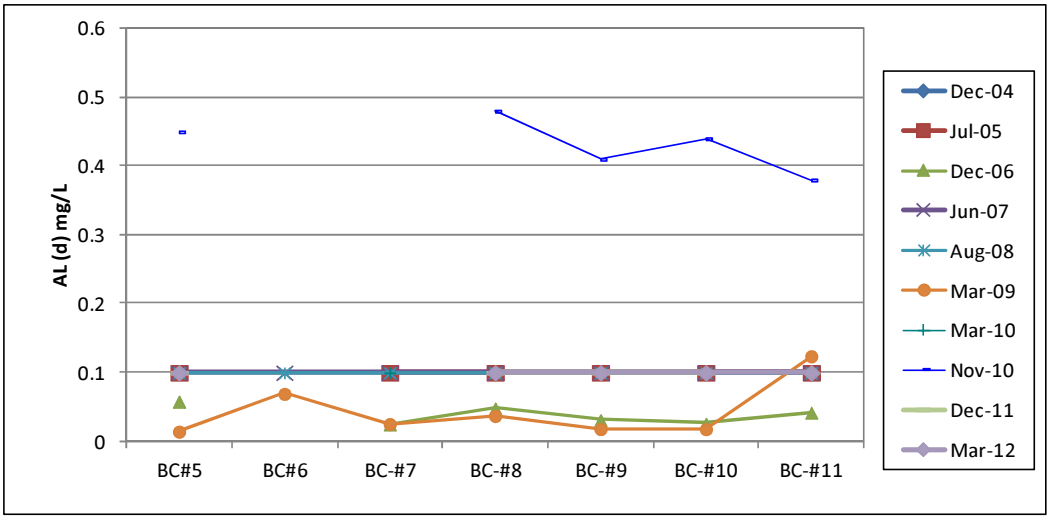


Figure 5-11 Bessemer Creek Profile – dissolved aluminium.

5.3.4 Buck Creek - Upper and Lower Sites (0400765 & 0400766) & Klo (0400767)

The Upper Buck Creek sample site is situated upstream of the confluence with Bessemer Creek and is the designated background site for this system. The Lower Buck Creek site is located below the confluence with Bessemer Creek and above Goosly Lake. In 2012, the Buck Creek at Klo site was sampled twice, once during the discharge period and once after discharge was complete.

The average dissolved copper concentration at the Upper Buck Creek site for 2012 was 0.0011 mg/L which was below the 2011 average of 0.0012 mg/L. The maximum dissolved copper value for the Upper site in 2012 was 0.0016 mg/L which occurred on May 14th. The average annual dissolved copper level for Lower Buck was 0.0021 mg/L in 2011, which was close to the average for the previous nine years. The peak dissolved copper value for the Lower site was 0.0037 mg/L which occurred on April 30th. The highest monthly average at the Lower site in 2012 occurred in April with a value of 0.0037 mg/L (Figure 5-12). The dissolved copper averaged 0.0012 mg/L for the Buck at Klo site for the May and August samples.

The dissolved zinc concentrations at the Upper Buck Creek site in 2012 were below the detection limit of 0.005 mg/L for all but one sample taken in January where the dissolved zinc was 0.0065 mg/L. The average annual dissolved zinc level at the Lower Buck site was lower in 2012 with an average of 0.0055 mg/L versus the 2011 average of 0.0070 mg/L. The peak zinc value at the Lower site was 0.0111 mg/L and occurred on October 31st (Figure 5-13). Dissolved zinc remained lower than the detection limit of 0.005 mg/L for the Buck at Klo site for the May and August samples.

Dissolved cadmium concentrations at the Upper Buck Creek site were below the detection limit of 0.00005 mg/L for all samples taken in 2012. The average dissolved cadmium concentration at the Lower Buck site in 2012 was 0.00010 mg/L which was a decrease from the 2011 average of 0.00014 mg/L. The peak dissolved cadmium for Lower Buck was 0.00027 mg/L on July 9th. Dissolved cadmium concentrations at the Buck Creek at Klo site were below the detection limit of 0.00005 mg/L for both 2012 samples.

In 2012, the dissolved aluminium in Buck Creek continued to show higher values at the background site than at the Lower Buck site. The 2012 average dissolved aluminium levels for the Upper Buck site were 0.104 mg/L compared to 0.059 mg/L for the Lower Buck site (Appendix I).

The average sulphate level decreased at the Upper Buck site in 2012 to 0.9 mg/L compared to the 2011 average of 1.5 mg/L. Sulphate levels at the Lower Buck site decreased from the 2011 value of 311.9 mg/L to an average of 151.4 mg/L in 2012. The sulphate levels peaked during the discharge months with a maximum monthly average of 314 mg/L in July. The sulphate levels for the Buck at Klo site ranged between 25.6 to 32.0 mg/L for the May and August samples.

Alkalinity values were similar to historical operations values at the Lower Buck and Upper Buck sites in 2012 (Figure 5-11).

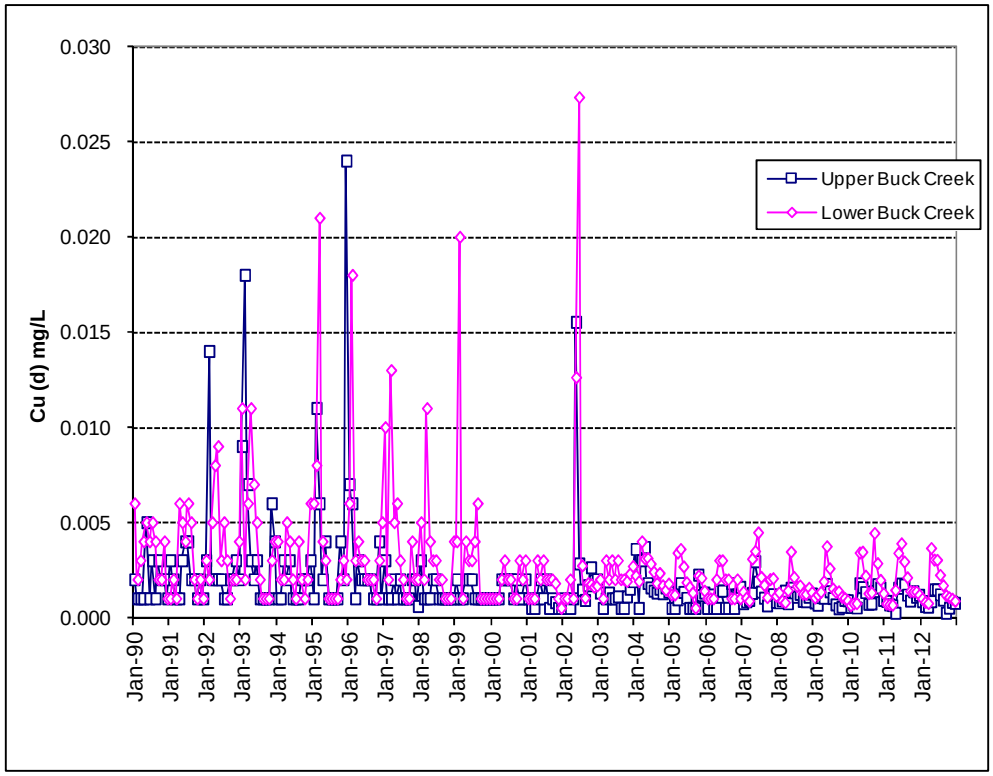


Figure 5-12 Buck Creek dissolved copper

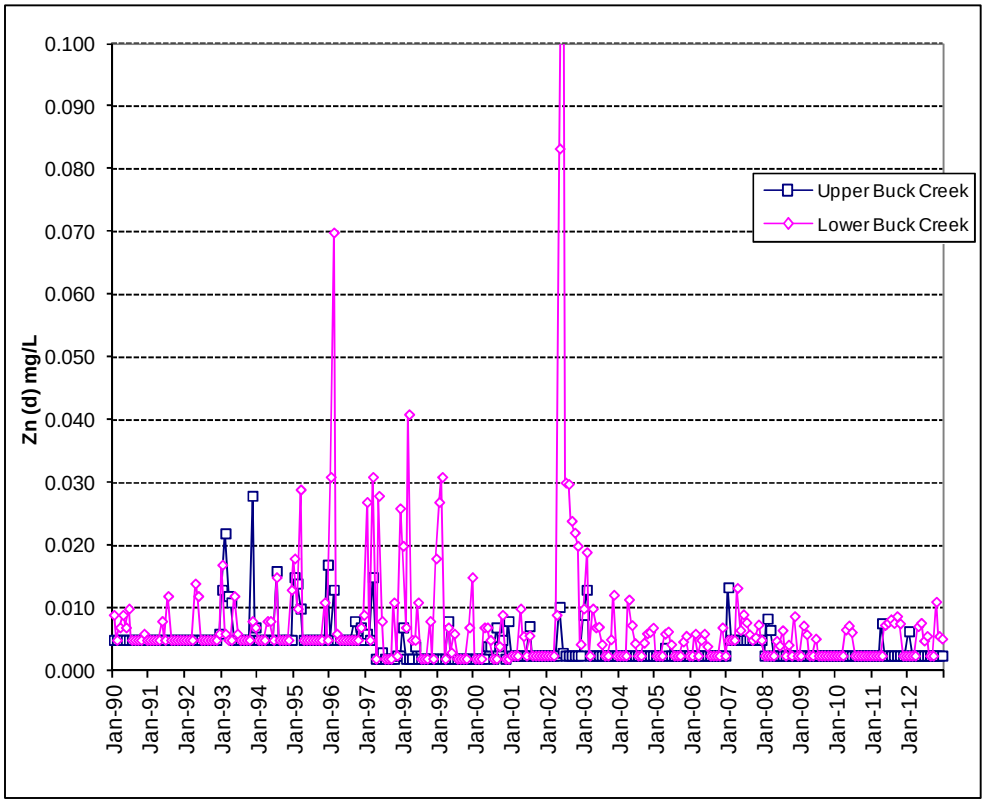


Figure 5-13 Buck Creek dissolved zinc

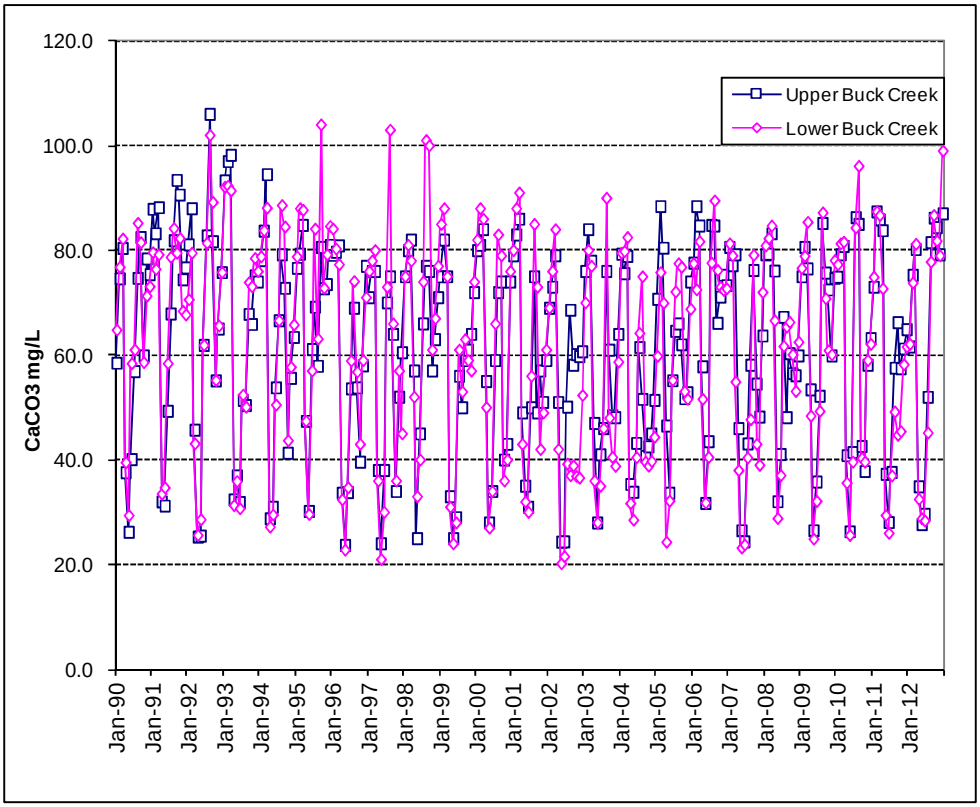


Figure 5-14 Buck Creek alkalinity

5.4 Discharge Water Quality

Discharge of treated water to the environment is covered in section 4.0 of this report. In 2012 all treated water was discharged from the Main Zone Pit so the discussion of treated water quality can be found in the Main Zone Pit section (5.6).

Accumulated run-off water was pumped from the Emergency Pond to Bessemer Creek from June 11th to July 12th. The pH and conductivity were measured daily during the pumping period, while water quality sampling was performed weekly at the discharge pipe during the discharge period for physical and metals analyses. Metal concentrations sampled from the Emergency Pond were below the discharge permit concentrations. Analytical results from prior to and during discharge are presented in table 5-2. Emergency Pond water was sampled at 5 metres depth for *Ceriodaphnia dubia* toxicity testing prior to discharge on May 28th, 2012 (Table 7-3).

Table 5-2 Emergency Pond – Water Quality

Date	FIELD pH pH unit	ACIDITY CaCO3	SPECIFIC CONDUCT(F) µS/cm	DISSOLVED SULPHATE mg/L	TOTAL ALKALINITY mg/L	DISSOLVED ALUMINIUM mg/L	DISSOLVED ARSENIC mg/L	DISSOLVED COPPER mg/L	DISSOLVED CADMIUM mg/L	DISSOLVED IRON mg/L	DISSOLVED ZINC mg/L
13/03/2012	6.94	9.8	1783	917		<0.015	<0.00050	0.0079	0.00499	<0.030	0.404
28/05/2012	7.37	8.7	555	235	33.9	<0.20	0.00035	0.00902	0.00195	0.047	0.172
11/06/2012	7.32		452	193	32.5	<0.20	0.00035	0.00878	0.00145	<0.030	0.119
18/06/2012	7.51		474	196	32.1	<0.20	0.00041	0.00833	0.00145	<0.030	0.114
25/06/2012	7.43		620	286	31.4	<0.20	0.00053	0.00747	0.00182	<0.030	0.125
09/07/2012	7.44		810	304	33.5	<0.20	0.00051	0.00589	0.00198	<0.030	0.123

5.5 Southern Tail Pit Water Quality

All Southern Tail Pit water was collected and treated in 2012. Approximately 49,487 m^3 was collected in 2012 compared to a total volume of 63,255 m^3 collected in 2011. The 2012 total volume was 37.2% below the average volume collected for the period 1997 to 2012 (79,040 m^3). However, the flow from seep 97-01 was higher in 2012 similar to 2011 and is linked to the Southern Tail Pit.

The average concentration of dissolved copper increased in 2012 to 0.052 mg/L from 0.036 mg/L in 2011 (Figure 5-17). The copper loading increased from 0.148 mg/sec in 2011 to 0.209 mg/sec in 2012 as a result of the higher concentration (Figure 5-15). The copper loading in 2012 was considerably higher than historic values.

Average dissolved zinc concentrations from the Southern Tail discharge increased in 2012 to 29.57 mg/L from the 2011 concentration of 26.79 mg/L (Figure 5-17). The dissolved zinc loading increased from the 2011 value of 62.83 mg/s to 65.13 mg/s in 2012 (Figure 5-15). Dissolved cadmium concentrations increased to 0.203 mg/L in 2012 from 0.175 mg/L in 2011 (Figure 5-18). Sulphate levels increased in 2012 to 3288 mg/L compared to 3196 mg/L in 2011. Alkalinity levels decreased from 152 mg/L in 2011 to 123 mg/L in 2012 (Figure 5-19). Average acidity increased from 101.4 mg/L in the last quarter of 2011to 121.5 mg/L for 2012. Dissolved iron concentrations decreased from an average of 62.2 mg/L in 2011 to 40.91 mg/L in 2012 with a peak of 81.7 mg/L in August.

Arsenic and antimony analyses were completed at low detection limits in 2012. The results for both metals were below the low detection limits (Table 5-4b).

TABLE 5-3 Southern Tail Pit: (a) Metal Loading, (b) Arsenic and Antimony Concentrations.

(a)	Flow m^3/sec	Cu (d) mg/sec	Zn (d) mg/sec	Cd (d) mg/sec
1991	0.0035	1.228	15.35	0.132
1992	0.0032	1.054	17.8	0.143
1993	0.0029	0.798	18.63	0.127
1994	0.003	0.666	21.61	0.155
1995	0.0021	0.357	14.18	0.096
1996	0.0038	0.294	33.01	0.204
1997	0.0026	0.076	28.7	0.170
1998	0.0023	0.047	26.62	0.141
1999	0.0032	0.052	34.04	0.197
2000	0.0028	0.011	28.29	0.131
2001	0.0018	0.015	17.78	0.078
2002	0.0037	0.098	41.9	0.164
2003	0.0026	0.013	29.73	0.117
2004	0.0042	0.018	54.21	0.198
2005	0.0037	0.007	45.3	0.176
2006	0.0014	0.004	16.94	0.059
2007	0.0034	0.045	72.61	0.317
2008	0.0013	0.011	22.29	0.1246
2009	0.0018	0.016	39.58	0.1722
2010	0.0017	0.023	42.29	0.1938
2011	0.0021	0.148	62.83	0.3665
2012	0.0020	0.210	65.13	0.4082

(b)	As (diss) mg/L	Sb (diss) (mg/L)
1999	<0.2	<0.2
2000	<0.2	<0.2
2001	<0.2	<0.2
2002	0.002	0.002
2007	<0.1	<0.2
2008	<0.0010	<0.0010
2009	<0.0010	<0.0010
2010	<0.0010	<0.0010
2011	<0.0010	<0.0010
2012	<0.0010	<0.2

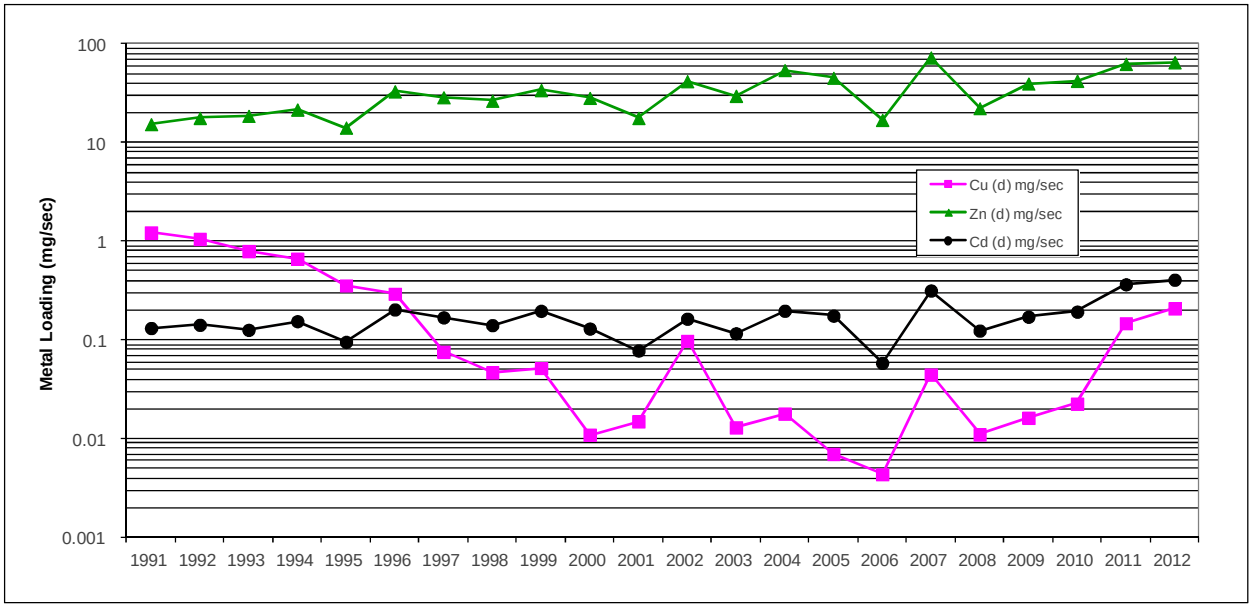


Figure 5-15 Southern Tail Pit metal load.

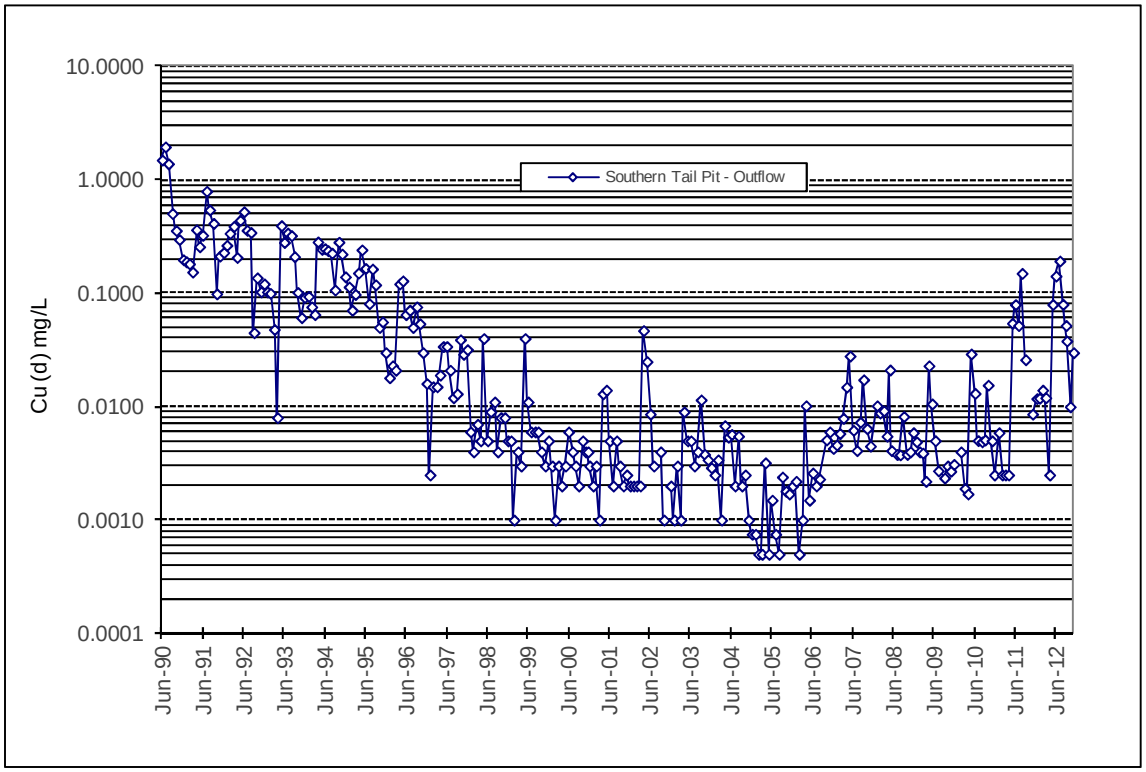


Figure 5-16 Southern Tail Pit dissolved copper

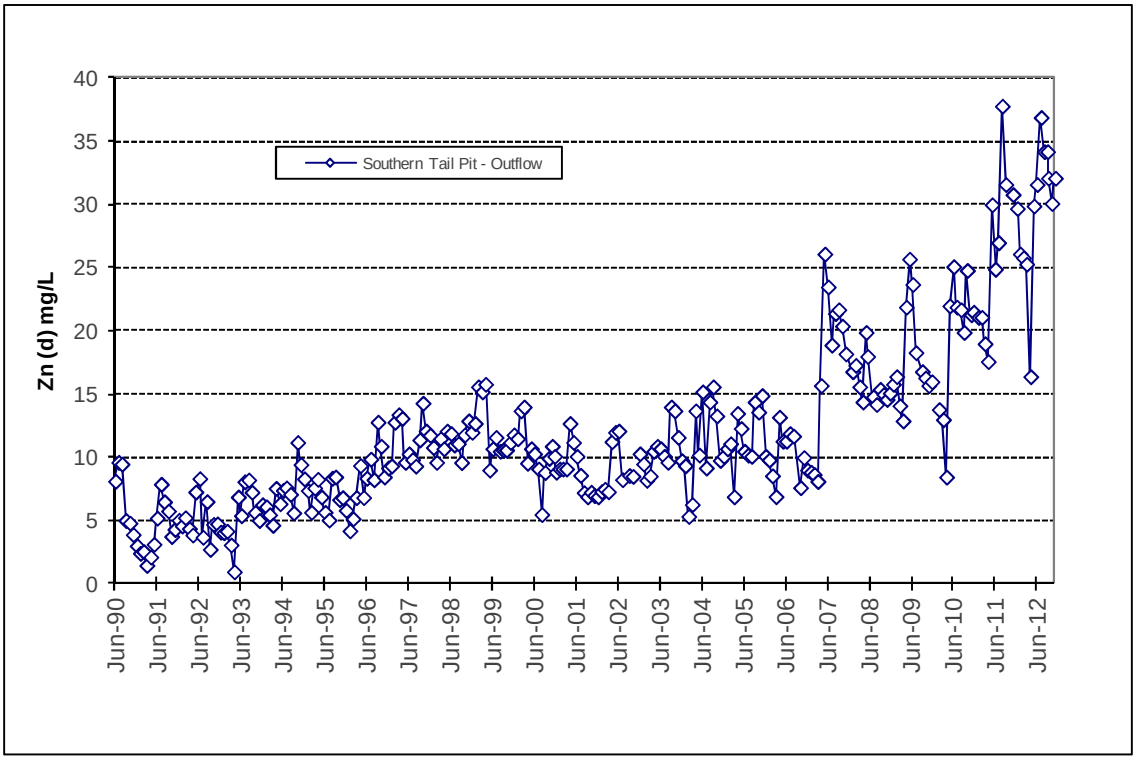


Figure 5-17 Southern Tail Pit dissolved zinc

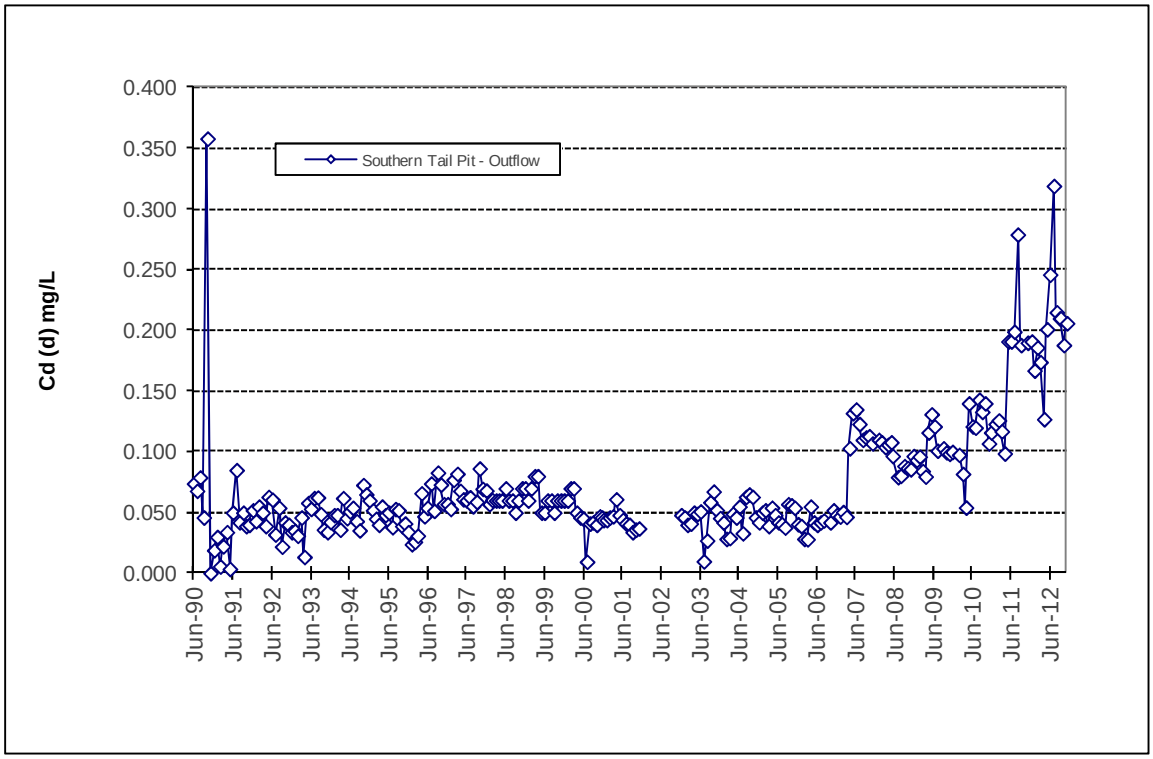


Figure 5-18 Southern Tail Pit dissolved cadmium

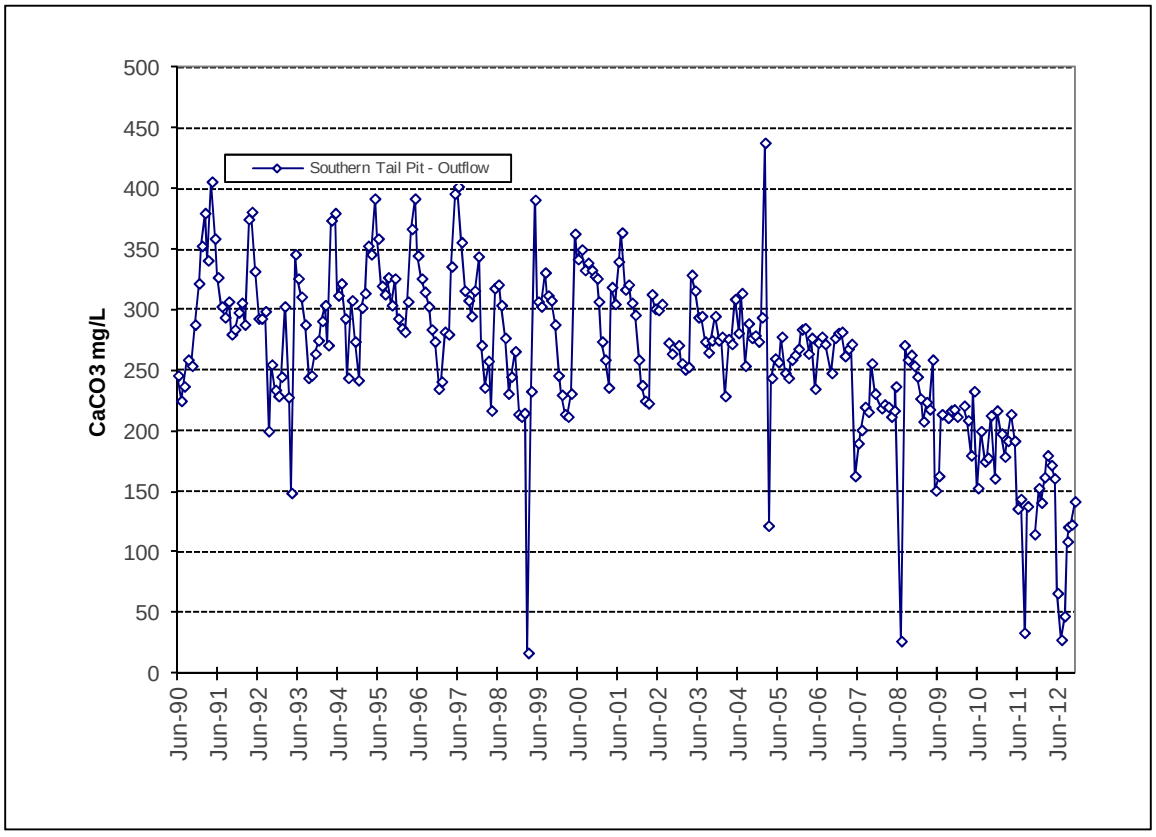


Figure 5-19 Southern Tail Pit alkalinity

5.6 Main Zone & Waterline Pits Water Quality

A series of staff gauges have been installed along the old ramp into the Main Zone Pit to allow for more accurate and frequent measurements of the water level in the operating zone (Figure 5-20a). The water level in the Main Zone Pit on October 5th was 1258.12 metres which corresponds to a volume of approximately 14,689,943 m^3. The maximum measured pit water level in 2012 was 1259.92 metres on April 23rd. The minimum water level was 1256.58 metres on July 23rd. There was one period of pumping from the Main Zone in 2012: April 23rd to July 27th. Two plots of the Main Zone Pit water level are shown in Figures 5-20 & 5-21. Plot 5-20 shows the readings from the staff gauge installed along the ramp which are within the operating range of the pit. Plot 5-21 shows the water elevation from the pit since it started to flood in November 1991 and has the spillway elevation and watershed divide elevation proposed by URS.

In 2012, a total of 2,238,705 m^3 was discharged from the Main Zone Pit of which 1,609,455 m^3 was directed to Buck Creek and 629,250 m^3 was pumped to Foxy Creek. Inputs to the Main Zone Pit in 2012 included: 538,642m^3 of tailings pond water, 1,065,257 m^3 of treated ARD, 227,244 m^3 of Diversion Pond water, and 69,945 m^3 of wasted sludge from the HDS plant. Total known inputs to the Main Zone pit were 1,901,068 m^3 which leaves roughly 337,637 m^3 for groundwater, Wateline Pit overflow, runoff, and direct precipitation inputs to the pit. There was approximately 190,890 m^3 more water in the Main Zone Pit on October 5, 2012 than on October 20, 2011 which changes the groundwater, Waterline Pit overflow, runoff and precipitation inputs to 528,527 m^3 when the change in pit level is considered.

The water quality from the Main Zone Pit was monitored frequently in 2012 and focused mainly on the water quality at 20 meters below the surface since the discharge pump intakes are set at 20 metres. The Main Zone Pit profiles were completed twice in 2012 while the Waterline Pit was completed only once due to access problems. Table 5-5 shows the water quality for samples collected at 20 metres depth during 2012. Water quality at 20 metres depth in 2012 averaged 7.42 pH, 0.0018 mg/L dissolved copper, 0.0111 mg/L dissolved zinc, and 0.00138 mg/L dissolved cadmium. Plots for dissolved copper, zinc, cadmium, and sulphate for the Main Zone at 20 metres depth are shown in Figures 5-22 to 5-25 respectively.

Arsenic, copper, cadmium and zinc loading from the Main Zone pit to Buck creek were all below average in 2012 while sulphate was higher than average. For Buck Creek dissolved arsenic was 0.462 kg versus an average of 0.656kg, dissolved copper loading was 3.413 kg versus an average of 3.729 kg, dissolved cadmium was 2.600 kg versus an average of 2.770 kg, dissolved zinc was 25.20 kg versus an average of 26.71 kg, and sulphate was 3580 tonnes versus an average of 3279 tonnes. For Foxy Creek arsenic, copper and sulphate loadings were all less than average, while cadmium and zinc were above average. Dissolved arsenic loading was 0.158 kg versus an average of 0.305 kg, dissolved copper loading was 1.124 kg versus an average of 1.360 kg, dissolved cadmium was 0.939 kg versus an average of 0.880 kg, zinc was 8.28 kg versus an average of 7.65 kg, and sulphate was 1283 tonnes versus an average of 1310 tonnes (Appendix III).

Sub-lethal bioassays using Ceriodaphnia were collected weekly during the discharge periods and previous to discharge (see section 7.0).

Table 5-4 Main Zone Pit water quality at pumping depth (20 meters)

DATE	FIELD pH pH unit	TOTAL ALKALINITY mg/L	DISSOLVED SULPHATE mg/L	SPECIFIC CONDUCT µS/cm	DISSOLVED ALUMINIUM mg/L	DISSOLVED ANTIMONY mg/L	DISSOLVED ARSENIC mg/L	DISSOLVED CADMIUM mg/L	DISSOLVED COPPER mg/L	DISSOLVED IRON mg/L	DISSOLVED ZINC mg/L
3/1/2012	7.24	24.7	1920	2925	0.10	0.10	0.0005	0.00145	0.0025	0.015	0.0109
4/11/2012	6.98		1950	3002	0.10	0.10	0.0006	0.00092	0.0013	0.015	0.0062
4/23/2012	7.28	22.1	1880	2975	0.10	0.10	0.0250	0.00090	0.0013	0.015	0.0025
4/30/2012	7.85	6.1	2150	3000	0.10	0.10	0.0003	0.00100	0.0030	0.015	0.0025
5/7/2012	7.37	22.1	2000	3038	0.10	0.10	0.0003	0.00138	0.0030	0.015	0.0145
5/14/2012	6.99	22.5	2050	3005	0.10	0.10	0.0003	0.00192	0.0052	0.015	0.0465
5/22/2012	7.34	23.2	2110	3001	0.10	0.10	0.0003	0.00154	0.0013	0.015	0.0184
5/28/2012	6.95	21.9	2040	2980	0.02	0.10	0.0003	0.00203	0.0035	0.015	0.0429
6/4/2012	7.17	24.5	1990	2973	0.05	0.10	0.0003	0.00156	0.0013	0.015	0.0102
6/11/2012	7.26	22.5	2130	2983	0.10	0.10	0.0003	0.00161	0.0013	0.015	0.0095
6/18/2012	7.52	20.7	1970	2993	0.10	0.10	0.0003	0.00143	0.0013	0.015	0.0056
6/25/2012	7.56	21.4	2140	3007	0.10	0.10	0.0003	0.00121	0.0013	0.015	0.0025
7/3/2012	7.79	22.3	1970	3008	0.10	0.10	0.0003	0.00132	0.0013	0.015	0.0025
7/9/2012	7.70	22.6	1980	3011	0.10	0.10	0.0003	0.00127	0.0011	0.015	0.0025
7/16/2012	7.67	22	2040	3007	0.10	0.10	0.0003	0.00131	0.0013	0.015	0.0025
7/23/2012	7.56	21.2	2010	2998	0.10	0.10	0.0002	0.00133	0.0005	0.015	0.0071
8/13/2012	7.89	23.3	2000	2996	0.10	0.10	0.0003	0.00127	0.0013	0.015	0.0025
2012 avg	7.42	21.4	2019	2994	0.09	0.10	0.0017	0.00138	0.0018	0.015	0.0111

C:/excelfil/H2Obal/MZ 20 metre comp.xls

* detection limit taken at half value

2000 avg	7.63	40.3	1497	2556	0.04	<0.2	<0.2	0.00180	0.0032	0.050	0.0766
2001 avg	7.26	43.1	1720	2560	0.09	<0.2	<0.2	0.00251	0.0028	0.130	0.0366
2002 avg	8.12	36.0	1880	1293	0.26	<0.2	<0.2	0.00305	0.0028	0.060	0.0220
2003 avg	7.68	26.5	2049	2841	0.22	<0.2	<0.2	0.00172	0.0016	<0.030	0.0128
2004 avg	7.73	25.6	2062	2070	0.15	<0.20	0.000	0.00145	0.0012	0.036	0.0130
2005 avg	7.59	46.9	2093	2480	0.21	<0.20	<0.05	0.00138	0.0021	<0.030	0.0182
2006 avg	7.26	32.0	2020	2942	0.08	<0.20	<0.05	0.00179	0.0022	0.034	0.0131
2007 avg	7.20	26.2	1984	2962	0.12	0.10	0.028	0.00161	0.0029	0.021	0.0189
2008 avg	6.80	35.4	1994	2934	0.10	0.10	0.038	0.00109	0.0022	0.015	0.0107
2009 avg	7.48	26.6	1978	2961	0.11	0.10	0.024	0.00098	0.0019	0.016	0.0106
2010 avg	7.31	25.9	1993	2985	0.10	0.10	0.025	0.00107	0.0021	0.016	0.0130
2011 avg	7.62	23.2	2052	2961	0.12	0.10	0.001	0.00103	0.0025	0.015	0.0086
2012 avg	7.42	21.4	2019	2994	0.09	0.10	0.002	0.00138	0.0018	0.015	0.0111

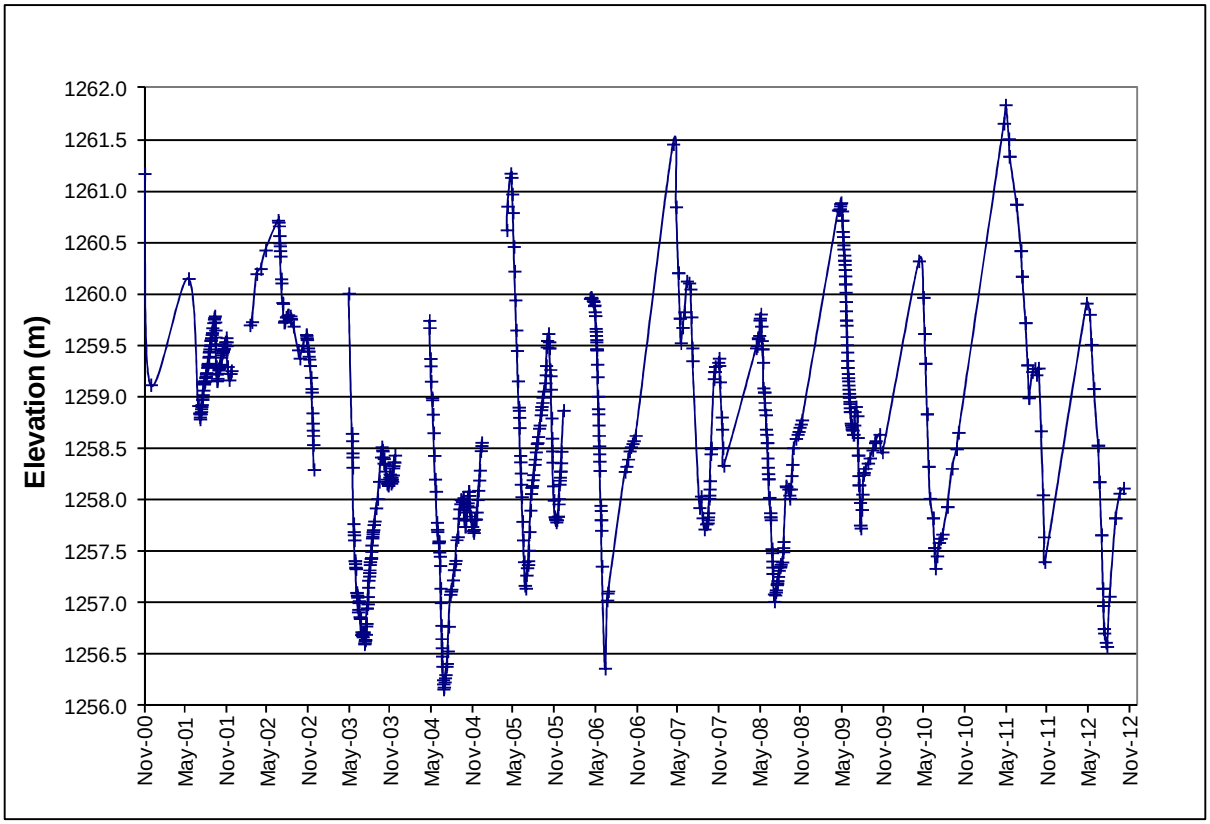


Figure 5-20 Main Zone Pit water level

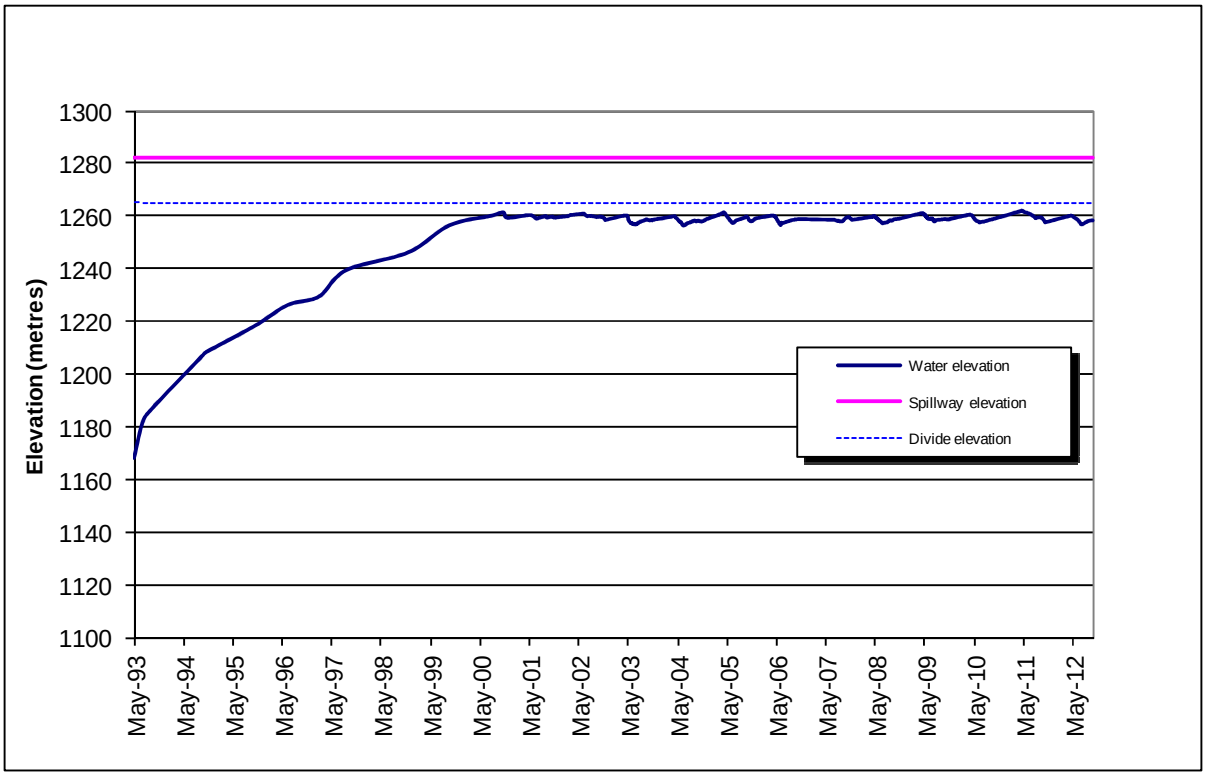


Figure 5-21 Main Zone Pit elevations

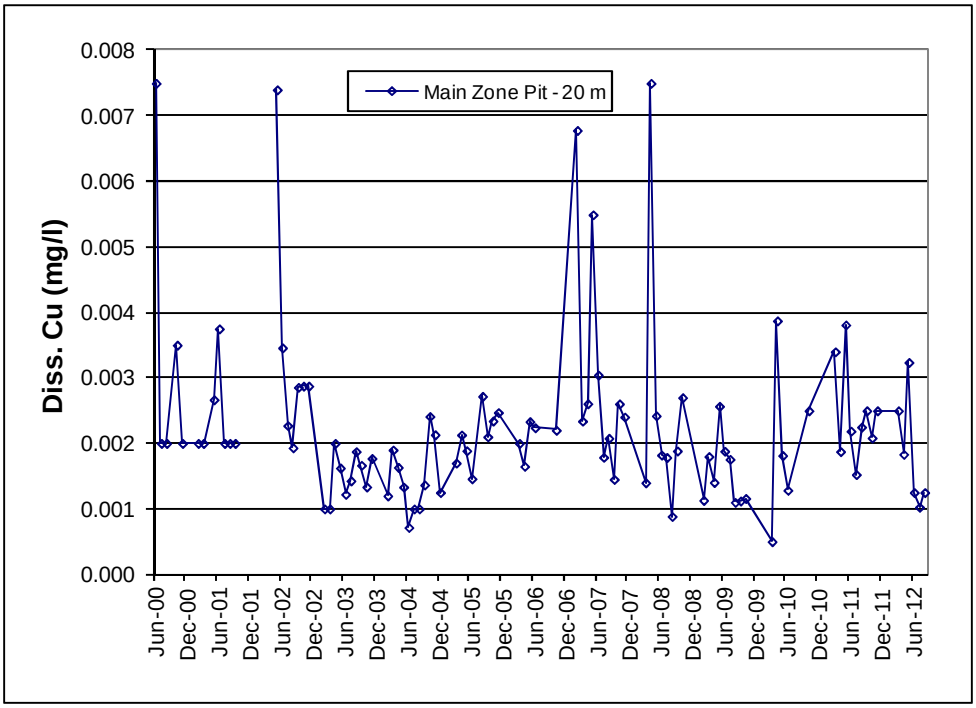


Figure 5-22 Main Zone Pit dissolved copper (monthly average)

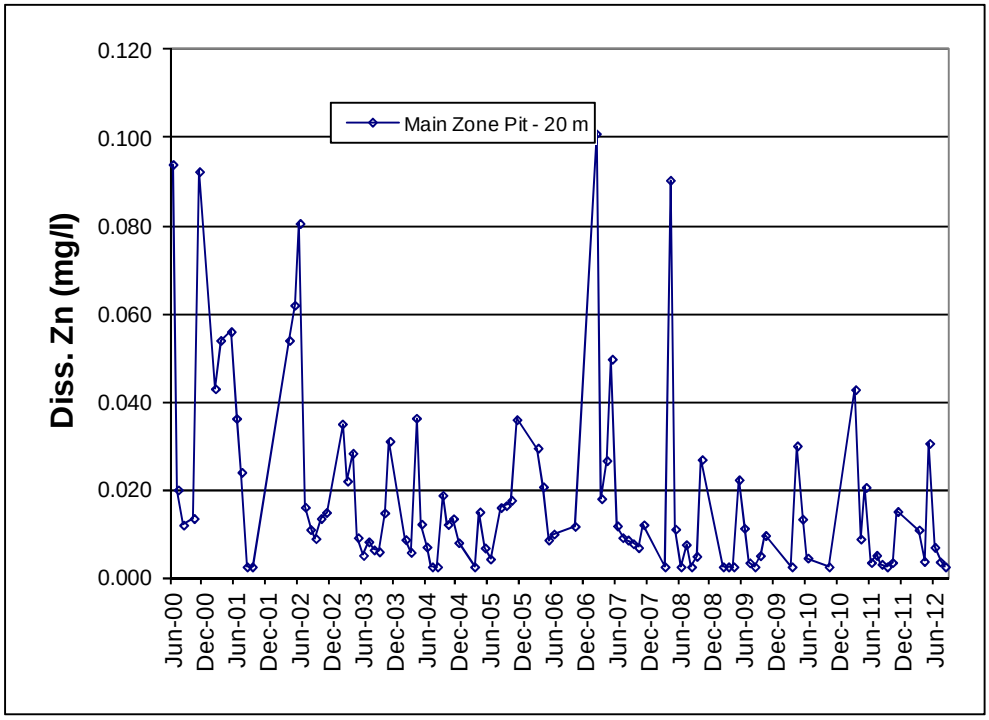


Figure 5-23 Main Zone Pit dissolved zinc (monthly average)

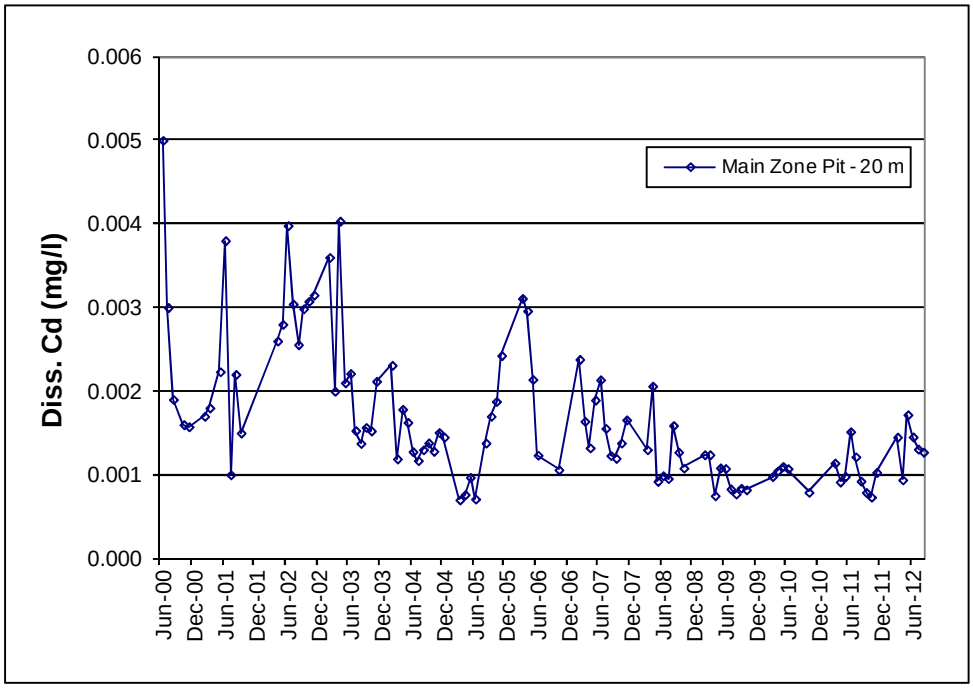


Figure 5-24 Main Zone Pit dissolved cadmium (monthly average)

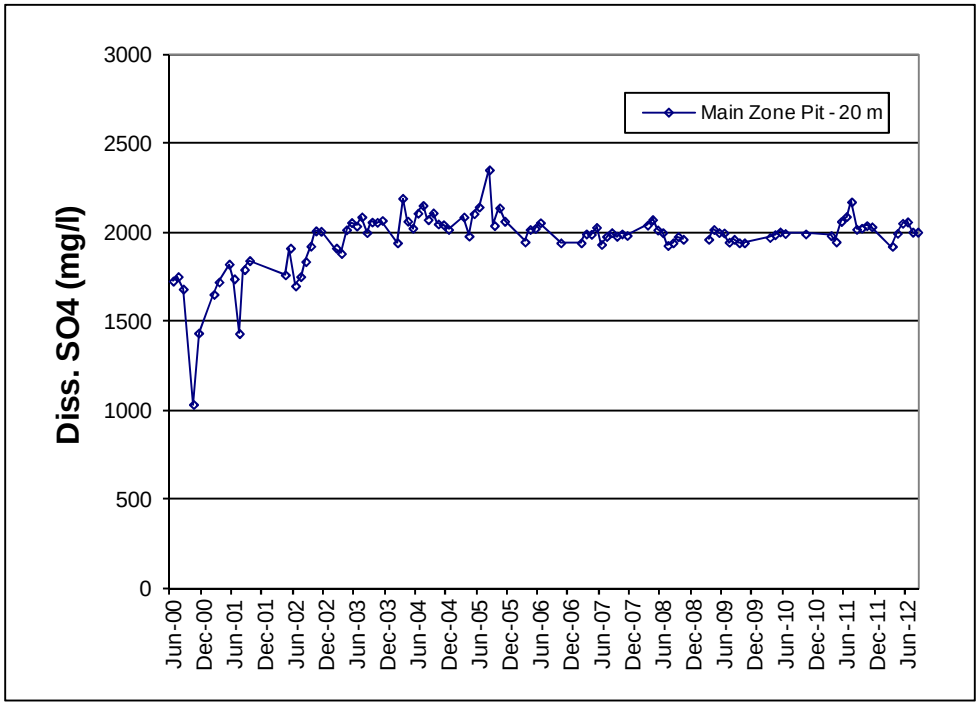


Figure 5-25 Main Zone Pit dissolved sulphate (monthly average)

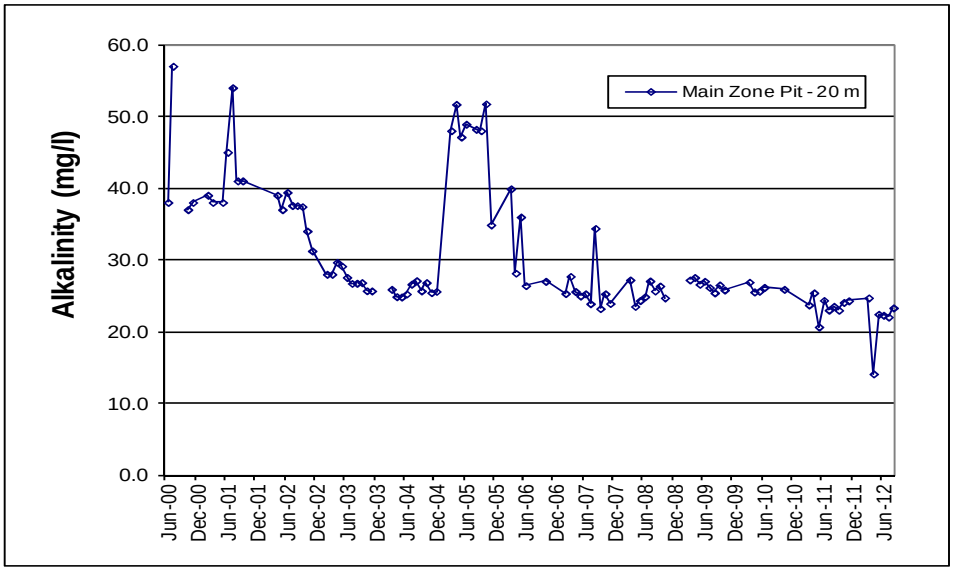


Figure 5-26 Main Zone Pit Alkalinity (monthly average)

The Waterline Pit samples for 2012 are shown in Tables 5-6 & 5-7. Total zinc averaged 0.72 mg/L in 2012. Total copper averaged 0.019 mg/L for the year. The total iron concentration was 0.05 mg/L in 2012. The average pH in 2012 was 7.66. The average acidity was 16 mg/L in 2012. Mixing is frequently observed in the Waterline Pit. Only one profile was completed in the Waterline in 2012 in the first quarter. The dissolved metals analyses for the Waterline Pit profile samples are presented in Table 5-7. Dissolved iron and arsenic both increased with depth while dissolved cadmium was at its maximum value at 10m depth. Dissolved copper and zinc varied through the water column with a general trend of increasing with depth. Graphs showing dissolved copper, zinc, arsenic and iron in the Waterline Pit at various depths with the data that is available since 1997 are shown below in Figures 5-27 to 5-30. The data for 35m and 40m were combined because current depth profiles use 35m where 40m were used in the past. Copper and zinc appear to vary throughout the depth of the Pit while arsenic and iron occur in high concentrations (>2 mg/L and > 45 mg/L respectively) deep in the pit and very low concentrations at the surface (often below their detection limits of 0.05 mg/L and 0.03 mg/L respectively).

TABLE 5-5 Waterline Pit pH, acidity and total metals (surface samples).

DATE	pH	Acidity mg/l	As (t) mg/l	Cd(t) mg/l	Cu(t) mg/l	Fe(t) mg/l	Zn(t) mg/l
2002 avg	7.64	<1	<0.2	<0.01	0.07	0.59	0.39
2003 avg	7.47	<1	<0.2	<0.01	0.04	0.92	0.46
2004 avg	7.66	0.5	<0.2	<0.01	0.03	0.71	0.42
2005 avg	7.55	3.2	<0.2	<0.01	0.05	0.68	0.42
2006 avg	7.42	3.3	<0.2	<0.01	<0.01	0.05	0.44
2007 avg	7.46	8.0	<0.2	<0.01	0.05	1.61	0.86
2008 avg	7.56	<1	<0.2	<0.01	0.09	1.21	0.69
2009 avg	7.37	5.6	<0.2	<0.01	0.11	2.66	0.71
2010 avg	7.26	10.5	<0.2	<0.01	0.25	10.25	0.68
2011 avg	7.91	7.7	<0.2	<0.01	<0.01	0.36	0.74
2012 avg	7.66	16.0	<0.2	<0.01	0.019	0.05	0.72

TABLE 5-6 Waterline Pit Profile – 2012.

Depth (m)	Alkalinity Mar-12	As(d) mg/L Mar-12	Cd(d) mg/L Mar-12	Cu(d) mg/L Mar-12	Fe(d) mg/L Mar-12	Zn(d) mg/L Mar-12
1		0.00078	0.00292	<0.0010	<0.030	0.678
5		0.00036	0.00319	<0.0010	<0.030	0.716
10	96.1	0.00022	0.00390	<0.0010	<0.030	0.769
20	127	0.29	0.00174	<0.0025	12.7	0.629
30		0.42	0.00219	<0.0025	26.4	1.070
40	138	1.03	0.00073	<0.0025	31.2	0.609

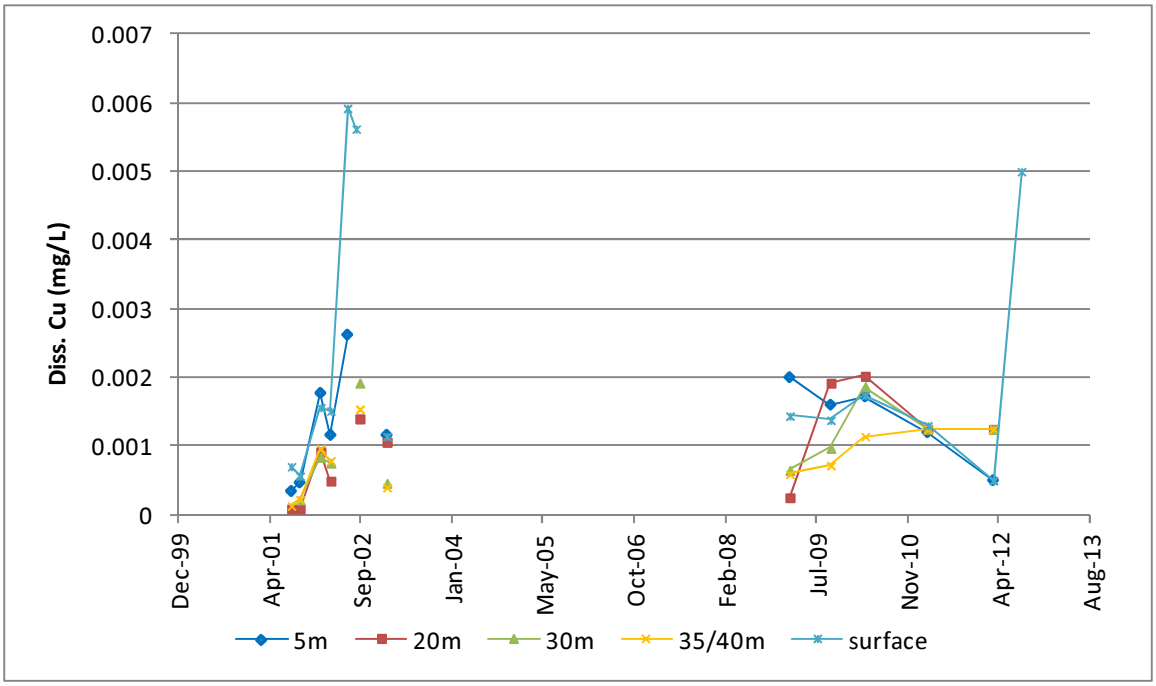


Figure 5-27 Dissolved copper at different depths in the Waterline Pit

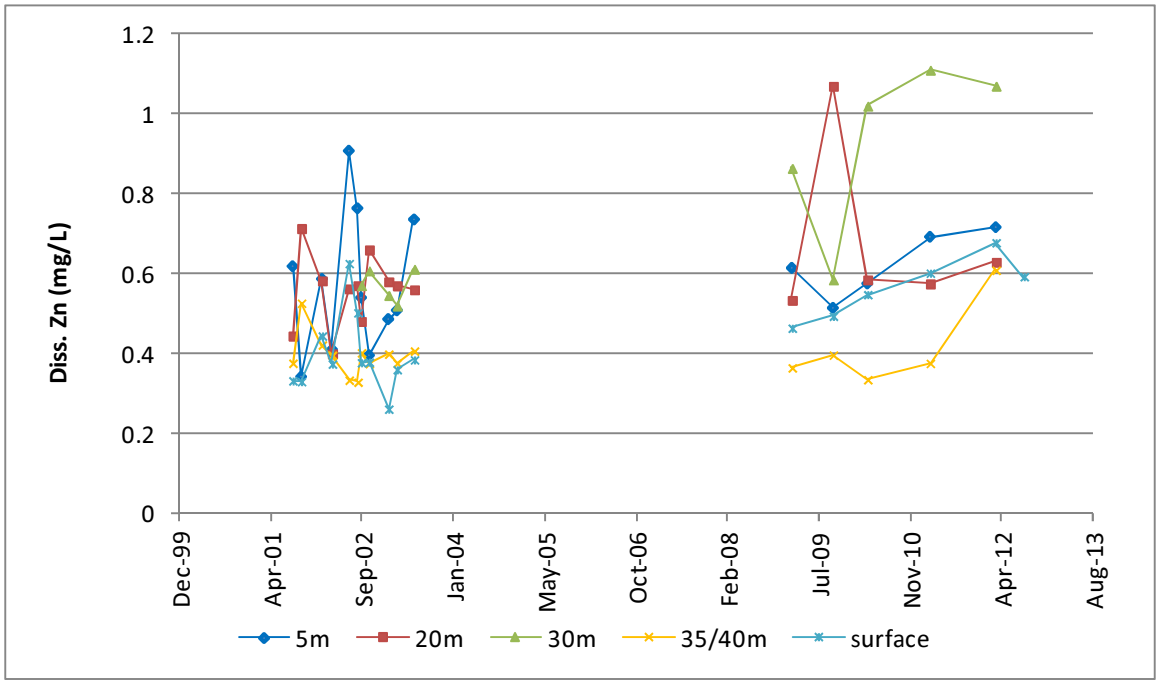


Figure 5-28 Dissolved zinc and different depths in the Waterline Pit

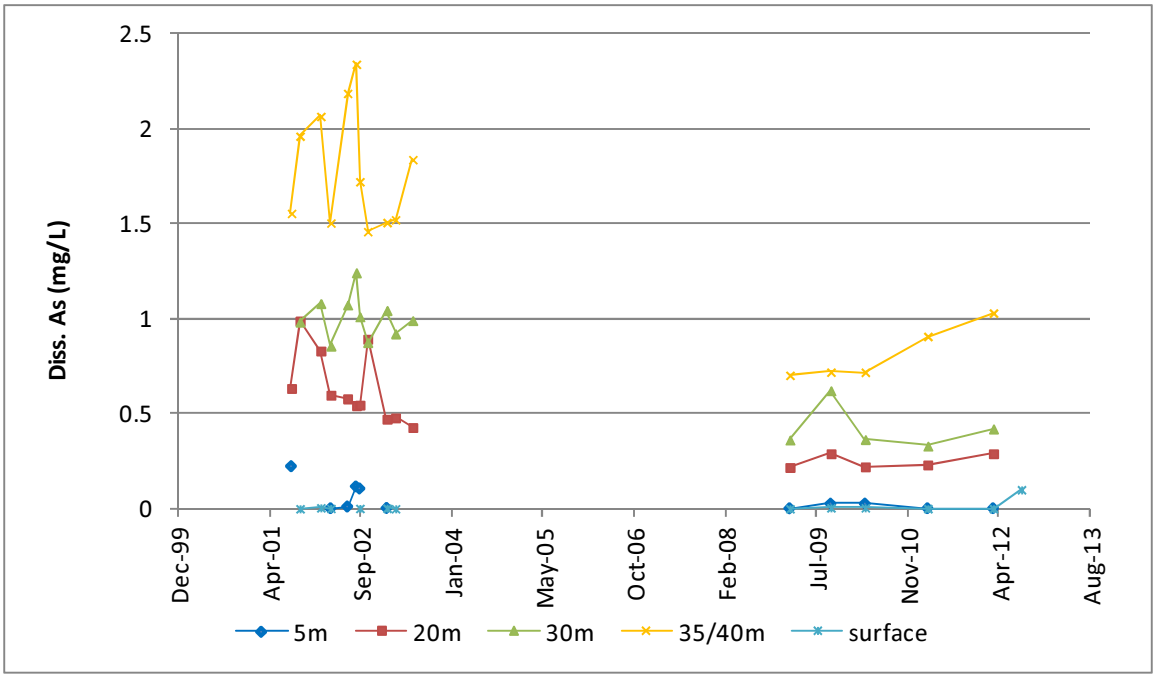


Figure 5-29 Dissolved arsenic at different depths in the Waterline Pit

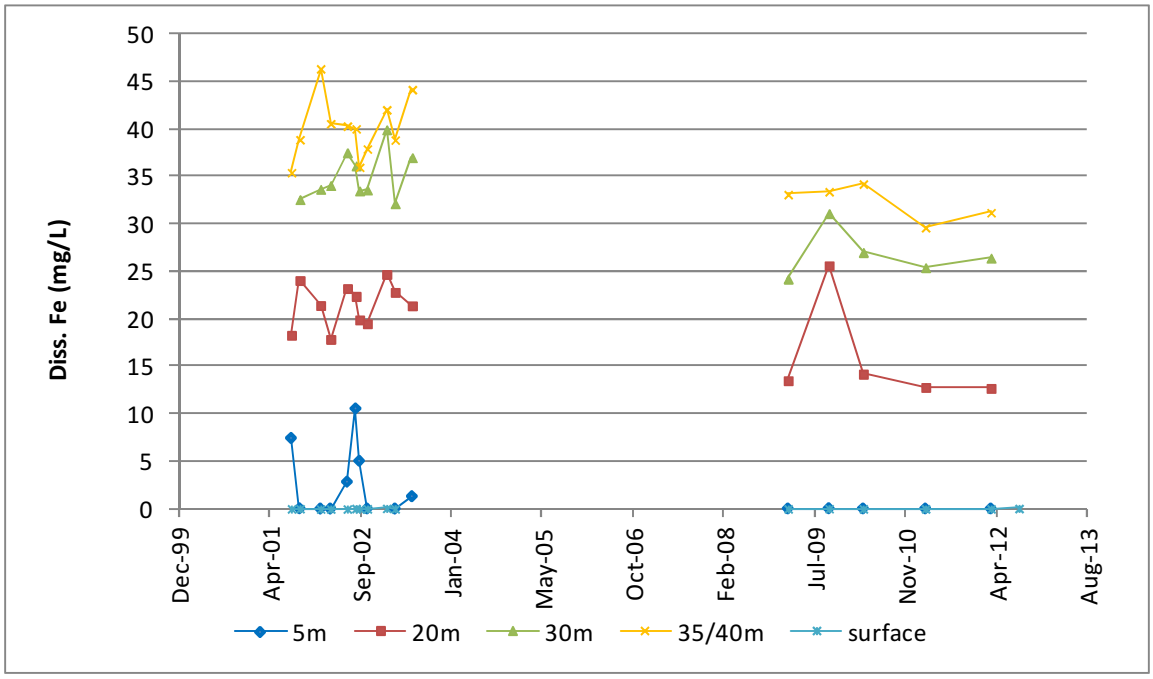


Figure 5-30 Dissolved iron at different depths in the Waterline Pit

5.7 GROUNDWATER

All groundwater wells are sampled semi-annually with the exception of piezometers RH82-02-01 and RH82-03-01 which are sampled quarterly. Historic operations and current groundwater data can be found in Appendix II of this report.

5.7.1 Foxy Creek Catchment

Ambient groundwater quality for the Foxy Creek catchment is monitored with piezometers at the Lu Creek site (RH82-01-01, RH82-01-02, & RH82-01-03) while the piezometers near the #1 Dam Seepage Pond (RH82-06-01, RH82-06-02, & RH82-02a) provide groundwater quality downstream of the tailings pond.

All piezometers at the Lu Creek site are located within an andesite volcanic horizon. Below #1 Dam Seepage, piezometers RH82-06-01 and RH82-06-02 are also within andesite units, while RH82-06a is located within a gravel aquifer above the andesite horizon. During the permit amendment discussions in 1993/94 it was determined that a sufficient data set had been accumulated from the Lu Creek background sites with no significant changes over the twelve year sampling period. It was decided that the Lu Creek piezometers would not be sampled further unless downstream ground water quality deteriorated.

The piezometers below #1 Dam Seepage showed little change from previous years.

5.7.2 Bessemer Creek Catchment

RH82-02-01 is located on the west side of the waste dump within the weathered interface between quartz monzonite bedrock and gravelly clay. This piezometer is slightly artesian which causes problems in the winter months because the exposed section of the well freezes and hinders sample collection. In 2012 two

samples were collected from the piezometer even though the nitrogen purge tubing was inoperable and could not be replaced. The piezometer was sampled using a thin bailer to collect the sample. The piezometer has been sampled since 1982 with no sign of contamination from the waste rock dump.

Piezometer RH82-03, located downstream of the Southern Tail pit in the Getty Creek valley, is positioned in sandy gravelly clay immediately above the weathered quartz monzonite horizon. Water quality at this site has been monitored closely since 1982 due to a fairly steady increase in iron levels. The trend for both iron and sulphate shows rapid increases from 1985 to 1990 and slight increases from 1990 to 1994. Between early 1995 and 1998 the dissolved iron values levelled off, but starting in the latter half of 1999 the dissolved iron values increased to above 70 mg/L. In 2012, sulphate levels increased with an average of 985 mg/L which is greater than the 2011 average of 949 mg/L. Dissolved iron showed a slight increase in 2012 with an average of 90.5 mg/L compared to the 2011 average of 89.5 mg/L (Figures 5-31 & 32). Dissolved zinc increased in 2012 with an average of 0.267 mg/L. Dissolved copper was below the detection limit of 0.0025 mg/L for 2012. Dissolved cadmium was below the detection limit of 0.00025 mg/L in 2012 compared to 0.00031 mg/L in 2011.

Fourteen groundwater wells were installed along the west side of the waste dump just above Bessemer Creek in 1991. Of the 14 wells only 7 contain sufficient water for sampling and were sampled twice in 2012. Piezometer RH90-10 is situated on the west side of Bessemer Creek and acts as a background sample point.

Piezometer RH 90-16 is a very shallow well terminated in till mixed with gravel that was been sampled more frequently since a water quality sample collected in November 2004 showed a large increase in several dissolved metals and dissolved sulphate. The secondary ARD ditch, which is directly uphill from the piezometer, was suspected to be the source of some ARD that may have been leaking from the ditch and migrating down in shallow groundwater. Some improvements were made to the secondary ARD ditch in 2005 and 2010. The maximum dissolved copper concentration at RH 90-16 piezometer was 2.57 mg/L in 2012 and was an increase from the 2011 maximum value of 1.62 mg/L (Figure 5-32). Dissolved zinc and aluminium averages in 2012 were 6.32 mg/L and 29.9 mg/L respectively which was an increase from the previous year. Analyses of the Bessemer Creek profiles have shown that this water has not reached Bessemer Creek. This area will continue to be monitored closely.

A table of water levels for the Bessemer Creek piezometer, the P99 series wells, and the P00 series wells are included in appendix II.

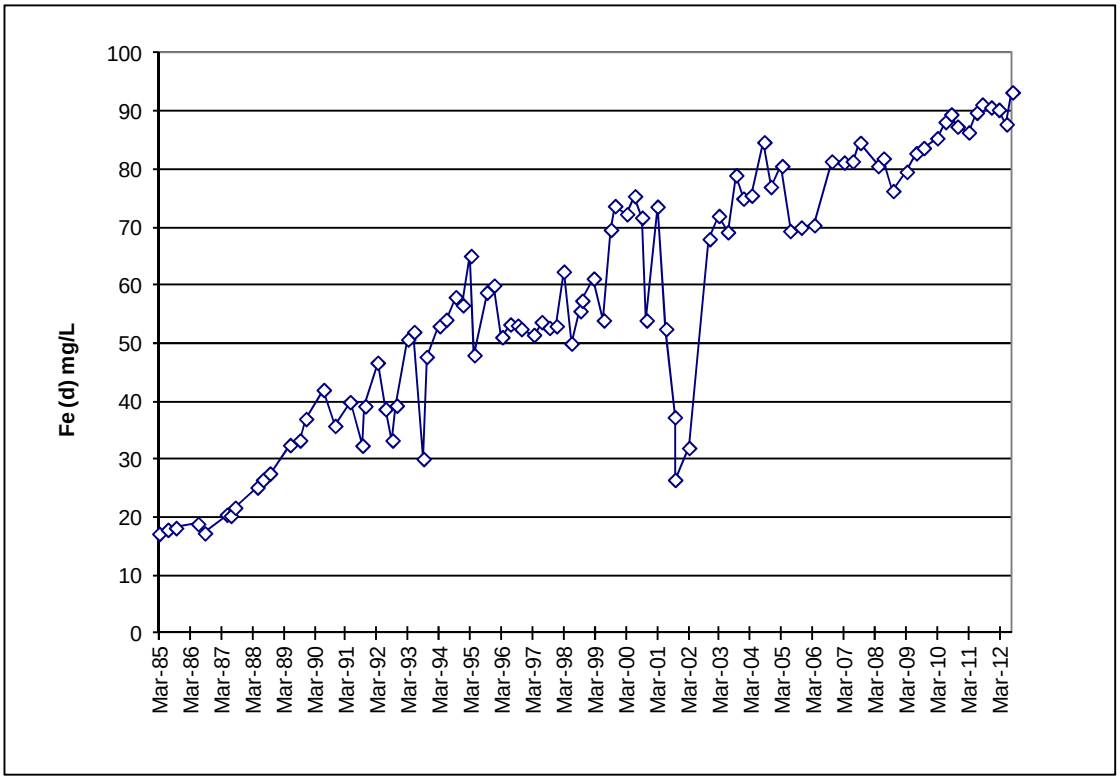


Figure 5-31 Getty Creek piezometer dissolved iron

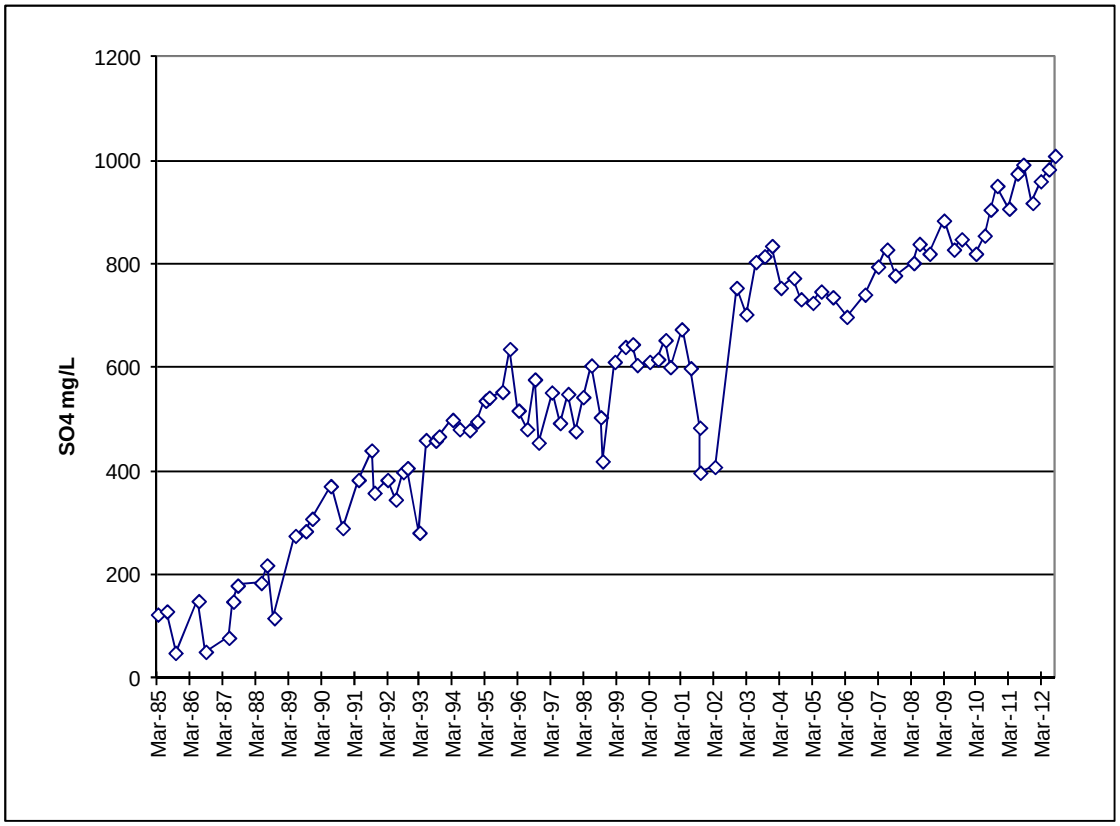


Figure 5-32 Getty Creek piezometer dissolved sulphate

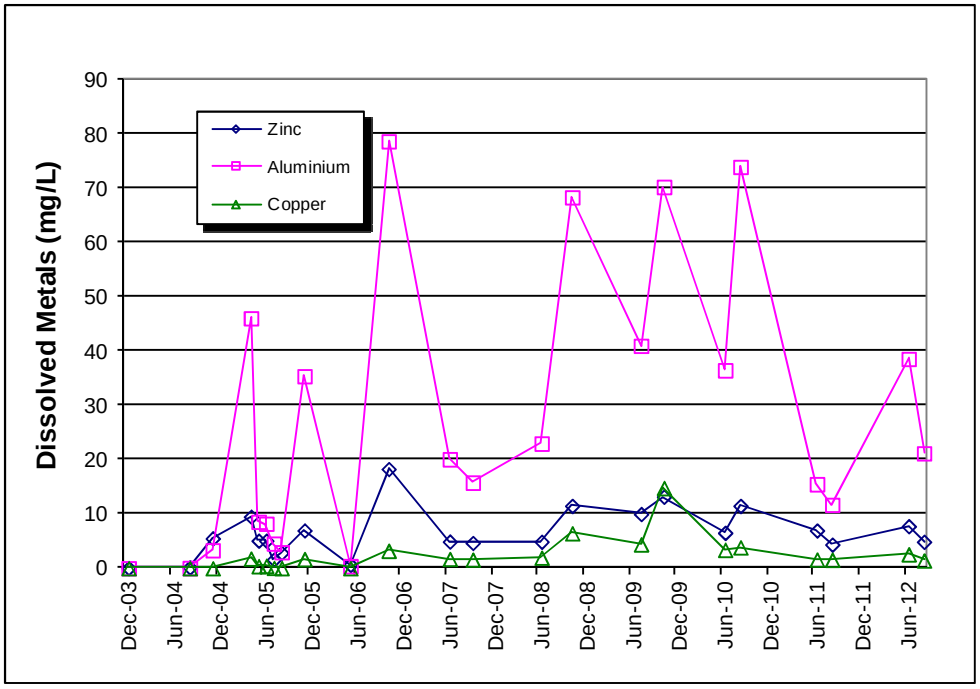


Figure 5-33 Piezometer RH 90-16 - Dissolved metal concentrations.

5.8 Tailings Pond

In 1998 the Tailings Pond water quality showed decreasing pH and elevated dissolved copper and zinc values. A Lorax study in 1999 (Lorax, 1999) indicated that the increased metal levels were being caused by the destabilization of an untreated ARD sludge located in the northeast corner of the tailings impoundment. The study found that the pH was naturally decreasing through precipitation and snowmelt which was destabilizing an untreated ARD sludge from #1 Dam Seepage with the result being the release of copper and zinc. Lime slurry was added to the Tailings Pond in 2000 and 2001 to raise the pH. In 2003 the pH in the Tailings Pond started to decrease rapidly, which was theorized to be related to the release of acidity in the nitrification of ammonia. Lorax did a modeling exercise on the Tailings Pond pH and determined that 80 tonnes of lime was required as an initial dose to increase the pH to around 8.0. In 2003, 87.8 tonnes of slaked lime was added to the Tailings Pond followed by 34.6 tonnes in 2004 causing the pH to increase to an average of 6.81. In 2006, 7.92 tonnes of lime slurry was added to the Tailings Pond and in 2007 32.0 tonnes of lime slurry was added. No lime slurry has been added since 2007, but future lime additions will be made to maintain the pH if required. The average pH in 2012 was 7.02, which was an increase from the 2011 average of 6.93 (Figure 5-36).

Dissolved copper concentrations in 2012 averaged 0.0086 mg/L, which was below the 2011 average of 0.0089 mg/L. The copper values in 2012 ranged from a low of 0.0024 mg/L in September to a high of 0.0384 mg/L in April (Figure 5-34). Dissolved zinc decreased to an average of 0.047 mg/L in 2012 compared to the 2011 average of 0.079 mg/L. The zinc values in 2012 ranged from a low of 0.014 mg/L in September to a high of 0.127 mg/L in May (Figure 5-35). The average sulphate level for 2012 was 484 mg/L which was a decrease from the 2011 average of 563 mg/L. The sulphate and metals trends in 2012 showed the highest values generally occurred during the ice covered months and lower values during the ice free months.

Low level results for dissolved arsenic in 2012 showed dissolved arsenic at 0.00314 mg/L in January and 0.00104 mg/L in May. Dissolved antimony was <0.20 mg/L for all samples taken in 2012 (Table 5-8).

From 1992 to 2007 total cyanide levels decreased from 4.462 mg/L to <0.005 mg/L (Appendix I). No cyanide analyses were completed in 2012. Ammonia testing continued on a monthly basis during the year. Ammonia levels decreased in 2012 to average 0.038 mg/L, down from 0.077 mg/L in 2011 (Figure 5-37). Ammonia levels peaked in August at a level of 0.271 mg/L and reached a minimum of 0.007 mg/L in November.

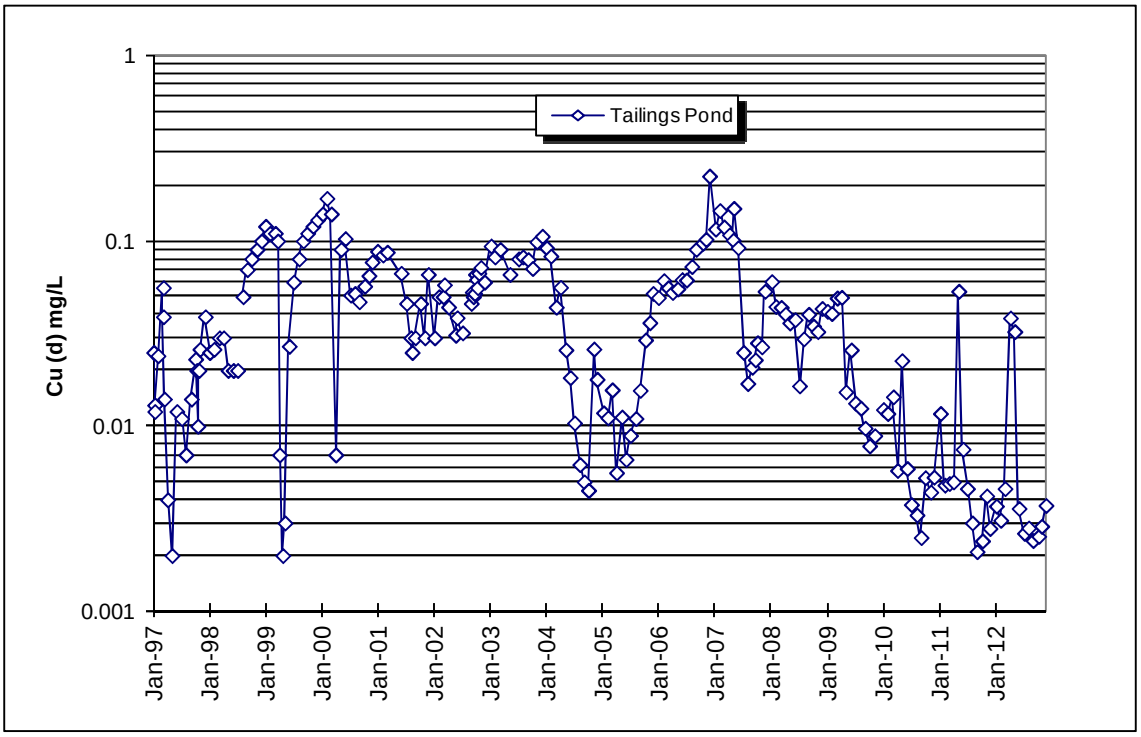


Figure 5-34 Tailings Pond dissolved copper

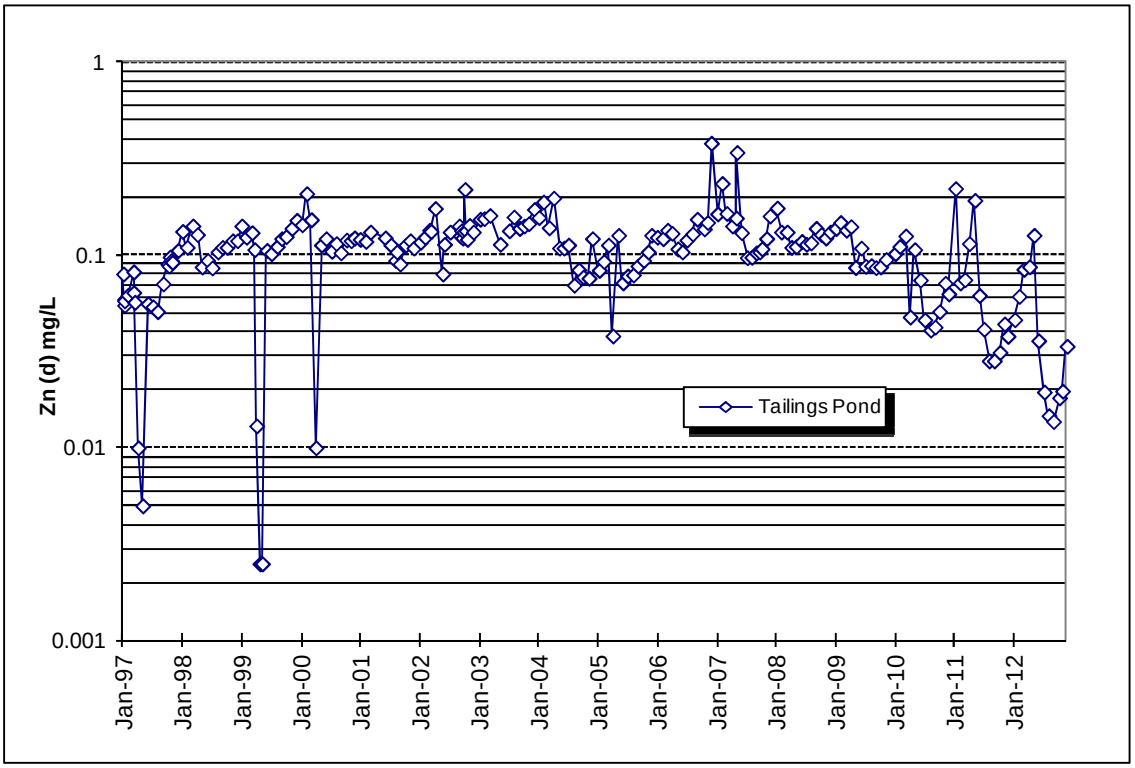


Figure 5-35 Tailings Pond dissolved zinc

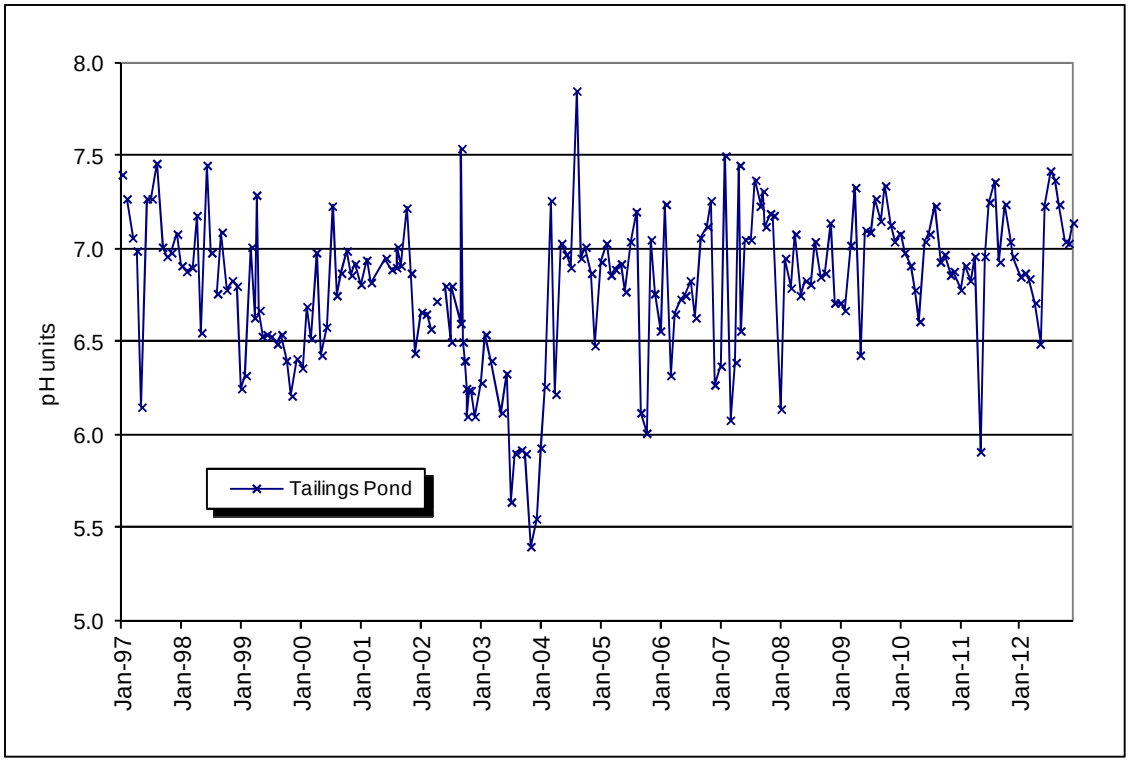


Figure 5-36 Tailings Pond pH

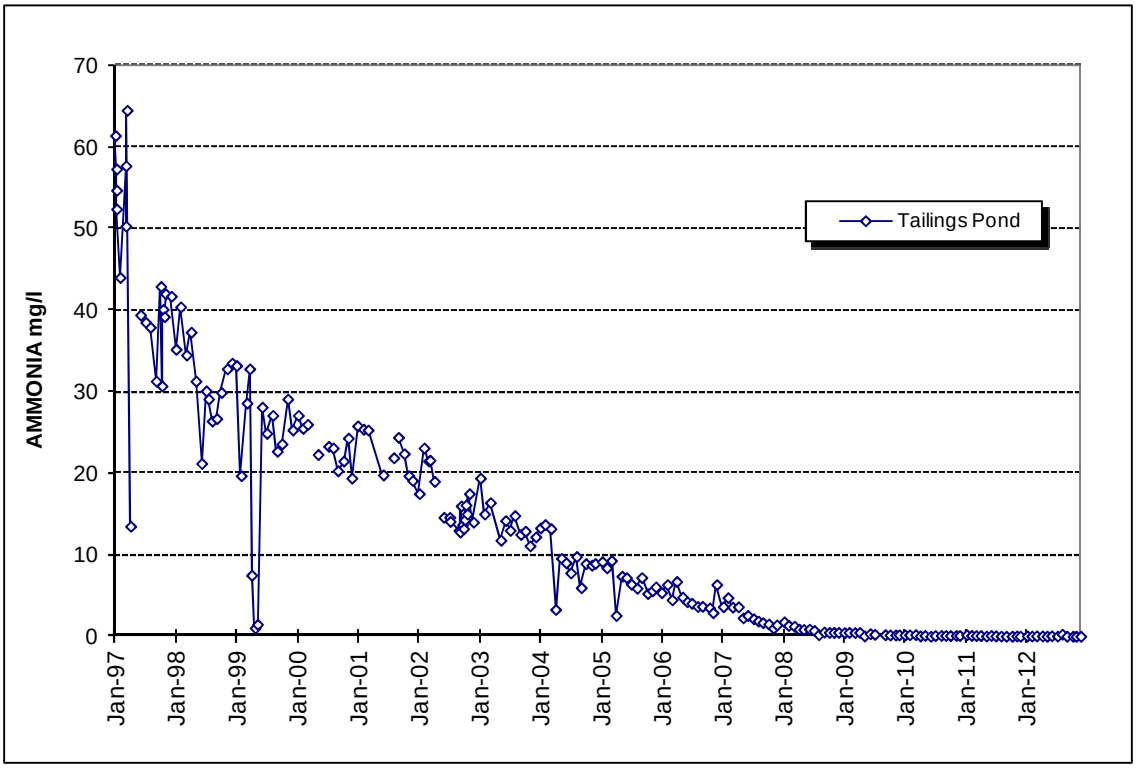


Figure 5-37 Tailings Pond ammonia

Table 5-7 Tailings pond arsenic and antimony concentrations (1999 – 2012).

	As (d) (mg/L)	Sb (d) (mg/L)
1999	0.0049	0.0299
2000	0.0029	0.0206
2001	<0.2	<0.2
2002	<0.2	<0.2
2003	0.0038	0.0133
2006	0.0024	<0.2
2007	<0.05	<0.2
2008	0.0039	0.0112
2009	0.0031	0.011
2010	0.0032	0.0126
2011	0.0029	0.0106
2012	0.0021	<0.2

5.9 ARD Monitoring

Monitoring of ARD flows from the waste rock dumps, Southern Tail pit, #1 Dam Seepage, Getty Creek, and the plant site continued in 2012. ARD sample analyses for 2012 were performed by ALS Environmental in Vancouver. The Main ARD Pond (site C-8) is used for evaluating trends in ARD. Table 5-9 shows the calendar year and July to June average concentrations and loadings for C-8. The monthly data for C-8 back to June 1990 can be found in Appendix III. The Main Pond collects ARD from the Main Waste Rock Dump, Bessemer Waste Rock Dump, Southern Tail Pit, the old plant site, Getty Creek Pond, and various sumps. Collection of water from the Southern Tail Pit into the Main Pond began in June 1994. The only ARD not collected at the Main Pond is from #1 Dam Seepage which is pumped directly to the Storage Pond. Variations in the acidity loading of the Main Pond are mirrored by the lime consumption at the ARD treatment plant since the vast majority of the treated ARD is pumped from the Main Pond.

The data for the Main Pond has been separated into two different periods: the normal calendar year for comparison to other years and a period starting at the beginning of July and finishing at the end of June. The July to June period covers the entire precipitation cycle by including all of the snow accumulation months and the corresponding freshet months. This results in a more accurate representation of the ARD trends.

The July to June summary in Table 5-9 shows slight increases of pH, and a decrease of acidity, sulphate, copper, iron, zinc and arsenic concentrations during the 11/12 period in comparison to the 10/11 period. For the same period the flow rate was lower which helped cause lower loadings than the previous July to June period (Figures 5-38 & 5-39). The sulphate, copper, iron and arsenic loadings were all below average while acidity and zinc were above average.

The normal calendar year summary is shown in Table 5-9. The 2012 averages show decreases of acidity, and dissolved metal concentrations compared to 2011 values. The flow rate for 2012 was lower than 2011 resulting in decreased loadings for acidity, sulphate and metals that were all below average (Figures 5-40 & 5-41).

Table 5-8 Main ARD Collection Pond (C-8) concentrations and loadings

July - June 12-Month Averages	Time Period	pH	ACID mg/L	SO4 mg/L	Cu(t) mg/L	Fe(t) mg/L	Zn(t) mg/L	As (t) mg/L	Al (t) mg/L	FLOW m3/sec	ACID mg/sec	SO4 mg/sec	Cu(t) mg/sec	Fe(t) mg/sec	Zn(t) mg/sec	As (t) mg/sec	Al (t) mg/sec
	90/91	2.64	10341	14916	164	1764	179			0.0298	267912	395237	4249	47457	4807		
	91/92	2.60	10801	15355	158	1770	192			0.0292	284055	384125	3963	43712	5034		
	92/93	2.65	10631	12965	128	1239	199			0.0260	237859	366806	3710	36364	5575		
	93/94	2.61	11100	19264	148	1618	233			0.0315	301728	492127	4084	47181	6409		
	94/95	2.44	8330		99	1573	171			0.0274	200459		2361	35850	4704		
	95/96	2.42	7718		89	1216	125			0.0298	196767		2307	32186	3255		
	96/97	2.38	11266		130	1808	159			0.0361	318564		3728	50111	5055		
	97/98	2.42	9253		98	1313	158			0.0245	189617		2023	26406	3341		
	98/99	2.49	8724		91	1209	153			0.0226	180627		1824	25511	3326		
	99/00	2.53	9620		97	1274	169			0.0197	161987		1644	21009	2954		
	00/01	2.56	9856		100	1337	171			0.0216	184735		1837	25079	3585		
	01/02	2.57	12858		113	1639	202	11.2	1416	0.0269	314945		3250	47319	5508	405	55554
	02/03	2.56	11964		96	1278	192	3.8	1090	0.0156	183258		1459	20309	2972	73	17983
	03/04	2.58	10402		80	1171	176	3.4	996	0.0222	210831		1638	23904	3659	68	20023
	04/05	2.57	10981		94	1102	192	3.4	1132	0.0276	290767		2482	30690	5091	101	29940
	05/06	2.64	11043		90	1244	191	4.2	1134	0.0204	208339		1688	23641	3631	84	21164
	06/07	2.57	11361		81	1305	175	5.4	1040	0.0347	321013		2243	36969	5232	151	28825
	07/08	2.58	10811		73	1036	171	2.3	981	0.0277	255834		1752	23891	4310	42	23011
	08/09	2.52	11085		77	1158	168	4.4	1012	0.0236	254328		1799	30559	3328	125	22961
	09/10	2.39	12043		83	1239	180	5.0	1106	0.0217	269509		1874	26556	3952	108	25189
	10/11	2.61	12496	16124	78	1413	173	6.3	1178	0.0345	412270	537041	2702	46643	5274	215	38145
	11/12	2.75	9143	12942	68	1091	157	4.5	1012	0.0324	265917	342334	1895	28903	4718	109	28127
Historical Means	90/91 to 11/12	2.55	10538	15261	102	1354	177	4.9	1100	0.0266	250515	419612	2478	33193	4351	135	28266

January - December Yearly Averages																	
	91	2.60	12556	17822	191	2097	203			0.0256	287166	409208	4377	49297	4622		
	92	2.59	10550	13364	133	1415	194			0.0264	252497	325491	3259	35782	4704		
	93	2.67	10647	16153	145	1407	224			0.0295	277004	464104	4488	43886	6742		
	94	2.52	9101	22340	116	1650	194			0.0302	249724	773570	3254	46341	5457		
	95	2.42	8076		93	1243	151			0.0231	171552		1966	25534	3750		
	96	2.40	8895		102	1438	121			0.0354	250779		2912	40703	3787		
	97	2.42	10779		124	1665	171			0.0344	294200		3445	45351	5052		
	98	2.45	9103		95	1253	157			0.0214	169327		1776	23295	3011		
	99	2.50	10079		104	1442	172			0.0253	223056		2259	31903	3957		
	00	2.53	9173		94	1208	163			0.0193	151354		1537	19470	2817		
	01	2.59	10932		100	1386	186			0.0198	181906		1683	23476	3472		
	02	2.57	13106		111	1555	208	6.8	1234	0.0271	320047		3237	46462	5631	216	34275
	03	2.57	10909		87	1213	178	3.4	1018	0.0186	194512		1532	22046	3230	74	19582
	04	2.54	10809		86	1209	179	3.8	1035	0.0253	256704		2059	28481	4382	89	24717
	05	2.62	11201		96	1161	197	4.0	1177	0.0255	268935		2298	29565	4725	106	28037
	06	2.62	11134		83	1172	183	4.0	1059	0.0168	174253		1309	18472	2907	64	16628
	07	2.58	10381		76	1188	172	4.2	986	0.0430	372642		2651	40707	6317	137	33751
	08	2.54	11435		76	1103	182	3.2	1044	0.0199	205682		1357	20199	3395	53	18781
	09	2.50	11147		77	1175	160	4.7	995	0.0247	262313		1860	31488	3387	132	23489
	10	2.41	12479	15408	80	1381	180	5.4	1163	0.0230	288902	343468	1932	29719	4154	122	27284
	11	2.75	11181	15444	78	1264	172	5.9	1134	0.0387	421230	455962	2931	47677	5860	212	40758
	12	2.71	8793	10799	63	1009	152	4.1	952	0.0272	218281	274280	1495	23218	3822	89	22638
Historical Means	91 to 12	2.55	10567	15904	100	1347	177	4.5	1073	0.0264	249639	435155	2437	32867	4326	118	26358

c:/excelfil/contam/c8calc.xls

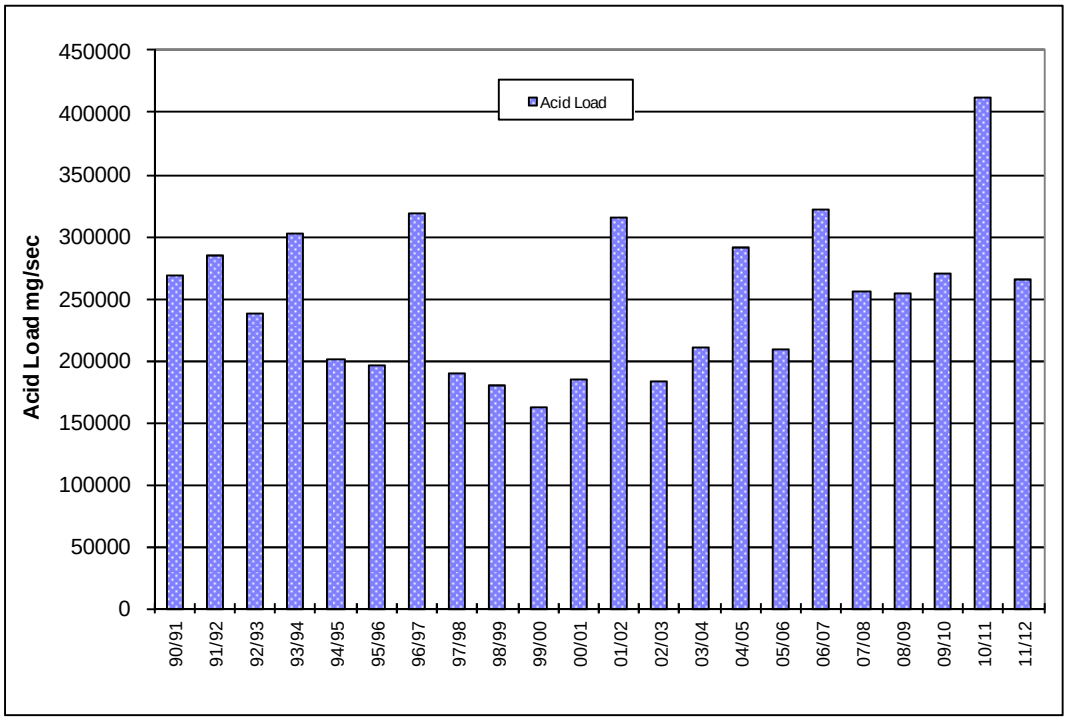


Figure 5-38 Average acid loading rate for Main Pond (C8) July to June period

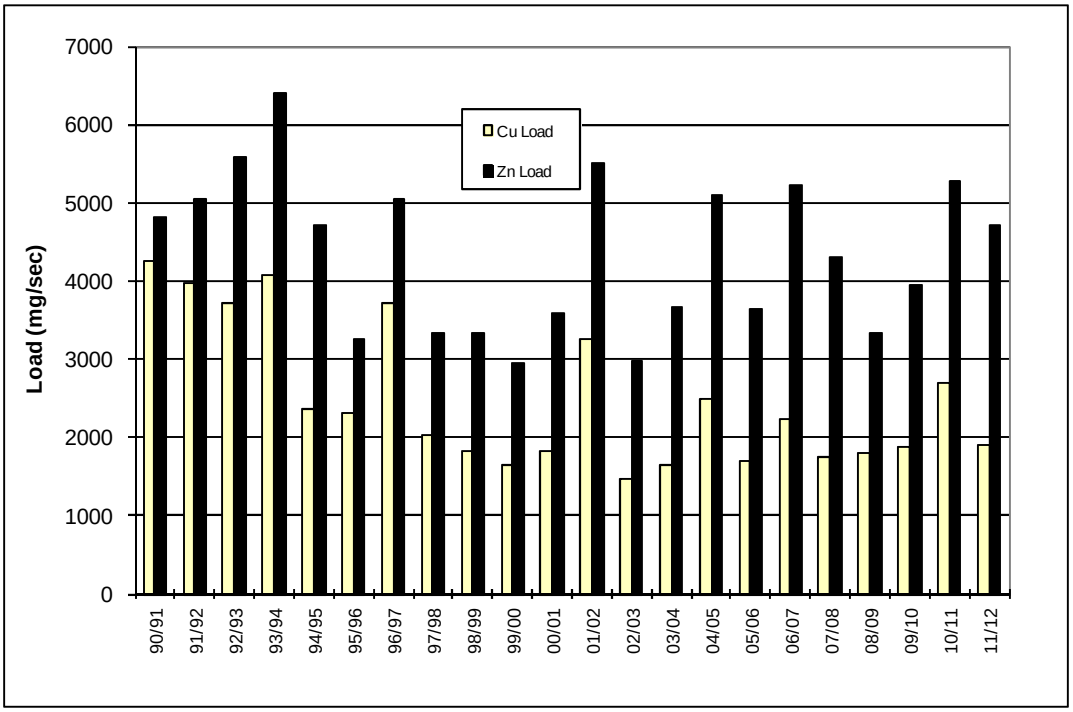


Figure 5-39 Average copper and zinc loading rates for the Main Pond (C8) July to June period

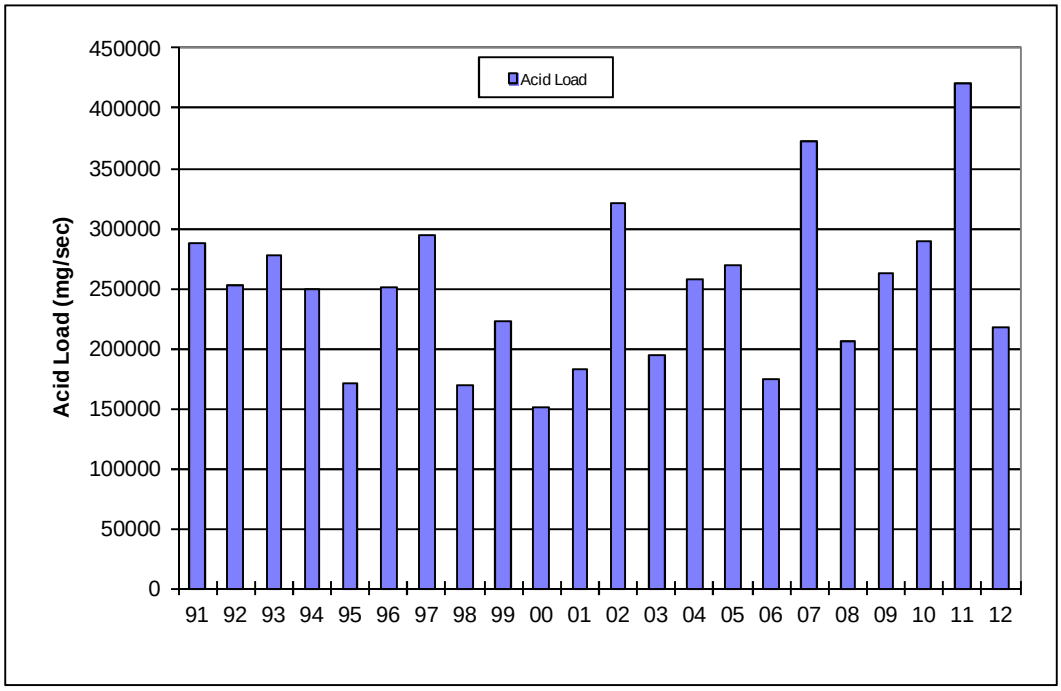


Figure 5-40 Average acid loading rate for the Main Pond (C8) – calendar year

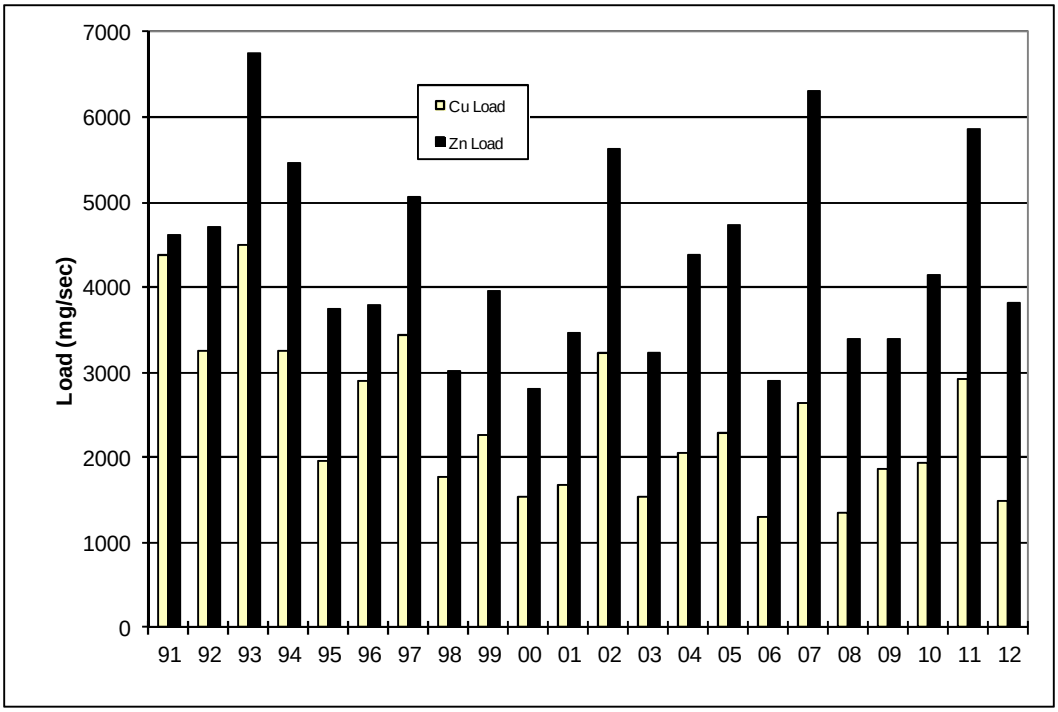


Figure 5-41 Average copper and zinc loading rate for the Main Pond (C8) – calendar year

6.0 RECLAMATION

6.1 INTRODUCTION

The Equity mine financial security is required to be reviewed every five years or less. The fourth scheduled review of the Equity mine long term financial security was completed in 2010 by the Equity Mine Financial Security Technical Advisory Group (EMFSTAG). The review by the EMFSTAG resulted in the Ministry of EMNG amending permit M-114 in early 2011 to be increased by $5.232 million to a total of $56.291 million. The letter of credit (LC) for the financial security was increased in February 2011 by Goldcorp Inc. to $56.291 million. The increase to the financial security resulted mainly from decreased interest rates for the first 30 years NPV, increased lime base to 4500 tonnes, and increased unit costs for lime. The financial security would only be used if Goldcorp Canada Ltd. was unable to meet its financial obligations for the Equity mine.

The table below shows the status of the various security triggers at the end of 2012. No triggers were exceeded in 2012 although the lime cost and power cost triggers were fairly close.

Trigger	Terms of Trigger	2012 Status	Triggered (Y or N)
Lime Cost	Unit cost of lime changes by +/- 10% over new base rate of $240.65 ($216.58/$264.72)	In December 2012 lime cost was $262.97 (+9.28% from new base rate)	N
Lime Use	A difference of 1000 t from the existing actual 3 year rolling average July to June of 4500 t	For 11/12 the 3 year rolling average was 4979 t	N
Power Cost	Increase in 2 year rolling average electricity cost >50% - new base of $128.131k set in 2010	The 2 yr rolling average for 2012 was ($188.2k) 46.9% higher than the new base for the bond of $128.1k	N

Payment was made for several Equity claims that are being retained and which the past assessment work has expired. Thirty six claims plus the existing three mining leases are being retained to cover the ARD collection system, waste rock dumps, tailings pond, and open pits. The CART limestone property was also retained for another year. In 2012 there was a lot of correspondence with the Ministry of EMNG and Mineral Titles to try to determine why the Equity claim shape file on the Ministry website appears to be shifted and compressed in some areas. An old inspection report from 2001 was emailed to Mineral Titles to support the original claim locations.

6.2 MINING PROGRAM

6.2.1 Surface Development to Date

A description of the surface development up to the end of 1994 (end of mine life) can be found in the 1994 Equity annual report.

6.2.2 Surface Development in Current Year

There was no mining at Equity in 2012. All mining activities at Equity were concluded in the first quarter

of 1994. Quantities and distribution of waste rock and tailings up to 2012 are detailed in Table 6-1.

Surface development is summarized in Table 6-2.

6.2.3 Projected over Five Years

Projected surface development and reclamation over the next five years is summarized in Table 6.3 and includes 1) area disturbed 2) area recontoured 3) area seeded and 4) area fertilized.

6.3 Reclamation Program

6.3.1 Reclamation Facilities and Staff

By the end of 2012 Equity staffing consisted of five permanent employees, with one employee working 8 months of the year while completing a university degree. The operations manager for the year was Mike Aziz. The environmental crew reports to the operations manager who reported to George Burns, the Goldcorp Ltd. Chief operating Officer to the end of 2012.

6.3.2 Past Year's Program

Reclamation work completed in 2012 is listed in Table 6-2.

6.3.2.1 Reclamation of Waste Dumps & Plantsite

A property auction was held at Equity in August 1994. All of the assets on the property were sold with the exception of items required for environmental control. Most of the structures on the plantsite were dismantled and removed in 1995 and 1996. The final compacted clay cover work was completed in 1997 with the completion of the cover on the west side of the plantsite area.

Sections of the Berzelius diversion ditch were cleared of gravel and sediment in 2012 as part of ongoing ditch maintenance. A half crushed culvert, downstream of the emergency tailings spillway, was replaced with 2 larger culverts where the road crosses Berzelius diversion in early August 2012 as recommended in the 2010 AMEC annual review Hydraulic Structures Evaluation. Rip rap was repaired below the twin culverts as recommended by AMEC during their site visit in September. Broken bedrock that was partially blocking the flow was removed. The new culverts had no trouble handling the large flows from a localized storm event on August 20, 2012 which was ranked as a 500 year event after receiving 51.5 mm of rain in 1 hour and 40 minutes.

An over-steepened slope, as noted in the 2011 AMEC annual review, on Berzelius diversion above the tailings pond spillway was flattened. A lot of rock had to be removed from the road and was placed as a stability berm against the water tower pipeline slope which has been eroding for a number of years. The 2012 AMEC review noted that the modified slope was much better and would require no further work.

Small trees were removed from the tailings dams, plant site and waste rock dumps using a brush saw and Roundup in 2012. Small trees were also removed from under the power line from the mine site to Lu Lake using the small excavator. Sections of the Equity Mine road were cleared of encroaching brush under a Ministry of Highways contract. Equity added to the contract to remove brush from certain areas of the access road and underneath the power line.

TABLE 6-1 WASTE ROCK & TAILINGS DISPOSAL

QUANTITIES OF WASTE ROCK, TAILINGS, AND LOW GRADE ORE FOR RECLAMATION PERMIT # M-114 AS OF DECEMBER 31, 2012

* ALL QUANTITIES IN MILLIONS OF TONNES

NAME OF WASTE PILE OR POND	ACID GENERATING WASTE		POTENTIALLY ACID GENERATING WASTE		NON-ACID GENERATING WASTE	
	2012	TOTAL	2012	TOTAL	2012	TOTAL
WASTE DUMPS:						
1) Southern Tail		12.0		5.0		0.5
2) Main		43.1				
3) Bessemer		15.944				
4) Main Zone Pit				0.321		
5) Sinkhole Backfill		0.023				
TOTAL		71.067		5.321		0.5
TAILINGS POND:						
1) Dams (rock)		0.6		0.5		4.1
2) Pond (tailings)		33.67				
3)						
4)						
5)						
TOTAL		34.27		0.5		4.1
LOW GRADE ORE:						
1) Stockpile		6.0				
2)						
3)						
4)						
5)						
TOTAL		6.0				

Table 6-2: SURFACE DEVELOPMENT IN 2012

COMPANY: Goldcorp Canada - Equity PERMIT NO.: M-114

	MINING		RECLAMATION							
	AREA DISTURBED (Ha)		AREA RECONTOURED (Ha)		AREA SEEDED/PLANTED (Ha)		AREA FERTILIZED (Ha)		AREA* RECLAIMED (Ha)	LAND USE** OBJECTIVE
YEAR	2012	TOTAL***	2012	TOTAL***	2012	TOTAL***	2012	TOTAL***	TOTAL***	
Roads		126.0		65.5		83.0		83.0	93.0	Road Allowance
Treated Water Pond		(33.0)							(33.0)	Lake unit - wildlife
Ground Around Ponds		112.6		16.2		21.9		13.0	95.0	Forestry - wildlife
Plant Site		35.3		35.8		35.3		35.3	35.3	Wildlife
Pit Area		(47.0)							(47.0)	Lake unit
Around Pits (incl. borrow pits)		89.9		32.5		42.2		25.2	78.0	Wildlife - some forestry
Waste Dumps		130.0		130.0		130.0		130.0	130.0	Wildlife
Tailings Ponds		(109.2)							(109.2)	Lake unit
Stockpiles	Included in waste dumps									
Exploration		24.5		4.5		9.5		7.5	20.0	Wildlife
Treatment Plant		19.2								
ARD Pumping		56.3		24.5		21.0		20.0	48.0	Wildlife
Tailings Dams (Tops)		6.6				6.6			6.6	
TOTAL	0.0	789.6	0.0	309.0	0.0	349.9	0.0	314.0	695.1	

* In order for an area to be recorded as "reclaimed" it must have supported vegetation that will lead to a designated land use for at least one year.

** Specify land use. Options include: forestry, grazing, wildlife habitat, recreation, agricultural, industrial, residential, and other.

*** Total up to December 31, 2012

() Denotes water cover.

Table 6-3: FIVE YEAR PROJECTION OF ANTICIPATED MINING AND RECLAMATION

COMPANY: Goldcorp Canada - Equity PERMIT NO.: M-114

	MINING						RECLAMATION																	
	AREA DISTURBED (Ha)						AREA RECONTOURED (Ha)						AREA SEEDED/PLANTED (Ha)						AREA FERTILIZED (Ha)					
YEAR	13	14	15	16	17	total	13	14	15	16	17	total	13	14	15	16	17	total	13	14	15	16	17	total
Roads						126.0																		
Treated Water Pond						(33.0)																		
Ground Around Ponds						112.6																		
Plant Site						35.3																		
Pit Area						(47.0)																		
Around Pits (incl borrows)						89.9																		
Waste Dumps						130.0																		
Tailings Ponds						(109.2)																		
Stockpiles	Included in waste dumps																							
Exploration						24.5																		
Treatment Plant						19.2																		
ARD Pumping						56.3																		
Tailings Dams (Tops)						6.6																		
TOTAL						789.6						0.0						0.0						0.0

6.3.2.2 Revegetation

In 2012, three man days were spent cutting and pulling and two and a quarter days were spent spraying woody species from the waste rock dump and plantsite covers and tailings dams. The spraying (Roundup) of the woody species is used along ditches where the woody species have no competition and tend to come in thicker.

Table 6-4 Control of Woody Species on Waste Rock Dumps

Year	# Days Pulling Woody Species
1998	2.5
1999	0.5
2000	0.5
2001	3.6
2002	1.5
2003	2.5
2004	2.5
2005	4.1
2006	0.5
2007	0.5
2008	2.0 plus 5.0 days spraying
2009	4.0 plus 1.0 day spraying
2010	3.0 plus 1.0 day spraying
2011	1.0 plus 1.0 day spraying
2012	3.0 plus 2.25 days spraying

Wendy Siemens (Noxious Weed Council of Canada) came to the site in 2006 and 2007 to spray Tordon 22k on a patch of Canada thistle located on top of the Main waste rock dump along the middle of the West crest. This same patch of Canada Thistle has required multiple spraying with Killex in 2008 and 2009 on small plants. In 2008 a separate patch of short Canada thistle was found along the South crest of the Main waste rock dump and in 2009 another patch of larger Canada Thistle plants were found along the Southeast crest of the Main waste rock dump. The Noxious Weed Council was notified that more areas have appeared and plans were to spray in the fall of 2010 and then in 2011, but the spraying did not happen due to weather and schedule conflicts. Shirley Hamblin was contracted in August of 2012 to spray four patches of Canada Thistle with an herbicide called Milestone which contains amino-pyrolid.

No seeding was completed in 2012.

6.3.3 Reclamation Research

6.3.3.1 Waste Dumps - Glacial Till Covers

In 2008 a trench was constructed along the ‘neck’ area between the Main Zone pit and the Southern Tail pit. The trench was placed where URS recommended and is 80 metres long with a depth of 2 to 4 metres. In the fall of 2010 the trench was deepened by an additional 2 metres where possible to see if more flows could be intercepted and the outflow was directed to the southwest face of the Main Zone pit. Monitoring of the trench flow in 2012 was hampered by excessive snow in the area, but a few samples were collected June and July (Table 6-5).

Table 6-5 Trench between Main Zone Pit and Southern Tail Pit

Date	pH	Cond	Flow l/s	Flow m3/d
08/06/2012	3.25	730	1.60	138.1
04/07/2012	3.02	1010	0.60	52.1
11/07/2012	-	-	no flow	-

The regular waste dump monitoring continued in 2012. Data was collected from the soil suction sites, automatic weather station, waste dump piezometers, oxygen probes, temperature probes and neutron probes.

Oxygen probe data was collected periodically during the year, mainly during the summer months. The oxygen trends were similar to past years. Most of the oxygen sites showed oxygen trends that started moderately high in January, decreased to a minimum in the summer, and remained low in the fall (Figure 6-1). Figure 6-2 shows the oxygen trends from P6 (Southern Tail), P99-8S (Lowgrade), and P00-2S (Bessemer). In general the measured oxygen levels were around average for 2012. The mechanisms controlling the oxygen levels within the waste rock dumps are not well understood.

Data and trends for the temperature probes are shown in Figures 6-3 and 6-4. The overall temperature trend for the majority of deep probes (Figure 6-3) and shallow probes (Figure 6-4) continued downward in 2012. There were some probes that levelled off and some that increased in temperature. The deep probe of P-5 (flat Southern Tail) remained within the 10 to 15^{o}C range, while the 5 metre deep probe at P-2 increased a few degrees over 2012. Temperature changes are generally very slow due to the low thermal conductivity of the waste rock dumps.

The Southern Tail lysimeters were pumped out on the 17th of October. Eleven of the twelve lysimeters were found. The access tube for the #8 lysimeter has not been located since 2006. The average infiltration rate for the 11 lysimeters was 3.51% which was based on one year of precipitation at 699.9 mm. The lysimeter infiltration rates range from a low of 0.02% to a high of 7.18% (Table 6-8). When the low infiltration rates (>0.6%) are excluded from the average the resulting average increases to 5.39%. Both averages are within the normal range for the lysimeters.

Water levels were monitored for the 5 piezometers installed in 1997, the 15 piezometers that were installed in 1999, and the 13 piezometers that were installed in 2000. Water levels were monitored nine times between January and the end of August in 2012 (Appendix II). No water quality samples were collected from the waste rock dump piezometers in 2012.

A snow survey was completed on the waste rocks dumps in March of 2012. The survey was similar to the surveys completed in 2005, 2007 and 2009. Ten measurements were taken using GPS coordinates for the ten sites sampled in the previous surveys. The surveys main focus is on snow depth and snow water equivalent. The snow surveys show large variability across the waste rock dumps due to frequent winds blowing snow from some areas and leaving it in others. The survey completed in 2012 was the largest of the four years for average snow depth and snow water equivalent.

Table 6-6 Waste Dump Snow Pack Survey – 2012
(taken on March 20, 2012)

Location					Snow Measurements			
Description	GPS Loc. ID	Easting m	Northing m	Elevation m	Depth cm	Core Length cm	Water Equiv cm	Density %
Bessemer, north slope	S01	677943	6008447	1281	134	114	49	36.6
Bessemer, top	S02	677883	6008190	1303	72	67	26	36.1
LG stockpile, east - base	S03	677951	6007814	1313	145	140	59	40.7
Main, top by weather station	S04	677756	6007521	1333	82	73	30	36.6
Southern Tail, southeast	S05	678055	6007018	1321	84	67	24	28.6
Southern Tail, northeast	S06	678152	6007400	1336	116	107	44	37.9
Main, northwest slope	S07	677748	6007893	1295	49	39	10	20.4
Main, south-mid slope	S08	677558	6007261	1270	130	124	50	38.5
Main, south slope at toe	S09	677473	6007175	1232	46	39	14	30.4
Main, west slope (upper road)	S10	677236	6007658	1241	106	91	34	32.1
Snowpack site 4B-14 (avg)				1420	160		47	29.4

Maintenance was completed on the automatic and manual weather stations in 2012. The back-up storage module was sent to Campbell Scientific to replace a dead battery. The battery was determined to be dead when the storage module was brought in to fill in gaps in the weather record. The cable connecting the rain gauge to the datalogger was repaired after snow on the cable caused it to be pulled out of the datalogger box causing a loss of rain data for 2012 up to June 27th . The Equity Environmental Technician completed a one day datalogger course by Campbell Scientific in Prince George in March of 2012. The box on the manual weather station was replaced in June by Jack Bowler from MoE. New thermometers and a new thermograph were installed at the same time.

Water quality data and information on inputs (treated water, sludge, waste rock) to the Main Zone pit were sent to Grant Feasby of SENES in January 2009 for a MEND study on various pit lakes. A draft report was received by MEND in late 2010 that contained many factual errors with respect to the Equity case study. Grant contacted Equity in 2012 to discuss the case study and organize a trip to the site in early 2013 to gather better information on the pit lakes. The report remains as a draft at the time of writing this annual report.

The MEND and industry sponsored Phase III Lorax study on treatment sludge characterization and stability that began in 2009 was delayed in 2011 as Lorax was waiting for x-ray absorption spectroscopy results from the synchrotron light source in Saskatoon. The synchrotron was down for much of 2011. Sludge samples were collected from the Equity Mine and several other Canadian mine sites to evaluate the stability of treatment sludges using high resolution characterisation techniques (XRD, SEM, and TEM). A draft report was circulated to the MEND steering committee in late 2012 with the final report expected in 2013.

In November four jerry cans (20 gallons) of ARD from the Main Pond were sent to Ledcor Environmental Solutions in Vancouver for testing with electro coagulation treatment technology. Initial results were presented by the end of the year that showed promising metal removal levels. Testing will continue into 2013.

6.3.3.2 Tailings Pond Research

Lime addition to the Tailings Pond has been ongoing over the past several years to maintain neutral pH

and keep the concentrations of dissolved metals lower. This has been in response to decreasing pH in the pond, which in previous studies has been linked to the nitrification of ammonia releasing acidity, and the subsequent increase in concentrations of certain dissolved metals at low pH conditions. A study by Lorax in 2003 showed that approximately 80 tonnes of lime was required as an initial dose to increase the pH of the Tailings Pond to around 8.0. Over the past four years the pH in the tailings pond has remained neutral without the addition of lime slurry. As a result no lime has been added since 2007. This may be linked to the lower levels of ammonia observed in the tailings pond over the last few years. More lime additions may be required in the future to maintain a neutral pH.

Table 6-7 Lime addition to Tailings Pond

Year	Tonnes of Lime
2000	50.6
2001	23.0
2003	87.8
2004	34.6
2006	7.9
2007	32.0
Total	235.9

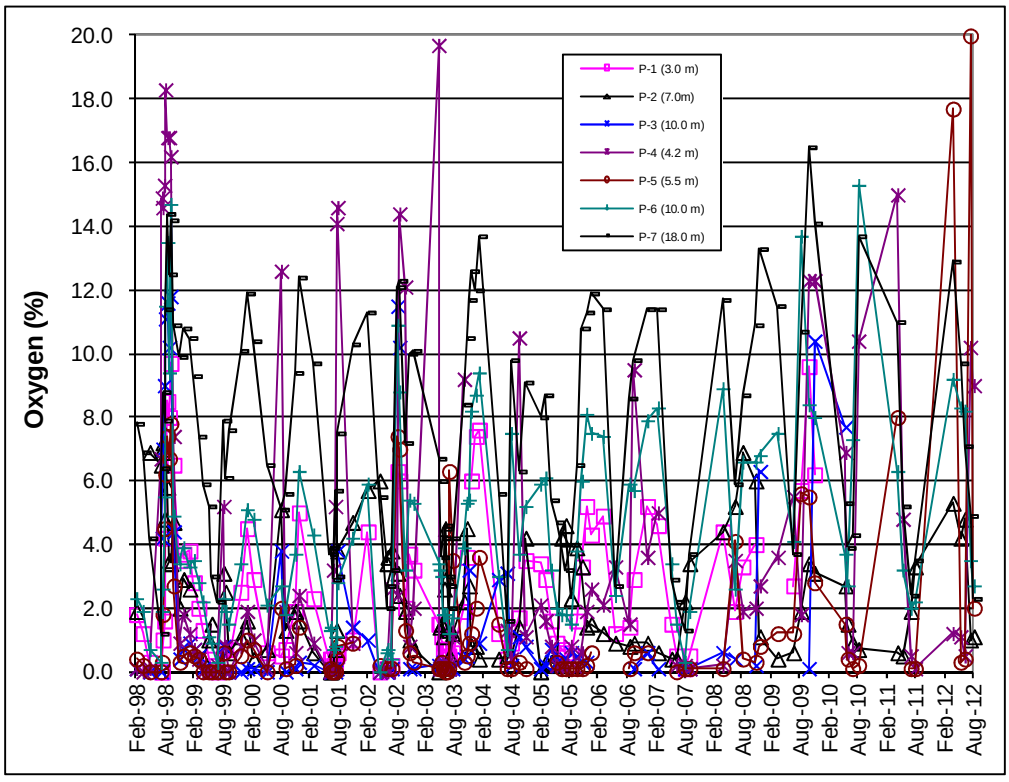
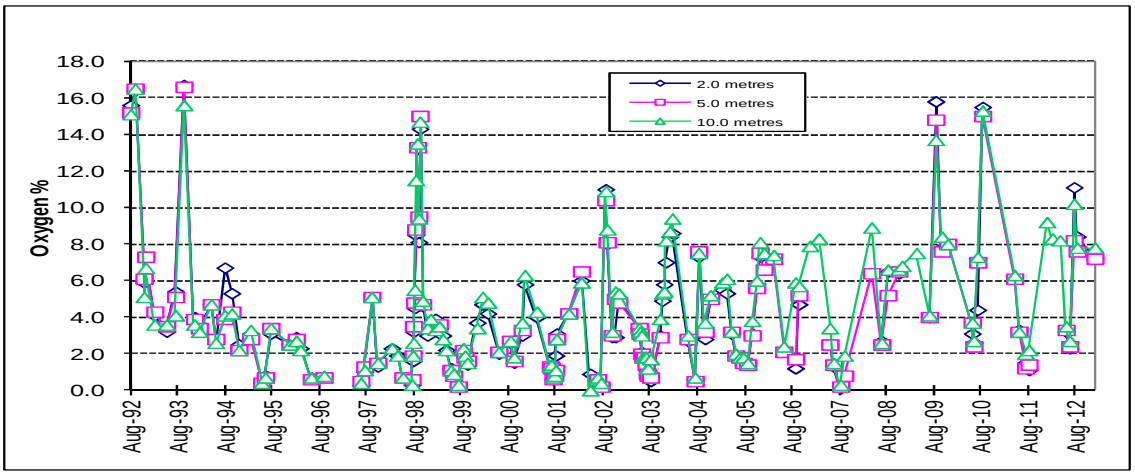
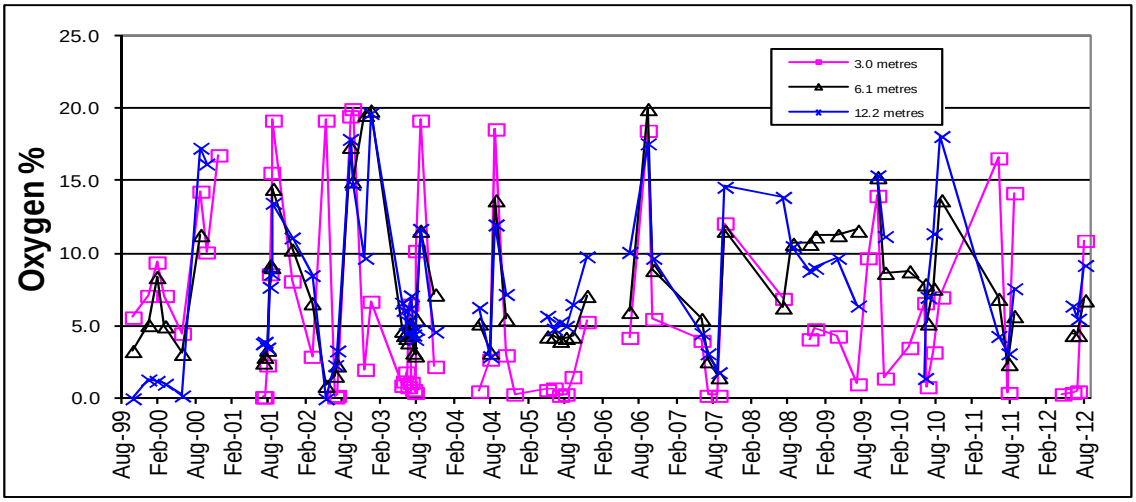


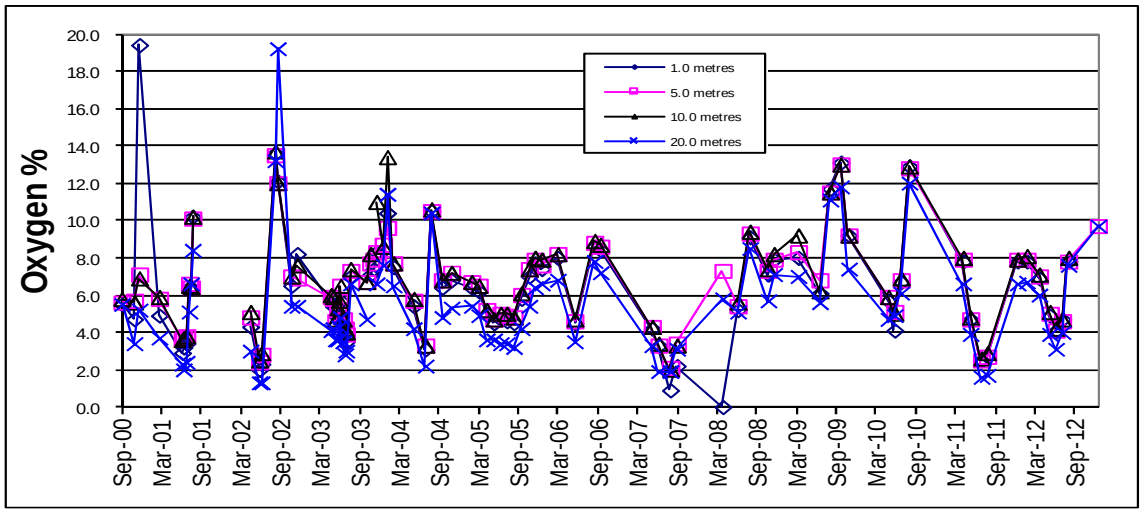
Figure 6-1: Oxygen Probes (P-1 to P-7), Deep Ports



P6 Southern Tail (Cantex Site)



P99-8S East Lowgrade



P00-2S Bessemer Dump

Figure 6-2: Various Oxygen Sites

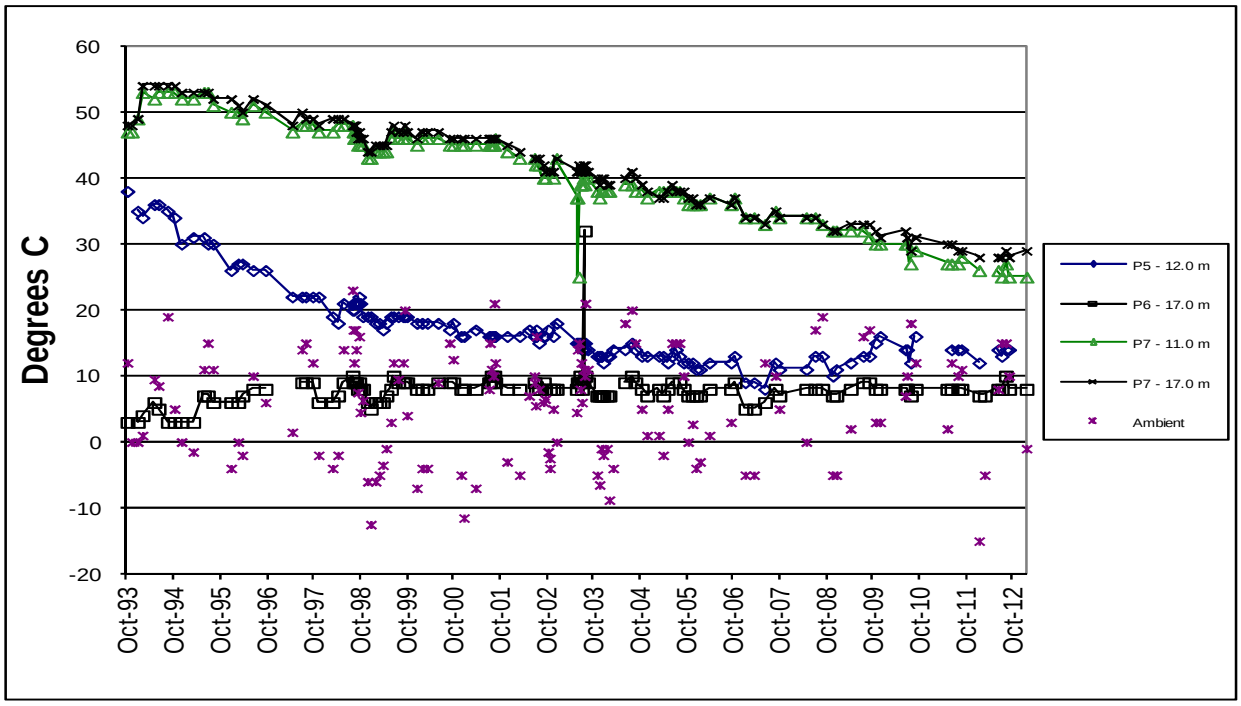


Figure 6-3: Internal temperatures for deep ports in waste rock dumps

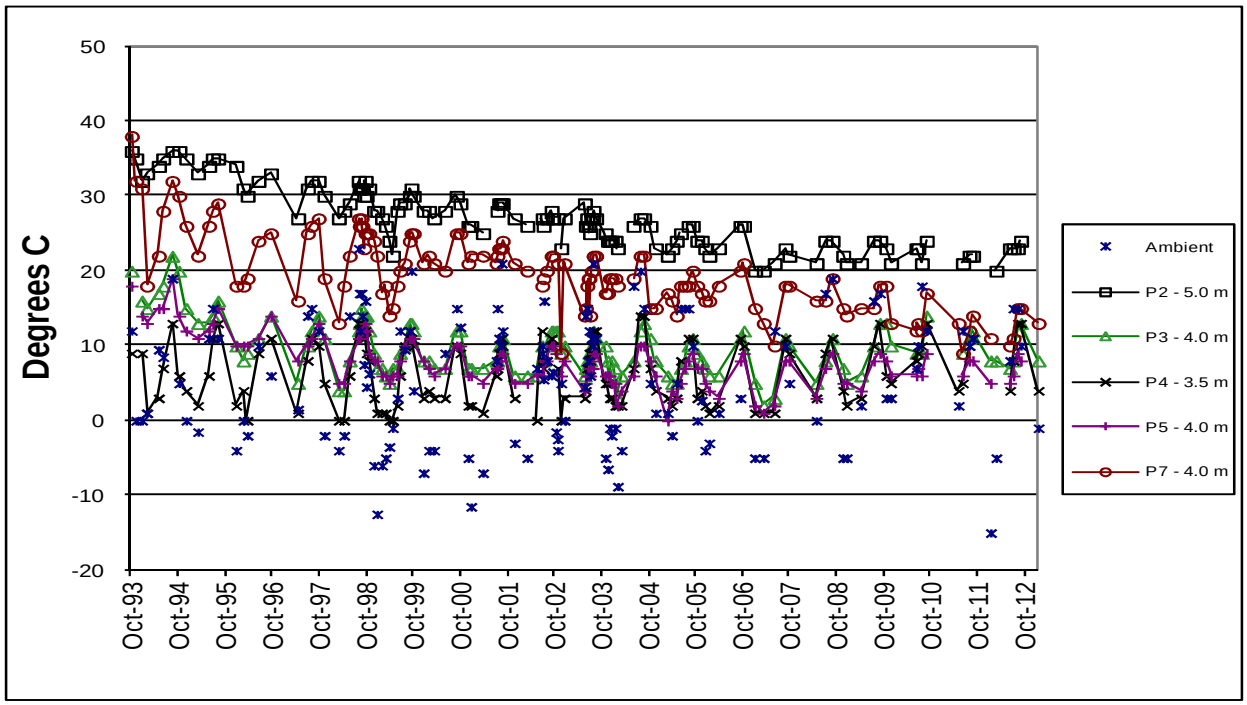


Figure 6-4: Internal temperatures for shallow ports in waste rock dumps

TABLE 6-8 LYSIMETER READINGS (% infiltration)

SITE	92	92	93	94	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
L-1	5.9	0.8	9.1	12.0	1.0	8.6	6.5	6.5	10.8	7.0	8.8	8.1	9.0	11.2	9.2	8.8	8.2	7.1	8.3	6.1	8.76	7.46	5.27
L-2	7.1	20.1	6.0	6.8	10.0	4.9	4.1	4.1	5.9	4.7	6.1	5.2	5.3	6.7	5.4	5.9	7.2	4.2	5.77	5.3	5.23	4.42	5.34
L-3	4.6	10.6	2.3	5.5	3.6	2.1	3.1	4.7	3.0	3.0	5.9	4.5	4.4	8.6	5.5	5.3	4.1		1.6	1.6	6.09	2.18	0.00
L-4	0.0	0.0	1.8	2.6	2.5	0.9	1.1	1.4	0.8	1.4	2.8	1.5	2.2	3.9	3.4	3.2	0.0		0.5	0.8	2.83	2.44	0.61
L-5	6.7	3.6	5.7	6.2	5.3	5.9	5.6	4.6	6.1	4.1	6.2	4.7	6.2	7.5	6.0	5.9	6.6	4.6	5.8	4.9	6.00	5.08	5.22
L-6	8.8	5.4	8.3	8.7	12.1	7.0	6.3	6.3	10.7	6.8	9.3	8.5	9.3	10.5	9.2	8.8	9.1		3.4	6.8	8.46	7.57	6.03
L-7	10.9	31.3	10.0	10.4	16.6	8.5	0.0	6.1	10.3	6.6	8.8	8.8	9.0	10.5	8.6	8.8	11.3	7.1	9.2	5.7	8.06	7.03	5.68
L-8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				-	-	-
L-9	0.04	0.0	0.00	0.02	0.11	0.04	0.04	0.05	0.00	0.00	0.00	0.00	0.03	0.04	0.05	0.03	0.10	0.10	0.003	0.0	0.06	0.03	0.02
L-10	0.8	0.0	0.1	0.0	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.06	4.9	2.5	1.6	0.2	1.6	2.82	0.27
L-11	1.9	0.6	3.9	10.0	6.9	7.6	5.5	4.7	7.3	6.6	9.8	8.5	9.3	11.6	9.2	8.2	11.3		3.6	6.9	7.84	7.09	7.18
L-12	4.2	7.8	4.0	5.2	6.7	2.5		1.4	4.2	2.6	3.8	3.4	3.4	6.5	4.1	4.1	3.1	3.6	3.7	2.0	4.15	3.53	3.02
AVG:	4.2	6.7	4.3	5.6	5.4	4.0	2.9	3.3	4.9	3.6	5.1	4.4	4.9	6.4	5.1	4.94	5.50	4.85	3.95	3.66	5.37	4.51	3.51

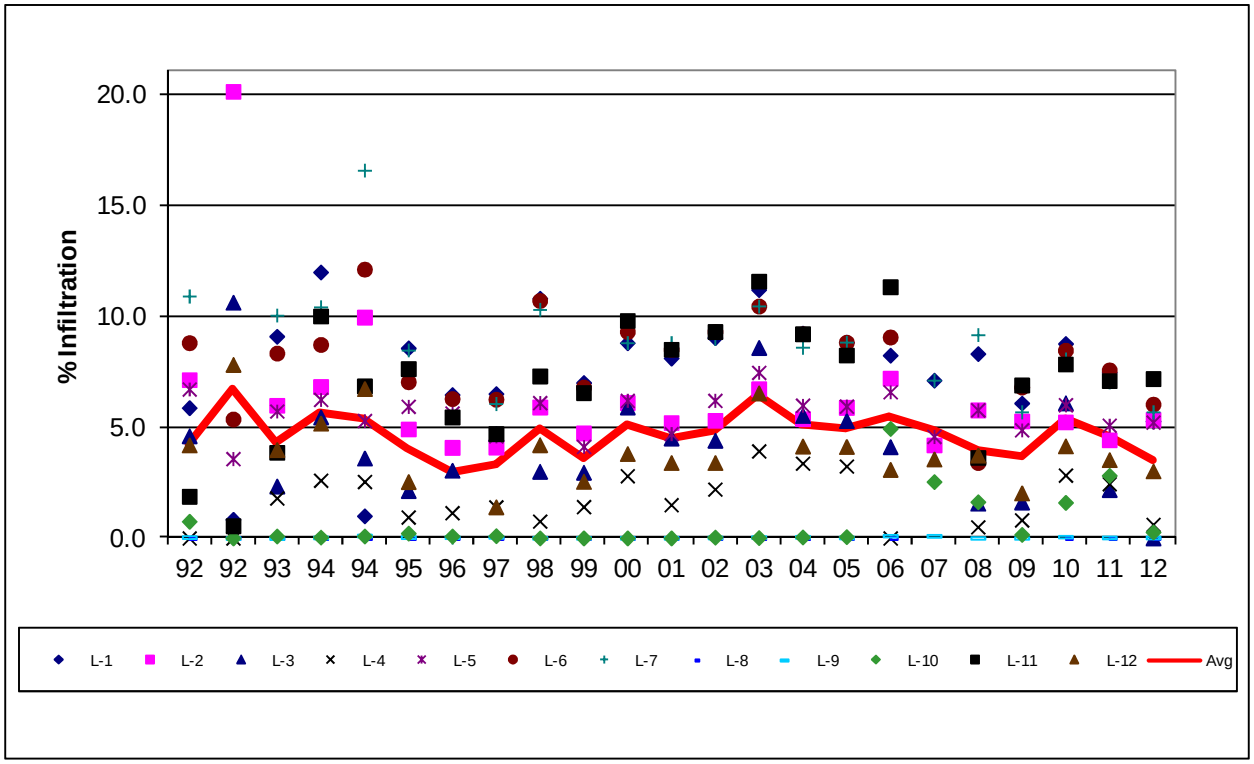


Figure 6.5: Temporal variation in infiltration as measured by lysimeters

6.3.4 Closure Planning

Projects, completed in 2012, on the ARD collection and treatment plant systems are discussed in sections 3.1 and 6.3.2.1.

6.4 Future Reclamation Programs

In 2013 several projects will be undertaken:

Improved pumping is being evaluated for the #1 Dam Seepage Pond and the ARD Storage Pond. A new stainless steel pump has been ordered for the #1 Dam Seepage pump house. Sediment removal is being considered as back flushing increased inflow volumes.

Approximately 100 insulators will be replaced along the Equity power line in the continuation of an annual program to systematically replace old and broken insulators.

The DSR completed in 2010 and the associated spillway review identified several items to improve over the next few years. Work will be completed on spillways in 2013. The items identified through the evaluations will be ranked by priority.

The Main Pond slope will continue to be monitored using the inclinometers, extensiometer, and piezometers. A long term slope stability strategy devised by AMEC in 2004 and reviewed annually does not require any extreme measures to be taken.

Intensive flow monitoring of the property ARD and runoff flows will continue during the runoff and rain events. Monitoring of the waste rock dump cover instrumentation and site piezometers will continue.

TABLE 6-9 EQUITY WORK PROJECTS

Component		Description of Work	Scheduled	Status
Tailings Pond	Water	Lime slurry addition to raise pH and decrease dissolved metals.	AS REQUIRED	ONGOING
Reclamation	Trees	Plant spruce and pine seedlings in areas where no compacted clay cover - boneyard, around tailings pond.	AS REQUIRED	IN PROGRESS
	Erosion	Erosion protection for runoff ditches.	AS REQUIRED	IN PROGRESS
ARD Collection	Main Pond	Clean out sediment.	3Q2013	ANNUAL
	Main Pond Slope	Continue to monitor slope.	2013	ONGOING
	ARD Ponds	Assess spillways and modify as required.	2010	IN PROGRESS
Diversions	Boneyard	Clean up tailings across from scale and construct ditch to shed treed area to boneyard.	3Q2013	INCOMPLETE
	Bessemer Dump	Tie in lower tier of Bessemer Dump with diversion ditch across access road.	2013	ASSESS
	Getty Valley	Construct diversion ditch to shed water from Getty Valley to environment. Need secondary ARD ditch first.	3Q2013	INCOMPLETE
	Waterline Pit	Seal off seepage from Berzelius Diversion to Waterline pit.	AS REQUIRED	ONGOING
Main Zone Pit	Water level	Continue pumping Main Zone pit water to maintain water level below about 1262 metres.	AS REQUIRED	ANNUAL

Table 6-10 Outstanding Recommendations From 2002 Studies

Study	Recommendation	Status
Waste Dump Water Balance	Divert uncontaminated runoff from Getty slope	ASSESS
	Large scale tracer study to determine pathways through waste dump cover	COMPLETED
	Explore options to reduce infiltration through waste dump cover	IN PROGRESS
Clearwater #4 Memo	Areas of minor ponding in ditches should be re-graded if possible.	IN PROGRESS
	Abandoned weirs should be repaired or removed.	COMPLETED
	Improvements of Berzelius diversion around the Waterline pit required	ON GOING
	Repair sections of tailings pond diversion	ON GOING
	Reinforce waste dump toe to reduce erosion of fine material	ON GOING
	Dredging of accumulated sediment in the Surge Pond.	ASSESS

7.0 ENVIRONMENTAL EFFECTS STUDIES

7.1 Annual Fish Tissue Study

The annual fish study in 2012 involved the collection of rainbow trout from Goosly Lake, Foxy Creek, and Crow Creek for tissue analysis. The fish were collected and shipped to ALS Labs in Vancouver to analyze the axial muscle tissue for concentrations of copper, zinc, and cadmium. Additional aspects of the 2012 fish study included comparison of fish density, size, and external fish health information.

The following sections discussing the 2012 fish study and results have been taken and summarized from the complete study "Fish Monitoring Studies In Buck and Foxy Creeks and Goosly Lake 2012" by David Bustard and Associates Ltd. This report will be distributed to the EMPAC.

Fish sampling was undertaken at Goosly Lake on July 26th, 2012 targeting rainbow trout using three floating gillnets (1.5" mesh) at the southwest end of the lake (Figure 1). Nets were monitored continuously and fish were carefully removed from the nets and transferred to a holding pen established on the south side of Goosly Lake for processing.

The three nets were effective in collecting the target 20 fish for the metal analyses. All fish were weighed, fork lengths measured and scales removed for aging. External fish health assessments were conducted on the lake sample of fish using the same field keys and characteristics as those used since 2002 (Hatfield Consultants Ltd. 2003). Body cavities were opened to confirm the sex of fish samples. Scales from rainbow trout were aged by Birkenhead Scale Analyses (Lone Butte).

The three main fish index sites in upper Buck Creek were sampled in 2012. Sampling was also conducted at a fourth location in lower Bessemer Creek since it was still wetted during the late August sample period. The fish population studies in upper Buck Creek were conducted between August 27th and August 29th, corresponding closely to the timing of past surveys undertaken in Buck Creek since 1987.

Length and weight measurements and an external fish health assessment were conducted on 30 rainbow parr collected by electrofishing in Foxy and Crow creeks on August 30th, 2012. Scales were removed from representative length classes for ageing. The muscle tissue metal analyses were conducted on 10 samples each consisting of a single fish from this same group of fish. The total tissue needed to conduct the metal analyses was reduced from 20 g in 2012 due to ALS Lab's ability to conduct the digestions and analyses on a smaller total amount of fish tissue requiring a single fish sample. The fish samples were bagged separately, placed on ice in the field and frozen within the day. The samples were then submitted to ALS Labs as whole fish with the muscle dissections undertaken in the lab to minimize field contamination – similar to past years.

Conclusions:

- *Four upper Buck Creek fish index sites were sampled in 2012, including two sites upstream from Bessemer Creek and one located immediately downstream. Fish were not present at a fourth site located in lower Bessemer Creek in 2012.*

- *Equity Mines discharged treated water from late April until late July 2012 in Buck Creek and early May until late July in Foxy Creek. The stream fish sampling was conducted during August at the end of a dry late summer period and approximately one month after treated water releases finished.*

- *Rainbow trout fry densities at the potential effects site downstream from Bessemer Creek were high compared to most past sampling at this location. Densities at the reference site just upstream from Bessemer Creek were also above average, while fry densities at the old reference location one km upstream from Bessemer were close to the long-term average. The uppermost reference site continues to have the highest fry densities of the three locations, but the difference amongst sites was low in 2012.*

- *Rainbow parr densities at the two reference index sites and the potential effects site below Bessemer Creek were all close in 2012, well above the average for past years. The uppermost reference site typically has higher parr densities than the downstream locations.*

- *Rainbow trout fry lengths were on average 3 mm smaller than the long-term mean at all of the sample locations. Similarly, yearling rainbow parr at all of the index sites were smaller than average.*

- *The small fry and parr captured in 2012 at both the reference and potential impact site suggest that environmental factors common throughout the system were affecting size. It is not clear if these environmental conditions common to all of the sites (e.g. low late summer flows) reflect increased rearing competition between high densities of fry and parr, leading to smaller overall fish lengths.*

- *Overall condition factor of rainbow parr at the index sites were in the mid-range of past measurements at all sites except the upstream reference location, where parr condition was high. A similar pattern was noted in 2011.*

- *Long-term monitoring suggests that typically Buck Creek is adequately seeded with fry, and that parr densities in the range of 20 to 40 parr/100m^2 reflect the habitat capabilities of a relatively stable stream environment in this section of Buck Creek. The overall parr densities measured at all of the reference sites in 2012 were at the upper end or just exceeded this historical range. Parr densities in the potential impact site have been more variable than the two reference locations.*

- *Levels of cadmium and zinc in Goosly Lake rainbow trout muscle tissue in 2012 were comparable to the mean levels measured since 1982. Copper levels in Goosly fish were high compared to past samples, and were slightly above the highest levels recorded in 2002. The*

2012 Goosly Lake zinc and copper levels were strongly influenced by high metal levels reported for a small number of individual fish leading to a high variance in the sample results.

- *The data continue to demonstrate a long-term trend of increasing zinc levels in Goosly Lake fish, but at a reduced significance level compared to some past years. There was no significant trend for cadmium or copper.*

- *The 2012 Foxy Creek copper results exceeded all of the past measurements at this location, but were not significantly different from the reference site in Crow Creek that also demonstrated high copper levels. Both sites had consistently high copper levels across most fish sampled.*

- *Zinc levels in Foxy Creek fish muscle tissue were also high in 2012, but within the range of past levels measured at this site. The results were strongly influenced by results in a single fish from Foxy Creek. The Crow Creek reference site had lower zinc levels than in Foxy, but the samples were not statistically different due to high variance in the Foxy sample.*

- *Trend analyses of metal levels in Foxy Creek rainbow trout continue to suggest an upward trend over time for zinc and copper and no trend for cadmium. This upward trend in zinc and copper levels was strengthened by the 2012 results.*

- *The metal analyses were confounded by some difficulties with the lab preparation of the muscle tissue, and analyses had to be re-done in 2012. The lab has improved its handling of fish tissue sample preparation to avoid future problems.*

- *External fish health assessments were continued in 2012. The observations suggest a low incidence of external abnormalities in rainbow trout from Goosly Lake, upper Buck, Foxy and Crow creeks. Most abnormalities were associated with external parasites. There was also some indication of past electrofishing injury to several fish in upper Buck Creek.*

- *The 2012 results demonstrate the importance of conducting sampling in the Crow Creek reference site, and we recommend that this should be continued in the upcoming field season.*

It is our opinion that it is highly improbable that juvenile rainbow trout from Foxy Creek have any regular connection to fish captured at the Crow Creek reference site. Foxy Creek enters Maxan Creek approximately one km downstream from Maxan Lake (Figure 1). Studies conducted on rainbow trout spawning suggest Maxan rainbow spawn in lower Foxy Creek and in Maxan Creek for a short distance downstream from the Foxy confluence (Bustard 1993). Cool water temperatures and suitable bed material in Foxy Creek are probably key factors for spawning site selection.

Crow Creek enters the upper Bulkley River approximately 2 kms downstream from the Bulkley Lake outlet (Figure 1). The sample collection site is located a further 4 kms upstream on Crow Creek at the road crossing. We suspect these Crow Creek juveniles are associated with rainbow spawners from Bulkley Lake that drop downstream below the lake and into the cooler inlet tributary (Crow Creek) to spawn in the lower accessible sections similar to the Maxan rainbow using Foxy Creek.

The pattern of rainbow spawners moving into a lake outlet and then up a tributary to the outlet stream is similar to that studied by Northcote (1969) for Hihium Creek, tributary to the Loon Lake outlet stream. We would not expect Foxy Creek juveniles to move 10 km downstream through Maxan Creek to Bulkley Lake, and then move through the lake and into the outlet, and then and up the outlet creek to rear, before moving back up into a lake as older juveniles.

7.2 Main Zone Pit Sub-Lethal Testing

A permit amendment to PE4475 allows the discharge of Main Zone pit water to Buck and Foxy Creeks and specifies monitoring requirements for the Main Zone pit water and the receiving environment. Sub-lethal bioassays using Ceriodaphnia dubia were specified as a main component of the environmental effects monitoring requirements in the permit. Ceriodaphnia dubia were chosen for the bioassays because they are more sensitive to elevated metal levels than are rainbow trout that are used in the standard 96 hour pass/fail bioassays. 96 hour pass/fail rainbow trout bioassays were also conducted during the peak periods of treated water discharge.

Table 7-2 shows the results of the Ceriodaphnia tests and 96 hour pass/fail rainbow trout bioassays that were conducted by Maxxam Analytics in 2012. The Ceriodaphnia tests were done using water sampled from the Main Zone pit, Buck Creek, Foxy Creek and the Emergency Pond in 2012. These tests were run from March 26th to July 23rd to cover the period of treated water discharge from April to July. The sub-lethal bioassay results show the survival % for 48-hours and 7-days as well as the reproduction numbers for 7-days for concentrations ranging from 10% to 100%. Each sample was run with a control for survival and reproduction. In 2012 all the Main Zone pit samples were run as dilution series to determine what amount of pit water could be discharged without a significant effect on the Ceriodaphnia as outlined in the effluent permit.

The results of the Ceriodaphnia tests for 2012 were generally excellent to moderate survival and moderate to poor reproduction at 100% concentration of Main Zone pit water, but at concentrations of 50% Main Zone pit water there was usually no statistical difference with the control. The favourable results with the 50% dilution allowed the discharge rate for Buck Creek to remain at 3:1 for the entire discharge period. There were no control failures experienced during the 2012 Ceriodaphnia toxicity testing.

The rainbow trout 96-h LT50 bioassays were completed through Maxxam Analytics in 2012 (Table 7-2). The trout bioassays were for Bessemer Creek at the Siltcheck and Main Zone Pit during periods of treated water discharge from the Main Zone pit. The results of the toxicity tests showed zero mortality in both cases. The trout bioassays were completed in late May for Bessemer Creek and early June for Main Zone Pit in 2012.

TABLE 7-1

FISH TISSUE SUMMARY

Year	System	Fish Tissue	Cu(t) ug/gr	Zn(t) ug/gr	Cd(t) ug/gr
1994	Goosly Lake	Rainbow Trout (muscle)	1.2	30.2	0.05
		Largescale Suckers (muscle)	1.0	35.4	0.05
	Foxy Creek	Rainbow Trout (muscle)	1.7	35.1	0.05
1995	Goosly Lake	Rainbow Trout (muscle)	1.6	38.9	0.05
		Largescale Suckers (muscle)	1.0	29.0	0.05
	Foxy Creek	Rainbow Trout (muscle)	1.9	28.5	0.05
1996	Goosly Lake	Rainbow Trout (muscle)	1.2	20.2	<0.05
		Largescale Suckers (muscle)	1.0	25.8	<0.05
	Foxy Creek	Rainbow Trout (muscle)	1.6	22.6	<0.05
1997	Goosly Lake	Rainbow Trout (muscle)	1.4	25.6	<0.05
		Largescale Suckers (muscle)	1.0	27.2	<0.05
	Foxy Creek	Rainbow Trout (muscle)	2.7	21.2	<0.05
1998	Goosly Lake	Rainbow Trout (muscle)	1.2	31.9	<0.05
		Largescale Suckers (muscle)	0.8	30.0	<0.05
	Foxy Creek	Rainbow Trout (muscle)	1.8	23.2	<0.05
1999	Goosly Lake	Rainbow Trout (muscle)	1.1	19.5	<0.03
		Largescale Suckers (muscle)	1.0	31.7	<0.03
	Foxy Creek	Rainbow Trout (muscle)	1.7	21.2	<0.04
2000	Goosly Lake	Rainbow Trout (muscle)	1.4	40.8	0.02
		Largescale Suckers (muscle)	1.4	29.2	0.03
	Foxy Creek	Rainbow Trout (muscle)	1.5	26.7	0.02
2001	Goosly Lake	Rainbow Trout (muscle)	1.8	40.1	0.02
		Largescale Suckers (muscle)	1.9	35.8	0.02
	Foxy Creek	Rainbow Trout (muscle)	2.5	34.4	0.06
2002	Goosly Lake	Rainbow Trout (muscle)	2.2	46.9	0.10
		Largescale Suckers (muscle)	2.8	23.3	ND
	Foxy Creek	Rainbow Trout (muscle)	2.0	54.5	0.04
	Crow Creek	Rainbow Trout (muscle)	2.4	48.9	0.06
	Buck above Bessemer	Rainbow Trout (muscle)	1.8	36.5	0.03
	Buck below Bessemer	Rainbow Trout (muscle)	4.5	97.3	0.61
	Buck below Goosly	Rainbow Trout (muscle)	2.3	41.7	0.08
	Bessemer Creek	Rainbow Trout (muscle)	2.4	48.7	0.21
2003	Goosly Lake	Rainbow Trout (muscle)	1.8	30.4	0.05
		Largescale Suckers (muscle)	1.1	44.6	0.04
	Foxy Creek	Rainbow Trout (muscle)	2.5	35.3	0.05
2005	Goosly Lake	Rainbow Trout (muscle)	1.7	37.4	<0.03
		Largescale Suckers (muscle)	0.9	31.6	<0.03
	Foxy Creek	Rainbow Trout (muscle)	2.3	34.1	0.03
2006	Goosly Lake	Rainbow Trout (muscle)	1.4	49.3	0.04
	Foxy Creek	Rainbow Trout (muscle)	2.6	31.5	0.02
	Crow Creek	Rainbow Trout (muscle)	2.2	32.8	0.04
	Buck below Bessemer (BB1)	Rainbow Trout (muscle)	2.1	37.1	0.11
	Buck above Bessemer (BB2)	Rainbow Trout (muscle)	2.8	35.1	0.04
2007	Goosly Lake	Rainbow Trout (muscle)	2.0	44.4	0.04
	Foxy Creek	Rainbow Trout (muscle)	3.0	43.1	0.04
2008	Goosly Lake	Rainbow Trout (muscle)	1.5	50.7	0.07
	Foxy Creek	Rainbow Trout (muscle)	2.2	33.8	0.03
2009	Goosly Lake	Rainbow Trout (muscle)	1.8	59.0	0.08
	Foxy Creek	Rainbow Trout (muscle)	2.3	41.0	0.02
2010	Goosly Lake	Rainbow Trout (muscle)	1.0	33.5	0.02
	Foxy Creek	Rainbow Trout (muscle)	1.7	28.8	0.02
	Crow Creek	Rainbow Trout (muscle)	1.5	26.6	0.03
	Buck below Bessemer (BB1)	Rainbow Trout (muscle)	2.0	30.4	0.13
	Buck above Bessemer (BB2)	Rainbow Trout (muscle)	1.7	32.0	0.04
	Maxan Lake	Rainbow Trout (muscle)	1.2	22.3	0.02
2011	Goosly Lake	Rainbow Trout (muscle)	1.3	34.1	0.02
	Foxy Creek	Rainbow Trout (muscle)	2.7	43.6	0.08
2012	Goosly Lake	Rainbow Trout (muscle)	2.3	40.4	0.02
	Foxy Creek	Rainbow Trout (muscle)	3.5	40.4	0.04
	Crow Creek	Rainbow Trout (muscle)	3.0	30.9	0.04
Historical Averages (94-10)	Goosly Lake	Rainbow Trout (muscle)	1.5	37.2	0.05
		Largescale Suckers (muscle)	1.3	31.2	0.04
	Foxy Creek	Rainbow Trout (muscle)	2.1	32.2	0.04

Note: 2004 data was removed because the lab did not disect the muscle tissue, but used whole fish resulting in much higher metal values.

c:\excelfiles\report\fishcomp.xls

Table 7-2 Ceriodaphnia Dubia Toxicity Test Results (2012)

Date Sampled	Lab	Sample ID	Test treatment (% v\v)	Survival (%) 48-hour	Survival (%) 7-day	7-Day Survival Significantly Different Relative to Control	Reproduction (mean young) 7-day	Standard Deviation for Reproduction (+/-)	Reproduction Significantly Different Relative to Control	Test Endpoint	48-h Survival (% v\v)	6-d Survival (% v\v)	Reproduction (% v\v)	96-hr Rainbow % Survival in 100% (v\v) Test Sample after 96 hrs	Main Zone Discharge to Buck GPM	Min. Dilution Ratio to Buck Limit	Main Zone Discharge to Foxy GPM	Min. Dilution Ratio to Foxy Limit
26-Mar-12	Maxxam	Negative Control		100	100		30.3	1.8							0	3:1	0	3:1
		Buck above Bessemer		100	100		27.5	7.0										
		Buck at Goosly		100	100		30.8	6.5										
		Foxy above Lu diversion		100	100		32.5	1.3										
		Foxy below Berzelius		100	100		27.6	4.3										
11-Apr-12	Maxxam	Main Zone Pit	Negative Control	100	100		19.3	8.5		NOEC	100	100	50		0	3:1	0	3:1
			Buck above Bessemer	100	90		27.4	7.3		LOEC	>100	>100	100					
			16.7	100	100		26.9	6.6		LC50	>100	>100	na					
			25	100	100		32.2	1.8		IC25 (95% CL)	na	na	64.2 (40.6, 77.9)					
			50	100	100		24.8	8.5		IC50 (95% CL)	na	na	>100					
			100	100	100		16.0	5.2										
07-May-12	Maxxam	Main Zone Pit	Negative Control	90	90		21.7	10.1		NOEC	100	100	50		3610	3:1	0	3:1
			Buck above Bessemer	100	100		28.8	6.8		LOEC	>100	100	100					
			16.7	100	100		29.8	5.3		LC50	>100	>100	na					
			25	100	100		26.8	9.4		IC25 (95% CL)	na	na	54.7 (23.9, 61.6)					
			50	100	100		24.0	7.7		IC50 (95% CL)	na	na	75.4 (64.0, 90.4)					
			100	100	90		8.2	7.0	#									
14-May-12	Maxxam	Main Zone Pit	Negative Control	100	100		29.3	3.6		NOEC	100	100	50		3610	3:1	1000	3:1
			Buck above Bessemer	100	100		30.4	5.4		LOEC	>100	>100	100					
			16.7	100	100		30.3	4.7		LC50	>100	>100	na					
			25	100	100		29.8	4.8		IC25 (95% CL)	na	na	70.1 (61.5, 75.4)					
			50	100	100		30.6	3.4		IC50 (95% CL)	na	na	99.1 (85.7, 100)					
			100	100	100		15.0	5.1										
		Negative Control		100	100		29.3	3.6										
		Buck at Goosly		100	100		30.2	4.6										
		Foxy above Lu diversion		100	100		28.3	3.4										
		Foxy below Berzelius		100	100		26.5	7.0										
22-May-12	Maxxam	Main Zone Pit	Negative Control	100	100		32.1	3.9		NOEC	100	100	50		3610	3:1	1650	3:1
			Buck above Bessemer	100	100		33.2	7.6		LOEC	>100	>100	100					
			16.7	100	100		38.5	5.0		LC50	>100	>100	na					
			25	100	100		36.2	4.7		IC25 (95% CL)	na	na	70.0 (47.8, 84.9)					
			50	100	100		32.0	9.0		IC50 (95% CL)	na	na	> 100					
			100	100	100		21.6	3.7										
28-May-12	Maxxam	Main Zone Pit	Negative Control	100	100		31.0	3.2		NOEC	100	100	50		3610	3:1	1650	3:1
			Buck above Bessemer	100	100		30.5	4.0		LOEC	>100	100	100					
			16.7	100	100		33.7	2.9		LC50	>100	>100	na					
			25	100	100		34.3	3.9		IC25 (95% CL)	na	na	61.7 (57.9, 67.1)					
			50	100	100		29.7	2.9		IC50 (95% CL)	na	na	86.5 (77.6, 100)					
			100	100	100		12.9	6.8	#									
		Negative Control		100	100		31.0	3.2										
		Buck at Goosly		100	100		34.2	3.6										
		Foxy above Lu diversion		100	100		32.4	5.0										
		Foxy below Berzelius		100	100		32.4	2.9										
		Emergency Pond		100	100		28.6	5.0										
		Main Zone Pit												100				
04-Jun-12	Maxxam	Main Zone Pit	Negative Control	100	100		31.6	2.1		NOEC	100	100	50		3610	3:1	1650	3:1
			Buck above Bessemer	100	100		25.2	3.3		LOEC	>100	>100	100					
			16.7	100	100		26.1	4.4		LC50	>100	>100	na					
			25	100	100		24.7	8.1		IC25 (95% CL)	na	na	99.4 (64.2, 100)					
			50	100	100		23.4	3.3		IC50 (95% CL)	na	na	>100					
			100	100	100		19.2	3.6										
		Bessemer @ Siltcheck												100				
11-Jun-12	Maxxam	Main Zone Pit	Negative Control	100	100		23.7	5.7		NOEC	100	50	50		3610	3:1	1650	3:1
			Buck above Bessemer	100	100		30.2	4.7		LOEC	>100	>100	100					
			16.7	100	100		31.5	4.4		LC50	>100	>100	na					
			25	100	100		32.4	3.4		IC25 (95% CL)	na	na	62.8 (57.8, 68.5)					
			50	100	100		30.0	3.0		IC50 (95% CL)	na	na	82.6 (73.9, 97.7)					
			100	100	80		10.2	8.1	#									
		Negative Control		100	100		23.7	5.7										
		Buck at Goosly		100	100		30.9	8.8										
		Foxy above Lu diversion		100	90		26.7	9.9										
		Foxy below Berzelius		100	100		29.8	5.1										
18-Jun-12	Maxxam	Main Zone Pit	Negative Control	100	90		17.8	12.4		NOEC	100	100	50		3610	3:1	1650	3:1
			Buck above Bessemer	100	100		32.0	3.2		LOEC	>100	>100	100					
			16.7	90	90		28.3	11.3		LC50	>100	>100	na					
			25	100	100		29.8	9.1		IC25 (95% CL)	na	na	53.9 (24.5, 60.1)					
			50	90	90		26.2	10.4		IC50 (95% CL)	na	na	71.0 (56.2, 82.6)					
			100	100	100		6.0	9.4	#									
25-Jun-12	Maxxam	Main Zone Pit	Negative Control	100	100		24.2	10.2		NOEC	100	50	50		3610	3:1	1650	3:1
			Buck above Bessemer	100	100		26.4	5.5		LOEC	>100	>100	100					
			16.7	100	100		23.2	10.5		LC50	>100	>100	na					
			25	100	100		21.6	9.1		IC25 (95% CL)	na	na	39.7 (9.2, 55.2)					
			50	100	100		18.9	8.7		IC50 (95% CL)	na	na	62.6 (48.8, 69.3)					
			100	100	60		1.3	3.4	#									
		Negative Control		100	100		24.2	10.2										
		Buck at Goosly		100	100		21.6	4.6										
		Foxy above Lu diversion		100	90		22.7	11.9										
		Foxy below Berzelius		100	100		26.9	8.5										
03-Jul-12	Maxxam	Main Zone Pit	Negative Control	100	100		30.3	2.2		NOEC	100	100	25		3610	3:1	1650	3:1
			Buck above Bessemer	100	100		31.9	6.6		LOEC	>100	>100	50					
			16.7	100	100		28.5	9.4		LC50	>100	>100	na					
			25	100	100		31.5	8.5		IC25 (95% CL)	na	na	41.3 (24.5, 56.0)					
			50	100	100		21.6	6.6		IC50 (95% CL)	na	na	76.6 (60.1, 95.4)					
			100	100	100		12.4	4.5										
09-Jul-12	Maxxam	Main Zone Pit	Negative Control	100	100		27.5	6.3		NOEC	100	100	50		3610	3:1	1650	3:1
			Buck above Bessemer	100	100		19.8	6.9		LOEC	>100	>100	100					
			16.7	100	100		22.1	9.5		LC50	>100	>100	na					
			25	100	100		22.4	8.6		IC25 (95% CL)	na	na	65.5 (52.2, 68.3)					
			50	100	100		21.8	8.4		IC50 (95% CL)	na	na	85.8 (75.3, 93.4)					
			100	100	100		7.7	2.9	#									
		Negative Control		100	100		27.5	6.3										
		Buck at Goosly		100	100		22.8	8.2										
		Foxy above Lu diversion		100	100		19.8	8.6										
		Foxy below Berzelius		100	100		26.7	9.2										
16-Jul-12	Maxxam	Main Zone Pit	Negative Control	100	100		28.9	3.0		NOEC	100	100	25		900	3:1	1650	3:1
			Buck above Bessemer	100	100		31.1	2.6		LOEC	>100	>100	50					
			16.7	100	100		31.0	2.5		LC50	>100	>100	na					
			25	100	100		29.0	5.0		IC25 (95% CL)	na	na	46.1 (35.3, 53.2)					
			50	90	90		22.6	5.9		IC50 (95% CL)	na	na	63.3 (57.8, 67.9)					
			100	100	100		1.9	4.4	#									
23-Jul-12	Maxxam	Main Zone Pit	Negative Control	100	100		24.2	4.8		NOEC	100	100	25		1700	3:1	500	3:1
			Buck above Bessemer	100	100		28.5	4.2		LOEC	>100	>100	50					
			16.7	100	100		29.9	2.5		LC50	>100	>100	na					
			25	100	100		29.9	2.9		IC25 (95% CL)	na	na	50.6 (41.6, 54.8)					
			50	100	100		22.4	4.9		IC50 (95% CL)	na	na	65.0 (60.1, 68.5)					
			100	100	80		2.0	2.2	#									
		Negative Control		100	100		24.2	4.8										
		Buck at Goosly		100	100		28.5	4.2										
		Foxy above Lu diversion		100	100		29.0	2.9										
		Foxy below Berzelius		100	100		27.6	2.9										

REFERENCES

Pertains to 2004 - 2012 Reports

AMEC Earth and Environmental, June 2004. Equity Silver Water Management Project Splitter Dyke Design Final Report, Equity Silver Mine, Houston BC

AMEC Earth and Environmental, November 2004. Main ARD Pond Slope, 2004 Site Investigation and Long-term Stability Assessment

AMEC Earth and Environmental, January 2005. Tailings Impoundment and Water Management Structures – 2004 Operation, Maintenance and Surveillance Manual – Rev. 0 – Equity Silver Mine

AMEC Earth and Environmental, March 2005. Equity Silver Risk Assessment Workshop – Final Report – Houston, B.C.

AMEC Earth and Environmental - Tailings Impoundment and Water Management Structures – 04, 05, 06, 07, 08, 09, 10, 11, 12 Annual Review – Equity Silver Mine

AMEC Earth and Environmental, October 2005. Bessemer Creek Siltcheck Dam – Spillway Reconstruction Final Report – Equity Silver Mine

AMEC Earth and Environmental, March 2009. Diversion Pond Splitter Dike As-Built Report - Goldcorp Equity Silver Mine.

David Bustard & Associates, 03, 04, 05, 06, 07, 08. 09, 10, 11, 12 Fish Population Monitoring In Buck and Foxy Creeks and Goosly Lake

Limnotek, March 2007. Benthic Invertebrates and Periphyton Monitoring in Drainages Near the Equity Mine 2006.

Lorax Environmental., November 2005. Equity Silver Pit Lake Research Program – Wrap Up Report

Lorax Environmental., October 2009. Stable Isotope Investigation on the Origins of Equity Mine Waste Dump Seepage. Phase II – Screening Level Investigation.

Morin, K.A. and Hutt, N.M. (MDAG), October 2004. Equity Division - Review of 2003 ARD and Assessment of ARD Mechanisms

Morin, K.A. and Hutt, N.M. (MDAG), February 2010. Equity Division – ARD-Related Trends through 2009, Including Drainage Chemistry, Pore Gases, and Internal Temperatures.

Price, B., January 2011, Review and Recommendations by 2010 Equity Silver Mine Financial Security Technical Advisory Group.

Willowstick, January 2012. Willowstick Geophysical Investigation of Equity Silver Mine Waste Rock Dump.

APPENDIX I

DATA TABLES FOR WATER QUALITY MONITORING SITES

Contents (in order of appearance):

UPPER FOXY CREEK 0400763

		SUS	pH	SO4	CaCO3	Cu(d)	Cu(t)	Zn(d)	Zn(t)	Al(d)	Cd(d)	Cd(t)
2002	AVG	4.9	7.27	2.0	22.0	0.001	0.004	0.003	0.004	0.117	0.0001	0.0001
	STD	8.3	0.32	1.0	7.0	0.001	0.002	0.001	0.003	0.053	0.0001	0.0001
	MAX	29.0	7.80	5.0	33.0	0.022	0.005	0.018	0.013	0.227	0.0003	0.0003
	MIN	2.0	6.77	0.5	9.0	0.001	0.001	0.002	0.001	0.060	0.00002	0.00002
2003	AVG	2.9	7.14	2.0	21.1	0.001	0.002	0.005	0.005	0.113	0.0001	0.0001
	STD	2.6	0.18	1.2	6.7	0.001	0.002	0.005	0.005	0.060		
	MAX	11.0	7.44	4.0	31.0	0.002	0.007	0.020	0.020	0.248	0.0002	0.0005
	MIN	1.5	6.83	0.5	11.0	0.001	0.001	0.003	0.003	0.040	0.0001	0.0001
2004	AVG	2.8	7.26	0.6	17.9	0.002	0.003	0.003	0.003	0.120	0.0001	0.0001
	STD	2.7	0.3333386	0.5	6.5	0.001	0.002	0.001	0.001	0.047		
	MAX	9.2	7.92	2.0	32.5	0.006	0.005	0.005	0.007	0.250	0.0001	0.0001
	MIN	1.5	6.65	0.3	9.4	0.001	0.001	0.003	0.003	0.041	0.0001	0.0001
2005	AVG	2.2	7.32	0.6	18.2	0.0007	0.004	0.003	0.003	0.125	0.0001	0.0001
	STD	2.1	0.24	0.4	4.1	0.0003	0.002	0.001	0.002	0.055	0.0000	
	MAX	9.7	7.64	2.6	26.6	0.001	0.005	0.006	0.013	0.270	0.0001	0.0050
	MIN	1.5	6.75	0.5	10.1	0.001	0.001	0.003	0.003	0.074	0.0001	0.0001
2006	AVG	2.3	7.37	0.5	20.4	0.0008	0.002	0.003	0.003	0.109	0.0001	0.0014
	STD	2.6	0.38	0.1	6.2	0.0005	0.002	0.001	0.000	0.045	0.0000	0.0022
	MAX	12.7	7.94	0.5	32.2	0.002	0.005	0.006	0.003	0.208	0.0001	0.0050
	MIN	1.5	6.62	0.3	9.2	0.001	0.001	0.003	0.003	0.024	0.0001	0.0001
2007	AVG	3.4	7.70	3.1	18.1	0.001	0.004	0.003	0.003	0.127	0.00003	0.00390
	STD	6.5	0.23	13.3	5.4	0.0003	0.002	0.002	0.002	0.065	0.00001	0.00210
	MAX	34.0	8.23	69.4	29.0	0.002	0.005	0.014	0.010	0.370	0.00006	0.00500
	MIN	1.5	7.35	0.3	8.5	0.0005	0.0005	0.003	0.003	0.064	0.00003	0.00003
2008	AVG	1.8	7.31	1.0	20.4	0.001	0.003	0.003	0.003	0.102	0.00003	0.00238
	STD	1	0.18	0.9	6.1	0.000	0.002	0.000	0.000	0.050	0.00000	0.00255
	MAX	5.2	7.69	2.5	28.9	0.001	0.005	0.003	0.003	0.240	0.00003	0.00500
	MIN	1.5	6.94	0.3	9.7	0.0004	0.0003	0.003	0.003	0.035	0.00003	0.00003
2009	AVG	2.1	7.09	0.8	20.5	0.001	0.003	0.003	0.003	0.107	0.00003	0.00301
	STD	1.2	0.30	0.9	7.8	0.000	0.002	0.000	0.000	0.063	0.00000	0.00250
	MAX	5.7	7.65	2.5	32.3	0.001	0.005	0.003	0.003	0.250	0.00003	0.00500
	MIN	1.5	6.62	0.3	8.7	0.0004	0.0003	0.003	0.003	0.027	0.00003	0.00003
2010	AVG	1.8	7.28	1.0	18.4	0.001	0.003	0.003	0.003	0.185	0.00003	0.00238
	STD	0.7	0.27	1.1	7.4	0.000	0.002	0.000	0.002	0.126	0.00000	0.00255
	MAX	3.8	7.82	2.5	32.1	0.002	0.005	0.003	0.011	0.448	0.00003	0.00500
	MIN	1.5	6.83	0.3	9.2	0.0004	0.0003	0.003	0.003	0.029	0.00003	0.00003
2011	AVG	1.7	7.31	0.3	19.5	0.001	0.003	0.003	0.003	0.121	0.00003	0.00242
	STD	0.8	0.26	0.2	6.9	0.000	0.002	0.001	0.000	0.055	0.00000	0.00253
	MAX	5.1	7.73	1.3	33.0	0.001	0.005	0.009	0.003	0.300	0.00003	0.00500
	MIN	1.5	6.74	0.3	8.8	0.0003	0.0003	0.003	0.003	0.050	0.00003	0.00003
2012	AVG	2.1	7.10	0.3	20.6	0.0005	0.0020	0.003	0.003	0.108	0.00003	0.00145
	STD	1.3	0.39	0.1	7.9	0.0003	0.0020	0.001	0.002	0.072	0	0.00230
	MAX	6.3	7.59	0.6	31.8	0.0015	0.0050	0.008	0.010	0.277	0.00003	0.00500
	MIN	1.5	6.30	0.3	9.6	0.0003	0.0003	0.003	0.003	0.018	0.00003	0.00003

AVERAGES

	SUS	pH	SO4	CaCO3	Cu(d)	Cu(t)	Zn(d)	Zn(t)	Al(d)	Cd(d)	Cd(t)
1980	1.6	7.65	8.1		0.005	0.015	0.007	0.037			
1981	3.0	7.28	6.2		0.002	0.012	0.010	0.026			
1982	5.9	6.98	4.7	19.1	0.004	0.010	0.012	0.017	0.270		0.0010
1983	4.9	7.01	1.7	29.8	0.003	0.013	0.008	0.025	0.149	0.0005	0.0027
1984	3.8	7.04	1.2	30.3	0.003	0.003	0.005	0.007	0.155	0.0006	0.0006
1985	9.1	6.74	2.3	18.8	0.002	0.012	0.006	0.013	0.120	0.0005	0.0005
1986	2.4	7.06	3.6		0.004	0.007	0.006	0.008	0.160		
1987	3.2	7.36	1.4	18.0	0.002	0.011	0.005	0.006	0.115		
1988		7.13	1.8	20.0	0.002	0.003	0.005	0.006	0.137		
1989	2.7	7.03	1.0	24.0	0.002	0.003	0.005	0.005	0.124		
1990		7.04	1.9	23.8	0.001	0.002	0.005	0.005	0.109	0.0010	0.0020
1991		7.11	1.3	23.1	0.002	0.005	0.005	0.007	0.143		
1992		7.06	1.4	21.2	0.001	0.002	0.005	0.005	0.190		
1993		7.01	1.9	23.0	0.001	0.001	0.007	0.009	0.157		
1994	3.1	7.05	2.1	20.9	0.001	0.002	0.006	0.008	0.142	0.0002	0.0002
1995	2.0	7.05	2.0	25.0	0.001	0.002	0.005	0.005	0.110	0.0002	0.0002
1996	2.1	7.03	1.4	21.5	0.002	0.002	0.005	0.005	0.127	0.0002	0.0002
1997	5.0	6.77	1.5	19.0	0.002	0.002	0.005	0.005	0.117	0.0001	0.0001
1998	4.0	7.26	2.6	22.0	0.001	0.001	0.002	0.003	0.090	0.0001	0.0001
1999	1.7	6.87	1.3	19.0	0.001	0.001	0.003	0.003	0.136	0.0001	0.0001
2000	3.9	7.24	1.5	20.0	0.001	0.001	0.003	0.003	0.137	0.0001	0.0001
2001	4.2	7.12	1.5	21.0	0.001	0.003	0.003	0.003	0.125	0.0001	0.0001
2002	4.9	7.27	2.0	22.0	0.001	0.004	0.003	0.004	0.117	0.0001	0.0001
2003	2.9	7.14	2.0	21.1	0.001	0.002	0.005	0.005	0.113	0.0001	0.0001
2004	2.8	7.26	0.6	17.9	0.002	0.003	0.003	0.003	0.120	0.0001	0.0001
2005	2.2	7.32	0.6	18.2	0.001	0.004	0.003	0.003	0.125	0.0001	0.0001
2006	2.3	7.37	0.5	20.4	0.001	0.002	0.003	0.003	0.109	0.0001	0.0014
2007	3.4	7.70	3.1	18.1	0.001	0.004	0.003	0.003	0.127	0.000026	0.0039
2008	1.8	7.31	1.0	20.4	0.001	0.003	0.003	0.003	0.102	0.000030	0.0024
2009	2.1	7.09	0.8	20.5	0.001	0.003	0.003	0.003	0.107	0.000025	0.0030
2010	1.8	7.28	1.0	18.4	0.001	0.003	0.003	0.003	0.185	0.000025	0.0024
2011	1.7	7.31	0.3	19.5	0.001	0.003	0.003	0.003	0.121	0.000025	0.0024
2012	2.1	7.10	0.3	20.6	0.001	0.002	0.003	0.003	0.108	0.000025	0.0014

LOWER FOXY CREEK 0400764

		SUS	pH	SO4	CaCO3	Cu(d)	Cu(t)	Zn(d)	Zn(t)	Al(d)	Cd(d)	Cd(t)
2002	AVG	5.0	7.29	19.0	31.0	0.008	0.010	0.018	0.019	0.106	0.0002	0.0003
	STD	8.8	0.27	12.0	13.0	0.016	0.018	0.038	0.041	0.072	0.0003	0.0004
	MAX	46.0	7.70	106.0	49.0	0.080	0.098	0.224	0.248	0.350	0.0021	0.0012
	MIN	2.0	6.60	5.0	10.0	0.001	0.001	0.002	0.002	0.015	0.0000	0.0000
2003	AVG	7.9	7.25	42.7	33.2	0.003	0.004	0.005	0.006	0.090	0.0002	0.0003
	STD	17.5	0.18	213.7	11.5	0.001	0.002	0.006	0.006	0.055	0.0002	
	MAX	70.0	7.50	773.0	54.0	0.004	0.008	0.020	0.020	0.233	0.0008	0.0014
	MIN	1.5	6.92	2.0	17.0	0.001	0.001	0.003	0.003	0.016	0.0001	0.0001
2004	AVG	5.2	7.37	119.2	27.3	0.002	0.004	0.003	0.003	0.084	0.0001	0.0001
	STD	6.5	0.13	129.5	9.5	0.001	0.002	0.002	0.002			
	MAX	22.3	7.56	453.0	53.2	0.004	0.006	0.009	0.012	0.146	0.0002	0.0002
	MIN	1.5	7.08	20.5	15.6	0.001	0.001	0.003	0.003	0.017	0.0001	0.0001
2005	AVG	4.5	7.23	242.9	29.2	0.002	0.004	0.003	0.004	0.095	0.0001	0.0001
	STD	9.2	0.27	204.9	9.8	0.001	0.002	0.002	0.003	0.035	0.0001	
	MAX	48.9	7.79	603.0	49.6	0.003	0.005	0.008	0.014	0.230	0.0003	0.0003
	MIN	1.5	6.77	5.7	15.4	0.001	0.001	0.003	0.003	0.022	0.0001	0.0001
2006	AVG	16.0	7.07	156.7	32.2	0.002	0.004	0.003	0.005	0.071	0.0001	0.0014
	STD	58.9	0.37	130.9	10.8	0.001	0.004	0.002	0.007	0.047	0.0000	0.0022
	MAX	259.0	7.69	406.0	57.6	0.003	0.017	0.009	0.033	0.206	0.0002	0.0050
	MIN	1.5	6.54	25.7	14.1	0.001	0.001	0.003	0.003	0.014	0.0001	0.0001
2007	AVE	6.3	7.35	340.3	25.6	0.002	0.004	0.003	0.004	0.103	0.0001	0.0039
	STD	12.2	0.27	282.2	7.5	0.0004	0.001	0.001	0.003	0.058	0.0001	0.0021
	MAX	64.8	7.94	978.0	39.7	0.003	0.005	0.007	0.012	0.320	0.0007	0.0050
	MIN	1.5	7.00	32.7	12.0	0.001	0.001	0.003	0.003	0.030	0.00003	0.00003
2008	AVE	3.6	7.00	177.8	29.5	0.002	0.003	0.003	0.005	0.075	0.00006	0.00238
	STD	4.6	0.22	195.6	8.9	0.000	0.002	0.002	0.006	0.040	0.00005	0.00255
	MAX	17.8	7.46	631.0	44.5	0.002	0.005	0.010	0.025	0.174	0.00016	0.00500
	MIN	1.5	6.60	2.5	14.2	0.001	0.001	0.003	0.003	0.014	0.00003	0.00003
2009	AVG	11.6	7.16	132.9	31.6	0.002	0.005	0.003	0.004	0.078	0.00005	0.00301
	STD	28.7	0.18	142.7	11.3	0.000	0.004	0.000	0.003	0.034	0.00004	0.00250
	MAX	130.0	7.40	515.0	48.2	0.003	0.020	0.003	0.016	0.100	0.00014	0.00500
	MIN	1.5	6.86	30.6	14.3	0.001	0.001	0.003	0.003	0.016	0.00003	0.00003
2010	AVG	3.5	7.14	112.5	29.4	0.002	0.003	0.003	0.003	0.102	0.00006	0.00251
	STD	3.9	0.24	117.3	8.7	0.001	0.002	0.002	0.001	0.077	0.00005	0.00255
	MAX	18.3	7.68	422.0	43.3	0.004	0.005	0.010	0.008	0.317	0.00018	0.00500
	MIN	1.5	6.72	0.3	16.6	0.001	0.001	0.003	0.003	0.018	0.00003	0.00003
2011	AVG	5.2	7.30	403.8	26.0	0.001	0.003	0.003	0.003	0.084	0.00012	0.00247
	STD	7.3	0.20	418.2	8.5	0.000	0.002	0.001	0.002	0.033	0.00009	0.00248
	MAX	38.0	7.80	1380.0	47.5	0.002	0.005	0.007	0.010	0.136	0.00032	0.00500
	MIN	1.5	6.98	0.6	13.6	0.001	0.001	0.003	0.003	0.016	0.00003	0.00003
2012	AVG	5.6	7.24	130.0	29.8	0.0016	0.0028	0.0030	0.0046	0.079	0.00007	0.00147
	STD	7.3	0.22	163.9	11.6	0.0005	0.0015	0.0015	0.0035	0.058	0.00007	0.00229
	MAX	27.7	7.62	659.0	53.6	0.0027	0.0050	0.0085	0.0166	0.240	0.00028	0.00500
	MIN	1.5	6.84	12.1	14.3	0.0009	0.0013	0.0025	0.0025	0.018	0.00003	0.00003

AVERAGES

	SUS	pH	SO4	CaCO3	Cu(d)	Cu(t)	Zn(d)	Zn(t)	Al(d)	Cd(d)	Cd(t)
1980	1.9	7.55	9.1		0.002	0.006	0.008	0.016			
1981	2.9	7.24	25.8		0.002	0.019	0.010	0.017			
1982	6.2	7.13	34.2	33.0	0.023	0.040	0.051	0.062	0.192		0.00144
1983	4.0	7.46	34.1	41.7	0.004	0.008	0.010	0.013	0.118	0.00050	0.00059
1984	3.7	7.40	288.3	39.0	0.005	0.005	0.006	0.008	0.087	0.00067	0.00067
1985	9.9	7.30	286.2	32.6	0.005	0.005	0.008	0.008	0.090	0.00050	0.00051
1986	4.5	7.37	110.3	32.3	0.004	0.006	0.006	0.007	0.054	0.00050	0.00050
1987	2.3	7.49	99.8	36.1	0.003	0.007	0.006	0.007	0.088	0.00050	0.00050
1988	12.1	7.45	98.8	30.5	0.004	0.005	0.007	0.012	0.083	0.00023	0.00031
1989	3.6	7.27	77.5	41.4	0.003	0.004	0.006	0.006	0.083	0.00021	0.00020
1990	7.7	7.29	53.7	40.1	0.005	0.007	0.009	0.012	0.065	0.00022	
1991	15.0	7.39	54.0	42.3	0.003	0.008	0.007	0.026	0.090	0.00051	
1992	7.8	7.24	49.6	36.6	0.004	0.004	0.006	0.008	0.132	0.00021	
1993	3.4	7.14	28.5	58.8	0.002	0.003	0.005	0.006	0.092	0.00020	
1994	2.9	7.22	42.9	34.5	0.002	0.003	0.006	0.009	0.085	0.00020	0.00020
1995	6.0	7.26	47.5	38.6	0.002	0.003	0.005	0.006	0.078	0.00020	0.00020
1996	4.1	7.29	29.2	34.7	0.003	0.003	0.005	0.005	0.085	0.00020	0.00026
1997	8.0	7.07	46.3	31.1	0.003	0.003	0.004	0.004	0.094	0.00010	0.00010
1998	3.0	7.42	30.0	36.0	0.002	0.002	0.004	0.004	0.063	0.00010	0.00010
1999	5.2	7.15	83.0	28.0	0.002	0.004	0.003	0.003	0.100	0.00010	0.00010
2000	5.0	7.24	150.0	32.0	0.002	0.003	0.005	0.005	0.084	0.00020	0.00020
2001	8.5	7.09	111.0	33.0	0.002	0.003	0.003	0.005	0.089	0.00020	0.00020
2002	5.0	7.29	19.0	31.0	0.008	0.010	0.018	0.019	0.106	0.00020	0.00030
2003	7.9	7.25	42.7	33.2	0.003	0.004	0.005	0.006	0.090	0.00020	0.00030
2004	5.2	7.37	119.2	27.3	0.002	0.004	0.003	0.003	0.084	0.00011	0.00010
2005	4.5	7.23	242.9	29.2	0.002	0.004	0.003	0.004	0.095	0.00014	0.00010
2006	16.0	7.07	156.7	32.2	0.002	0.004	0.003	0.005	0.071	0.00011	0.00140
2007	6.3	7.35	340.3	25.6	0.002	0.004	0.003	0.004	0.103	0.00014	0.00390
2008	3.6	7.00	177.8	29.5	0.002	0.003	0.003	0.005	0.075	0.00006	0.00238
2009	11.6	7.16	132.9	31.6	0.002	0.005	0.003	0.004	0.078	0.00005	0.00301
2010	3.5	7.14	112.5	29.4	0.002	0.003	0.003	0.003	0.102	0.00006	0.00251
2011	5.2	7.30	403.8	26.0	0.001	0.003	0.003	0.003	0.084	0.00012	0.00247
2012	5.6	7.24	130.0	29.8	0.002	0.003	0.003	0.005	0.079	0.00007	0.00147

Foxy Creek Above Maxan Creek: 0700108												
		SUS	pH	SO4	CaCO3	Cu(d)	Cu(t)	Zn(d)	Zn(t)	Al(d)	Cd(d)	Cd(t)
2002	AVG	9.5	7.44	11.0	40.0	0.006	0.008	0.007	0.008	0.135	0.0001	0.0001
	STD	13.9	0.19	1.0	20.0	0.005	0.005	0.007	0.009	0.060		
	MAX	48.0	7.60	21.0	53.0	0.029	0.034	0.037	0.048	0.250	0.0003	0.0001
	MIN	2.0	6.70	4.0	14.0	0.002	0.004	0.002	0.002	0.100	0.00002	0.00002
2003	AVG	1.5	7.23	14.0	41.0	0.002	0.002	0.003	0.003	0.033	0.0001	0.0070
	STD	0.0	0.00	0.0		0.000	0.000	0.000	0.000	0.000	0.0000	0.0000
	MAX	1.5	7.23	14.0		0.002	0.002	0.003	0.003	0.033	0.0001	0.0070
	MIN	1.5	7.23	14.0		0.002	0.002	0.003	0.003	0.033	0.0001	0.0070
2004	AVG	2.6	7.35	42.4	36.9	0.002	0.003	0.003	0.003	0.109	0.0001	0.0001
	STD	1.3	0.11	39.7	12.6	0.0002	0.002	0.001	0.001	0.122		
	MAX	4.0	7.49	96.6	53.0	0.002	0.005	0.005	0.005	0.283	0.0001	0.0001
	MIN	1.5	7.26	10.0	23.5	0.002	0.002	0.003	0.003	0.011	0.0001	0.0001
2005	AVG	3.0	7.27	80.3	43.2	0.001	0.001	0.003	0.003	0.027	0.0001	0.0001
	STD	3.0	0.14	71.0	12.6	0.0004	0.001	0.000	0.000	0.020	0.0000	0.0000
	MAX	7.5	7.47	163.0	56.4	0.001	0.002	0.003	0.003	0.056	0.0001	0.0001
	MIN	1.5	7.14	20.8	26.1	0.001	0.001	0.003	0.003	0.011	0.0001	0.0001
2006	AVG	6.5	7.19	33.1	49.0	0.002	0.002	0.003	0.003	0.072	0.0001	0.0001
	STD	8.7	0.35	15.9	25.7	0.0005	0.001	0.000	0.000	0.050	0.0000	0.0000
	MAX	16.5	7.57	50.0	70.4	0.002	0.003	0.003	0.003	0.101	0.0001	0.0001
	MIN	1.5	6.87	18.3	20.5	0.001	0.001	0.003	0.003	0.014	0.0001	0.0001
2007	AVG	6.4	7.38	128.7	27.1	0.002	0.005	0.003	0.003	0.170	0.00003	0.00500
	STD	8.5	0.38	75.3	8.4	0.0005	0.000	0.000	0.000	0.121	0.00000	0.00000
	MAX	16.3	7.78	185.0	33.2	0.002	0.005	0.003	0.003	0.310	0.00003	0.00500
	MIN	1.5	7.03	43.2	17.5	0.0011	0.005	0.003	0.003	0.100	0.00003	0.00500
2008	AVG	1.5	6.93	167.7	39.1	0.001	0.005	0.003	0.003	0.100	0.00003	0.0050
	STD	0	0.08	101.0	6.7	0.0002	0.000	0.000	0.000	0.000	0.00000	0.0000
	MAX	1.5	7.01	229.0	46.7	0.001	0.005	0.003	0.003	0.100	0.00003	0.0050
	MIN	1.5	6.86	51.1	34.2	0.001	0.005	0.003	0.003	0.100	0.00003	0.0050
2009	AVG	4.6	7.01	87.8	35.9	0.001	0.005	0.003	0.003	0.100	0.00003	0.0050
	STD	5.3	0.25	58.0	16.3	0.000	0.000	0.000	0.000	0.000	0.00000	0.0000
	MAX	10.7	7.28	153.0	54.4	0.002	0.005	0.003	0.003	0.100	0.00003	0.0050
	MIN	1.5	6.79	42.1	23.6	0.001	0.005	0.003	0.003	0.100	0.00003	0.0050
2010	AVG	1.5	7.41	83.6	50.2	0.001	0.001	0.003	0.003	0.017	0.00003	0.000025
	STD	0.0	0.16	95.7	19.2	0.000	0.000	0.000	0.000	0.011	0.00000	0.000000
	MAX	1.5	7.55	194.0	61.9	0.002	0.001	0.003	0.003	0.030	0.00003	0.000025
	MIN	1.5	7.24	25.0	28.0	0.001	0.001	0.003	0.003	0.009	0.00003	0.000025
2011	AVG	4.0	7.39	291.0	35.9	0.001	0.005	0.003	0.003	0.100	0.00003	0.005000
	STD	0.0	0.00	0.0	0.0	0.000	0.000	0.000	0.000	0.000	0.00000	0.000000
	MAX	4.0	7.39	291.0	35.9	0.001	0.005	0.003	0.003	0.100	0.00003	0.005000
	MIN	4.0	7.39	291.0	35.9	0.001	0.005	0.003	0.003	0.100	0.00003	0.005000
2012	AVG	10.4	7.28	26.3	41.3	0.0012	0.0050	0.0025	0.0025	0.134	0.00003	0.005000
	STD	12.6	0.21	15.3	29.6	0.0001	0	0	0	0.047	0	0
	MAX	19.3	7.43	37.1	62.2	0.0013	0.0050	0.0025	0.0025	0.167	0.00003	0.005000
	MIN	1.5	7.13	15.5	20.4	0.0011	0.0050	0.0025	0.0025	0.100	0.00003	0.005000

`

AVERAGES

	SUS	pH	SO4	CaCO3	Cu(d)	Cu(t)	Zn(d)	Zn(t)	Al(d)	Cd(d)	Cd(t)
1982	17.8	7.22	13.8	30.2	0.006	0.015	0.011	0.020	0.158		0.0018
1983	2.9	7.45	8.0	49.5	0.003	0.003	0.006	0.006	0.073		0.0006
1984	3.8	7.45	157.2	41.9	0.003	0.004	0.015	0.020	0.085	0.0006	0.0006
1985	14.1	7.50	93.9	30.5	0.002	0.003	0.005	0.005	0.066	0.0005	0.0005
1986	1.0	7.41	67.2		0.003	0.003	0.005	0.005	0.067		
1987		7.41	41.8		0.002	0.006	0.006	0.006	0.040		
1988		7.39	27.9		0.004	0.006	0.006	0.007	0.099		
1989		7.49	24.2		0.003	0.003	0.005	0.005	0.079	0.0002	0.0002
1990		7.38	13.9		0.002	0.002	0.005	0.005	0.044		
1991		7.18	14.2		0.002	0.003	0.005	0.007	0.088		
1992		7.25	21.0		0.002	0.002	0.006	0.006	0.189		
1993		7.22	13.3		0.002	0.002	0.005	0.006	0.122		
1994	3.3	7.28	8.2	38.2	0.002	0.002	0.007	0.010	0.144	0.0002	0.0002
1995	3.0	7.35	12.9	51.0	0.002	0.001	0.005	0.005	0.088	0.0002	0.0002
1996	9.3	7.31	12.3	35.0	0.003	0.002	0.006	0.005	0.112	0.0002	0.0002
1997	6.6	7.06	19.0	37.0	0.002	0.003	0.003	0.003	0.124	0.0001	0.0001
1998	2.0	7.44	36.0	44.0	0.002	0.002	0.004	0.004	0.072	0.0001	0.0001
1999	3.7	7.37	22.0	34.0	0.002	0.002	0.003	0.003	0.078	0.0001	0.0001
2000	2.4	7.34	52.0	37.0	0.002	0.002	0.005	0.003	0.104	0.0001	0.0001
2001	8.5	7.00	88.0	29.0	0.001	0.003	0.004	0.003	0.098	0.0001	0.0001
2002	9.5	7.44	11.0	40.0	0.006	0.008	0.007	0.008	0.135	0.0001	0.0001
2003	1.5	7.23	14.0	41.0	0.002	0.002	0.003	0.003	0.033	0.0001	0.0070
2004	2.6	7.35	42.4	36.9	0.002	0.003	0.003	0.003	0.109	0.0001	0.0001
2005	3.0	7.27	80.3	43.2	0.001	0.001	0.003	0.003	0.027	0.0001	0.0001
2006	6.5	7.19	33.1	49.0	0.002	0.002	0.003	0.003	0.072	0.0001	0.0001
2007	6.4	7.38	128.7	27.1	0.002	0.005	0.003	0.003	0.170	0.00003	0.00500
2008	1.5	6.93	167.7	39.1	0.001	0.005	0.003	0.003	0.100	0.00003	0.0050
2009	4.6	7.01	87.8	35.9	0.001	0.005	0.003	0.003	0.100	0.00003	0.0050
2010	1.5	7.41	83.6	50.2	0.001	0.001	0.003	0.003	0.017	0.00003	0.000025
2011	4.0	7.39	291.0	35.9	0.001	0.005	0.003	0.003	0.100	0.00003	0.0050
2012	10.4	7.28	26.3	41.3	0.001	0.005	0.003	0.003	0.134	0.00003	0.0050

UPPER BUCK CREEK 0400765

		SUS	pH	SO4	CaCO3	Cu(d)	Cu(t)	Zn(d)	Zn(t)	Al(d)	Cd(d)	Cd(t)
2002	AVG	3.0	7.33	3.0	57.0	0.003	0.003	0.003	0.003	0.094	0.0001	0.0001
	STD	3.1	0.25	2.0	17.0	0.004	0.002	0.002	0.000	0.053		
	MAX	66.0	7.70	32.0	79.0	0.080	0.005	0.045	0.010	0.253	0.0003	0.0002
	MIN	2.0	6.86	0.5	19.0	0.001	0.001	0.001	0.001	0.015	0.00002	0.00002
2003	AVG	3.0	7.24	1.9	59.6	0.001	0.003	0.004	0.005	0.055	0.0003	0.0003
	STD	6.9	0.11	1.7	17.2	0.001	0.002	0.003	0.004			
	MAX	40.0	7.44	6.0	84.0	0.002	0.005	0.013	0.022	0.178	0.0016	0.0016
	MIN	1.5	7.01	0.5	25.0	0.001	0.001	0.003	0.003	0.007	0.0001	0.0001
2004	AVG	1.9	7.29	1.3	46.0	0.002	0.003	0.003	0.003	0.078	0.0001	0.0001
	STD	1.1	0.13	0.7	13.7	0.001	0.002	0.001	0.001			
	MAX	6.8	7.62	2.8	79.3	0.005	0.005	0.005	0.007	0.176	0.0001	0.0001
	MIN	1.5	7.07	0.5	25.0	0.001	0.001	0.003	0.003	0.010	0.0001	0.0001
2005	AVG	2.9	7.31	0.6	54.9	0.001	0.004	0.003	0.003	0.103	0.0001	0.0001
	STD	2.7	0.18	0.3	16.7	0.001	0.003	0.001	0.001	0.075	0.000	
	MAX	12.9	7.69	1.7	88.4	0.007	0.010	0.005	0.005	0.320	0.0001	0.0100
	MIN	1.5	6.98	0.5	26.2	0.001	0.001	0.003	0.003	0.010	0.0001	0.0001
2006	AVG	2.1	7.25	0.6	57.7	0.001	0.002	0.003	0.003	0.067	0.0001	0.0016
	STD	1.8	0.25	0.2	22.3	0.000	0.002	0.000	0.001	0.045	0.000	0.0023
	MAX	8.9	7.77	1.3	88.4	0.002	0.005	0.003	0.006	0.147	0.0001	0.0050
	MIN	1.5	6.84	0.5	25.2	0.001	0.001	0.003	0.003	0.010	0.0001	0.0001
2007	AVG	2.2	7.56	8.7	47.9	0.001	0.004	0.003	0.003	0.110	0.0003	0.0036
	STD	1.8	0.39	47.1	17.5	0.001	0.002	0.002	0.001	0.062	0.0000	0.0023
	MAX	9.1	8.42	271.0	80.6	0.004	0.005	0.013	0.008	0.280	0.00003	0.0050
	MIN	1.5	7.06	0.3	17.4	0.001	0.001	0.003	0.003	0.010	0.00003	0.00003
2008	AVG	3.3	7.11	1.8	54.6	0.001	0.003	0.003	0.003	0.099	0.00003	0.0024
	STD	3.0	0.17	2.3	18.2	0.000	0.002	0.002	0.001	0.087	0.00000	0.0025
	MAX	10.8	7.45	10.9	83.2	0.002	0.005	0.008	0.006	0.330	0.00003	0.0050
	MIN	1.5	6.77	0.3	23.1	0.001	0.001	0.003	0.003	0.013	0.00003	0.00003
2009	AVG	1.8	7.15	0.9	56.2	0.001	0.003	0.003	0.003	0.084	0.00003	0.0028
	STD	0.8	0.24	0.9	20.7	0.000	0.002	0.000	0.001	0.076	0.00000	0.0025
	MAX	4.2	7.69	2.5	85.2	0.003	0.005	0.003	0.006	0.250	0.00003	0.0050
	MIN	1.5	6.69	0.3	23.7	0.00037	0.00025	0.003	0.003	0.006	0.00003	0.0000
2010	AVG	3.2	7.27	1.3	51.4	0.001	0.003	0.003	0.003	0.134	0.00003	0.0024
	STD	4.7	0.17	1.2	21.3	0.000	0.002	0.000	0.000	0.122	0.00001	0.0026
	MAX	19.0	7.59	3.0	86.3	0.002	0.005	0.003	0.003	0.340	0.00007	0.0050
	MIN	1.5	6.93	0.3	24.5	0.00052	0.0004	0.003	0.003	0.007	0.00003	0.0000
2011	AVG	2.5	7.30	1.5	54.5	0.001	0.004	0.003	0.003	0.096	0.00003	0.0036
	STD	2.2	0.16	3.7	21.3	0.001	0.002	0.002	0.000	0.062	0.00001	0.0023
	MAX	12.2	7.67	21.6	87.4	0.002	0.005	0.013	0.003	0.270	0.00008	0.0050
	MIN	1.5	6.98	0.3	18.9	0.00025	0.0003	0.003	0.003	0.010	0.00003	0.0000
2012	AVG	3.9	7.30	0.9	52.7	0.0011	0.0033	0.0027	0.003	0.104	0.00003	0.0028
	STD	2.8	0.10	1.7	24.0	0.0004	0.0020	0.0008	0.000	0.096	0	0.0025
	MAX	11.4	7.50	8.5	87.0	0.0016	0.0050	0.0064	0.003	0.330	0.00003	0.0050
	MIN	1.5	7.11	0.3	22.0	0.0003	0.0007	0.0025	0.003	0.007	0.00003	0.0000

AVERAGES

	SUS	pH	SO4	CaCO3	Cu(d)	Cu(t)	Zn(d)	Zn(t)	Al(d)	Cd(d)	Cd(t)
1980	2.1	7.50	9.5		0.002	0.008	0.008	0.032			
1981	3.6	7.28	6.5		0.002	0.007	0.009	0.015			
1982	5.5	7.21	6.9	55.6	0.002	0.019	0.010	0.024	0.132		0.0011
1983	2.5	7.33	2.3	69.3	0.002	0.003	0.006	0.012	0.072	0.00050	0.0006
1984	3.1	7.33	1.8	56.8	0.003	0.007	0.009	0.019	0.148	0.00053	0.0005
1985	3.8	7.30	2.6	58.3	0.002	0.004	0.005	0.007	0.079	0.00050	0.0005
1986	4.7	7.25	1.6	57.2	0.002	0.003	0.005	0.006	0.058	0.00050	0.0005
1987	5.8	7.42	2.2	59.3	0.003	0.006	0.005	0.006	0.099	0.00050	0.0011
1988	4.1	7.43	1.8	60.3	0.002	0.003	0.005	0.005	0.083	0.00026	0.0003
1989	6.3	7.45	1.9	60.4	0.002	0.003	0.005	0.005	0.046	0.00020	0.0002
1990	4.7	7.30	2.7	64.1	0.002	0.003	0.005	0.005	0.140	0.00020	0.0002
1991	5.7	7.30	1.6	71.4	0.002	0.004	0.005	0.007	0.064	0.00021	0.0002
1992	3.1	7.29	1.7	66.2	0.003	0.005	0.005	0.010	0.119	0.00020	0.0002
1993	2.9	7.22	6.4	64.5	0.005	0.010	0.010	0.021	0.096	0.00020	0.0002
1994	2.3	7.31	2.4	62.4	0.002	0.002	0.006	0.009	0.081	0.00020	0.0002
1995	2.8	7.29	1.5	67.9	0.005	0.008	0.005	0.008	0.038	0.00020	0.0002
1996	8.8	7.27	1.7	56.8	0.003	0.003	0.006	0.007	0.089	0.00020	0.0002
1997	3.7	7.04	2.2	51.8	0.001	0.002	0.003	0.003	0.105	0.00010	0.0001
1998	6.0	7.46	2.0	55.0	0.001	0.001	0.003	0.003	0.071	0.00010	0.0001
1999	3.7	7.31	1.6	48.0	0.001	0.001	0.003	0.003	0.111	0.00010	0.0001
2000	2.8	7.48	1.7	51.0	0.001	0.002	0.004	0.003	0.127	0.00010	0.0001
2001	3.2	7.14	1.6	51.0	0.001	0.004	0.003	0.003	0.096	0.00010	0.0033
2002	3.0	7.33	3.0	57.0	0.003	0.003	0.003	0.003	0.094	0.00010	0.0001
2003	3.0	7.24	1.9	59.6	0.001	0.003	0.004	0.005	0.055	0.00030	0.0003
2004	1.9	7.29	1.3	46.0	0.002	0.003	0.003	0.003	0.078	0.00010	0.0001
2005	2.9	7.31	0.6	54.9	0.001	0.004	0.003	0.003	0.103	0.00010	0.0001
2006	2.1	7.25	0.6	57.7	0.001	0.002	0.003	0.003	0.067	0.00010	0.0016
2007	2.2	7.56	8.7	47.9	0.001	0.004	0.003	0.003	0.110	0.00030	0.0036
2008	3.3	7.11	1.8	54.6	0.001	0.003	0.003	0.003	0.099	0.00003	0.0024
2009	1.8	7.15	0.9	56.2	0.001	0.003	0.003	0.003	0.084	0.00003	0.0028
2010	3.2	7.27	1.3	51.4	0.001	0.003	0.003	0.003	0.134	0.00003	0.0024
2011	2.5	7.30	1.5	54.5	0.001	0.004	0.003	0.003	0.096	0.00003	0.0036
2012	3.9	7.30	0.9	52.7	0.001	0.003	0.003	0.003	0.104	0.00003	0.0028

BUCK CREEK @ GOOSLY LAKE 0400766

		SUS	pH	SO4	CaCO3	Cu(d)	Cu(t)	Zn(d)	Zn(t)	Al(d)	Cd(d)	Cd(t)
2002	AVG	4.4	7.07	462.0	46.0	0.0050	0.007	0.032	0.033	0.088	0.0004	0.0011
	STD	3.3	0.14	510.0	20.0	0.0080	0.009	0.043	0.045	0.055	0.0004	0.0017
	MAX	39.0	7.50	1450.0	85.0	0.097	0.114	0.568	0.595	0.570	0.0046	0.0046
	MIN	2.0	6.40	9.0	13.0	0.0010	0.001	0.002	0.002	0.015	0.0001	0.0001
2003	AVG	3.6	7.09	209.9	55.8	0.002	0.003	0.007	0.008	0.037	0.0002	0.0002
	STD	2.7	0.11	198.5	17.2	0.001	0.002	0.004	0.005		0.0001	
	MAX	10.0	7.35	784.0	90.0	0.004	0.008	0.019	0.021	0.083	0.0005	0.0008
	MIN	1.5	6.87	31.0	25.0	0.001	0.001	0.003	0.003	0.009	0.0001	0.0001
2004	AVG	2.7	7.12	239.3	43.7	0.002	0.004	0.006	0.006	0.029	0.0001	0.0001
	STD	1.5	0.10	133.9	16.7	0.001	0.002	0.003	0.003		0.00004	
	MAX	6.7	7.38	510.0	82.5	0.004	0.005	0.014	0.012	0.059	0.0003	0.0006
	MIN	1.5	6.93	33.2	22.7	0.001	0.001	0.003	0.003	0.008	0.0001	0.0001
2005	AVG	3.3	7.09	221.7	53.6	0.002	0.005	0.005	0.006	0.083	0.0001	0.0001
	STD	2.5	0.14	162.9	16.3	0.001	0.004	0.002	0.003	0.046	0.00003	
	MAX	11.6	7.47	520.0	79.0	0.005	0.024	0.011	0.013	0.230	0.0002	0.0050
	MIN	1.5	6.87	27.3	24.3	0.001	0.001	0.003	0.003	0.010	0.0001	0.0001
2006	AVG	4.9	7.06	130.2	56.1	0.002	0.003	0.004	0.004	0.055	0.0001	0.0016
	STD	4.8	0.25	110.8	21.7	0.001	0.002	0.002	0.002	0.035	0.00000	0.0023
	MAX	16.7	7.61	335.0	89.5	0.004	0.011	0.007	0.011	0.100	0.0001	0.0050
	MIN	1.5	6.71	22.0	26.7	0.001	0.001	0.003	0.003	0.013	0.0001	0.0001
2007	AVG	3.3	7.37	224.8	42.1	0.002	0.004	0.006	0.008	0.090	0.00010	0.00360
	STD	2.3	0.33	152.6	17.3	0.001	0.002	0.004	0.005	0.055	0.00010	0.00230
	MAX	11.0	8.12	580.0	81.3	0.005	0.005	0.020	0.021	0.290	0.00030	0.00500
	MIN	1.5	6.92	0.5	17.0	0.001	0.001	0.003	0.003	0.008	0.00003	0.00003
2008	AVG	3.4	6.88	133.4	53.8	0.002	0.003	0.004	0.008	0.068	0.0001	0.00240
	STD	3.4	0.16	119.5	20.2	0.001	0.002	0.003	0.014	0.053	0.00004	0.00254
	MAX	15.2	7.31	420.0	84.7	0.004	0.005	0.012	0.065	0.230	0.00017	0.00500
	MIN	1.5	6.64	24.2	22.2	0.001	0.001	0.003	0.003	0.010	0.00003	0.00003
2009	AVG	3.5	7.05	171.7	54.0	0.002	0.003	0.003	0.005	0.061	0.00006	0.00271
	STD	3.5	0.17	104.3	20.8	0.001	0.002	0.002	0.003	0.044	0.00004	0.00252
	MAX	16.7	7.43	345.0	87.2	0.004	0.005	0.007	0.012	0.100	0.00015	0.00500
	MIN	1.5	6.75	17.3	22.7	0.001	0.001	0.003	0.003	0.003	0.00003	0.00003
2010	AVG	4.6	7.04	139.6	49.8	0.002	0.004	0.005	0.006	0.074	0.00007	0.00252
	STD	4.7	0.17	114.8	23.4	0.001	0.002	0.003	0.003	0.051	0.00005	0.00255
	MAX	17.0	7.45	301.0	96.1	0.004	0.007	0.009	0.010	0.172	0.00016	0.00500
	MIN	1.5	6.82	13.6	23.2	0.001	0.001	0.003	0.003	0.007	0.00003	0.00003
2011	AVG	3.8	7.12	311.9	43.8	0.002	0.004	0.007	0.008	0.076	0.00014	0.00257
	STD	3.1	0.18	255.1	17.3	0.001	0.002	0.003	0.003	0.040	0.00009	0.00247
	MAX	14.2	7.44	768.0	86.7	0.005	0.010	0.010	0.012	0.166	0.00033	0.00500
	MIN	1.5	6.85	0.9	16.4	0.001	0.001	0.003	0.003	0.003	0.00003	0.00003
2012	AVG	6.0	7.13	151.4	52.4	0.0021	0.0035	0.005	0.008	0.059	0.00010	0.00173
	STD	5.8	0.21	133.5	24.7	0.0010	0.0016	0.003	0.005	0.044	0.00007	0.00237
	MAX	19.2	7.44	464.0	99.0	0.0037	0.0057	0.011	0.017	0.128	0.00027	0.00500
	MIN	1.5	6.62	24.4	23.8	0.0008	0.0010	0.003	0.003	0.006	0.00003	0.00003

AVERAGES

	SUS	pH	SO4	CaCO3	Cu(d)	Cu(t)	Zn(d)	Zn(t)	Al(d)	Cd(d)	Cd(t)
1980	1.9	7.50	15.5		0.003	0.010	0.010	0.034			
1981	3.1	7.16	6.5		0.003	0.008	0.010	0.017			
1982	8.9	7.03	31.6	48.5	0.004	0.010	0.028	0.039	0.139		0.00104
1983	5.5	7.11	15.4	69.3	0.004	0.011	0.010	0.023	0.064	0.00050	0.00070
1984	7.7	7.20	16.0	58.5	0.004	0.006	0.005	0.010	0.136	0.00439	0.00053
1985	4.0	7.10	26.3	57.6	0.003	0.004	0.006	0.007	0.061	0.00050	0.00050
1986	13.9	7.14	44.9	71.3	0.004	0.006	0.009	0.011	0.035	0.00050	0.00050
1987	8.0	7.23	52.4	51.7	0.005	0.007	0.007	0.009	0.060	0.00052	0.00053
1988	4.3	7.46	41.8	70.1	0.005	0.008	0.006	0.008	0.067	0.00020	0.00024
1989	10.7	7.26	41.3	53.6	0.007	0.010	0.007	0.010	0.053	0.00020	0.00020
1990	6.0	7.27	109.4	65.2	0.004	0.006	0.007	0.010	0.084	0.00020	0.00020
1991	3.9	7.32	97.0	68.6	0.003	0.004	0.006	0.010	0.048	0.00020	0.00023
1992	5.3	7.29	50.5	64.9	0.004	0.004	0.006	0.010	0.083	0.00020	0.00020
1993	5.9	7.18	32.4	64.8	0.004	0.010	0.007	0.018	0.099	0.00020	0.00025
1994	3.4	7.08	28.7	63.7	0.003	0.004	0.007	0.012	0.064	0.00024	0.00025
1995	5.0	7.20	51.7	72.4	0.004	0.012	0.006	0.008	0.028	0.00020	0.00017
1996	3.4	7.06	24.0	57.9	0.004	0.006	0.013	0.017	0.058	0.00028	0.00028
1997	7.0	6.95	187.0	48.9	0.004	0.005	0.014	0.014	0.063	0.00020	0.00020
1998	3.0	7.39	82.0	60.0	0.003	0.003	0.010	0.010	0.046	0.00010	0.00020
1999	3.2	7.10	90.0	48.0	0.004	0.004	0.007	0.007	0.069	0.00010	0.00020
2000	2.6	7.50	117.0	51.0	0.002	0.002	0.004	0.004	0.060	0.00010	0.00010
2001	3.2	6.98	188.0	50.0	0.002	0.004	0.004	0.004	0.075	0.00010	0.00330
2002	4.4	7.10	462.0	46.0	0.005	0.007	0.032	0.033	0.088	0.00040	0.00110
2003	3.6	7.09	209.9	55.8	0.002	0.003	0.007	0.008	0.037	0.00020	0.00020
2004	2.7	7.12	239.3	43.7	0.002	0.004	0.006	0.006	0.029	0.00012	0.00010
2005	3.3	7.09	221.7	53.6	0.002	0.005	0.005	0.006	0.083	0.00011	0.00010
2006	4.9	7.06	130.2	56.1	0.002	0.003	0.004	0.004	0.055	0.00010	0.00165
2007	3.3	7.37	224.8	42.1	0.002	0.004	0.006	0.008	0.090	0.00010	0.00360
2008	3.4	6.88	133.4	53.8	0.002	0.003	0.004	0.008	0.068	0.00007	0.00240
2009	3.5	7.05	171.7	54.0	0.002	0.003	0.003	0.005	0.061	0.00006	0.00271
2010	4.6	7.04	139.6	49.8	0.002	0.004	0.005	0.006	0.074	0.00007	0.00252
2011	3.8	7.12	311.9	43.8	0.002	0.004	0.007	0.008	0.076	0.00014	0.00257
2012	6.0	7.13	151.4	52.4	0.002	0.004	0.005	0.008	0.059	0.00010	0.00173

BESSEMER CREEK AT THE SILTCHECK 0700081

		SUS	pH	SO4	CaCO3	Cu(d)	Cu(t)	Zn(d)	Zn(t)	Al(d)	Cd(d)	Cd(t)
2002	AVG	28.3	7.25	1004.0	39.0	0.032	0.044	0.168	0.176	0.178	0.0026	0.0040
	STD	96.6	0.65	623.0	17.0	0.265	0.286	1.247	1.254	1.223	0.0114	0.0111
	MAX	883.0	7.90	2280.0	69.0	1.470	1.540	6.310	6.560	7.780	0.0590	0.0602
	MIN	1.5	5.20	114.0	3.0	0.002	0.003	0.009	0.006	0.015	0.0001	0.0001
2003	AVG	7.2	7.22	858.0	42.5	0.007	0.011	0.023	0.028	0.029	0.0008	0.0009
	STD	13.4	0.20	592.0	23.6	0.003	0.012	0.014	0.026		0.0007	
	MAX	85.0	7.66	1780.0	102.0	0.014	0.067	0.066	0.141	0.066	0.0030	0.0035
	MIN	1.5	6.86	214.0	23.1	0.001	0.005	0.003	0.003	0.013	0.0001	0.0001
2004	AVG	3.8	7.36	769.0	38.3	0.008	0.010	0.021	0.023	0.046	0.0005	0.0006
	STD	4.3	0.19	561.0	15.7	0.003	0.006	0.013	0.014		0.0004	0.0020
	MAX	23.6	7.98	1660.0	69.7	0.016	0.027	0.058	0.065	0.255	0.0012	0.0120
	MIN	1.5	7.05	181.0	19.4	0.003	0.002	0.003	0.003	0.011	0.0001	0.0001
2005	AVG	6.4	7.28	608.1	44.2	0.010	0.014	0.015	0.019	0.087	0.0004	0.0007
	STD	21.2	0.28	549.1	11.0	0.004	0.010	0.009	0.013	0.066	0.0004	0.0011
	MAX	155.0	7.83	1710.0	65.2	0.020	0.070	0.039	0.077	0.287	0.0014	0.0050
	MIN	1.5	6.83	76.2	20.7	0.002	0.004	0.003	0.003	0.022	0.0001	0.0001
2006	AVG	3.5	7.23	413.3	48.8	0.009	0.011	0.010	0.012	0.040	0.0003	0.0005
	STD	7.0	0.33	422.6	14.0	0.003	0.006	0.008	0.010	0.033	0.0003	0.0010
	MAX	48.0	8.09	1610.0	74.7	0.016	0.034	0.034	0.039	0.129	0.0014	0.0050
	MIN	1.5	6.70	135.0	23.0	0.005	0.005	0.000	0.003	0.011	0.0001	0.0001
2007	AVG	11.5	7.31	723.4	37.0	0.010	0.014	0.021	0.026	0.078	0.0006	0.0008
	STD	42.4	0.40	561.0	16.3	0.006	0.018	0.016	0.022	0.159	0.0004	0.0011
	MAX	307.0	8.39	1660.0	68.4	0.032	0.013	0.058	0.107	1.150	0.0013	0.0050
	MIN	1.5	6.55	57.0	12.0	0.005	0.005	0.003	0.003	0.012	0.00008	0.00005
2008	AVG	5.3	6.90	553.1	42.8	0.007	0.010	0.011	0.013	0.044	0.0003	0.0003
	STD	10.8	0.20	459.1	13.4	0.002	0.007	0.007	0.009	0.033	0.0002	0.0003
	MAX	66.5	7.37	1630.0	70.2	0.016	0.048	0.030	0.039	0.145	0.0009	0.0009
	MIN	1.5	6.58	125.0	18.6	0.004	0.005	0.003	0.003	0.016	0.00008	0.00009
2009	AVG	5.4	7.14	577.3	42.0	0.007	0.010	0.015	0.017	0.036	0.0004	0.0004
	STD	11.0	0.25	434.1	17.9	0.002	0.007	0.010	0.012	0.027	0.0003	0.0003
	MAX	54.8	7.78	1530.0	75.6	0.015	0.038	0.039	0.050	0.108	0.0009	0.0010
	MIN	1.5	6.52	117.0	19.4	0.004	0.004	0.003	0.003	0.008	0.0001	0.0001
2010	AVG	4.4	7.10	466.1	41.2	0.009	0.013	0.014	0.015	0.071	0.0003	0.0004
	STD	6.4	0.25	408.0	15.2	0.004	0.008	0.012	0.014	0.079	0.0003	0.0007
	MAX	29.1	7.68	1370.0	67.4	0.021	0.037	0.048	0.053	0.319	0.0010	0.0050
	MIN	1.5	6.67	84.9	20.6	0.005	0.005	0.003	0.003	0.013	0.0001	0.0001
2011	AVG	10.1	7.10	812.8	37.7	0.007	0.011	0.020	0.024	0.060	0.0005	0.0006
	STD	27.5	0.18	669.6	17.1	0.003	0.010	0.012	0.016	0.032	0.0004	0.0004
	MAX	177.0	7.66	1940.0	71.9	0.015	0.065	0.068	0.073	0.133	0.0012	0.0014
	MIN	1.5	6.67	113.0	13.8	0.003	0.003	0.006	0.008	0.016	0.0001	0.0001
2012	AVG	7.4	7.17	557.2	44.1	0.008	0.011	0.015	0.018	0.054	0.0004	0.0006
	STD	14.4	0.15	444.6	18.3	0.004	0.008	0.010	0.014	0.062	0.0003	0.0010
	MAX	66.3	7.55	1710.0	73.2	0.024	0.033	0.037	0.058	0.347	0.0011	0.0050
	MIN	1.5	6.86	114.0	16.7	0.004	0.005	0.005	0.006	0.011	0.0001	0.0001

AVERAGES

	SUS	pH	SO4	CaCO3	Cu(d)	Cu(t)	Zn(d)	Zn(t)	Al(d)	Cd(d)	Cd(t)
1982	37.0	6.69	212.7	14.9	0.477	0.509	0.438	0.468	0.975		0.0041
1983	21.4	7.33	274.2	38.7	0.056	0.119	0.214	0.259	0.162	0.0017	0.0042
1984	25.6	7.13	189.1	38.7	0.127	0.206	0.183	0.236	0.199	0.0019	0.0026
1985	19.9	7.32	423.5	57.6	0.029	0.062	0.056	0.086	0.128	0.0012	0.0012
1986	22.1	7.30	547.4	38.0	0.036	0.058	0.080	0.094	0.210	0.0020	0.0022
1987	10.0	7.50	516.3	60.2	0.026	0.062	0.068	0.090	0.068	0.0021	0.0025
1988	14.1	7.71	386.5	75.1	0.032	0.064	0.071	0.096	0.324	0.0017	0.0021
1989	18.3	7.63	531.9	82.5	0.057	0.082	0.087	0.109	0.106	0.0012	0.0014
1990	11.8	7.68	754.3	92.0	0.016	0.023	0.039	0.049	0.058	0.0007	0.0008
1991	8.2	7.77	629.5	91.1	0.012	0.018	0.039	0.059	0.047	0.0009	0.0009
1992	10.4	7.60	505.2	49.8	0.013	0.019	0.036	0.050	0.090	0.0005	0.0006
1993	13.4	7.24	205.6	45.2	0.016	0.025	0.028	0.048	0.107	0.0004	0.0005
1994	7.8	7.27	194.8	42.1	0.014	0.019	0.023	0.031	0.084	0.0004	0.0005
1995	7.0	7.40	467.9	43.9	0.010	0.013	0.017	0.020	0.085	0.0003	0.0003
1996	18.7	7.34	193.8	40.4	0.014	0.021	0.012	0.019	0.097	0.0002	0.0003
1997	20.5	7.17	413.4	37.3	0.013	0.020	0.025	0.030	0.084	0.0003	0.0004
1998	6.0	7.33	473.0	36.0	0.010	0.012	0.035	0.036	0.049	0.0007	0.0007
1999	8.6	7.21	440.0	35.5	0.012	0.016	0.023	0.025	0.065	0.0003	0.0003
2000	9.8	7.30	528.0	37.0	0.010	0.014	0.023	0.024	0.059	0.0004	0.0004
2001	9.0	7.05	611.9	43.0	0.008	0.011	0.019	0.019	0.048	0.0005	0.0005
2002	28.3	7.25	1004.0	39.0	0.032	0.044	0.168	0.176	0.178	0.0026	0.0040
2003	7.2	7.22	858.0	42.5	0.007	0.011	0.023	0.028	0.029	0.0008	0.0009
2004	3.8	7.36	769.0	38.3	0.008	0.010	0.021	0.023	0.046	0.0005	0.0006
2005	6.4	7.28	608.1	44.2	0.010	0.014	0.015	0.019	0.087	0.0004	0.0007
2006	3.5	7.23	413.3	48.8	0.009	0.011	0.010	0.012	0.040	0.0003	0.0005
2007	11.5	7.31	723.4	37.0	0.010	0.014	0.021	0.026	0.078	0.0006	0.0008
2008	5.3	6.90	553.1	42.8	0.007	0.010	0.011	0.013	0.044	0.0003	0.0003
2009	5.4	7.14	577.3	42.0	0.007	0.010	0.015	0.017	0.036	0.0004	0.0004
2010	4.4	7.10	466.1	41.2	0.009	0.013	0.014	0.015	0.071	0.0003	0.0004
2011	10.1	7.10	812.8	37.7	0.007	0.011	0.020	0.024	0.060	0.0005	0.0006
2012	7.4	7.17	557.2	44.1	0.008	0.011	0.015	0.018	0.054	0.0004	0.0006

SOUTHERN TAIL PIT DISCHARGE 0700146

		pH	SO4	CaCO3	Cu(d)	Cu(t)	Zn(d)	Zn(t)	Al(d)	Cd(d)	Cd(t)
2002	AVG	6.68	2242	272	0.017	0.021	9.61	9.60	0.064	0.044	0.050
	STD	0.27	216	30	0.023	0.026	2.18	2.13	0.046	0.017	0.012
	MAX	7.04	2740	313	0.074	0.065	13.10	13.20	0.110	0.068	0.071
	MIN	6.3	1910	223	0.001	0.001	6.90	7.00	0.009	0.010	0.036
2003	AVG	6.67	2250	281	0.004	0.006	10.64	10.87	0.008	0.045	0.045
	STD	0.23	80	25	0.003	0.008	1.78	2.09	0.008	0.015	0.018
	MAX	7.08	2390	329	0.012	0.024	14.00	15.60	0.014	0.067	0.068
	MIN	6.38	2150	251	0.001	0.001	8.20	8.31	0.003	0.010	0.005
2004	AVG	6.56	2252	278	0.003	0.003	11.01	12.01	0.003	0.047	0.058
	STD	0.22	142	22	0.002	0.003	3.39	2.95	0.000	0.013	0.015
	MAX	6.92	2450	314	0.007	0.009	15.60	15.70	0.003	0.065	0.096
	MIN	6.33	1940	229	0.001	0.001	5.35	6.16	0.003	0.028	0.046
2005	AVG	6.56	2275	265	0.001	0.001	11.5	11.79		0.0477	0.0488
	STD	0.14	120	69	0.001	0.001	2.3	2.14		0.0071	0.0078
	MAX	6.77	2450	438	0.003	0.005	14.9	15.1		0.057	0.058
	MIN	6.25	2120	122	0.001	0.001	6.9	9.29		0.0377	0.0372
2006	AVG	6.60	2240	269	0.003	0.005	10.2	10.41	0.017	0.0411	0.042
	STD	0.19	126	15	0.003	0.007	1.9	1.84	0.000	0.0081	0.008
	MAX	6.91	2390	285	0.010	0.025	13.2	13.00	0.017	0.0550	0.055
	MIN	6.29	2000	235	0.001	0.001	6.9	7.03	0.017	0.0281	0.028
2007	AVG	6.56	2635	237	0.009	0.011	16.71	17.22	0.074	0.094	0.095
	STD	0.24	317	39	0.007	0.006	6.49	7.31	0.070	0.035	0.036
	MAX	6.94	3040	282	0.028	0.020	26.10	28.10	0.219	0.135	0.142
	MIN	6.28	2030	163	0.004	0.005	8.12	6.74	0.003	0.047	0.048
2008	AVG	6.37	2683	220	0.007	0.011	15.90	16.10	0.013	0.096	0.095
	STD	0.18	78	64	0.005	0.011	1.70	2.00	0.029	0.011	0.013
	MAX	6.67	2780	271	0.021	0.041	19.90	20.10	0.100	0.110	0.116
	MIN	5.98	2580	27	0.004	0.003	14.20	14.30	0.003	0.079	0.077
2009	AVG	6.50	2708	210	0.006	0.009	17.80	17.80	0.033	0.102	0.102
	STD	0.21	103	28	0.006	0.011	3.90	4.10	0.040	0.015	0.017
	MAX	6.77	2910	259	0.023	0.034	25.70	26.10	0.100	0.131	0.138
	MIN	6.23	2600	151	0.002	0.003	12.90	12.90	0.005	0.080	0.079
2010	AVG	6.42	2845	195	0.008	0.011	19.41	19.02	0.037	0.114	0.116
	STD	0.25	335	26	0.008	0.008	5.29	5.68	0.037	0.028	0.029
	MAX	7.01	3330	233	0.029	0.026	25.10	24.90	0.100	0.143	0.148
	MIN	6.03	2020	153	0.002	0.002	8.46	8.26	0.005	0.054	0.057
2011	AVG	6.32	3196	152	0.036	0.062	26.74	28.28	0.237	0.175	0.184
	STD	0.33	341	51	0.046	0.082	6.52	7.92	0.295	0.053	0.065
	MAX	6.89	3820	214	0.150	0.279	37.80	46.70	0.962	0.279	0.352
	MIN	5.84	2860	34	0.003	0.003	17.60	17.90	0.015	0.099	0.112
2012	AVG	6.17	3288	123	0.052	0.079	29.57	31.12	0.399	0.203	0.218
	STD	0.30	380	49	0.058	0.090	5.26	6.50	0.462	0.045	0.049
	MAX	6.92	3820	180	0.193	0.288	36.90	41.20	1.760	0.319	0.333
	MIN	5.77	2660	28	0.003	0.005	16.40	16.20	0.015	0.127	0.123

Averages

	pH	SO4	CaCO3	Cu(d)	Cu(t)	Zn(d)	Zn(t)	Al(d)	Cd(d)	Cd(t)
1985	4.83			6.050		7.30				
1986	5.42	1534		3.030		5.66				
1987	7.52	1070	192	0.019		0.34		0.021	0.004	
1988	7.49	959	212	0.017		1.10		0.165	0.024	
1989	7.22	1307	291	0.034		2.12		0.015	0.023	
1990	7.31	1313	260	0.540	0.561	4.87	4.87	0.012	0.064	0.358
1991	7.48	1409	328	0.314	0.342	4.19	4.27	0.045	0.038	0.001
1992	7.72	1365	290	0.273	0.343	5.02	5.47	0.125	0.045	
1993	7.53	1295	269	0.172	0.202	5.43	5.65	0.077	0.044	
1994	7.18	1441	301	0.186	0.209	7.24	7.46	0.084	0.052	0.060
1995	7.09	1435	329	0.112	0.122	6.89	7.14	0.200	0.046	0.047
1996	6.87	1538	310	0.056	0.073	8.36	8.58	0.006	0.054	0.055
1997	6.93	1574	316	0.020	0.026	11.16	11.43	0.200	0.065	0.067
1998	7.41	1662	263	0.009	0.011	11.25	11.21	0.100	0.061	0.063
1999	6.80	1942	264	0.008	0.010	12.11	12.34	0.100	0.060	0.060
2000	6.86	1948	300	0.003	0.004	10.34	10.59		0.047	0.048
2001	6.69	2036	304	0.005	0.005	8.93	8.96	0.033	0.044	0.042
2002	6.68	2242	272	0.017	0.021	9.61	9.60	0.064	0.044	0.050
2003	6.67	2250	281	0.004	0.006	10.64	10.87	0.008	0.045	0.045
2004	6.56	2252	278	0.003	0.003	11.01	12.01	0.003	0.047	0.058
2005	6.56	2275	265	0.001	0.001	11.50	11.79		0.048	0.049
2006	6.60	2240	269	0.003	0.005	10.22	10.41	0.017	0.041	0.042
2007	6.56	2635	237	0.009	0.011	16.71	17.22	0.074	0.094	0.095
2008	6.37	2683	220	0.007	0.011	15.90	16.10	0.013	0.096	0.095
2009	6.50	2708	210	0.006	0.009	17.80	17.80	0.033	0.102	0.102
2010	6.42	2845	195	0.008	0.011	19.41	19.02	0.037	0.114	0.116
2011	6.32	3196	152	0.036	0.062	26.74	28.28	0.237	0.175	0.184
2012	6.17	3288	123	0.052	0.079	29.57	31.12	0.399	0.203	0.218

STATION: TAILINGS SUPERNATANT (RECLAIM)

	AMMONIA NITROGEN mg/L	TOTAL CYANIDE mg/L	WAD CYANIDE mg/L	THIO CYNANATE mg/L	CYANATE mg/L	DISSOLVED COPPER mg/L	DISSOLVED ZINC mg/L	DISSOLVED CADMIUM mg/L	pH pH unit	SPECIFIC CONDUCT(L) µS/cm	DISSOLVED SULPHATE mg/L
22-Jan-01	25.8					0.088	0.121	0.0018	6.81	2577	1420
26-Feb-01	25.4					0.084	0.118	0.0018	6.94	2461	1330
26-Mar-01	25.3	0.0025			2.5	0.087	0.132	0.0018	6.82	2438	1400
25-Jun-01	19.8	0.0025	0.0025	0.25	2.5	0.067	0.123	0.0017	6.95	2099	1170
30-Jul-01						0.046	0.113	0.0016	6.89	2105	1170
27-Aug-01	21.9					0.030	0.094	0.0015	6.90	2190	1170
04-Sep-01						0.025	0.104		7.01	2237	
24-Sep-01	24.4					0.030	0.090	0.0014	6.91	2178	1170
29-Oct-01	22.4					0.046	0.113	0.0015	7.22	2465	1160
26-Nov-01	19.7					0.030	0.119	<0.01	6.87	2398	1240
18-Dec-01	19.1	0.0025		0.25		0.066	0.109	0.0018	6.44	2340	1310
28-Jan-02	17.5					0.030	0.117	0.0019	6.66	2338	1320
25-Feb-02	23.1					0.050	0.124	0.0019	6.65	2392	1370
25-Mar-02	21.5	0.0025		0.25		0.050	0.135	0.0017	6.57	2523	1730
02-Apr-02	21.6					0.058	0.133				
29-Apr-02	19.0					0.044	0.175	0.0020	6.72	2392	1310
14-Jun-02						0.031	0.080	0.0011			502
24-Jun-02	14.6					0.039	0.114	0.0016	6.80	1830	1030
29-Jul-02	14.6					0.032	0.132	0.0017	6.50	1027	994
01-Aug-02	14.1								6.80	950	
23-Sep-02	13.0					0.046	0.142	0.0017	6.60	800	1080
30-Sep-02	12.8					0.053	0.126	0.0018	7.54	115	1040
07-Oct-02	16.0					0.050	0.134	0.0018	6.50	790	1300
15-Oct-02	13.7					0.052	0.123	0.0018	6.40	860	1010
21-Oct-02	13.2					0.066	0.132	0.0037	6.40	978	1010
28-Oct-02	14.3					0.062	0.220	0.0033	6.25	1044	1180
04-Nov-02	16.1					0.056	0.134	0.0018	6.10	1110	1200
12-Nov-02	15.0					0.067	0.121	0.0016	6.24	855	1180
25-Nov-02	17.5					0.072	0.143	0.0017	6.24	1126	1150
19-Dec-02	14.0					0.060	0.132	0.0019	6.10	1233	1160
30-Jan-03	19.4	0.007		0.25		0.094	0.154	0.002	6.28	2060	1140
24-Feb-03	15.0					0.082	0.155	0.0026	6.54	2067	1140
31-Mar-03	16.4					0.090	0.161	0.0024	6.40	2108	1110
02-Jun-03	11.8					0.066	0.114	0.0016	6.12	1690	877
30-Jun-03	14.2								6.33	1860	990
28-Jul-03	13.0					0.080	0.134	0.0019	5.64	1840	1010
25-Aug-03	14.8					0.082	0.158	0.0017	5.90	1830	963
29-Sep-03	12.5					0.079	0.138	0.0018	5.92	1840	973
27-Oct-03	12.9					0.071	0.142	0.0015	5.90	1870	1040
24-Nov-03	11.1					0.099	0.146	0.0015	5.40	1920	1000
29-Dec-03	12.2					0.106	0.173	0.0020	5.55	1990	1090
26-Jan-04	13.3					0.092	0.157	0.00184	5.93	1220	1080
23-Feb-04	13.7					0.083	0.189	0.00214	6.26	1470	1020
29-Mar-04	13.2					0.044	0.139	0.00182	7.26	1380	1010
26-Apr-04	3.3					0.056	0.198	0.00208	6.22	678	429
31-May-04	9.6					0.026	0.109	0.00136	7.03	1370	754
28-Jun-04	9.0					0.018	0.109	0.00132	6.97	1400	904
26-Jul-04	7.8					0.010	0.113	0.00141	6.90	1400	899
30-Aug-04	9.8					0.006	0.0699	0.0013	7.85	1420	888
27-Sep-04	6.0					0.005	0.084	0.00163	6.95	1280	904
25-Oct-04	8.9					0.005	0.0771	0.0012	7.01	1140	877
29-Nov-04	8.7					0.026	0.076	0.0015	6.87	1310	966
20-Dec-04	8.9					0.018	0.122	0.0018	6.48	1230	938
31-Jan-05	9.2					0.012	0.084	0.0016	6.93	1790	934
28-Feb-05	8.4					0.011	0.093	0.0018	7.03	1790	997
28-Mar-05	9.3					0.016	0.113	0.0019	6.86	1760	955
25-Apr-05	2.6					0.006	0.038	0.0005	6.89	741	272
30-May-05	7.4					0.011	0.127	0.0014	6.92	1350	812
26-Jun-05	7.2					0.007	0.072	0.0013	6.77	1390	749
25-Jul-05	6.4					0.009	0.078	0.0014	7.04	1130	719
29-Aug-05	5.9					0.011	0.079	0.0014	7.20	1630	849
26-Sep-05	7.2					0.016	0.088	0.0015	6.12	1650	778
31-Oct-05	5.3	<0.0050		0.55		0.029	0.094	0.0015	6.01	1620	827
28-Nov-05	5.6					0.036	0.104	0.0015	7.05	1660	845
19-Dec-05	6.1					0.052	0.127	0.0020	6.76	1780	941
23-Jan-06	5.4					0.050	0.124	0.0020	6.56	1780	920
27-Feb-06	6.3					0.061	0.122	0.0022	7.24	1780	900
27-Mar-06	4.5					0.056	0.135	0.0019	6.32	1800	901
24-Apr-06	6.7					0.053	0.130	0.0018	6.65	1720	822
29-May-06	4.8					0.055	0.108	0.0017	6.73	1480	651
26-Jun-06	4.2					0.062	0.104	0.0020	6.75	1530	703
24-Jul-06	4.1					0.062	0.120	0.0017	6.83	1540	779
28-Aug-06	3.7					0.073	0.129	0.0018	6.63	1540	788
25-Sep-06	3.7					0.090	0.154	0.0023	7.06	1570	774
08-Nov-06	3.5					0.098	0.137	0.0020	7.12	1650	772
28-Nov-06	2.9					0.102	0.148	0.0021	7.26	1600	775
21-Dec-06	6.4					0.224	0.382	0.0050	6.27	2950	1650
29-Jan-07	3.6					0.116	0.164	0.0022	6.37	1720	955
26-Feb-07	4.8					0.146	0.236	0.0030	7.50	2180	1090
26-Mar-07	3.6					0.119	0.165	0.0023	6.08	1670	830
30-Apr-07	3.6	<0.0050	<0.0050	0.58	0.51	0.108	0.142	0.0023	6.39	1670	842
24-May-07						0.101	0.156	0.0020	7.45	1570	711
28-May-07	2.3					0.150	0.342	0.0040	6.56	1290	635
25-Jun-07	2.6					0.092	0.131	0.0050	7.05	1500	716
30-Jul-07	2.2					0.025	0.097	0.0017	7.05	1380	665
27-Aug-07	1.9					0.017	0.098	0.0017	7.37	1420	685
24-Sep-07	1.7					0.021	0.103	0.0018	7.23	1390	679
15-Oct-07						0.023	0.104	0.0017	7.31	1410	683
29-Oct-07	1.5					0.028	0.108	0.0017	7.12	1370	637
26-Nov-07	1.0					0.027	0.122	0.0018	7.19	1620	803
17-Dec-07	1.4					0.054	0.160	0.0026	7.18	1820	935

	AMMONIA NITROGEN mg/L	TOTAL CYANIDE mg/L	WAD CYANIDE mg/L	THIO CYNANATE mg/L	CYANATE mg/L	DISSOLVED COPPER mg/L	DISSOLVED ZINC mg/L	DISSOLVED CADMIUM mg/L	pH pH unit	SPECIFIC CONDUCT(L) µS/cm	DISSOLVED SULPHATE mg/L
30-Jan-08	1.78					0.0604	0.176	0.00270	6.14	801	859
25-Feb-08	1.34					0.0443	0.132	0.00185	6.95	1475	727
31-Mar-08	1.24					0.0438	0.132	0.00191	6.79	1467	739
28-Apr-08	0.87					0.0403	0.110	0.00158	7.08	1195	568
26-May-08	0.852					0.0361	0.111	0.00118	6.75	1052	498
30-Jun-08	0.899					0.0376	0.118	0.00175	6.83	1296	643
28-Jul-08	0.716					0.0165	0.114	0.000804	6.81	1322	658
25-Aug-08	0.209					0.0296	0.116	0.00172	7.04	1316	651
26-Sep-08	0.536					0.0402	0.138	0.00190	6.85	1329	610
27-Oct-08	0.483					0.0347	0.128	0.00190	6.87	1423	654
24-Nov-08	0.480					0.0324	0.123	0.00180	7.14	1423	701
22-Dec-08	0.491					0.0432	0.132	0.00200	6.71	1451	716
26-Jan-09	0.459					0.0417	0.138	0.00192	6.71	1472	701
23-Feb-09	0.492					0.0406	0.148	0.00195	6.67	1462	731
30-Mar-09	0.471					0.0492	0.135	0.00194	7.02	1501	668
28-Apr-09	0.478					0.0496	0.141	0.00198	7.33	1458	736
26-May-09	0.059					0.0153	0.087	0.00078	6.43	211	68
30-Jun-09	0.322					0.0258	0.109	0.00159	7.10	1243	562
27-Jul-09	0.253					0.0133	0.088	0.00134	7.09	1220	621
31-Aug-09						0.0125	0.088	0.00146	7.27	1324	584
28-Sep-09	0.203	<0.0050				0.0098	0.086	0.00129	7.15	1327	576
27-Oct-09	0.178					0.0078	0.087	0.00125	7.34	1299	578
30-Nov-09	0.169					0.0089	0.095	0.00133	7.13	1321	612
21-Dec-09	0.192								7.04	1357	591
25-Jan-10	0.18					0.0123	0.102	0.00134	7.08	1338	681
22-Feb-10	0.200					0.0117	0.111	0.00153	6.98	1446	730
30-Mar-10	0.216					0.0144	0.126	0.00170	6.91	1489	809
27-Apr-10	0.064					0.0058	0.048	0.00053	6.78	764	462
25-May-10	0.117					0.0226	0.107	0.00137	6.61	966	417
29-Jun-10	0.009					0.0059	0.074	0.00097	7.04	1178	550
26-Jul-10	0.101					0.0038	0.046	0.00077	7.08	1199	621
31-Aug-10	0.115					0.0033	0.041	0.00075	7.23	1226	601
27-Sep-10	0.113					0.0025	0.042	0.00069	6.93	1190	607
25-Oct-10	0.099					0.0053	0.051	0.00071	6.97	1213	604
29-Nov-10	0.113					0.0044	0.072	0.00078	6.86	1537	814
20-Dec-10	0.111					0.0053	0.063	0.00084	6.88	1291	646
31-Jan-11	0.2					0.0117	0.222	0.00205	6.78	3416	2010
1-Mar-11	0.117					0.0048	0.072	0.00084	6.91	1369	677
29-Mar-11	0.107					0.0049	0.075	0.00070	6.83	1326	683
26-Apr-11	0.103					0.0050	0.115	0.00084	6.96	1425	678
30-May-11	0.0427					0.0535	0.193	0.00196	5.91	594	271
27-Jun-11	0.115					0.0075	0.062	0.00082	6.96	1089	556
25-Jul-11	0.067					0.0046	0.041	0.00060	7.25	1073	524
26-Aug-11	0.0347					0.0030	0.028	0.00046	7.36	1100	521
26-Sep-11	0.0213					0.0021	0.028	0.00040	6.93	1098	557
31-Oct-11	0.023					0.0024	0.031	0.00038	7.24	1099	563
28-Nov-11	0.0602					0.0042	0.044	0.00048	7.04	1168	587
19-Dec-11	0.0278					0.0028	0.038	0.00044	6.96	1136	582
30-Jan-12	0.0567					0.0037	0.046	0.00047	6.85	1208	546
27-Feb-12	0.042					0.0031	0.061	0.00052	6.87	1182	536
26-Mar-12	0.0638					0.0046	0.085	0.00057	6.84	1261	570
30-Apr-12	0.049					0.0384	0.087	0.00088	6.71	978	472
28-May-12	0.0284					0.0324	0.127	0.00151	6.49	688	300
25-Jun-12	0.079					0.0036	0.036	0.00048	7.23	994	500
30-Jul-12	0.0443					0.0026	0.020	0.00032	7.42	1004	429
27-Aug-12	0.271					0.0028	0.015	0.00026	7.37	1011	440
24-Sep-12	0.0203					0.0024	0.014	0.00023	7.24	1030	519
31-Oct-12	0.011					0.0025	0.018	0.00023	7.04	1054	493
19-Nov-12	0.0071					0.0029	0.020	0.00029	7.03	1071	494
17-Dec-12	0.0129					0.0037	0.034	0.00030	7.14	1092	511

c:/excwlfil/monitor/tailannual.xls

Averages:	AMMONIA	CYANIDE	WAD Cyanide	Thio Cyanate	Cyanate	Cu (d)	Zn (d)	Cd (d)	pH	Conductivity	Sulphate
1993	36.9	3.863	2.407	224.45	42.07	7.241	0.171		7.63	4092	
1994	42.3	0.893	0.306	120.05	24.98	0.759	0.184	0.0033	7.24	3725	1873
1995	57.3	0.049	0.025	41.11	12.49	0.023	0.045	0.0014	7.52	3230	1794
1996	53.3	0.008	0.006	0.640	9.55	0.010	0.032	0.0004	7.45	3305	1701
1997	45.9	0.005	0.005	0.500	7.16	0.021	0.073	0.0008	7.18	2947	1592
1998	31.4	0.004	0.003	0.329	6.21	0.047	0.112	0.0012	6.93	2524	1386
1999	26.8	0.005	0.004	0.250	7.17	0.097	0.124	0.0017	6.48	2496	1415
2000	23.3	0.004	0.003	0.250	5.033	0.090	0.130	0.0019	6.75	2388	1298
2001	22.6	0.003	0.003	0.250	2.500	0.054	0.112	0.0017	6.89	2317	1254
2002	16.2	0.003		0.250		0.051	0.134	0.0019	6.53	1315	1151
2003	13.9	0.007		0.250		0.085	0.148	0.0019	6.00	1916	1030
2004	9.9					0.032	0.120	0.0016	6.81	1275	889
2005	6.7	<0.0050		0.550		0.018	0.091	0.0015	6.80	1524	807
2006	4.7					0.082	0.149	0.0022	6.79	1745	870
2007	2.5	<0.0050	<0.0050	0.58	0.51	0.073	0.152	0.0024	6.99	1572	776
2008	0.82					0.038	0.128	0.0018	6.83	1296	669
2009	0.30	<0.0050				0.025	0.109	0.0015	7.02	1266	586
2010	0.12					0.008	0.074	0.0010	6.95	1236	629
2011	0.08					0.009	0.079	0.0008	6.93	1324	564
2012	0.04					0.009	0.047	0.0005	7.02	1048	484

Note: Averages do not include months with obvious dilution effects

APPENDIX II

DATA TABLES AND GRAPHS FOR GROUNDWATER WELLS

Contents (in order of appearance):

PIEZOMETER MONITORING DATA (1990-2012)

STATION: RH82-06-01 #1 Dam Seepage Pond Piezometer

Date	LAB pH pH unit	DISSOLVED SULPHATE mg/L	TOTAL ALKALINITY mg/L	SPECIFIC CONDUCT(L) µS/cm	DISSOLVED ALUMINIUM mg/L	DISSOLVED CADMIUM mg/L	DISSOLVED COPPER mg/L	DISSOLVED ZINC mg/L
06/05/91	7.30	217	371		0.022	0.0002	0.002	0.005
10/30/91	7.60	146	384		0.008	0.0002	0.006	0.005
06/24/92	7.35	188		967	0.005	<0.0002	<0.001	<0.005
11/02/92	7.36	347	417	1000	0.020	<0.0002	<0.001	<0.005
05/26/93	7.50	199	393	1050	0.049	<0.0002	0.002	<0.005
10/19/93	7.53	196	431	1030	<0.005	<0.0002	<0.001	<0.005
06/06/94	7.59	191		1090	0.007	<0.0002	<0.001	<0.005
12/13/94	7.28	187		1080	0.030	<0.0002	0.001	0.006
05/02/95	7.42	180		1090	0.010	<0.0002	0.002	<0.005
12/19/95	7.55	179		1090	0.011	<0.0002	<0.005	<0.005
06/28/96	7.58	164		1090	<0.005	<0.0002	0.001	<0.005
04/11/96					0.009	0.0003	<0.001	<0.005
06/30/97	7.55	166		1060	<0.02	<0.0002	<0.001	0.073
12/22/97	7.31	176		988	<0.005	<0.0002	<0.001	<0.005
06/15/98					<0.005	<0.0002	<0.001	<0.005
10/19/98					<0.005	<0.0002	0.001	<0.005
06/21/99	7.47	179		1090	<0.005	<0.0002	<0.001	<0.005
11/12/00	7.34	170		961	<0.03	<0.0002	<0.001	<0.005
11/21/02	7.50	192		585	<0.01	<0.0004	<0.002	<0.005
06/24/03					<0.03	<0.0002	<0.002	<0.005

STATION: RH82-06-02 #1 Dam Seepage Pond Piezometer

Date	LAB pH pH unit	DISSOLVED SULPHATE mg/L	TOTAL ALKALINITY mg/L	SPECIFIC CONDUCT(L) µS/cm	DISSOLVED ALUMINIUM mg/L	DISSOLVED CADMIUM mg/L	DISSOLVED COPPER mg/L	DISSOLVED ZINC mg/L
06/29/90	8.00	277	338		0.005	0.0002	0.001	0.005
06/05/91	7.50	260	354		0.005	0.0002	0.001	0.005
10/30/91	7.80	167	364		0.005	0.0002	0.001	0.005
06/24/92	7.54	231		1020	<0.005	<0.0002	<0.001	0.005
11/02/92	7.56	205	381	1060	0.012	<0.0002	<0.001	<0.005
05/26/93	7.65	234	365	1100	0.028	<0.0002	0.002	<0.005
10/19/93	7.80	238	410	1110	0.005	<0.0002	<0.001	<0.005
06/06/94	7.69	230		1150	0.005	<0.0002	<0.001	<0.005
12/13/94	7.40	233		1140	0.009	<0.0002	<0.001	0.005
05/02/95	7.40	237		1150	0.033	<0.0002	<0.001	<0.005
12/19/95	7.50	245		1150	0.009	<0.0002	<0.005	<0.005
06/28/96	7.78	230		1150	<0.005	<0.0002	0.001	<0.005
04/11/96	7.59	196		1200	0.008	<0.0002	<0.001	<0.005
06/30/97	7.65	249		1150	<0.02	<0.0002	<0.001	0.038
12/22/97	7.44	257		1070	<0.005	<0.0002	<0.001	<0.005
06/15/98	8.04	225		1160	<0.005	<0.0002	<0.001	<0.005
10/19/98	8.23	246		1150	0.006	<0.0002	<0.001	<0.005
06/21/99	7.57	257		1220	<0.005	<0.0002	0.003	<0.005
08/11/99	7.83	256		1220	<0.005	<0.0002	<0.001	<0.005
11/12/00	7.51	191		1070	<0.03	<0.0002	<0.001	<0.005
12/10/01	7.96	299		1458	<0.005	<0.0002	<0.05	<0.005
11/21/02	7.65	254		613	<0.01	<0.0004	<0.002	<0.005
06/24/03	7.67	237		1240	<0.03	<0.0002	<0.002	<0.005
06/23/05	7.76	273		1220	<0.010	<0.00020	<0.0010	<0.0050
11/08/05	7.6	256		1210	<0.010	<0.00020	<0.0016	<0.0050

05/25/06	7.51	200	1220	<0.010	<0.00020	<0.0010	<0.0050
10/25/06	7.33		1240	0.011	<0.00020	<0.0010	0.0051
06/28/07	7.56	269	1230	<0.20	<0.00010	<0.00020	<0.0050
09/25/07	6.81	274	1240	0.0134	<0.00025	0.00187	<0.0050
06/24/08	6.65	272	898	<0.20	<0.00010	0.00092	<0.0050
10/15/08	8.23	284	1225	0.0017	<0.000050	0.00028	<0.0050
07/13/09	7.95	260	1224	<0.0020	<0.00010	0.00022	<0.0050
10/07/09	7.68	285	1234	<0.0020	<0.00010	<0.00020	<0.0050
06/21/10	7.48	281	1236	<0.0050	<0.00025	<0.00050	<0.0050
06/22/11	7.57	288	1216	<0.0060	0.000130	<0.0010	<0.0050
08/25/11	7.64	277	1232	<0.0060	<0.00010	<0.0010	<0.0050
06/06/12	7.45	275	1232	<0.0030	<0.000050	<0.00050	<0.0050
08/14/12	7.56	277	1235	<0.20	<0.000050	<0.00050	<0.0050

STATION: RH82-06A #1 Dam Seepage Pond Piezometer

Date	LAB pH pH unit	DISSOLVED SULPHATE mg/L	TOTAL ALKALINITY mg/L	SPECIFIC CONDUCT(L) µS/cm	DISSOLVED ALUMINIUM mg/L	DISSOLVED CADMIUM mg/L	DISSOLVED COPPER mg/L	DISSOLVED ZINC mg/L
06/29/90	7.60	214	330		0.009	0.0002	0.001	0.005
06/05/91	7.30	200	364		0.008	0.0002	0.001	0.005
10/30/91	8.00	142	381		0.005	0.0002	0.001	0.005
06/24/92	7.42	173		915	0.011	<0.0002	<0.001	0.005
11/02/92	7.42	250	401	956	0.031	<0.0002	0.003	<0.005
05/26/93	7.40	188	382	1010	0.033	<0.0002	<0.001	0.006
10/19/93	7.39	182	416	978	<0.005	<0.0002	<0.001	<0.005
06/06/94	7.69	178		1030	0.008	0.0002	<0.001	0.008
12/13/94	7.22	176		1030	0.013	<0.0002	<0.001	<0.005
05/02/95	7.19	172		1040	0.013	<0.0002	0.002	<0.005
12/19/95	7.27	169		1040	0.012	<0.0002	<0.005	<0.005
06/28/96	7.54	144		994	0.009	<0.0002	<0.001	<0.005
04/11/96	7.36	155		1040	0.012	<0.0002	0.003	<0.005
06/30/97	7.39	156		978	<0.02	<0.0002	0.002	<0.005
12/22/97	7.29	164		909	<0.005	<0.0002	<0.001	<0.005
06/15/98	7.92	172		966	<0.005	<0.0002	<0.001	<0.005
10/19/98	8.07	149		930	<0.005	<0.0002	0.002	<0.005
06/21/99	7.30	164		994	<0.005	<0.0002	<0.001	<0.005
08/11/99	7.58	164		971	0.01	<0.0002	<0.001	<0.005
11/12/00	7.48	275		1227	<0.03	<0.0002	<0.001	<0.005
12/10/01	7.25	173		1176	<0.005	<0.0002	<0.001	<0.005
11/21/02	7.43	177		560	<0.01	<0.0004	<0.002	<0.005
06/24/03	7.44	185		1010	<0.03	<0.0002	<0.002	<0.005
12/22/03	7.35	181		986	<0.0050	<0.00020	<0.0010	<0.0050
08/23/04	7.32	173		649	<0.010	<0.00020	<0.0010	<0.0050
11/09/04	7.22	173		660	<0.20	<0.00040	0.00031	<0.0050
06/23/05	7.18	167		912	<0.010	<0.00020	<0.0010	<0.0050
11/08/05	7.28	174		915	<0.010	<0.00020	<0.0010	<0.0050
05/25/06	7.21	142		911	<0.010	<0.00020	<0.0010	<0.005
10/25/06	6.65	176		932	0.028	<0.00020	0.0012	<0.0050
06/28/07	7.45	175		914	<0.20	<0.00010	0.00043	<0.0050
09/25/07	6.91	174		896	<0.0010	<0.000050	0.00028	<0.0050
06/24/08	7.43	190		1231	<0.20	<0.00010	0.00039	<0.0050
10/15/08	7.20	183		882	<0.0020	<0.00010	0.00032	<0.0050
07/13/09	7.57	171		888	<0.0010	<0.000050	0.0002	<0.0050
10/07/09	7.31	174		862	<0.0010	<0.000050	0.00011	<0.0050
06/21/10	7.34	169		866	<0.0020	<0.00010	0.00029	<0.0050
08/26/10	7.39	165		855	<0.20	<0.00010	<0.00020	<0.0050
06/22/11	7.36	180		874	<0.0030	<0.000050	<0.00050	<0.0050
08/25/11	7.39	175		850	<0.0030	<0.000050	<0.00050	<0.0050
06/06/12	7.37	176		906	<0.0030	<0.000050	<0.00050	<0.0050
08/14/12	7.36	163		850	<0.20	<0.000050	<0.00050	<0.0050

STATION: RH82-02-1 West Side of Waste Dump Piezo

Date	LAB pH pH unit	DISSOLVED SULPHATE mg/L	TOTAL ALKALINITY mg/L	SPECIFIC CONDUCT(L) µS/cm	DISSOLVED ALUMINIUM mg/L	DISSOLVED CADMIUM mg/L	DISSOLVED COPPER mg/L	DISSOLVED ZINC mg/L
07/10/90	8.20	90	199		0.005	0.0003	0.001	0.005
06/05/91	8.10	87	189		0.013	0.0002	0.001	0.005
09/27/91	7.70	115			0.009	0.0002	0.001	0.005
10/30/91	7.70	87	198		0.006	0.0002	0.001	0.005
06/24/92	7.33	81		466	0.010	<0.0002	0.001	<0.005
09/14/92	7.88	94	190	497	0.021	<0.0002	<0.001	0.010
11/02/92	7.91	104	175	504	0.019	<0.0002	0.008	0.006
05/26/93	7.64	98	191	519	0.031	<0.0002	0.002	<0.005
11/01/93	7.69	89	195	525	0.005	<0.0002	0.001	<0.005
06/06/94	7.91	95		531	0.006	<0.0002	<0.001	0.007
09/26/94	7.65	92		546	0.009	<0.0002	<0.001	<0.005
06/29/95	7.71	98		515	0.028	<0.0002	0.001	<0.005
06/28/96	7.66	92		529	0.007	<0.0002	0.001	<0.005
09/23/96	7.62	91		508	0.007	<0.0002	<0.001	<0.005
06/15/98	7.90	81		430	0.007	<0.0002	0.001	<0.005
09/28/98	8.02	88		506	<0.005	<0.0002	<0.001	<0.005
10/19/98	8.06	84		509	<0.005	<0.0002	<0.001	<0.005
06/21/99	7.80	97		526	<0.005	<0.0002	<0.001	<0.005
09/20/99	7.89	100			<0.005	<0.0002	<0.001	<0.005
06/28/01	7.82	101		540	0.01	<0.0002	<0.001	<0.005
09/10/01	7.51	103		581	0.007	<0.0002	<0.001	<0.005
06/24/03	7.53	108		546	<0.03	<0.0002	<0.002	<0.005
08/23/04	7.44	106		401	<0.010	<0.0002	<0.001	<0.005
06/23/05	7.93	109		554	<0.010	<0.00020	<0.0010	<0.0050
05/25/06	7.26	91		544	<0.010	<0.00020	0.0013	<0.0050
10/25/06	6.74	108		572	<0.010	0.00023	0.0022	<0.0050
06/28/07	6.81	112		580	<0.20	0.000067	0.00034	<0.0050
06/24/08	6.96	117		547	<0.20	<0.000050	0.0005	<0.0050
10/15/08	8.1	113		554	0.016	0.00047	0.0047	0.0062
07/13/09	7.85	111		557	0.004	0.00007	0.0003	<0.0050
10/07/09	7.53	114		548	0.002	<0.000050	0.0002	0.0260
no data in 2010/2011 - nitrogen port not functional								
06/06/12	7.4	119		569	0.022	<0.00015	0.0047	0.0196
08/14/12	7.48	119		570	<0.20	<0.000050	0.0010	0.0145

STATION: RH82-03-01 Getty Creek Piezometer

Date	LAB pH pH unit	DISSOLVED SULPHATE mg/L	TOTAL ALKALINITY mg/L	SPECIFIC CONDUCT(L) µS/cm	DISSOLVED ALUMINIUM mg/L	DISSOLVED CADMIUM mg/L	DISSOLVED COPPER mg/L	DISSOLVED ZINC mg/L	DISSOLVED IRON mg/L
06/29/90	6.00	372	10.4		0.027	0.0004	0.002	0.16	42.0
10/11/90		291	8.5		0.085		0.009	0.15	35.8
05/06/91	6.10	384	1		0.072	0.0006	0.03	0.131	39.9
09/27/91	5.40	441			0.086	0.0004	0.007	0.107	32.4
10/30/91	5.40	359	1.4		0.11	0.0003	0.031	0.112	39.2
03/23/92	6.00	384	47.6		0.044	0.0002	0.001	0.005	46.7
06/24/92	6.02	346		779	0.02	<0.0002	<0.001	0.02	38.7
09/14/92	6.18	399	53.9	841	0.059	<0.0002	<0.001	0.082	33.3
02/11/92	6.41	407	42	857	0.029	<0.0002	<0.001	0.061	39.3
03/15/93	5.92	282		895	0.089	0.0003	0.002	0.144	50.7
05/26/93	5.78	461	28	896	0.156	0.0002	0.006	0.139	52.0
09/13/93	6.05	460		997	0.134	0.0002	0.001	0.093	30.1
10/19/93	6.54	468	42.2	908	0.061	<0.0002	0.002	0.138	47.7

03/21/94	5.68	500	30.8	970	0.155	0.0006	0.002	0.187	53.0
06/06/94	5.95	482		971	0.103	<0.0002	0.001	0.153	54.1
09/26/94	5.54	480		970	0.162	0.0005	0.006	0.188	58.0
12/19/94	5.74	497		987	0.086	0.0002	0.003	0.173	56.6
03/24/95	5.99	537		971	0.11	<0.0002	0.003	0.168	65.1
02/05/95	5.64	543		1020	0.21	0.0003	0.002	0.162	48.0
09/26/95	5.78	554		1030	0.151	<0.0002	0.003	0.128	58.8
12/19/95	5.69	637		1050	0.112	0.0004	<0.005	0.17	60.0
03/25/96	5.62	518	38.4	1000	0.075	0.0005	<0.001	0.172	51.1
06/28/96	5.80	482		984	0.062	0.0003	<0.001	0.17	53.3
09/23/96	6.03	578		1010	0.093	0.0004	0.009	0.175	53.1
04/11/96	5.96	456		1060	0.078	0.0003	<0.005	0.165	52.5
03/31/97	5.84	553		1020	0.184	0.0003	0.002	0.164	51.5
06/30/97	5.19	494		990	0.07	0.0003	0.002	0.169	53.7
09/29/97	5.83	550		1010	0.061	0.0003	0.004	0.184	52.7
12/22/97	5.65	478		945	0.06	0.0009	0.001	0.167	53.0
03/16/98	5.77	544	39.0	977	0.113	0.0006	0.002	0.231	62.4
06/15/98	6.27	605		991	0.058	0.0003	0.001	0.175	50.0
09/28/98	6.25	505		999	0.075	0.0004	<0.001	0.174	55.6
10/19/98	6.35	420		988	0.072	0.0003	<0.001	0.181	57.4
08/03/99	6.00	612		1070	0.07	0.0005	<0.001	0.185	61.2
06/29/99	5.36	641		1100	0.183	0.0013	0.012	0.195	54.0
09/20/99	6.21	646			0.065	<0.0002	<0.001	0.023	69.6
08/11/99	6.10	606		1150	0.082	<0.0002	<0.001	0.023	73.7
27/03/00	6.50	612		1130	0.075	<0.0002	<0.001	0.038	72.3
28/06/00	6.22	617		1110	0.069	<0.0002	<0.001	0.006	75.4
20/09/00	5.82	654	64		<0.2	<0.01	<0.01	0.027	71.7
11/12/00	6.81	602		1105	0.08	0.0007	<0.001	0.190	54.0
03/19/01	6.22	675		1238	0.098	<0.0002	<0.001	0.024	73.6
06/28/01	6.33	600		1115	0.096	0.0005	0.001	0.176	52.5
09/10/01	6.45	485		1225	0.134	0.0006	<0.001	0.137	37.3
12/10/01	6.90	398		1026	0.070	0.0003	<0.05	0.085	26.5
03/25/02	6.72	409	104	1016					32.0
11/21/02	5.80	755		567	0.120	0.0407	0.012	0.243	68.0
03/10/03	5.69	704	42	1266	0.139	0.0004	<0.001	0.146	72.0
06/24/03	5.63	805		1360	0.170	<0.0002	<0.002	0.105	69.2
09/29/03	5.75	816	41	1330		<0.001	0.002	0.064	79.0
12/22/03	5.60	836		1360	0.113	<0.00020	0.001	0.108	75.0
03/29/04	5.56	755	44	969		0.00088	0.007	0.250	75.5
08/23/04	5.55	774		964	0.107	0.00092	0.001	0.276	84.7
11/09/04	5.50	733		976	<0.20	<0.0010	0.002	0.254	77.0
03/21/05	5.76	726		1260	0.127	0.00103	<0.002	0.242	80.6
06/23/05	5.84	748		1180	0.113	0.00074	<0.0010	0.251	69.4
10/31/05	5.47	737	44.5	1360	0.119	0.00069	0.001	0.242	70.0
04/03/06	5.85	699	57.3	1350	0.112	<0.00020	<0.0010	<0.0050	70.4
05/25/06	6.30	672		1370	0.115	<0.00020	<0.0010	0.0154	77.6
10/25/06	5.90	742		1420	0.183	0.00088	0.0026	0.0146	81.4
03/19/07	5.74	796		1490	0.293	0.00144	0.00213	0.296	81.2
06/28/07	5.92	829		1470	<0.20	<0.00010	0.00058	0.0170	81.4
09/25/07	5.55	779		1480	0.153	<0.00025	0.00055	0.0056	84.6
04/21/08	5.96	803	41.2	1482	0.16	<0.00025	0.00071	0.0187	80.6
06/24/08	5.78	840		1473	0.21	0.00152	0.00143	0.0253	81.9
10/14/08	6.69	821		1516	0.50	0.00499	0.00965	0.3230	76.3
03/23/09	5.75	885		1550	0.35	0.00196	0.00053	0.3450	79.6
07/13/09	5.82	829		1560	0.22	0.00193	0.00345	0.2800	82.8
10/07/09	5.54	849		1544	<0.20	0.00093	0.00085	0.2280	83.7
03/15/10	5.68	821	37.1	1613	0.17	0.00113	0.00086	0.2410	85.4
06/21/10	5.62	856		1613	0.17	0.00026	<0.00050	0.0732	88.2
08/26/10	5.59	906		1638	0.23	0.00050	<0.00050	0.2100	89.5
11/08/10	5.40	952	40.3	1602	0.22	<0.00025	<0.0025	0.0435	87.4
03/21/11	5.66	908		1679	0.21	0.00042	<0.0025	0.1860	86.4
06/22/11	5.59	976		1683	0.23	<0.00025	<0.0025	0.1780	89.8
08/25/11	5.62	993		1686	0.25	<0.00025	<0.0025	<0.0050	91.2
12/08/11	5.43	919	16.7	1667	0.25	0.00031	<0.0025	0.2200	90.7
03/07/12	5.61	961	41.4	1710	0.24	<0.00025	<0.0025	<0.0050	90.3
06/06/12	5.58	984		1727	0.24	<0.00010	<0.0010	0.0168	87.8
08/14/12	5.54	1010		1753	0.29	<0.00010	<0.0010	0.0607	93.3

STATION: RH82-05-03 Bessemer Cr Siltcheck Piezo

Date	LAB pH pH unit	DISSOLVED SULPHATE mg/L	TOTAL ALKALINITY mg/L	SPECIFIC CONDUCT(L) µS/cm	DISSOLVED ALUMINIUM mg/L	DISSOLVED CADMIUM mg/L	DISSOLVED COPPER mg/L	DISSOLVED ZINC mg/L
07/10/90	6.90	270	68.4		0.005	0.0003	0.001	0.005
06/05/91	7.00	265	70.8		0.005	0.0003	0.002	0.005
10/30/91	7.10	187	70.8		0.005	0.0002	0.002	0.005
06/24/92	7.01	280		682	0.006	0.0005	0.002	0.009
11/02/92	6.84	347	71.9	777	0.016	<0.0002	0.003	0.006
05/26/93	6.85	329	72.8	777	0.044	<0.0002	0.002	<0.005
11/01/93	6.69	373	73.8	839	<0.005	0.0003	0.001	0.009
06/06/94	6.94	387		872	0.123	0.0002	0.001	0.011
12/13/94	6.68	391		858	0.016	<0.0002	0.002	0.008
06/29/95	6.83	375		824	0.044	<0.0002	0.003	0.006
12/21/95	7.31	355		795	0.014	0.0002	<0.005	<0.005
06/28/96	6.92	314		767	0.005	0.0002	0.003	0.007
04/11/96	6.64	299		785	0.01	<0.0002	<0.001	<0.005
12/22/97	6.65	290		662	0.017	<0.0002	<0.001	<0.005
06/15/98	7.78	276		424	<0.005	<0.0002	<0.001	0.005
10/19/98	7.48	258		665	<0.005	<0.0002	<0.001	<0.005
06/21/99	6.72	249		668	<0.005	<0.0002	<0.001	<0.005
08/11/99	6.89	234		663	<0.005	0.0003	0.001	<0.005

STATION: RH90-10 PIEZOMETER

Date	LAB pH pH unit	DISSOLVED SULPHATE mg/L	TOTAL ALKALINITY mg/L	SPECIFIC CONDUCT(L) µS/cm	DISSOLVED ALUMINIUM mg/L	DISSOLVED CADMIUM mg/L	DISSOLVED COPPER mg/L	DISSOLVED ZINC mg/L
06/05/91	7.40	100	305		0.031	0.0002	0.004	0.021
10/30/91	7.60	85	306		0.031	0.0002	0.002	0.025
06/24/92	7.41	91		651	0.020	<0.0002	<0.001	0.016
11/02/92	7.50	107	293	664	0.057	<0.0002	0.005	0.020
05/26/93	7.55	100	283	691	0.054	<0.0002	0.002	0.014
10/19/93	7.60	96	302	672	0.051	0.0003	0.006	0.047
06/20/94	7.43	89		677	0.007	<0.0002	0.002	0.015
12/19/94	7.37	92		680	0.012	<0.0002	0.003	0.047
06/29/95	7.53	92		664	0.046	<0.0002	<0.001	0.019
06/28/96	7.66	84		665	0.01	<0.0002	0.003	0.012
04/11/96	7.59	86		677	0.022	<0.0002	0.008	0.018
06/30/97	7.62	81		655	<0.02	<0.0002	<0.001	0.009
06/30/98	8.16	84		642	0.065	<0.0002	0.002	0.016
10/19/98	8.11	81		624	0.02	<0.0002	0.002	0.031
06/21/99	7.34	87		665	0.005	<0.0002	0.002	0.044
28/06/00	7.50	89		650	0.06	0.0004	0.010	0.030
06/28/01	7.32	90		749	0.023	<0.0002	<0.001	0.013
08/15/02	7.70	98		530	0.044	<0.0002	0.007	0.022
06/24/03	7.63	96		699	<0.03	<0.0002	<0.002	0.028
08/23/04	7.46	108		504	0.017	0.0002	0.006	0.041
06/23/05	7.84	89		781	0.015	<0.00020	0.001	0.009
11/04/05	7.36	91		684	<0.010	<0.00020	<0.0010	0.011
05/26/06	7.47	81		667	0.01	<0.00020	<0.0010	0.0144
10/25/06	6.81	90		677	0.085	0.00047	0.0154	0.0805
06/28/07	7.55	91		685	<0.20	<0.000050	0.00105	0.0053
09/25/07	7.12	87		673	0.0018	<0.000050	0.00085	<0.0050
06/24/08	7.63	94		662	<0.20	0.0001	0.003	0.013
10/15/08	6.94	88		685	0.009	0.0001	0.002	0.008
07/13/09	7.54	86		670	0.0084	0.0001	0.002	0.007

10/07/09	7.4	91		675	0.0054	0.0001	0.001	0.011
06/21/10	7.48	86		673	0.0069	<0.000050	0.001	0.009
08/26/10	7.45	88		693	<0.20	<0.000050	0.001	<0.0050
06/22/11	7.45	91		668	0.0044	<0.000050	0.001	<0.0050
08/25/11	7.5	97		681	0.0089	<0.00010	0.002	0.010
06/06/12	7.4	93		681	0.008	0.0001	0.002	0.014
08/14/12	7.43	92		691	<0.20	0.0001	0.005	0.019

STATION: RH90-11 PIEZOMETER

Date	LAB pH pH unit	DISSOLVED SULPHATE mg/L	TOTAL ALKALINITY mg/L	SPECIFIC CONDUCT(L) µS/cm	DISSOLVED ALUMINIUM mg/L	DISSOLVED CADMIUM mg/L	DISSOLVED COPPER mg/L	DISSOLVED ZINC mg/L
06/05/91	7.40	484	222		0.026	0.0002	0.004	0.017
06/24/92	7.35	395		1110	0.011	<0.0002	0.004	0.018
11/02/92	7.48	432	230	1100	0.041	0.0003	0.007	0.025
05/26/93	7.50	419	233	1160	0.064	<0.0002	0.004	0.035
10/19/93	7.30	384	221	1070	0.011	<0.0002	0.004	0.037
06/20/94	7.27	398		1100	0.013	<0.0002	<0.001	0.033
06/29/95	7.37	398		1100	0.041	<0.0002	0.002	0.014
06/28/96	7.63	365		1100	0.016	<0.0002	0.007	0.012
06/30/97	7.43	410		1090	<0.01	<0.0002	<0.001	0.005
06/30/98	8.13	386		1080	0.278	<0.0002	0.009	0.01
10/19/98	7.95	376		1040	0.013	<0.0002	0.012	0.038
06/21/99	7.22	384		1110	0.018	0.0002	0.002	0.031
28/06/00	7.38	402		1090	0.063	0.0002	0.006	0.015
06/28/01	7.39			1112	0.031	<0.0002	0.001	<0.005
08/15/02	7.70	382		610	0.015	<0.0002	0.004	<0.005
06/24/03					<0.03	<0.0002	<0.002	0.007
08/23/04	7.41	399		848	0.029	0.0002	0.004	0.025
06/23/05	7.58	370		1020	<0.010	<0.00020	<0.0010	<0.0050
11/04/05	7.37	360		1070	<0.010	<0.00020	<0.0020	0.011
05/26/06	7.46	281		1130	<0.010	<0.00020	<0.0040	0.0325
10/25/06	6.76	367		1090	0.21	<0.00020	0.0031	<0.0050
06/28/07	7.49	361		1080	<0.20	<0.00010	0.00271	0.0092
09/25/07	7.24	334		1070	0.0035	<0.000050	0.00116	<0.0050
06/24/08	7.28	304		1043	<0.20	0.000250	0.00557	0.0203
10/14/08	8.3	303		973	0.0157	<0.00010	0.00081	<0.0050
07/13/09	7.62	290		908	0.153	0.000220	0.00653	0.0143
10/07/09	7.66	307		915	0.0188	0.000400	0.00195	0.0692
06/21/10	7.69	178		559	0.0112	<0.00040	0.00109	<0.0050
08/26/10	7.54	292		956	<0.20	<0.00010	0.00066	0.0067
06/22/11	7.62	26.9		108.4	0.0356	0.000092	0.00603	0.0244
08/25/11	7.62	339		914	0.0074	<0.000050	0.00089	0.0087

STATION: RH90-12 PIEZOMETER

Date	LAB pH pH unit	DISSOLVED SULPHATE mg/L	TOTAL ALKALINITY mg/L	SPECIFIC CONDUCT(L) µS/cm	DISSOLVED ALUMINIUM mg/L	DISSOLVED CADMIUM mg/L	DISSOLVED COPPER mg/L	DISSOLVED ZINC mg/L
11/10/90		115	224					
06/05/91	10.30	107	49.1		0.030	0.0002	0.005	0.005
10/30/91	7.90	102	207		0.110	0.0002	0.005	0.008
06/24/92	7.55	131		623	0.031	<0.0002	0.002	<0.005
11/02/92	7.62	134	234	608	0.221	<0.0002	0.014	0.012
05/26/93	7.60	128	226	640	0.050	<0.0002	0.002	0.008
10/19/93	7.65	116	226	614	0.012	<0.0002	0.003	0.015
06/20/94	7.48	128		656	0.012	<0.0002	0.020	0.015
12/19/94	7.57	109		602	0.010	<0.0002	0.005	0.010

06/29/95	7.77	107		590	0.054	<0.0002	0.002	0.012
12/21/95	7.81	100		585	0.019	<0.0002	<0.005	<0.005
06/28/96	7.80	101		595	0.013	<0.0002	0.002	0.014
04/11/96	7.73	103		618	0.02	<0.0002	0.002	<0.005
06/30/97	7.57	118		621	0.01	<0.0002	0.002	0.02
06/30/98	8.19	85		557	0.008	<0.0002	0.002	0.007
10/19/98	8.13	94		574	0.016	<0.0002	0.003	0.023
06/21/99	7.48	86		589	0.021	0.0004	0.004	0.052
08/11/99	7.87	109		607	0.068	<0.0002	0.002	<0.005
28/06/00	7.58	94			0.06	0.0002	0.011	0.015
11/12/00	7.60	91		566	<0.03	0.0003	<0.001	<0.005
06/28/01	7.53	85		583	0.029	<0.0002	0.005	0.013
12/10/01	7.69	91		646	<0.005	<0.0002	0.001	<0.005
08/15/02	7.70	122		520	0.016	<0.0002	<0.001	<0.005
06/24/03	11.80	62		474	<0.03	<0.0002	<0.002	<0.005
12/22/03	8.27	95		537	0.024	<0.0002	0.003	<0.005
08/23/04	7.74	77		451	0.028	<0.0002	0.003	0.026
11/09/04	7.52	79		418	<0.20	<0.0002	0.001	<0.005
06/23/05	7.41	137		616	<0.010	<0.00020	<0.0010	<0.0050
11/08/05	7.62	98		594	<0.010	<0.00020	0.002	<0.0050
05/26/06	7.61	78		563	<0.010	<0.00020	<0.0010	<0.0050
10/25/06	6.98	61		591	0.064	<0.00020	0.0051	0.0076
06/28/07	7.51	200		805	<0.20	<0.00010	0.00185	0.0091
09/25/07	7.30	216		837	0.0045	<0.00010	0.00030	<0.0050
06/24/08	7.04	244		857	<0.20	<0.000050	0.00019	<0.0050
10/15/08	7.17	257		868	0.00	<0.00010	0.00043	<0.0050
07/13/09	7.5	279		986	0.01	<0.00010	0.00117	0.0067
10/07/09	7.31	289		990	0.00	<0.00010	0.00396	<0.0050
06/21/10	7.36	268		1015	0.01	<0.00010	0.00067	<0.0050
08/26/10	7.41	330		1088	<0.20	<0.00010	<0.00020	<0.0050
06/22/11	7.35	393		1132	0.01	<0.00010	<0.0010	0.0066
08/25/11	7.36	456		1216	<0.0060	<0.00010	<0.0010	<0.0050
06/06/12	7.3	434		1265	0.01	<0.000050	<0.00050	0.0082
08/14/12	7.28	485		1339	<0.20	<0.000050	<0.00050	0.0081

STATION: RH90-13 PIEZOMETER

Date	LAB pH pH unit	DISSOLVED SULPHATE mg/L	TOTAL ALKALINITY mg/L	SPECIFIC CONDUCT(L) µS/cm	DISSOLVED ALUMINIUM mg/L	DISSOLVED CADMIUM mg/L	DISSOLVED COPPER mg/L	DISSOLVED ZINC mg/L
06/05/91	7.50	215	274		0.049	0.0002	0.038	0.008
08/11/99	7.70	644		1690	0.071	0.0006	0.060	0.052
28/06/00	7.33	552		1540	0.220	0.0006	0.170	0.015
11/12/00	7.64	496		1453	0.090	0.0007	0.099	0.033
12/22/03	11.60			1120	0.089	<0.0002	0.009	<0.005
08/23/04	11.7	237		1070	0.219	<0.0002	0.011	0.013
11/09/04	10.9	273		584	0.270	<0.0004	0.024	<0.005
06/23/05	12.2	190		1910	0.456	<0.00020	0.020	<0.0050
11/08/05	12.5	166		2000	0.310	0.0002	0.024	<0.0050
05/26/06	8.31	11		160	0.042	<0.00020	0.0028	<0.0050
10/25/06	12.3	82		3550	0.25	<0.00020	0.0355	0.0068
10/15/08	12.22	31		3130	0.418	<0.00025	0.0461	0.0159
10/07/09	12.1	33		3312	0.728	<0.00025	0.053	<0.0050
08/26/10	12.49	29		3958	<0.20	<0.00025	0.0258	<0.0050
06/22/11	12.55	22		4986	0.081	<0.00025	0.0172	<0.0050
08/25/11	12.44	21		3823	0.133	<0.00025	0.0256	<0.0050
06/06/12	12.28	28		4299	0.169	<0.00014	0.0223	0.0121
08/14/12	12.08	30		2164	0.4	0.00021	0.0554	<0.0050

STATION: RH90-14 PIEZOMETER

Date	LAB pH pH unit	DISSOLVED SULPHATE mg/L	TOTAL ALKALINITY mg/L	SPECIFIC CONDUCT(L) µS/cm	DISSOLVED ALUMINIUM mg/L	DISSOLVED CADMIUM mg/L	DISSOLVED COPPER mg/L	DISSOLVED ZINC mg/L
11/10/90					0.042		0.002	0.005
06/05/91	11.30	518	119		0.050	0.0002	0.014	0.005
10/30/91	12.00	418	495		0.110	0.0002	0.018	0.005
06/24/92	11.90	369		2640	0.091	<0.0002	0.009	0.013
11/02/92	12.00	444	313	2460	0.123	<0.0002	0.020	0.006
05/26/93	11.60	464	244	2020	0.108	<0.0002	0.006	<0.005
10/19/93	11.60	343	197	2270	0.067	<0.0002	0.009	<0.005
06/20/94	12.00	538		2110	0.055	<0.0002	0.005	0.007
12/19/94	11.70	590		1850	0.102	<0.0002	0.013	0.015
06/29/95	11.60	574		2040	0.270	<0.0002	0.012	0.011
12/21/95	11.30	742		1910	0.116	<0.0002	<0.005	<0.005
06/28/96	11.30	555		1860	0.096	<0.0002	0.008	0.009
04/11/96	11.40	699		1880	0.166	0.0003	0.011	0.016
06/30/97	11.40	720		1840	0.151	<0.0002	0.018	0.019
12/29/97	11.00	775		1590	0.011	<0.0002	0.003	<0.005
06/30/98	10.60	825		1520	0.150	<0.0002	0.002	0.011
10/19/98	10.40	670		1400	0.174	<0.0002	0.019	0.014
06/21/99	9.47	792		1470	0.183	<0.0002	0.012	0.025
08/11/99	10.80	867		1720	0.073	<0.0002	0.005	<0.005
28/06/00	11.15	871		1600	0.024	<0.0002	0.050	0.017
11/12/00	11.03	983		1777	0.16	<0.0002	0.017	<0.005
06/28/01	10.97	890		1767	0.223	<0.0002	0.018	<0.005
12/10/01	10.93	890		2055	0.088	<0.0002	<0.05	<0.005
08/15/02	11.70	949		850	0.193	<0.0002	0.015	0.009
06/24/03	11.60	997		1920	<0.03	<0.0002	0.005	<0.005
12/22/03	11.40	1100		2010	0.095	<0.00020	0.007	0.009
08/23/04	10.70	1030		1490	0.093	<0.00020	0.003	0.009
11/09/04	10.60	1190		1440	<0.20	<0.0010	<0.010	<0.005
06/23/05	10.50	1130		1760	0.067	<0.00020	0.004	<0.0050
11/08/05	10.80	996		1980	0.122	<0.00020	0.006	<0.0050
05/26/06	10.5	757		1990	0.064	<0.00020	<0.0040	<0.0050
10/25/06	10.5	1050		1990	0.138	<0.00020	0.0126	0.027
06/28/07	9.73	1040		1980	<0.20	<0.00025	0.00560	<0.0050
09/25/07	10.2	981		1980	0.0708	<0.00025	0.00371	<0.0050
06/24/08	9.69	1140		1963	<0.20	<0.00025	0.00413	0.0064
10/14/08	9.04	1060		1974	0.0602	<0.00025	0.00539	0.0062
07/13/09	9.99	1070		2003	0.0317	<0.00025	0.00375	<0.0050
10/07/09	9.59	1060		1993	0.085	<0.00025	0.00644	0.0062
06/21/10	9.67	1050		2028	0.215	<0.0015	0.0296	0.0084
08/26/10	8.93	1130		2062	<0.20	<0.00025	0.00117	<0.0050
06/22/11	9.97	1170		2073	0.037	<0.00025	0.0043	<0.0050
08/25/11	9.13	1200		2062	0.017	<0.00025	<0.0025	<0.0050
06/06/12	9.99	1180		2091	0.0506	<0.00014	0.0089	<0.0050
08/14/12	8.99	1230		2150	<0.20	<0.00010	0.0036	<0.0050

STATION: RH90-15 PIEZOMETER

Date	LAB pH pH unit	DISSOLVED SULPHATE mg/L	TOTAL ALKALINITY mg/L	SPECIFIC CONDUCT(L) µS/cm	DISSOLVED ALUMINIUM mg/L	DISSOLVED CADMIUM mg/L	DISSOLVED COPPER mg/L	DISSOLVED ZINC mg/L
06/24/92	11.50	331		1330	0.021	<0.0002	0.005	0.006
11/02/92	11.70	361	37.8	1520	0.022	<0.0002	0.004	<0.005
05/26/93	10.50	326	22.9	891	0.194	<0.0002	0.004	<0.005
10/19/93	11.00	378	224	1070	0.015	<0.0002	0.004	<0.005
06/20/94	12.00	250		1640	3.920	<0.0002	0.034	0.018
12/19/94					0.030	<0.0002	0.001	0.021
06/29/95					0.077	<0.0002	0.048	0.006
12/21/95	11.80	213		3590	0.046	<0.0002	0.036	<0.005
06/28/96	11.20	7		1510	0.065	<0.0002	0.046	0.069
06/30/97	11.80	19		2080	20.1	<0.0002	0.246	0.169
12/29/97	11.60	33		3970	1.25	<0.0002	0.308	0.16
06/30/98	11.00	205		851	2.00	<0.0002	0.080	0.018
10/19/98	11.60	153		2200	0.196	<0.0002	0.120	0.041
06/21/99	11.10	256		1370	0.50	<0.0002	0.060	0.039
08/11/99	11.90	216		2390	0.092	<0.0002	0.070	0.012
28/06/00	12.46	211		2630	0.205	<0.0002	0.080	0.015
11/12/00	12.51	197		4828	0.05	<0.0002	0.078	<0.005
06/28/01	9.11	739		1448	0.60	0.0004	0.040	0.011
12/10/01	12.21	397		2896	0.49	<0.0002	0.060	0.014
08/15/02	10.60	353		560	28.4	<0.0002	0.042	<0.005
06/24/03	12.60	141		1090	<0.03	<0.0002	0.004	<0.005
12/22/03	12.50	245		2840	0.862	<0.00020	0.046	0.100
08/23/04	11.90	74		1170	0.276	<0.00020	0.036	0.086
11/09/04	12.00	194		1170	<0.20	<0.00040	0.032	0.017
06/23/05	12.30	73		1500	0.41	<0.00020	0.025	0.037
11/08/05	12.10	217		1360	0.08	<0.00020	0.020	0.009
05/26/06	11.9	244		1540	0.12	<0.00020	0.0158	0.0149
10/25/06	11.5	306		1320	0.04	<0.00020	0.0158	0.0186
06/28/07	11.6	330		1480	<0.20	<0.00010	0.0113	0.0053
09/25/07	11.7	301		1550	0.0859	<0.00010	0.00967	0.0094
06/24/08	11.46	286		1410	<0.20	<0.00025	0.0124	<0.0050
10/14/08	11.01	408		1142	0.0074	<0.00025	0.00523	<0.0050
07/13/09	11.57	290		1468	0.121	<0.000050	0.0106	<0.0050
10/07/09	11.53	305		1478	0.0942	0.00010	0.00866	0.0081
06/21/10	11.84	244		1744	0.0471	<0.000050	<0.020	<0.0050
08/26/10	10.83	311		1082	<0.20	<0.00010	0.00963	<0.0050
06/22/11	11.56	355		1474	0.129	<0.00010	0.0055	<0.0050
08/25/11	8.77	391		1147	0.0363	<0.00010	0.0075	0.0078
06/06/12	10	357		1100	0.0254	<0.000050	0.00994	0.0073
08/14/12	7.2	408		1369	<0.20	<0.000050	<0.00050	<0.0050

STATION: RH90-16 PIEZOMETER

Date	LAB pH pH unit	DISSOLVED SULPHATE mg/L	TOTAL ALKALINITY mg/L	SPECIFIC CONDUCT(L) µS/cm	DISSOLVED ALUMINIUM mg/L	DISSOLVED CADMIUM mg/L	DISSOLVED COPPER mg/L	DISSOLVED ZINC mg/L
06/24/92	7.55	87		467	0.101	<0.0002	0.005	0.012
05/26/93					0.067	<0.0002	0.003	<0.005
06/20/94					0.024	<0.0002	0.001	0.012
06/29/95					0.069	<0.0002	0.001	<0.005
12/29/97	6.73	70		255	0.042	0.0017	0.013	0.192
06/30/98	8.05	48		247	0.058	<0.0002	0.003	0.016
10/19/98	8.03	196		819	0.027	0.0003	0.005	0.020
06/21/99					0.021	<0.0002	0.005	0.103

08/11/99	7.20	122		709	0.086	<0.0002	0.004	0.009
28/06/00					0.070	<0.0002	0.004	0.010
06/28/01	7.21	409		1204	0.058	0.0004	0.004	0.043
08/15/02	10.60	107		550	0.077	<0.0002	0.003	<0.005
06/24/03					<0.03	<0.0002	0.009	0.04
12/22/03	6.85	978		1740	0.0265	0.00021	0.002	0.050
08/23/04	6.52	450		716	0.035	0.0003	0.009	0.154
11/09/04	5.74	1930		1880	3.33	0.0179	<0.010	5.51
04/18/05	4.43	1170		2240	46.1	0.0910	1.79	9.52
05/26/05	4.81	1100		1190	8.58	0.0430	0.405	5.09
06/23/05	5.09	1120		980	8.21	0.0390	0.453	5.09
07/21/05	5.24	1380		973	4.56	0.0072	0.0581	1.6
08/22/05	5.15	1240		2140	2.97	0.0210	0.050	2.85
11/04/05	4.65	1140		1920	35.4	0.0490	1.70	6.98
05/26/06	7.13	842		1950	0.385	0.00774	0.013	0.635
10/25/06	4.95	2270		3320	78.7	0.177	3.22	18.3
06/28/07	3.89	809		1400	20.1	0.0426	1.71	4.93
09/25/07	4.04	777		1410	15.8	0.0351	1.60	4.67
06/24/08	4.43	725		1239	23.0	0.0349	1.95	4.89
10/15/08	4.75	1580		2231	68.4	0.0983	6.45	11.5
07/13/09	4.27	1260		1951	41.0	0.0939	4.40	10
10/07/09	4.21	1280		1906	70.3	0.143	14.80	13.2
06/21/10	4.75	127		292	36.5	0.0537	3.40	6.54
08/26/10					74.0	0.0548	3.86	11.5
06/22/11	4.53	1340		2111	15.5	0.0536	1.62	6.97
08/25/11	4.46	881		1454	11.7	0.0456	1.57	4.36
06/06/12	4.57	1080		1732	38.6	0.0607	2.57	7.76
08/14/12	4.51			1585	21.2	0.0368	1.44	4.88

STATION: RH90-20 PIEZOMETER

Date	pH pH unit	DISSOLVED SULPHATE mg/L	TOTAL ALKALINITY mg/L	SPECIFIC CONDUCT(L) µS/cm	DISSOLVED ALUMINIUM mg/L	DISSOLVED CADMIUM mg/L	DISSOLVED COPPER mg/L	DISSOLVED ZINC mg/L
06/05/91	7.50	172	225		0.021	0.0002	0.006	0.006
06/24/92	7.41	212		789	0.015	<0.0002	0.007	0.014
11/02/92	7.60	306	277	941	0.045	<0.0002	0.002	0.006
05/26/93	7.55	321	239	1010	0.099	<0.0002	0.003	<0.005
10/19/93	7.76	353	243	1020	0.016	<0.0002	0.003	0.015
06/20/94	7.44	379		1070	0.019	<0.0002	0.002	0.101
12/19/94	7.50	403		1160	0.014	<0.0002	0.002	0.022
06/29/95	7.49	381		1090	0.083	0.0003	0.003	0.015
12/21/95					0.020	<0.0002	<0.005	<0.005
04/11/96	7.40	422		1270	0.069	<0.0002	<0.001	0.01
06/30/97	7.43	489		1080	0.023	<0.0002	<0.001	<0.005
12/29/97	6.94	424		1110				
06/30/98	7.99	210		1130	0.133	<0.0002	0.001	0.023
10/19/98	7.93	222		1210				
06/21/99	7.47	459		1220	0.032	<0.0002	0.002	0.007
08/11/99	7.79	491		1260	0.029	0.0003	0.002	0.030
28/06/00	7.41	460			0.029	0.0002	0.002	0.007
06/28/01	7.74	405		1076	0.030	<0.0002	0.002	0.018
12/10/01	7.48	484		1426	0.037	<0.0002	<0.05	0.016
08/15/02	7.60	474		550	0.009	<0.0002	<0.001	0.007
06/24/03	7.93	399		1220	<0.03	<0.0002	0.003	0.007
12/22/03	7.36	580		1310	0.034	0.0006	0.014	0.022
08/23/04	7.26	519		1000	0.045	0.00053	0.018	0.020
11/09/04	7.25	538		947	<0.20	<0.00040	0.006	0.027
06/23/05	7.11	518		884	0.014	<0.00020	0.004	0.018
11/08/05	7.85	497		1320	0.024	<0.00020	0.003	0.013

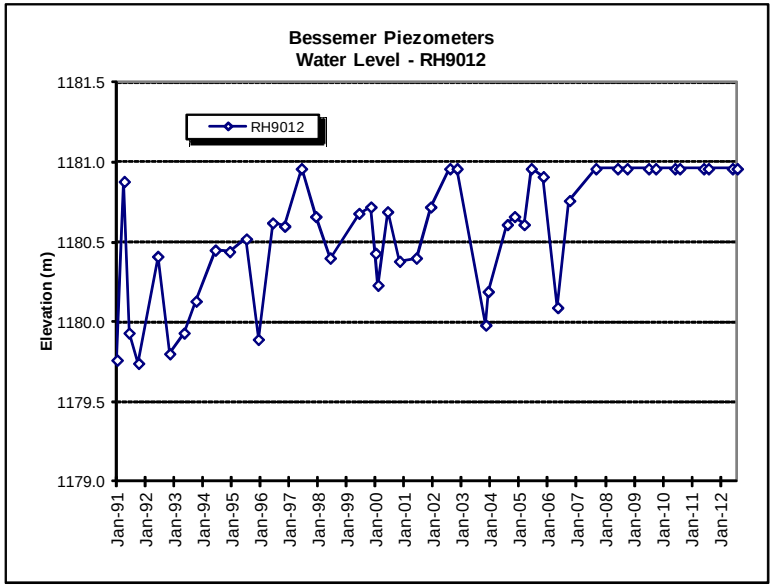
05/26/06	7.21	384	1160	0.014	0.00022	0.0028	0.0218
10/25/06	6.59	488	1300	0.065	0.00139	0.0183	0.0264
06/28/07	6.82	464	1200	<0.20	0.00015	0.00494	0.0227
09/25/07	6.62	489	1320	0.0069	0.00016	0.00112	0.0095
06/24/08	7.64	477	1341	<0.20	0.0003	0.00978	0.0154
10/15/08	7.00	441	1257	0.0146	0.00021	0.00288	0.0225
07/13/09	7.85	331	1094	0.0258	0.00031	0.00534	0.0327
10/07/09	7.19	463	1222	0.0527	0.00024	0.00296	0.0179
06/21/10	7.20	383	1218	0.0237	0.00017	0.00507	0.0128
08/26/10	7.35	486	1310	<0.20	0.0002	0.002	0.033
06/22/11	7.27	417	1077	0.009	<0.00010	0.002	0.006
08/25/11	7.27	535	1329	0.007	0.0002	0.008	0.011
08/14/12	7.18	511	1346	<0.20	<0.000050	<0.00050	<0.0050

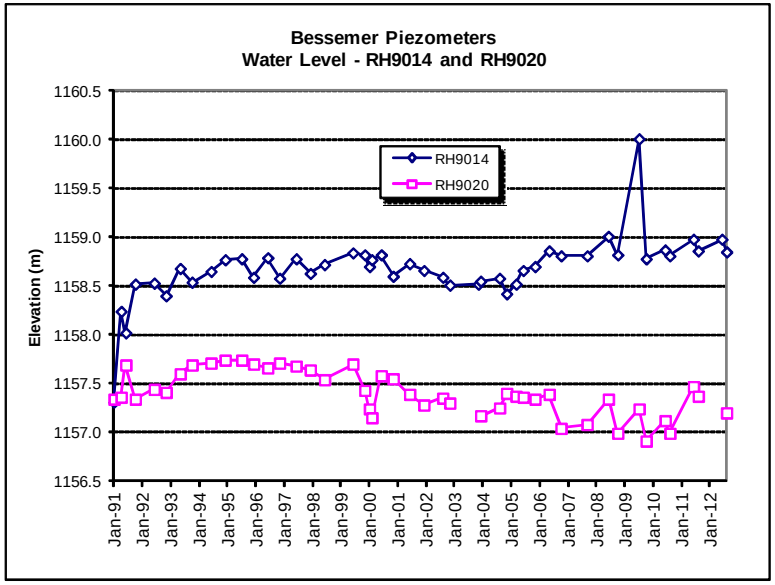
GOLDCORP CANADA - EQUITY DIVISION

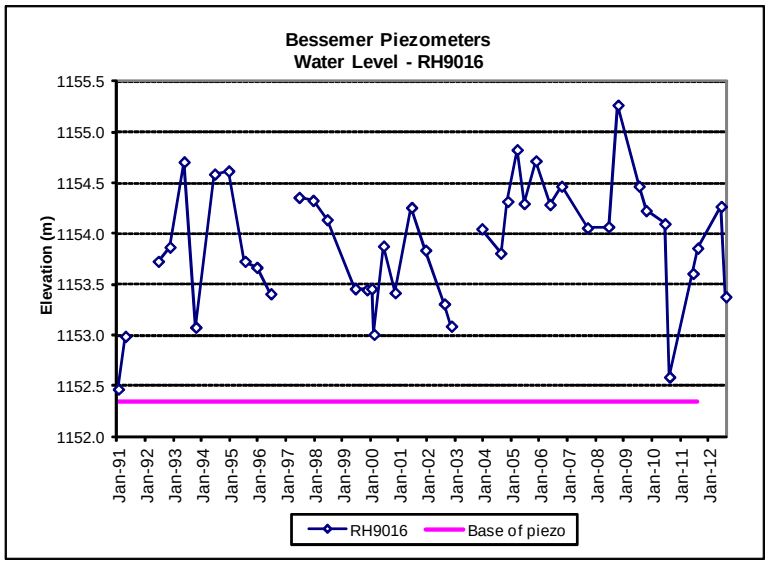
WATER ELEVATION IN BESSEMER CREEK PIEZOMETERS

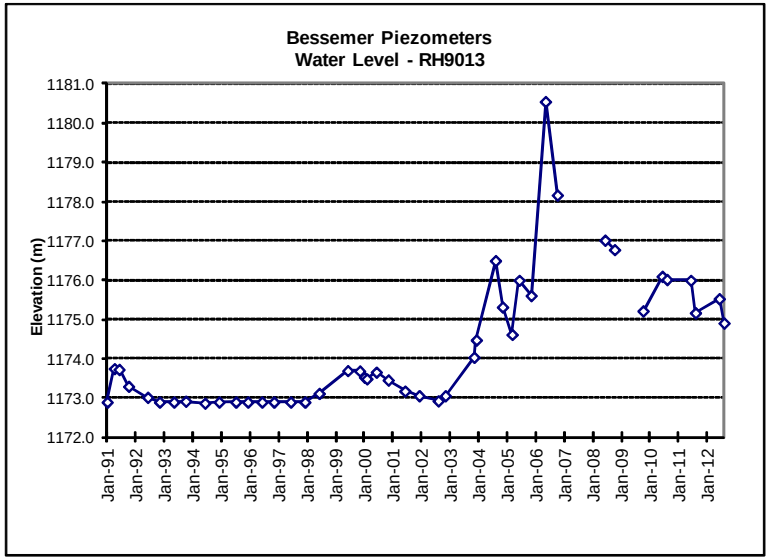
	WATER ELEVATION (metres)												
PIEZO #	**RH9011**	**RH9012**	**RH9013**	**RH9014**	**RH9015**	**RH9016**	**RH9017**	**RH9018**	**RH9019**	**RH9020**	**RH9021**	**RH9022**	**RH9023**
Northing (m)	7677.64	7612.45	7549.24	7371.58	7193.56	7193.56	6985.69	6985.69	6985.69	7020.27	6994.83	6984.75	6974.22
Easting (m)	7222.99	7141.47	7092.76	7076.73	7064.22	7064.22	7096.29	7096.29	7096.29	7107.98	7121.54	7124.92	7129.10
TOP (casing)	1191.26	1180.96	1182.82	1176.41	1155.32	1155.37	1130.63	1130.30	1130.27	1158.44	1156.05	1155.47	1153.95
BOTTOM (casing)	1171.06	1175.04	1172.90	1153.81	1137.40	1152.35	1112.43	1120.02	1124.21	1155.90	1149.29	1145.20	1143.68
24-Jan-91	1191.26	1179.76	1172.90	1157.31	1141.72	1152.47	1126.03	dry	1125.67	1157.34	dry	dry	dry
23-Apr-91	1191.18	1180.88	1173.75	1158.24	1141.95	1152.99	1119.93	dry	1126.39	1157.36	dry	dry	dry
05-Jun-91	1191.26	1179.93	1173.73	1158.02	1137.40		1119.77	dry	1126.07	1157.69	dry	dry	dry
30-Oct-91	1191.26	1179.74	1173.30	1158.52	1137.40		1119.65	dry	1129.44	1157.34	dry	dry	dry
24-Jun-92	1191.26	1180.41	1173.02	1158.53	1142.57	1153.73	lost	lost	lost	1157.44	dry	dry	dry
02-Nov-92	1191.26	1179.80	1172.90	1158.40	1142.67	1153.87	lost	lost	lost	1157.41	dry	dry	dry
26-May-93	1191.26	1179.93	1172.90	1158.68	1142.44	1154.71	lost	lost	lost	1157.60	dry	dry	dry
19-Oct-93	1191.26	1180.13	1172.92	1158.54	1142.63	1153.08	lost	lost	lost	1157.69	dry	dry	dry
22-Jun-94	1191.26	1180.45	1172.87	1158.65	1142.49	1154.59	lost	lost	lost	1157.71	dry	dry	dry
19-Dec-94	1191.26	1180.44	1172.90	1158.77		1154.62	lost	lost	lost	1157.74	dry	dry	dry
03-Jul-95	1191.26	1180.52	1172.90	1158.78	1142.34	1153.73	lost	lost	lost	1157.74	dry	dry	dry
21-Dec-95	1191.26	1179.89	1172.90	1158.59	1142.21	1153.67	lost	lost	lost	1157.70	dry	dry	dry
28-Jun-96	1191.26	1180.62	1172.90	1158.79	1142.19	1153.41	lost	lost	lost	1157.66	dry	dry	dry
04-Nov-96	1191.26	1180.60	1172.90	1158.58	1142.33		lost	lost	lost	1157.71	dry	dry	dry
30-Jun-97	1191.26	1180.96	1172.90	1158.78	1143.10	1154.36	lost	lost	lost	1157.68	dry	dry	dry
29-Dec-97	1191.26	1180.66	1172.90	1158.63	1142.73	1154.33	lost	lost	lost	1157.64	dry	dry	dry
30-Jun-98	1191.26	1180.40	1173.12	1158.72	1142.45	1154.14	lost	lost	lost	1157.54	dry	dry	dry
21-Jun-99	1191.26	1180.68	1173.70	1158.84	1142.18	1153.46	lost	lost	lost	1157.70	dry	dry	dry
08-Nov-99	1191.26	1180.72	1173.69	1158.82	1142.48	1153.45	lost	lost	lost	1157.43	dry	dry	dry
21-Jan-00	1191.26	1180.43	1173.53	1158.70	1142.49	1153.46	lost	lost	lost	1157.24	dry	dry	dry
29-Feb-00	1191.26	1180.23	1173.49	1158.77	1142.35	1153.01	lost	lost	lost	1157.15	dry	dry	dry
28-Jun-00	1191.26	1180.69	1173.66	1158.82	1142.33	1153.88	lost	lost	lost	1157.58	dry	dry	dry
12-Nov-00	1191.26	1180.38	1173.46	1158.60	1142.21	1153.42	lost	lost	lost	1157.55	dry	dry	dry
28-Jun-01	1191.26	1180.40	1173.18	1158.73	1142.14	1154.26	lost	lost	lost	1157.39	dry	dry	dry
10-Dec-01	1191.26	1180.72	1173.06	1158.66	1142.29	1153.84	lost	lost	lost	1157.28	dry	dry	dry
14-Aug-02	1191.26	1180.96	1172.93	1158.59	1142.43	1153.31	lost	lost	lost	1157.35	dry	dry	dry
14-Nov-02	1191.26	1180.96	1173.06	1158.51	1142.77	1153.09	lost	lost	lost	1157.30	dry	dry	dry
04-Nov-03	1191.26	1179.98	1174.04	1158.52			lost	lost	lost		dry	dry	dry
22-Dec-03	1191.26	1180.19	1174.48	1158.55	1142.07	1154.05	lost	lost	lost	1157.17	dry	dry	dry
23-Aug-04	1191.26	1180.61	1176.50	1158.58	1141.08	1153.81	lost	lost	lost	1157.25	dry	dry	dry
09-Nov-04	1191.26	1180.66	1175.32	1158.42	1142.09	1154.32	lost	lost	lost	1157.40	dry	dry	dry
10-Mar-05	1191.26	1180.61	1174.62	1158.52	1142.35	1154.83	lost	lost	lost	1157.37	1149.31	dry	dry
23-Jun-05	1191.26	1180.96	1176.00	1158.66	1142.61	1154.30	lost	lost	lost	1157.36	1149.34	dry	dry
08-Nov-05	1191.26	1180.91	1175.61	1158.70	1142.63	1154.72	lost	lost	lost	1157.34	dry	dry	dry
26-May-06	1191.26	1180.09	1180.55	1158.86	1142.47	1154.29	lost	lost	lost	1157.39	dry	dry	dry
25-Oct-06	1191.26	1180.76	1178.17	1158.81	1143.22	1154.47	lost	lost	lost	1157.04	dry	dry	dry
25-Sep-07	1191.26	1180.96		1158.81	1143.37	1154.06	lost	lost	lost	1157.08	dry	dry	dry
24-Jun-08	1191.26	1180.96	1177.02	1159.01	1142.92	1154.07	lost	lost	lost	1157.34	dry	dry	dry
15-Oct-08	1191.26	1180.96	1176.78	1158.82	1143.19	1155.27	lost	lost	lost	1156.99	dry	dry	dry
13-Jul-09	1191.26	1180.96		1160.01	1143.14	1154.47	lost	lost	lost	1157.24	dry	dry	dry
07-Oct-09	1189.91	1180.96	1175.22	1158.78	1142.46	1154.23	lost	lost	lost	1156.91	dry	dry	dry
21-Jun-10	1189.99	1180.96	1176.10	1158.87	1142.36	1154.10	lost	lost	lost	1157.12	dry	dry	dry
26-Aug-10	1190.03	1180.96	1176.02	1158.81	1142.52	1152.59	lost	lost	lost	1156.99	dry	dry	dry
22-Jun-11	1190.06	1180.96	1176.00	1158.98	1142.59	1153.61	lost	lost	lost	1157.47	1149.52	dry	dry
25-Aug-11	1189.87	1180.96	1175.17	1158.86	1142.86	1153.86	lost	lost	lost	1157.37	1149.52	dry	dry
06-Jun-12		1180.96	1175.53	1158.98	1142.70	1154.27	lost	lost	lost		1149.53	dry	dry
10-Aug-12	1189.85	1180.96	1174.91	1158.85	1142.96	1153.38	lost	lost	lost	1157.20	1149.53	dry	dry

C:/excelfil/H20Bal/besspiez.xls


Bessemer Piezometers
Water Level - RH9012
Elevation (m)
RH9012
1181.5
1181.0
1180.5
1180.0
1179.5
1179.0
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12


Bessemer Piezometers
Water Level - RH9014 and RH9020
Elevation (m)
RH9014
RH9020
1160.5
1160.0
1159.5
1159.0
1158.5
1158.0
1157.5
1157.0
1156.5
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12


Bessemer Piezometers
Water Level - RH9016
Elevation (m)
1155.5
1155.0
1154.5
1154.0
1153.5
1153.0
1152.5
1152.0
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
RH9016
Base of piezo


Bessemer Piezometers
Water Level - RH9013
Elevation (m)
1181.0
1180.0
1179.0
1178.0
1177.0
1176.0
1175.0
1174.0
1173.0
1172.0
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12

GOLDCORP CANADA - EQUITY DIVISION

Piezometer Readings

	Elevation of Water Level (m)														
	P99-1S	**P99-1D**	**P99-2S**	**P99-2D**	**P99-3**	**P99-4S**	**P99-4D**	**P99-5**	**P99-6S**	**P99-6D**	**P99-7**	**P99-8S**	**P99-8D**	**P99-9**	**P99-10**
Northing (m)	8552.38	8551.30	8248.32	8248.23	8271.99	7966.87	7963.36	7900.21	6990.08	6991.47	6706.68	7800.32	7803.27	8791.54	7054.32
Easting (m)	8200.36	8199.60	8055.56	8055.40	7708.83	8314.81	8313.75	7707.21	8397.26	8398.22	7948.06	8208.21	8210.09	7888.38	7313.73
Screen elev (m)	1276.36	1274.02	1271.44	1262.94	1246.03	1260.57	1250.86	1200.88	1354.81	1349.19	1264.04	1272.10	1265.44	1271.46	1206.43
Casing elev. (m)	1281.04	1279.88	1277.37	1277.25	1254.12	1275.82	1276.07	1230.89	1357.90	1357.59	1293.44	1287.57	1287.39	1278.41	1214.22
Date															
04-Feb-08	1276.50	1276.31	1271.79	1269.60	1253.48	1265.19	1259.33	1230.89	1356.77	1353.96	1268.54	1273.38	1277.04	1274.89	1210.79
28-Mar-08	1276.47	1276.88	1271.34	1269.07		1265.01	1259.63	1230.89		1353.74	1268.26	1273.33	1276.66	1274.73	1210.98
07-May-08	1276.88	1276.83	1273.31	1269.68	1253.35	1265.36	1260.41	1230.69		1354.46	1268.13	1273.32	1276.45	1275.39	1211.43
11-Jun-08	1276.88	1276.74	1273.31	1270.95	1253.26	1265.25	1259.68	1230.61	1356.77	1354.65	1268.76	1273.56	1278.24	1275.23	1210.79
16-Jul-08	1276.58	1276.57	1273.28	1270.56	1253.25	1265.10	1259.20	1230.59	1355.74	1354.37	1268.69	1273.48	1277.48	1275.10	1210.68
16-Sep-08	1276.61	1276.62	1273.31	1270.01	1253.33	1265.10	1259.37	1230.72	1356.47	1354.53	1268.63	1273.38	1276.95	1275.19	1210.94
13-Nov-08	1277.45	1276.78	1273.32	1270.24	1253.50	1265.14	1259.59	1230.80	1356.77	1354.41	1268.64	1273.31	1276.80	1275.38	1211.21
11-Dec-08	1277.44	1276.78	1273.30	1270.66	1253.48	1265.31	1260.07	1230.78	1356.70	1354.49	1268.57	1273.35	1277.18	1275.15	1211.27
20-Jan-09	1276.57	1276.52	1272.11	1269.97	1253.47	1265.08	1260.38	1230.74	1355.77	1354.23	1268.52	1273.37	1277.15	1274.80	1210.88
25-Mar-09	1276.48	1276.52	1271.33	1269.64	1253.47	1264.84	1260.88	1230.78	1354.92	1353.71		1273.34	1276.65	1274.63	1210.84
05-Jun-09	1277.74	1277.20	1273.34	1271.90	1253.33	1265.30	1260.39	1230.87	1356.83	1354.76	1269.08	1273.63	1278.71	1275.82	1211.32
07-Aug-09	1276.92	1276.62	1273.27	1271.65	1253.29	1265.15	1259.51	1230.77	1355.68	1354.46	1268.71	1273.57	1277.86	1275.06	1210.88
16-Sep-09	1276.62	1276.51	1271.86	1270.48	1253.30	1264.95	1259.29	1230.69	1355.66	1354.10	1268.55	1273.51	1277.30	1274.84	1210.62
18-Nov-09	1277.51	1276.73	1273.32	1271.23	1253.54	1265.19	1259.89	1230.72	1356.96	1354.44	1268.37	1273.37	1277.39	1275.39	1211.19
16-Dec-09	1276.70	1276.53	1272.67	1270.74	1253.54	1265.07	1260.05	1230.72	1355.76	1354.26	1268.34	1273.45	1277.39	1275.13	1210.99
23-Feb-10	1276.54	1276.49	1271.33	1269.39	1253.54	1264.85	1260.13	1230.77	1355.40	1353.96	1268.06	1273.37	1276.84	1274.67	1210.99
13-Apr-10	1276.50	1276.50	1271.32	1269.25	1253.53	1264.89	1260.76	1230.77	1355.41	1353.94	1267.84	1273.31	1276.54	1274.83	1211.39
26-May-10	1277.68	1277.25	1273.38	1271.85	1253.38	1265.30	1260.07	1230.79	1356.77	1354.77	1268.96	1273.70	1278.76	1275.47	1211.51
9-Jun-10	1277.57	1277.19	1273.34	1271.74	1253.42	1265.26	1259.90	1230.72	1356.74	1354.82	1268.91	1273.71	1278.62	1275.42	1211.47
23-Jun-10	1276.93	1276.79	1272.80	1271.36	1253.36	1265.20	1259.60	1230.73	1356.72	1354.75	1268.76	1273.69	1278.33	1275.23	1211.27
22-Jul-10	1276.65	1276.55	1271.76	1270.56	1253.36	1265.06	1259.22	1230.70	1355.14	1354.18	1268.69	1273.53	1277.69	1274.89	1210.95
27-Aug-10	1276.54	1276.48	1271.40	1270.05	1253.29	1264.93	1259.06	1230.73	1354.81	1353.66	1268.52	1273.44	1277.23	1274.67	1210.74
15-Dec-10	1276.62	1276.57	1272.20	1270.66	1253.49	1265.13	1260.78		1355.70	1354.15	1268.70	1273.45	1277.80	1275.12	1211.38
29-Apr-11	1276.46	1276.52	1271.32	1269.18		1264.88	1261.95		1355.68	1353.79	1268.02	1273.29	1276.57		1211.52
3-Jun-11	1277.76	1277.35	1273.35	1271.68	1253.39	1265.32	1262.21	1230.89	1356.81	1354.71	1269.75	1273.65	1278.77	1276.07	1211.77
29-Jun-11	1277.70	1277.33	1273.28	1271.66	1253.39	1265.28	1261.27	1230.84	1356.76	1354.81	1269.32	1273.53	1278.74	1275.52	1211.53
3-Aug-11	1277.63	1277.18	1273.30	1271.43	1253.38	1265.28	1260.42	1230.79	1356.73	1354.78	1269.12	1273.47	1278.60	1275.41	1211.46
24-Aug-11	1276.74	1276.67	1271.90	1270.68	1253.35	1265.22	1259.98	1230.69	1355.86	1354.47	1268.87	1273.33	1277.97	1275.06	1211.13
9-Jan-12	1276.55	1276.50	1271.35	1269.57		1265.02	1259.12		1355.62	1354.10	1268.49	1273.34	1276.95	1275.00	1211.08
13-Feb-12	1276.52	1276.49	1271.35	1269.24		1264.91	1259.13		1355.41	1353.97	1268.34	1273.32	1276.75	1274.71	1211.00
15-Mar-12	1276.50	1276.50	1271.36	1269.35		1264.88	1259.33		1355.42	1353.97	1268.21	1273.34	1276.66	1274.66	1211.11
13-Apr-12	1276.50	1276.51	1271.35	1269.19		1264.85	1259.65		1355.27	1353.92	1268.12	1273.56	1276.50	1274.64	1211.32
29-May-12	1277.79	1277.38	1273.27	1271.56	1253.47	1265.30	1260.53	1230.89			1269.46	1273.79	1278.78	1275.99	1211.63
14-Jun-12	1277.74	1277.30	1272.88	1271.52	1253.42	1265.28	1260.09	1230.89	1356.38	1354.80	1269.60	1273.82	1278.80	1275.50	1211.57
19-Jul-12	1276.98	1276.74	1271.80	1270.83	1253.36	1265.24	1259.60	1230.89	1356.43	1354.67	1269.18	1273.80	1278.37	1275.23	1211.31
3-Aug-12	1276.70	1276.61	1271.48	1270.55	1253.36	1265.18	1259.38	1230.89	1355.77	1354.49	1268.95	1273.70	1277.93	1275.02	1211.14
28-Aug-12	1277.07	1276.67	1271.38	1270.12	1253.42	1265.07	1259.29	1230.89	1356.19	1354.53	1268.71	1273.67	1277.55	1275.30	1211.14
3-Jan-13	1277.71	1275.56	1271.45	1269.51	frozen	1265.07	1259.63		1355.56	1354.04	1268.24	1273.37	1276.72	1274.85	1211.00

C:/excelfils/h2obal/piezos99&00.xls

GOLDCORP CANADA - EQUITY DIVISION

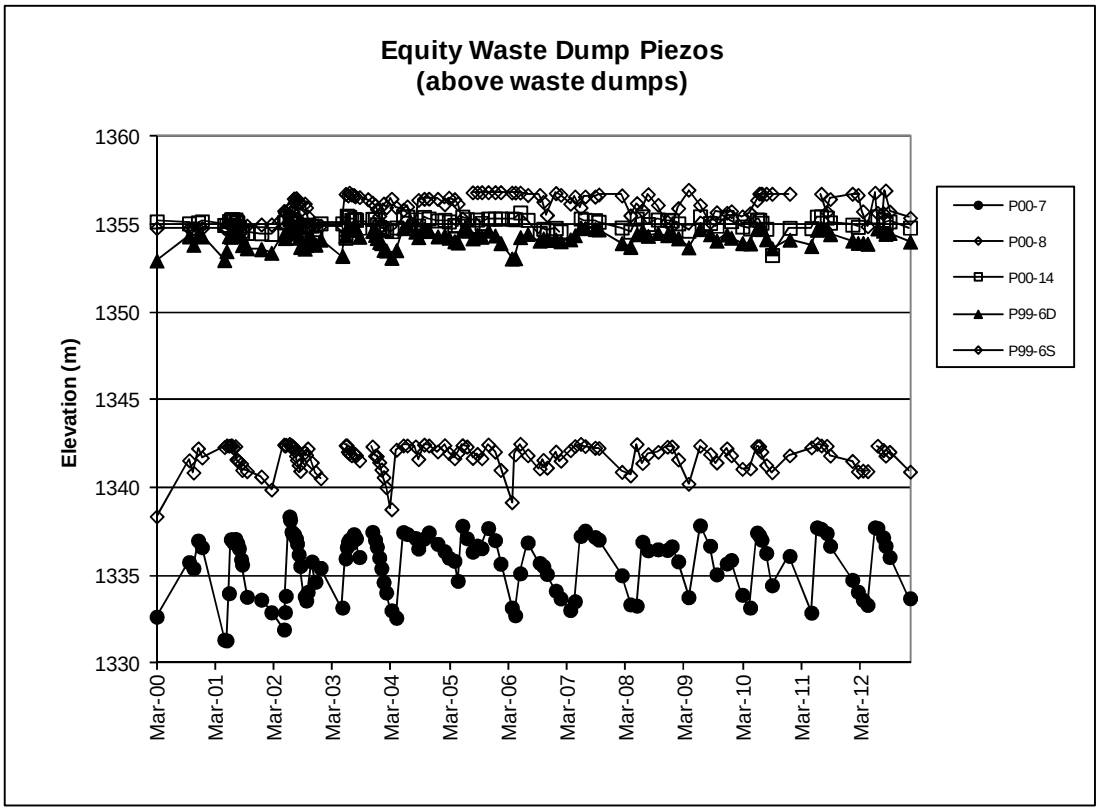
Piezometer Readings

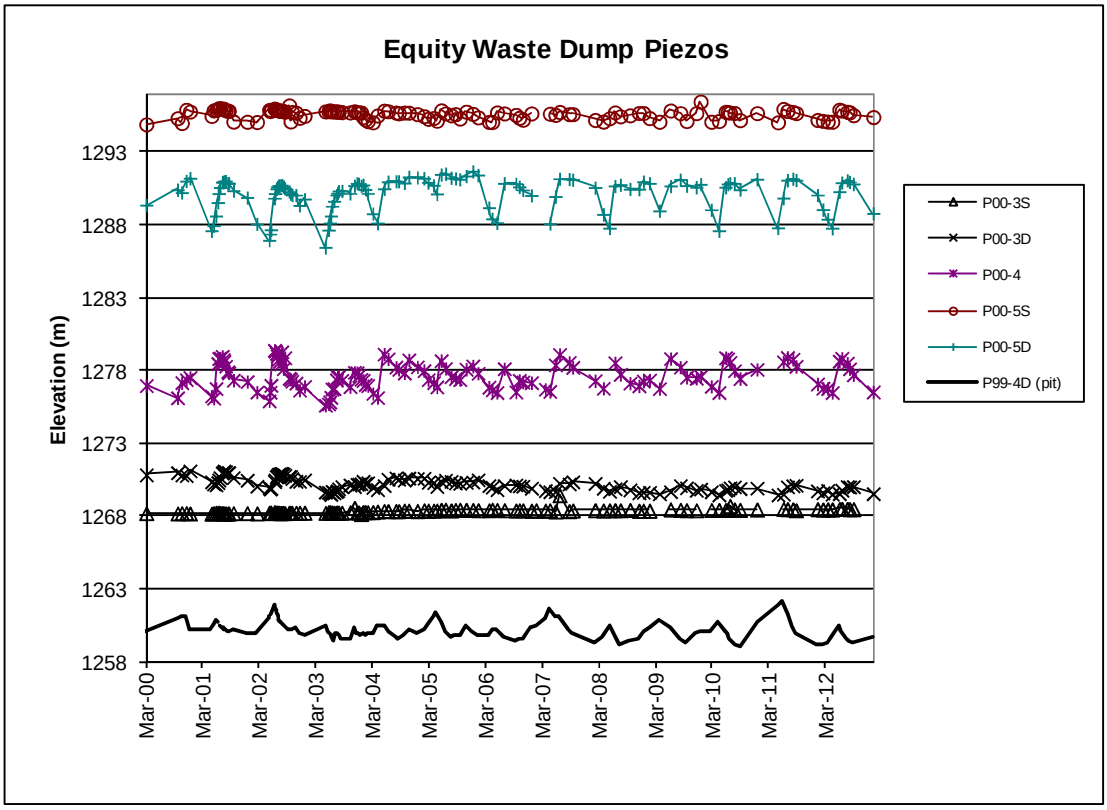
	Elevation of Water Level (m)												
	P00-1D	**P00-2**	**P00-3S**	**P00-3D**	**P00-4**	**P00-5S**	**P00-5D**	**P00-6**	**P00-7**	**P00-8**	**P00-9D**	**P00-10**	**P00-14**
Northing (m)	8550.45	8015.57	7670.61	7669.97	7724.98	7508.76	7508.18	7229.74	7304.76	6789.97	6839.15	6697.65	7028.57
Easting (m)	8197.61	8077.62	7897.55	7898.70	8144.62	8261.61	8262.60	8297.72	8536.58	8259.17	7297.17	7237.28	8423.31
Top screen elev (m)	1274.68	1252.18	1268.72	1260.55	1266.01	1295.48	1290.48	1276.66	1334.55	1341.91	1170.8	1109.73	1354.28
Bottom screen elev (m)	1273.84	1250.03	1267.22	1259.05	1264.61	1293.98	1284.48	1274.75	1328.55	1336.16	1168.68	1108.23	1348.28
Casing elev. (m)	1280.54	1300.84	1290.15	1290.07	1291.41	1317.64	1317.54	1324.80	1341.56	1346.30	1178.54	1129.14	1356.47
Date													
01-Feb-08	1276.48	1250.04	1268.41	1270.24	1277.29	1295.19	1290.55	1274.40	1335.04	1340.93	1169.13		1354.85
28-Mar-08	1276.44	1250.04	1268.39	1269.91	1276.77	1295.08	1288.71	1274.40	1333.38	1340.73	1169.21		1354.62
07-May-08	1276.63	1250.04	1268.40	1269.70		1295.31	1287.77	1274.40	1333.31	1342.51	1170.11		1355.36
11-Jun-08	1276.69	1250.04	1268.41	1269.88	1278.53	1295.71	1290.66	1274.40	1336.95	1341.43	1169.64		1355.48
16-Jul-08	1276.56	1250.04	1268.40	1270.02	1277.73	1295.44	1290.75	1274.40	1336.46	1341.94	1169.15		1355.05
16-Sep-08	1276.56	1250.04	1268.42	1269.80	1277.12	1295.51	1290.45	1274.40	1336.52	1342.07	1168.95		1355.30
13-Nov-08	1276.62	1250.04	1268.37	1269.60	1276.94	1295.67	1290.44	1274.40	1336.48	1342.36	1169.03		1355.28
11-Dec-08	1276.61	1250.04	1268.37	1269.63	1277.27	1295.67	1290.96	1274.40	1336.69	1342.38	1169.16		1355.25
20-Jan-09	1276.47	1250.04	1268.37	1269.63	1277.34	1295.32	1290.85	1274.40	1335.83	1341.64	1169.09		1355.08
25-Mar-09	1276.43	1250.04		1269.53	1276.75	1295.07	1288.96	1274.40	1333.79	1340.25	1169.08		1354.66
05-Jun-09	1277.07	1250.04	1268.46	1269.68	1278.81	1295.84	1290.66	1274.40	1337.88	1342.42	1170.07		1355.48
07-Aug-09	1276.57	1250.04	1268.43	1270.09	1278.22	1295.66	1291.10	1274.40	1336.72	1341.94	1169.21		1355.10
16-Sep-09	1276.49	1250.04	1268.41	1269.94	1277.53	1295.12	1290.69	1274.40	1335.09	1341.46	1168.88		1354.95
18-Nov-09	1276.62	1250.04	1268.40	1269.77	1277.46	1295.66	1290.58	1274.40	1335.71	1342.27	1169.05		1355.45
16-Dec-09	1276.49	1250.04		1269.85	1277.60	1296.45	1290.78	1274.40	1335.91	1341.87	1169.01		1355.21
23-Feb-10	1276.45	1250.04	1268.42	1269.67	1276.90	1295.07	1289.03	1274.40	1333.93	1341.10	1169.01		1354.90
13-Apr-10	1276.45	1250.04	1268.42	1269.45	1276.48	1295.12	1287.59	1274.40	1333.20	1341.12	1169.80		1354.80
26-May-10	1277.18	1250.04	1268.42	1269.76	1278.87	1295.75	1290.58	1274.40	1337.47	1342.40	1169.89		1355.30
09-Jun-10	1277.02	1250.04	1268.43	1269.81	1278.79	1295.73	1290.79	1274.40	1337.31	1342.39	1169.79		1355.29
23-Jun-10	1276.70	1250.04	1268.70	1269.94	1278.55	1295.70	1290.86	1274.40	1337.06	1342.08	1169.70		1355.12
22-Jul-10	1276.53	1250.04	1268.46	1270.01	1277.98	1295.67	1290.84	1274.40	1336.31	1341.31	1169.18		1354.77
27-Aug-10	1276.46	1250.04	1268.43	1269.89	1277.44	1295.18	1290.41	1274.40	1334.47	1340.91	1169.68		1353.28
15-Dec-10	1276.53	1250.04	1268.45	1269.92	1278.07	1295.66	1291.13	1274.40	1336.14	1341.87			1354.83
29-Apr-11	1276.48	1250.04		1269.45		1295.03	1287.79	1274.40	1332.91	1342.32	1169.85		1354.81
03-Jun-11	1277.32	1250.04	1268.49	1269.50	1278.60	1295.95	1289.83	1274.40	1337.77	1342.53	1170.48		1355.47
29-Jun-11	1277.26	1250.04	1268.48	1270.01	1278.89	1295.81	1291.06	1274.40	1337.68	1342.43	1169.95		1355.48
03-Aug-11	1276.99	1250.04	1268.47	1270.08	1278.76	1295.74	1291.16	1274.40	1337.44	1342.41	1169.95		1355.41
24-Aug-11	1276.61	1250.04	1268.40	1270.12	1278.28	1295.66	1291.07	1274.40	1336.72	1341.86	1169.67		1355.13
09-Jan-12	1276.46	1250.04	1268.48	1269.73	1277.07	1295.19	1290.04	1274.40	1334.78	1341.55	1169.16		1355.01
13-Feb-12	1276.47	1250.04	1268.45	1269.60	1276.78	1295.13	1289.04	1274.40	1334.10	1340.95	1169.28		1354.88
15-Mar-12	1276.46	1250.04	1268.46	1269.76	1276.76	1295.08	1288.38	1274.40	1333.64	1341.00	1169.33		
13-Apr-12	1276.46	1250.04	1268.46	1269.51	1276.48	1295.07	1287.76	1274.40	1333.35	1340.97	1169.39		
29-May-12	1277.39	1250.04	1268.50	1269.54	1278.63	1295.90	1290.27	1274.40	1337.77		1170.34		
14-Jun-12	1277.28	1250.04	1268.50	1269.78	1278.83	1295.83	1290.89	1274.40	1337.73	1342.42	1169.97		1355.48
19-Jul-12	1276.69	1250.04	1268.50	1270.03	1278.51	1295.75	1291.05	1274.40	1337.20	1342.17	1169.72		1355.29
03-Aug-12	1276.57	1250.04	1268.48	1270.00	1278.11	1295.72	1290.94	1274.40	1336.72	1341.85	1169.31		1355.09
28-Aug-12	1276.57	1250.04	1268.48	1270.02	1277.70	1295.52	1290.80	1274.40	1336.08	1342.07	1169.17		1355.19
03-Jan-13	1276.48	1250.04		1269.54	1276.52	1295.39	1288.78	1274.40	1333.73	1340.94	1169.07		1354.84

Goldcorp Canada - Equity Division

Waste Dump Piezometer Readings

	Depth to Water Level (m)									
	P97-01	Comments	P97-02	Comments	P97-03	Comments	P97-04	Comments	P97-05	Comments
Northing (m)	7696.38		6995.96		7019.44		7404.03		7528.88	
Easting (m)	8047.50		7811.26		7654.61		7917.66		8020.13	
TOP (casing)	1292.02		1281.49		1259.49		1327.37		1326.31	
BOTTOM (casing)	1271.67		1266.00		1244.73		1288.51		1297.33	
26-Jan-05		ice at top	1266.32	wet	1245.57	wet	1288.53	wet	1297.35	wet
22-Feb-05		ice at top	1266.32	wet	1245.53	wet	1288.53	wet	1297.34	wet
29-Mar-05	1272.04	wet	1266.29	wet	1245.54	wet	1288.54	wet	1297.37	wet
19-Apr-05	1272.04	wet	1266.30	wet	1245.58	wet	1288.54	wet	1297.42	wet
17-May-05	1272.12	wet	1266.30	wet	1245.62	wet	1288.53	wet	1297.42	wet
14-Jun-05	1272.11	wet	1266.30	wet	1245.57	wet	1288.53	wet	1297.42	wet
20-Jul-05	1272.10	wet	1266.32	wet	1245.44	wet	1288.55	wet	1297.41	wet
17-Aug-05	1272.10	wet	1266.30	wet	1245.43	wet	1288.55	wet	1297.39	wet
14-Sep-05	1272.08	wet	1266.30	wet	1245.34	wet	1288.52	wet	1297.42	wet
25-Oct-05	1272.14	wet	1266.31	wet	1245.50	wet	1288.56	wet	1297.43	wet
07-Dec-05	1272.14	wet	1266.31	wet	1245.54	wet	1288.54	wet	1297.41	wet
10-Jan-06	1272.12	wet	1266.29	wet	1245.44	wet	1288.53	wet	1297.41	wet
21-Mar-06	1272.09	wet	1266.29	wet	1245.40	wet	1288.53	wet	1297.43	wet
11-Apr-06	1272.08	wet	1266.29	wet	1245.44	wet	1288.55	wet	1297.45	wet
12-May-06	1272.09	wet	1266.30	wet	1245.48	wet	1288.55	wet	1297.45	wet
28-Jun-06	1272.08	wet	1266.31	wet	1245.48	wet	1288.55	wet	1297.44	wet
11-Sep-06	1272.05	wet	1266.32	wet	1245.35	wet	1288.49	wet	1297.44	wet
03-Oct-06	1273.08	wet	1266.33	wet	1247.49	wet?	1288.50	wet	1297.45	wet
26-Oct-06	1272.04	wet	1266.34	wet	1248.34	wet?	1288.51	wet	1297.44	wet
20-Dec-06			1266.31	wet	1248.79	wet		DNF		DNF
19-Jan-07			1266.31	wet	1248.54	frozen		DNF		DNF
20-Mar-07			1267.29	wet	1245.69	wet	1288.46	wet	1297.44	wet
18-Apr-07			1266.28	wet	1245.52	wet	1288.45	wet	1297.41	wet
24-May-07	1272.02	wet	1266.19	wet	1245.99	wet	1288.25	wet	1300.48	wet
20-Jun-07	1272.05	wet	1266.28	wet	1245.63	wet	1289.99	wet	1297.41	wet
21-Aug-07	1272.05	wet	1266.28	wet	1245.51	wet	1288.51	wet	1297.43	wet
13-Sep-07	1272.05	wet	1266.28	wet	1245.45	wet	1288.53	wet	1297.42	wet
04-Feb-08	1272.34	wet	1266.30	wet	1245.54	wet		ice at top		ice at top
28-Mar-08	1272.07	wet	1266.29	wet	1245.58	wet		ice at top		ice at top
07-May-08	1272.07	wet	1266.29	wet	1245.51	wet	1288.53	wet	1297.44	wet
11-Jun-08	1272.07	wet	1266.30	wet	1245.60	wet	1288.55	wet	1297.44	wet
16-Jul-08	1272.07	wet	1266.30	wet	1245.57	wet	1288.53	wet	1297.43	wet
16-Sep-08	1272.07	wet	1266.30	wet	1245.71	wet	1288.52	wet	1297.43	wet
13-Nov-08	1272.05	wet	1266.30	wet	1245.58	wet	1288.52	wet	1297.43	wet
11-Dec-08	1272.05	wet	1266.29	wet	1245.64	wet	1288.52	wet	1297.42	wet
20-Jan-09	1272.05	wet	1266.30	wet	1245.55	wet		ice at top	1297.44	wet
25-Mar-09	1272.06	wet	1266.28	wet	1245.45	wet		ice at top		ice at top
05-Jun-09	1272.10	wet	1266.30	wet	1245.72	wet	1288.53	wet	1297.44	wet
07-Aug-09	1272.10	wet	1266.30	wet	1245.60	wet	1288.54	wet	1297.45	wet
16-Sep-09	1272.08	wet	1266.30	wet	1245.46	wet	1288.53	wet	1297.44	wet
18-Nov-09	1272.06	wet	1266.27	wet	1245.47	wet	1288.52	wet	1297.41	wet
16-Dec-09	1272.06	wet	1266.29	wet	1245.37	wet		ice at top	1297.45	wet
23-Feb-10	1272.05	wet	1266.29	wet	1245.54	wet		ice at top	1297.45	wet
13-Apr-10	1272.05	wet	1266.29	wet	1245.65	wet	1288.52	wet	1297.47	wet
26-May-10	1272.07	wet	1266.30	wet	1245.66	wet	1288.52	wet	1297.41	wet
09-Jun-10	1272.10	wet	1266.29	wet	1245.74	wet	1288.52	wet	1297.47	wet
23-Jun-10	1272.08	wet	1266.28	wet	1245.72	wet	1288.53	wet	1297.49	wet
22-Jul-10	1272.06	wet	1266.27	wet	1245.65	wet	1288.52	wet	1297.46	wet
27-Aug-10	1272.06	wet	1266.29	wet	1245.50	wet	1288.50	wet	1297.46	wet
15-Dec-10	1272.11	wet	1266.26	wet	1245.56	wet	1288.55	wet	1297.48	wet
29-Apr-11	1272.03	wet	1266.29	wet	1245.57	wet		ice at top	1297.46	wet
03-Jun-11	1272.11	wet	1266.26	wet	1245.97	wet	1288.55	wet	1297.71	wet
29-Jun-11	1272.10	wet	1266.31	wet	1245.84	wet	1288.52	wet	1297.48	wet
03-Aug-11	1272.13	wet	1266.30	wet	1245.76	wet	1288.54	wet	1297.47	wet
24-Aug-11	1272.10	wet	1266.29	wet	1245.71	wet	1288.52	wet	1297.47	wet
09-Jan-12		DNF	1266.29	wet	1247.61	wet		ice at top	1297.46	wet
13-Feb-12		DNF	1266.31	wet	1247.60	wet		ice at top		ice at top
15-Mar-12		DNF	1266.29	wet	1246.02	wet		ice at top		ice at top
13-Apr-12		DNF	1266.30	wet	1245.96	wet		ice at top		ice at top
29-May-12	1272.14	wet	1266.30	wet	1245.96	wet	1288.52	wet	1297.47	wet
14-Jun-12	1272.13	wet	1266.30	wet	1247.61	wet	1288.51	wet	1297.47	wet
19-Jul-12	1272.10	wet	1266.30	wet	1245.97	wet	1288.51	wet	1297.48	wet
03-Aug-12	1272.15	wet	1266.30	wet	1245.96	wet	1288.50	wet	1297.47	wet
28-Aug-12	1272.13	wet	1266.30	wet	1245.79	wet	1288.51	wet	1297.48	wet
03-Jan-13		ice at top	1266.30	wet	1245.86	wet		ice at top		ice at top


Equity Waste Dump Piezos
(above waste dumps)
Elevation (m)
1360
1355
1350
1345
1340
1335
1330
Mar-00
Mar-01
Mar-02
Mar-03
Mar-04
Mar-05
Mar-06
Mar-07
Mar-08
Mar-09
Mar-10
Mar-11
Mar-12
P00-7
P00-8
P00-14
P99-6D
P99-6S


Equity Waste Dump Piezos
Elevation (m)
1293
1288
1283
1278
1273
1268
1263
1258
Mar-00
Mar-01
Mar-02
Mar-03
Mar-04
Mar-05
Mar-06
Mar-07
Mar-08
Mar-09
Mar-10
Mar-11
Mar-12
P00-3S
P00-3D
P00-4
P00-5S
P00-5D
P99-4D (pit)

APPENDIX III

FRESHET DATA

Contents (in order of appearance):

Date	Time	Black Pipe v-notch cm	BP flow l/sec	ST weir broadcrest cm	ST flow l/sec	C-11 v-notch cm	C-11 flow l/sec	C-7 v-notch cm	C-7 flow l/sec	Bessemer v-notch cm	Bessemer flow l/sec	Getty on yes/no	ST - V underflow cm	ST-V flow l/sec
5-Jan-12	9:00					3.8	1.49	10.8	5.16	10.6	4.92	No		
12-Jan-12	8:20					4.6	1.99	9.3	3.55	10.3	4.58	No	4.2	0.49
23-Jan-12	11:00					3.9	1.55	9.9	4.15	10.3	4.58	No	3.9	0.40
26-Jan-12	9:00					3.3	1.21	10.2	4.47	10.1	4.36	No		
2-Feb-12	8:30					4.6	1.99	10.4	4.69	9.8	4.04	No		
16-Feb-12	8:30					3.5	1.32	10.0	4.25	9.8	4.04	No	3.8	0.38
2-Mar-12	8:30					3.4	1.26	10.0	4.25	9.4	3.64	No	3.6	0.33
7-Mar-12	9:00					3.6	1.38	10.0	4.25	9.8	4.04	No	4.1	0.46
15-Mar-12	10:30					3.9	1.55	10.0	4.25	9.8	4.04	No	3.5	0.31
22-Mar-12	8:30					3.4	1.26	9.9	4.15	9.7	3.94	No	3.3	0.27
29-Mar-12	8:30					3.2	1.15	10.1	4.36	9.4	3.64	No	3.1	0.23
5-Apr-12	11:00					3.4	1.26	11.1	5.52	9.2	3.45	Yes		
11-Apr-12	10:45					4.3	1.80	12.1	6.85	9.7	3.94	No		
13-Apr-12	8:30					7.6	4.22	14.5	10.77	9.9	4.15	No		
16-Apr-12	11:00	3.6	0.33	1.0	0.41	7.2	3.89	14.3	10.40	10.1	4.36	No	2.9	0.19
17-Apr-12	9:00	3.3	0.27	1.1	0.47	4.8	2.12	14.4	10.58	10.7	5.04	No	3.2	0.25
18-Apr-12	8:30					6.1	3.03	14.7	11.14	10.9	5.28	No		
19-Apr-12	12:50					7.9	4.47	14.8	11.33	11.8	6.43	No		
20-Apr-12	8:30	3.4	0.29	1.1	0.47	6.3	3.18	15.6	12.93	11.7	6.30	No	3.2	0.25
23-Apr-12	11:00	2.6	0.15	0.9	0.35	6.7	3.49	14.3	10.40	13.1	8.35	No	3.2	0.25
24-Apr-12	9:30					7.7	4.30	16.1	13.99	13.2	8.51	No		
25-Apr-12	9:00					8.1	4.64	17.2	16.50	13.9	9.69	Yes		
26-Apr-12	9:00					10.6	6.95	18.5	19.80	13.9	9.69	No		
27-Apr-12	8:30	2.1	0.09	1.3	0.61	13.3	9.77	17.9	18.23	15.7	13.14	Yes	3.2	0.25
30-Apr-12	10:45	3.3	0.27			10.6	6.95	16.7	15.33	16.8	15.56	No		
1-May-12	9:15					10.0	6.37	16.8	15.56	17.7	17.73	Yes		
2-May-12	9:00					9.9	6.27	16.9	15.79	17.8	17.98	No		
3-May-12	11:00					9.1	5.53	16.3	14.43	17.9	18.23	Yes		
4-May-12	7:54	2.1	0.09	0.5	0.15	8.8	5.26	15.8	13.35	18.7	20.34	No	4.0	0.43
5-May-12	9:00	1.5	0.04	0.5	0.15	7.3	3.97	17.5	17.23	17.2	16.50	No		
8-May-12	9:00			0.8	0.29	9.5	5.90	17.2	16.50	17.0	16.03			
9-May-12	11:00					10.2	6.56	16.4	14.65	17.2	16.50			
10-May-12	10:30					9.6	5.99	16.5	14.87	17.6	17.48	No		
11-May-12	9:00			0.6	0.19	7.6	4.22	14.8	11.33	17.9	18.23	No	3.5	0.31
13-May-12	9:45			1.4	0.68	18.9	16.54	16.8	15.56	19.2	21.73	Yes	4.9	0.71
15-May-12	8:30			1.4	0.68	12.3	8.69	18.5	19.80	20.3	24.97	No		
16-May-12	9:00			1.3	0.61	14.8	11.46	18.5	19.80	21.0	27.18	Yes	5.8	1.09
17-May-12	9:00					12.5	8.90	18.4	19.53	22.0	30.53	No		
18-May-12	10:30	0.0	0.00	0.9	0.35	9.2	5.62	17.3	16.74	22.1	30.88	No	9.1	3.36
20-May-12	11:30	0.0	0.00	0.9	0.35	10.2	6.56	17.6	17.48	21.6	29.16	No	9.5	3.74
22-May-12	9:00			0.9	0.35	13.5	9.99	18.7	20.34	20.8	26.54			
23-May-12	9:00			1.5	0.76	15.2	11.93	19.1	21.44	20.9	26.86	Yes	9.6	3.84
24-May-12	9:45					13.7	10.21	19.5	22.58	22.0	30.53			
25-May-12	9:00			1.2	0.54	18.8	16.41	20.5	25.59	21.6	29.16	No	9.8	4.04
27-May-12	8:00					19.9	17.88	20.9	26.86	21.9	30.19	No		
28-May-12	9:00					12.4	8.79	20.9	26.86	22.4	31.94	Yes	9.8	4.04
29-May-12	9:10					12.4	8.79	20.9	26.86	21.3	28.16	No	10.2	4.47
30-May-12	9:15					12.0	8.37	20.8	26.54	22.4	31.94	No		
31-May-12	9:25					11.0	7.35	20.1	24.36	22.1	30.88	No	10.1	4.36
1-Jun-12	8:45					12.2	8.58	20.0	24.06	22.3	31.59	Yes	10.2	4.47
2-Jun-12	13:00					11.5	7.85	20.0	24.06	22.2	31.23	No		
4-Jun-12	9:00					7.6	4.22	20.3	24.97	21.7	29.50	Yes	9.6	3.84
5-Jun-12	9:10					15.2	11.93	20.5	25.59	20.7	26.22	No	9.7	3.94
6-Jun-12	9:05					10.4	6.75	20.0	24.06	20.7	26.22	No	10.0	4.25
7-Jun-12	9:00					9.0	5.44	19.7	23.17	21.5	28.83	Yes		
10-Jun-12	9:00					9.8	6.18	19.5	22.58	21.2	27.83	No		
11-Jun-12	9:10					9.4	5.80	20.0	24.06	21.5	28.83	No	10.1	4.36
12-Jun-12	9:00					9.6	5.99	19.8	23.46	21.7	29.50	No	10.4	4.69
13-Jun-12	9:00					8.4	4.90	18.6	20.07	21.4	28.49	No		
14-Jun-12	9:05					8.0	4.56	18.5	19.80	21.4	28.49	No		
15-Jun-12	8:45					7.6	4.22	18.4	19.53	21.3	28.16	No		
18-Jun-12	9:00					7.1	3.81	17.8	17.98	20.3	24.97	Yes	10.1	4.36
20-Jun-12	9:00					7.2	3.89	17.2	16.50	19.7	23.17	No		
21-Jun-12	9:10					7.3	3.97	17.9	18.23	19.5	22.58	No	10.3	4.58
22-Jun-12	8:10					5.9	2.89	17.5	17.23	19.5	22.58	No	10.0	4.25
25-Jun-12	9:00					6.1	3.03	17.5	17.23	19.1	21.44	No	10.2	4.47
27-Jun-12	9:15					6.6	3.41	17.2	16.50	18.8	20.61	No	10.5	4.81
29-Jun-12	8:00					8.8	5.26	17.2	16.50	17.9	18.23	Yes	10.9	5.28
3-Jul-12	9:00					8.5	4.99	17.3	16.74	17.5	17.23	No	10.8	5.16
5-Jul-12	8:50					6.4	3.26	16.9	15.79	16.0	13.77	No	10.5	4.81
6-Jul-12	9:15					6.0	2.96	16.1	13.99	15.5	12.72	No		
9-Jul-12	9:10					5.3	2.46	16.4	14.65	15.6	12.93	No	10.1	4.36
11-Jul-12	9:00					4.5	1.92	15.8	13.35	15.6	12.93	No	10.4	4.69
12-Jul-12	9:20					4.9	2.18	15.8	13.35	15.4	12.52	No		
17-Jul-12	8:50					5.4	2.53	15.3	12.32	14.1	10.04	No		
20-Jul-12	11:15					5.4	2.53	14.8	11.33	12.8	7.88	No	10.2	4.47
23-Jul-12	9:00					4.0	1.61	14.7	11.14	12.5	7.43	No	10.4	4.69
24-Jul-12	8:55					4.8	2.12	14.3	10.40	12.2	6.99	No		
27-Jul-12	8:55					4.8	2.12	14.2	10.22	11.9	6.57	No	10.4	4.69
30-Jul-12	10:50					4.1	1.67	13.7	9.34	10.2	4.47	No		
1-Aug-12	8:55					4.6	1.99	13.4	8.84	11.4	5.90	No	10.1	4.36
2-Aug-12	9:05					4.7	2.05	12.4	7.28	11.0	5.40	No		
8-Aug-12	8:50					4.3	1.80	13.2	8.51	10.4	4.69	No	10.0	4.25
10-Aug-12	8:30					4.4	1.86	13.2	8.51	10.8	5.16	No	9.9	4.15
13-Aug-12	9:15					4.4	1.86	12.5	7.43	10.3	4.58	No	9.9	4.15
16-Aug-12	9:05					4.2	1.73	12.4	7.28	10.1	4.36	No	9.6	3.84
20-Aug-12	9:00					3.6	1.38	10.8	5.16	10.0	4.25	No	6.8	1.62
23-Aug-12	9:10					6.7	3.49	9.9	4.15	9.7	3.94	No	6.2	1.29
28-Aug-12	8:45					4.3	1.80	10.5	4.81	10.0	4.25	No		
4-Sep-12	8:50					3.6	1.38			9.7	3.94	No	5.5	0.95
6-Sep-12	9:00					3.5	1.32	10.0	4.25	9.6	3.84	No	5.6	1.00
10-Sep-12	9:00					3.4	1.26	9.8	4.04	9.5	3.74	No	5.4	0.91
14-Sep-12	8:30					3.2	1.15	9.9	4.15	9.5	3.74	No	5.4	0.91
21-Sep-12	8:15					3.1	1.10	9.9	4.15	9.5	3.74	No	5.2	0.83
26-Sep-12	8:30					3.2	1.15	9.7	3.94	9.5	3.74	No	4.8	0.68
1-Oct-12	11:00					4.3	1.80	9.9	4.15	9.2	3.45	yes	5.1	0.79
12-Oct-12	8:30					10.9	7.25	9.8	4.04	9.3	3.55	No	4.9	0.71
26-Oct-12	8:30					3.5	1.32	9.8	4.04	9.0	3.27	No	4.2	0.49
31-Oct-12	9:45					2.8	0.94	9.5	3.74	8.1	2.51	No	3.8	0.38
5-Nov-12	8:30					4.6	1.99	10.3	4.58	8.7	3.00	No	3.5	0.31
22-Nov-12	11:00					3.6	1.38	9.2	3.45	8.9	3.18	No		
7-Dec-12	8:40					3.3	1.21	9.4	3.64	8.9	3.18	No	3.2	0.25
13-Dec-12	8:30					3.5	1.32	9.6	3.84	8.8	3.09	No		

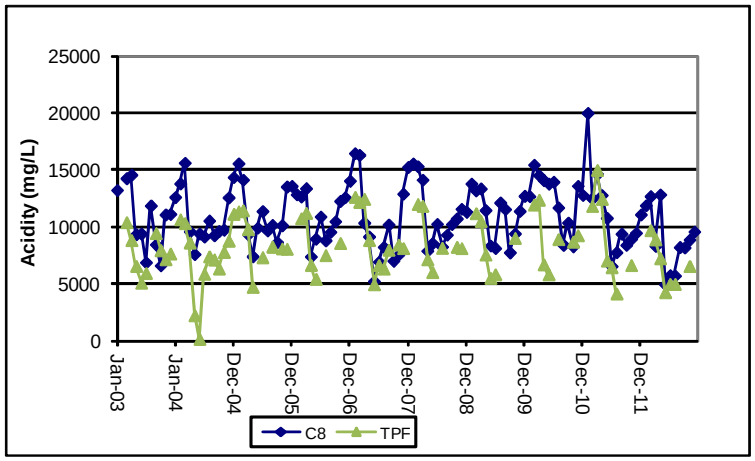
Seep 97-05 Chemistry - 2012

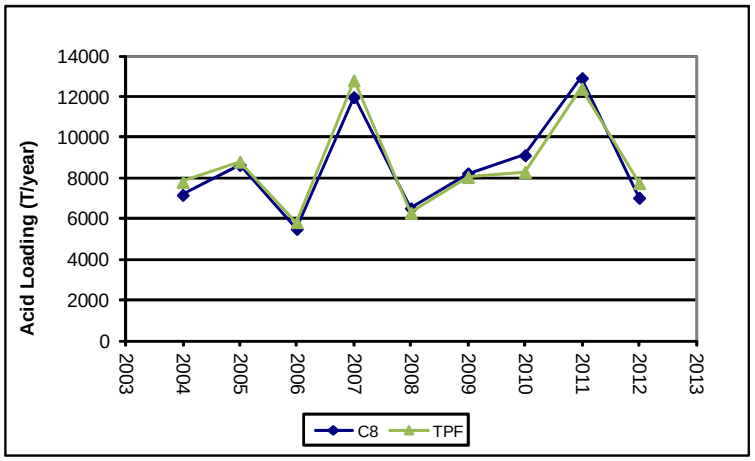
Date	LAB pH pH unit	ACIDITY mg/L	Flow L/s	Al (t) mg/L	As (t) mg/L	Ca (t) mg/L	Cd (t) mg/L	Co (t) mg/L	Cr (t) mg/L	Cu (t) mg/L	Fe (t) mg/L	Mg (t) mg/L	Mn (t) mg/L	Mo (t) mg/L	Ni (t) mg/L	Pb (t) mg/L	V (t) mg/L	Zn (t) mg/L
05/01/2012	2.29	35300		3770	34.0	511	2.17	16.4	1.52	298	6330	2250	284	<0.60	38.4	2.2	2.81	272
26/01/2012	2.01	41700		4310	45.5	554	2.36	18.0	1.83	340	7450	2470	282	<0.60	43.4	<4.0	3.73	292
16/02/2012	2.25	40600		4230	41.1	514	2.50	17.6	1.78	329	7050	2410	288	<0.60	41.7	<1.0	3.17	280
07/03/2012	2.14	38700		4050	44.4	503	2.20	16.9	1.80	321	6940	2190	264	<0.60	40.0	<5.0	2.97	262
29/03/2012	2.08	39700		4100	51.7	507	2.28	17.6	1.87	325	7240	2200	257	<0.60	40.9	<3.0	3.01	256
19/04/2012	1.99	31000	0.36	3040	50.8	503	1.30	12.6	1.69	237	7440	1360	187	<0.60	28.1	2.7	3.45	159
10/05/2012	2.14	35400	0.26	3400	58.8	540	1.69	13.7	1.83	255	7430	1650	231	<0.60	31.7	<1.0	3.15	200
31/05/2012	2.36	25400	0.45	2590	20.8	504	1.72	10.6	1.03	190	4660	1580	226	<0.60	25.7	<1.0	2.21	208
21/06/2012	2.47	22900	0.30	2200	13.0	541	1.54	8.9	0.82	164	3690	1430	179	<0.30	21.1	<0.50	1.81	179
12/07/2012	2.34	21200	0.25	2490	14.2	568	1.66	10.6	0.96	190	4070	1750	231	<0.30	25.6	<2.0	2.09	201
02/08/2012	2.36	26300	0.22	2780	15.7	539	1.97	12.4	1.08	211	4650	1880	260	<0.60	29.2	<1.0	2.47	230
15/08/2012	2.30	27700	0.19	2600	14.4	473	1.76	11.5	1.04	193	4310	1810	248	<0.60	27.5	<4.0	2.13	212
23/08/2012	2.28	27400	0.20	2720	15.3	479	1.85	11.6	1.03	203	4390	1920	264	<0.30	27.7	<0.50	2.29	216
26/09/2012	2.44	29971		3120	20.1	489	1.99	13.6	1.14	231	5080	2160	289	<0.60	32.3	<1.0	2.45	240
31/10/2012	2.27	33600		3650	29.0	503	2.28	16.0	1.37	275	5900	2460	318	<0.60	38.0	<1.2	2.57	275
22/11/2012	2.32	39700		4010	32.8	520	2.23	16.7	1.58	306	6490	2420	339	<0.60	39.5	<1.0	2.90	275
13/12/2012	2.25	37100		3970	35.9	523	2.08	16.8	1.58	311	6610	2520	330	<0.60	39.8	<1.2	2.73	279

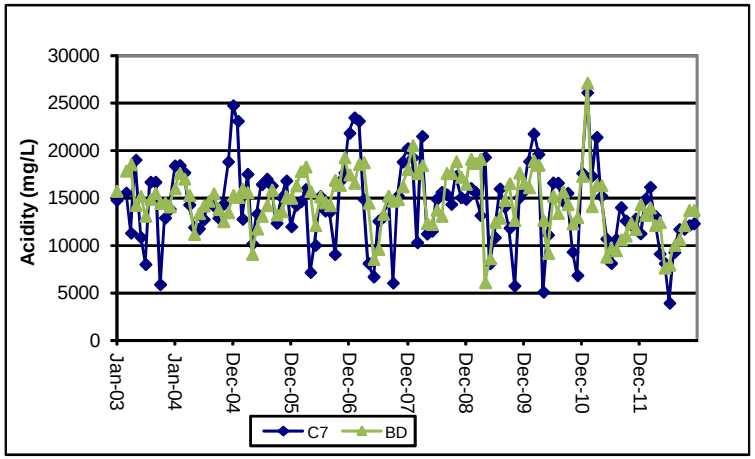
Bessemer Dump Chemistry - 2012

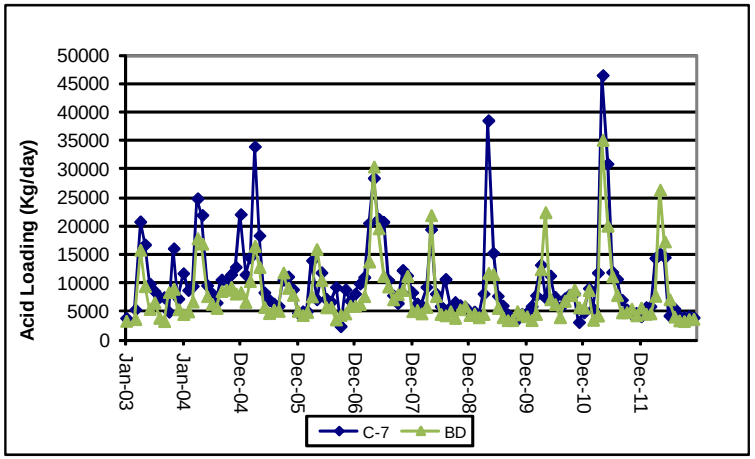
Date	LAB pH pH unit	ACIDITY mg/L	Flow L/s	Al (t) mg/L	As (t) mg/L	Ca (t) mg/L	Cd (t) mg/L	Co (t) mg/L	Cr (t) mg/L	Cu (t) mg/L	Fe (t) mg/L	Mg (t) mg/L	Mn (t) mg/L	Mo (t) mg/L	Ni (t) mg/L	Pb (t) mg/L	V (t) mg/L	Zn (t) mg/L
05/01/2012	2.77	13000	4.92	1540	1.0	486	4.06	7.46	0.18	78.3	947	2900	415	<0.30	11.80	0.76	<0.30	459
26/01/2012	2.40	15600	4.36	1630	0.9	481	4.23	7.65	0.15	78.1	954	3040	397	<0.30	12.20	<1.0	<0.30	464
16/02/2012	2.76	13200	4.04	1740	0.9	492	4.37	7.98	0.14	83.2	1000	3130	442	<0.30	12.80	<0.50	<0.30	477
07/03/2012	2.74	14100	4.04	1740	1.0	491	4.43	8.12	0.17	82.3	1030	3170	431	<0.30	12.90	<1.5	<0.30	486
29/03/2012	2.65	13800	3.64	1790	1.2	486	4.62	8.39	0.14	82.5	1010	3200	441	<0.30	13.20	<0.80	<0.30	492
19/04/2012	2.60	12100	6.32	1550	1.9	495	4.02	6.85	0.15	75.5	1250	2650	423	<0.30	11.10	0.94	<0.30	434
10/05/2012	2.65	17400	17.48	1300	<2.0	491	3.36	6.10	0.15	74.3	1010	2480	366	<0.30	10.10	<0.50	<0.30	367
31/05/2012	2.65	7460	30.88	757	0.7	440	1.95	3.42	0.11	53.9	642	1280	198	<0.15	5.83	<0.25	<0.15	206
21/06/2012	2.83	7630	22.58	732	0.5	482	1.97	3.39	0.09	57.1	492	1330	175	<0.15	5.90	<0.25	<0.15	214
12/07/2012	2.75	7930	12.52	872	<1.0	468	2.19	3.97	0.10	61.3	580	1580	256	<0.15	6.86	<0.80	<0.15	235
02/08/2012	2.80	8330	5.40	1020	<2.0	493	2.79	4.94	0.12	65.8	696	1940	290	<0.30	8.37	<0.50	<0.30	308
23/08/2012	2.76	11700	3.94	1190	<2.0	479	3.30	5.73	0.14	68.6	769	2270	350	<0.30	9.47	<0.50	<0.30	365
26/09/2012	2.81	10600	3.74	1370	<2.0	492	3.75	6.57	0.15	71.3	795	2610	377	<0.30	10.70	<0.50	<0.30	398
31/10/2012	2.75	12100	2.51	1420	<2.0	471	3.93	7.07	0.17	72.8	847	2890	423	<0.30	11.20	<0.50	<0.30	434
22/11/2012	2.73	13700	3.18	1550	<2.0	476	3.95	7.08	0.14	74.5	888	2770	443	<0.30	11.20	<0.50	<0.30	434
13/12/2012	2.77	13700	3.09	1570	<2.0	505	4.13	7.37	0.16	75.5	925	3040	440	<0.30	11.80	<0.50	<0.30	456

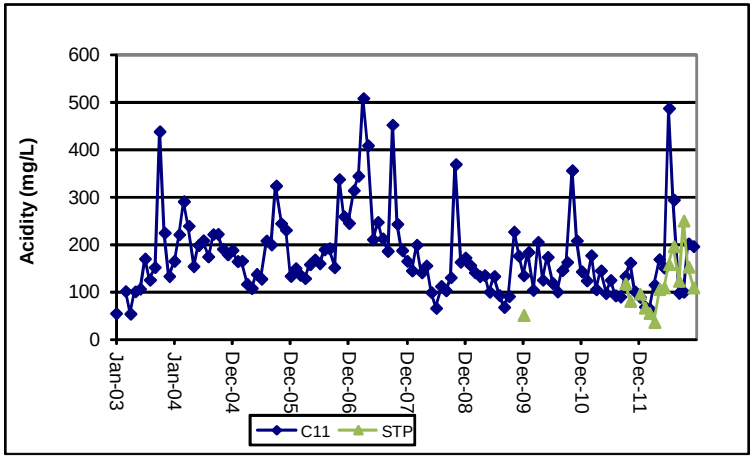
Contam/Seep 97-05 & BD for annual

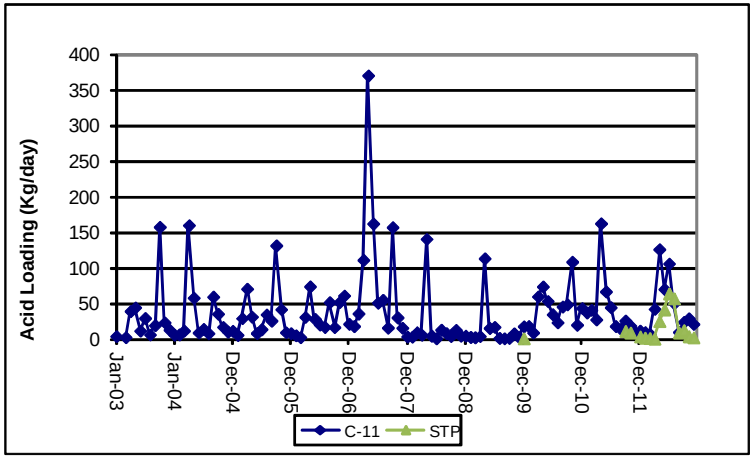

Acidity (mg/L)
25000
20000
15000
10000
5000
0
Jan-03
Jan-04
Dec-04
Dec-05
Dec-06
Dec-07
Dec-08
Dec-09
Dec-10
Dec-11
C8
TPF

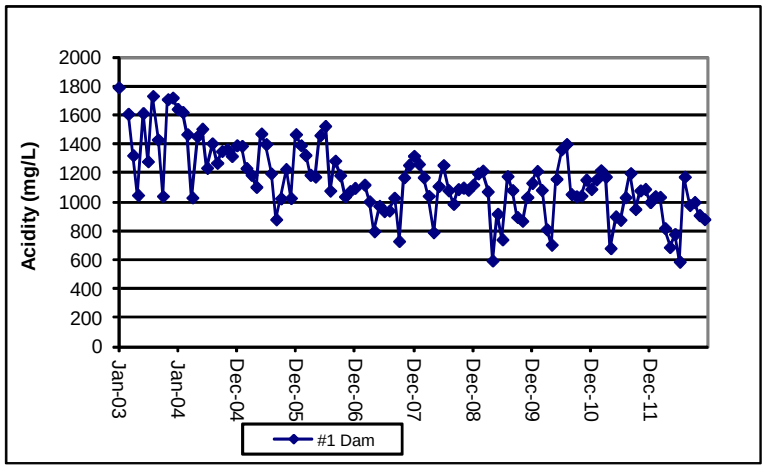

Acid Loading (T/year)
14000
12000
10000
8000
6000
4000
2000
0
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
C8
TPF

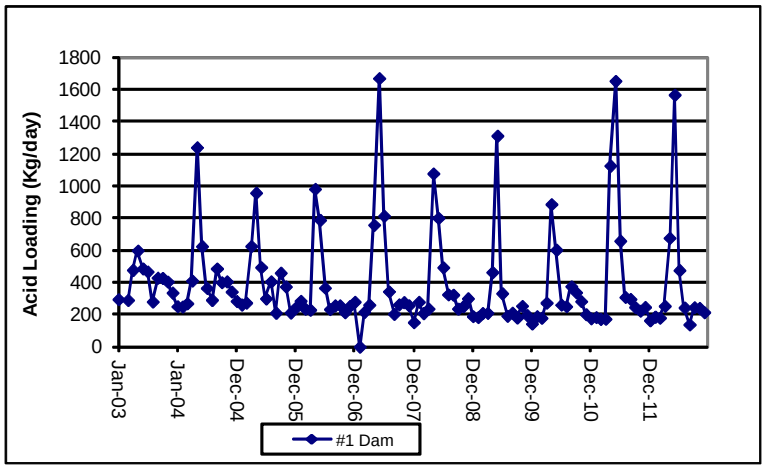

Acidity (mg/L)
30000
25000
20000
15000
10000
5000
0
Jan-03
Jan-04
Dec-04
Dec-05
Dec-06
Dec-07
Dec-08
Dec-09
Dec-10
Dec-11
C7
BD

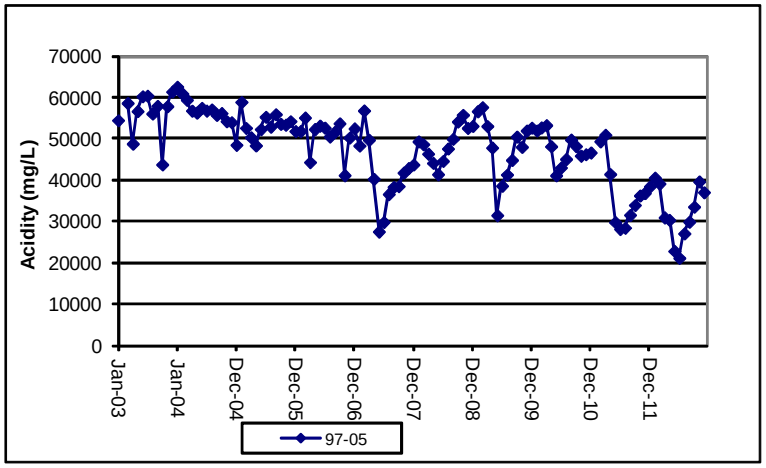

Acid Loading (Kg/day)
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
Jan-03
Jan-04
Dec-04
Dec-05
Dec-06
Dec-07
Dec-08
Dec-09
Dec-10
Dec-11
C-7
BD

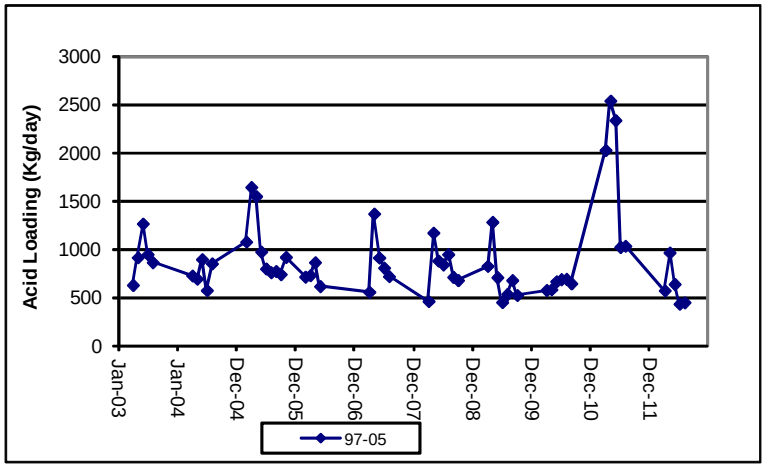

Acidity (mg/L)
600
500
400
300
200
100
0
Jan-03
Jan-04
Dec-04
Dec-05
Dec-06
Dec-07
Dec-08
Dec-09
Dec-10
Dec-11
C11
STP


Acid Loading (Kg/day)
400
350
300
250
200
150
100
50
0
Jan-03
Jan-04
Dec-04
Dec-05
Dec-06
Dec-07
Dec-08
Dec-09
Dec-10
Dec-11
C-11
STP


Acidity (mg/L)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Jan-03
Jan-04
Dec-04
Dec-05
Dec-06
Dec-07
Dec-08
Dec-09
Dec-10
Dec-11
#1 Dam

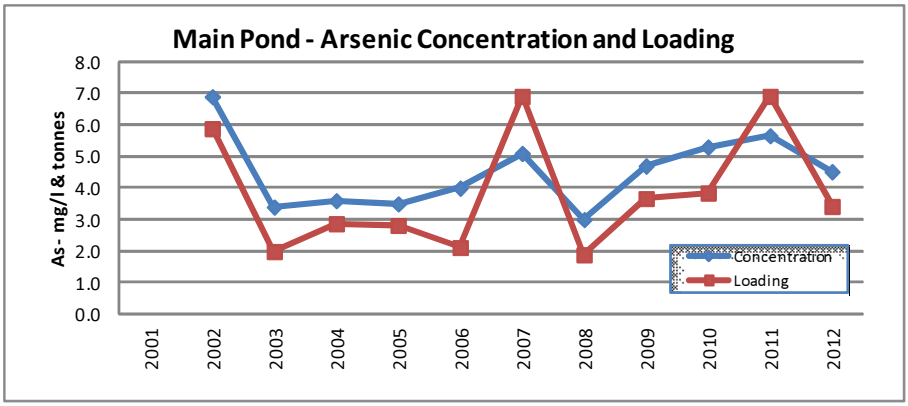

Acid Loading (Kg/day)
1800
1600
1400
1200
1000
800
600
400
200
0
Jan-03
Jan-04
Dec-04
Dec-05
Dec-06
Dec-07
Dec-08
Dec-09
Dec-10
Dec-11
#1 Dam

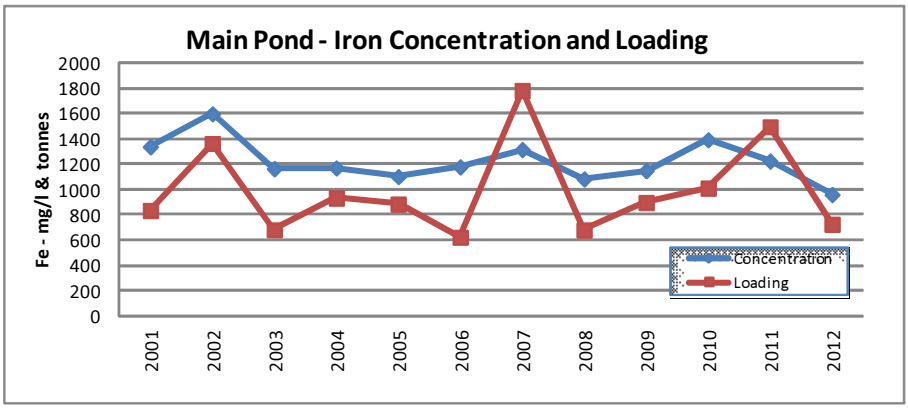

Acidity (mg/L)
70000
60000
50000
40000
30000
20000
10000
0
Jan-03
Jan-04
Dec-04
Dec-05
Dec-06
Dec-07
Dec-08
Dec-09
Dec-10
Dec-11
97-05

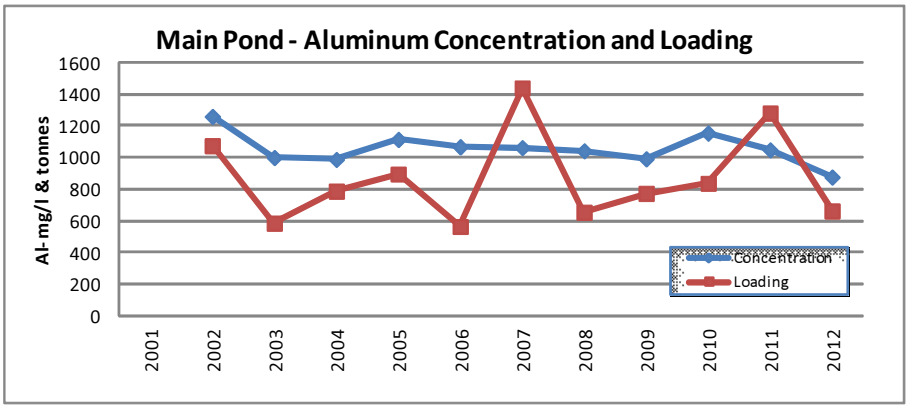

Acid Loading (Kg/day)
3000
2500
2000
1500
1000
500
0
Jan-03
Jan-04
Dec-04
Dec-05
Dec-06
Dec-07
Dec-08
Dec-09
Dec-10
Dec-11
97-05

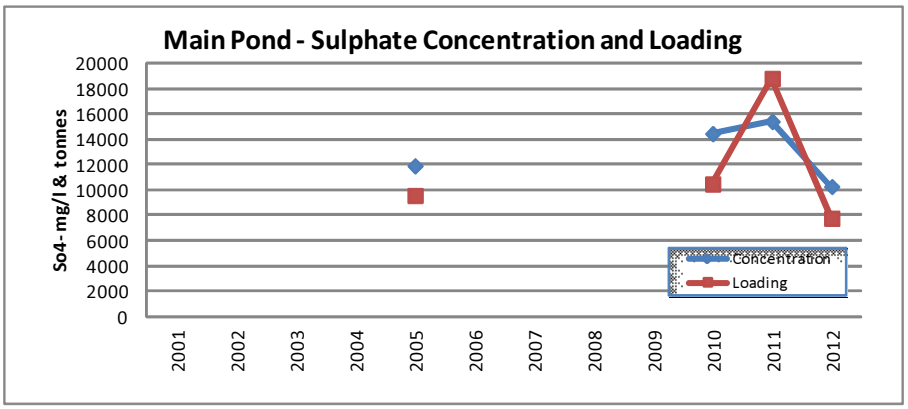
Main ARD Collection Pond
Site C-8 Concentration & Loading

		pH	ACID	SO4	Cu(t)	Fe(t)	Zn(t)	As (t)	Al (t)	FLOW	ACID	SO4	Cu(t)	Fe(t)	Zn(t)	As (t)	Al (t)
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	m3/sec	mg/sec	mg/sec	mg/sec	mg/sec	mg/sec	mg/sec	mg/sec
2006	J	2.64	13604		105	1427	224	4.9	1343.1	0.0114	154939		1200	16258	2551	56	15297
	F	2.67	12865		102	1418	228	4.4	1344.4	0.0105	135223		1077	14901	2393	46	14131
	M	2.74	12669		108	1478	242	4.6	1417.0	0.0102	129528		1109	15113	2479	47	14487
	A	2.43	13398		105	1872	169	9.7	1329.3	0.0172	230807		1811	32245	2911	167	22901
	M	2.79	7404		59	881	141	4.2	755.8	0.0406	300555		2407	35779	5708	170	30679
	J	2.55	8966		72	875	172	1.5	890.0	0.0308	276261		2231	26954	5285	45	27423
	J	2.50	10918		83	1139	209	2.7	1115.7	0.0158	172828		1314	18024	3310	43	17661
	A	2.61	8827		67	861	158	2.2	861.1	0.0155	136751		1042	13342	2455	34	13340
	S	2.64	9571		72	928	176	2.2	904.1	0.0130	124679		935	12094	2298	28	11777
	O	2.59	10499		75	923	188	1.9	974.9	0.0109	114478		820	10060	2055	20	10630
	N	2.69	12281		96	1511	173	6.5	1153.8	0.0104	127283		991	15663	1791	67	11958
	D	2.60	12607		52	755	111	3.3	621.2	0.0149	187702		776	11235	1648	49	9249
2007	J	2.64	14053		108	1771	230	9.3	1383.0	0.0177	248710		1911	31343	4071	164	24475
	F	2.50	16470		124	2387	225	11.9	1626.7	0.0118	194017		1461	28119	2651	140	19163
	M	2.50	16330		116	2160	240	10.9	1564.7	0.0206	336953		2394	44569	4952	224	32286
	A	2.39	10372		80	1686	129	9.1	1030.2	0.0337	349028		2692	56736	4341	305	34666
	M	2.59	9165		59	1144	139	5.1	789.6	0.1371	1256567		8089	156848	19058	699	108251
	J	2.62	5239		39	396	123	0.3	455.5	0.1151	603166		4490	45591	14161	35	52442
	J	2.54	6956		54	497	100	0.1	530.4	0.0539	374803		2910	26779	5388	5	28579
	A	2.64	8254		58	643	151	0.1	675.3	0.0363	299232		2103	23311	5474	4	24480
	S	2.58	10207		78	1011	167	0.6	1011.8	0.0192	195627		1495	19377	3201	11	19391
	O	2.75	7030		48	565	148	0.1	666.4	0.0257	180826		1235	14533	3807	3	17141
	N	2.67	7577		56	652	156	0.1	753.3	0.0268	203003		1500	17468	4180	3	20182
	D	2.51	12920		86	1339	254	2.9	1347.3	0.0178	229769		1529	23813	4517	52	23959
2008	J	2.39	15262		91	1320	210	3.8	1249.5	0.0106	161777		966	13993	2221	40	13245
	F	2.36	15572		103	1578	188	3.7	1398.1	0.0104	161949		1067	16409	1952	38	14540
	M	2.53	15324		95	1434	209	5.2	1332.4	0.0126	193082		1199	18071	2631	66	16788
	A	2.62	14145		105	1849	169	9.3	1361.5	0.0180	254610		1889	33275	3040	167	24507
	M	2.68	7910		51	799	150	1.4	728.3	0.0777	614607		3963	62107	11640	109	56585
	J	2.74	8578		50	750	157	0.1	715.3	0.0234	200725		1174	17561	3665	2	16738
	J	2.60	10272		81	998	201	0.6	1102.2	0.0146	149971		1180	14571	2940	9	16091
	A	2.73	8267		63	856	223	2.7	892.1	0.0124	102511		777	10610	2769	33	11062
	S	2.45	9316		61	735	166	2.4	827.6	0.0124	115518		755	9111	2055	30	10262
	O	2.48	10246		70	877	171	2.8	1000.2	0.0121	123977		852	10614	2063	34	12102
	N	2.42	10736		65	874	182	0.7	944.9	0.0150	161040		980	13112	2735	11	14174
	D	2.47	11595		75	1165	154	5.1	978.4	0.0197	228422		1478	22957	3030	100	19274
2009	J	2.54	12389		82	1062	191	3.9	1022.1	0.0113	139759		922	11986	2154	44	11531
	F	2.41	13804		96	1508	160	6.7	1168.3	0.0110	152023		1056	16609	1758	74	12866
	M	2.54	13190		97	1495	190	7.6	1270.4	0.0109	144211		1064	16348	2080	83	13890
	A	2.49	13370		81	1486	169	7.4	1152.4	0.0191	255519		1547	28400	3221	141	22024
	M	2.45	11477		83	1683	109	7.9	999.4	0.0856	981869		7109	143989	9285	676	85500
	J	2.65	8363		65	1151	98	4.6	786.7	0.0594	497118		3870	68397	5848	270	46760
	J	2.29	8146		63	769	161	1.4	820.9	0.0265	215725		1676	20359	4261	37	21739
	A	2.48	12143		73	970	187	3.5	942.9	0.0122	147539		884	11788	2267	43	11457
	S	2.38	11565		72	930	159	2.8	985.8	0.0133	154072		956	12386	2119	37	13133
	O	2.66	8484		62	768	198	1.4	849.3	0.0140	119015		871	10778	2782	20	11914
	N	2.65	9429		63	983	134	4.7	803.1	0.0217	204525		1377	21314	2906	102	17420
	D	2.45	11401		83	1296	164	4.7	1139.6	0.0120	136385		990	15505	1961	56	13633
2010	J	2.33	12726		84	1330	180	4.9	1151.5	0.0087	111030		730	11606	1567	43	10047
	F	2.67	12695		88	1523	198	5.9	1192.1	0.0123	155765		1085	18688	2433	72	14627
	M	2.32	15468		108	1951	196	13.2	1340.9	0.0145	223993		1561	28256	2837	191	19418
	A	2.16	14544		98	1825	182	9.5	1313.3	0.0348	505628		3419	63434	6342	329	45659
	M	2.00	14107		102	915	199	3.7	1379.3	0.0581	819493		5927	53155	11552	215	80127
	J	2.30	13804		94	1609	200	4.6	1349.0	0.0319	440937		3016	51396	6399	147	43091
	J	2.35	13965		58	1647	186	1.6	1219.7	0.0130	181329		754	21387	2417	20	15837
	A	2.70	11709		37	1521	195	0.1	1091.9	0.0117	137350		438	17842	2286	1	12809
	S	2.50	8429		57	720	158	3.1	734.5	0.0227	191191		1286	16333	3592	70	16661
	O	2.50	10383		61	685	123	4.4	986.5	0.0212	220372		1287	14538	2612	93	20937
	N	2.60	8298	12545	65	919	153	3.6	842.2	0.0307	254511	384762	1986	28185	4685	109	25831
	D	2.50	13617	18270	102	1923	189	10.8	1352.1	0.0165	225223	302174	1690	31809	3123	179	22363
2011	J	2.64	12800	15400	84	1320	183	7.1	1200.0	0.0153	195919	235715	1281	20204	2801	108	18367
	F	2.66	20000	18400	98	1740	190	10.9	1420.0	0.0134	268643	247151	1322	23372	2552	146	19074
	M	2.69	12500	16000	115	2010	238	11.3	1720.0	0.0133	166093	212599	1528	26708	3162	150	22854
	A	2.63	14650	17050	103	1885	188	11.1	1495.0	0.0148	216376	251823	1528	27841	2769	164	22081
	M	2.61	12800	15200	95	1780	136	9.0	1300.0	0.1398	1789529	2125066	13212	248856	19014	1264	181749
	J	2.91	10795		60	811	140	2.7	776.5	0.1020	1100711		6113	82643	14275	272	79176
	J	2.90	6560		56	681	136	1.5	738.0	0.0533	349793		2959	36312	7252	78	39352
	A	2.79	7780		55	755	135	2.3	752.0	0.0407	316405		2237	30685	5470	95	30583
	S	2.74	9410	17000	81	1210	210	4.0	1190.0	0.0211	198917	359361	1721	25578	4439	83	25155
	O	2.78	8420	12500	60	874	159	3.1	897.0	0.0189	158878	235864	1125	16492	3000	58	16926
	N	2.86	8970	13550	66	990	177	3.4	1035.0	0.0151	135204	204238	1002	14922	2668	51	15600
	D	2.77	9490	13900	68	1110	175	4.7	1090.0	0.0167	158287	231843	1141	18514	2919	78	18181
2012	J	2.72	11095		72	1190	172	5.2	1100.0	0.0125	138728		902	14879	2144	65	13754
	F	2.76	11900	15200	101	1890	159	9.3	1480.0	0.0088	104575	133575	888	16609	1397	81	13006
	M	2.60	12700	15800	99	1825	155	10.1	1435.0	0.0081	103039	128190	804	14807	1258	82	11643
	A	2.66	8340	11150	63	1125	152	5.0	955.5	0.0362	301973	403716	2288	40734	5485	182	34597
	M	2.71	9804	9706	55	939	141	4.4	919.0	0.0880	862803	854179	4846	82655	12426	387	80877
	J	2.77	5243	7668	41	501	118	1.0	547.5	0.0691	362404	530039	2833	34650	8157	69	37848
	J	2.70	5780	7580	45	537	126	0.5	604.0	0.0300	173414	227418	1350	16111	3780	15	18121
	A	2.74	5730	8240	45	566	124	1.0	619.0	0.0228	130716	187975	1021	12912	2817	22	14121
	S	2.73	8230	12400	47	493	244	0.5	867.0	0.0115	94423	142265	544	5656	2799	6	9947
	O	2.71	8200	12400	61	925	136	2.8	923.0	0.0141	115775	175074	867	13060	1920	40	13032
	N	2.75	8890	11400	62	1020	136	4.4	953.0	0.0128	113444	145473	791	13016	1735	56	12161
	D	2.74	9600	7250	66	1100	158	4.9	1020.0	0.0123	118075	89171	807	13529	1943	60	12545


Main Pond - Arsenic Concentration and Loading
As- mg/l & tonnes
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Concentration
Loading


Main Pond - Iron Concentration and Loading
Fe - mg/l & tonnes
2000
1800
1600
1400
1200
1000
800
600
400
200
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Concentration
Loading

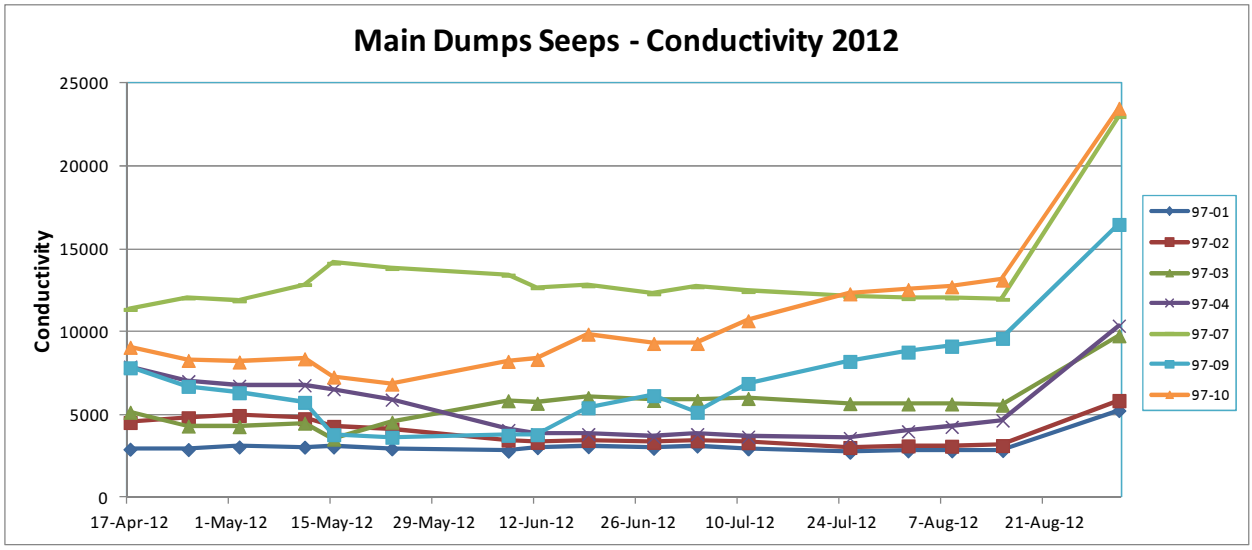

Main Pond - Aluminum Concentration and Loading
Al- mg/l & tonnes
1600
1400
1200
1000
800
600
400
200
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Concentration
Loading

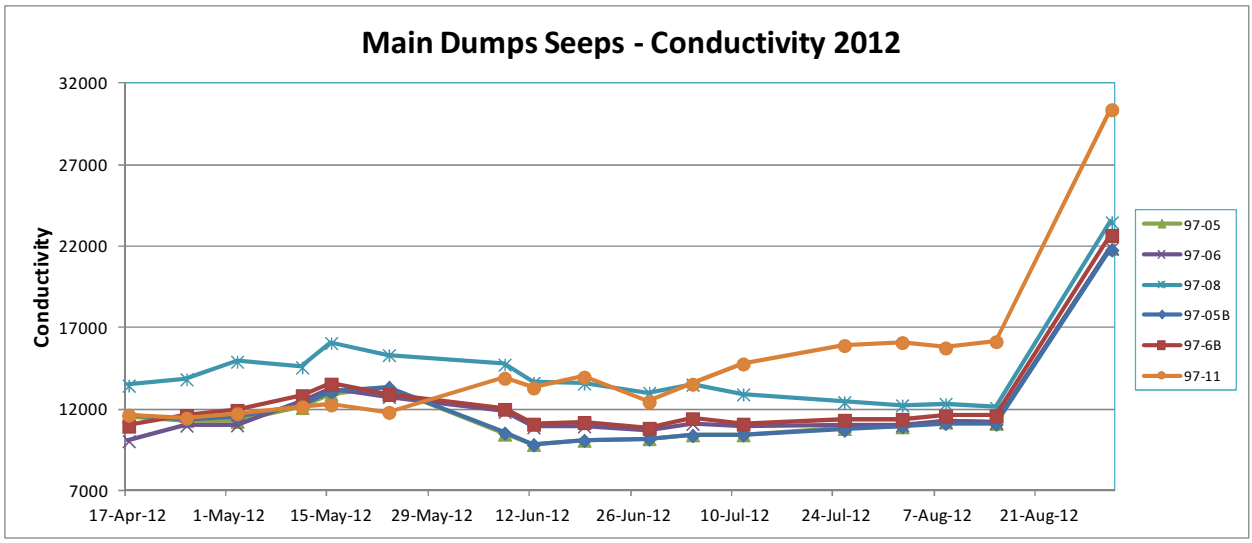

Main Pond - Sulphate Concentration and Loading
So4- mg/l & tonnes
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Concentration
Loading

Conductivity

2012	97-01	97-02	97-03	97-04	97-05	97-05B	97-06	97-6B	97-07	97-08	97-09	97-10	97-11	AVG
17-Apr-12	2940	4540	5170	7910	11580	11660	10070	11000	11370	13480	7850	9090	11670	9102
25-Apr-12	2920	4840	4330	7040	11320	11350	11030	11640	12070	13870	6730	8300	11490	8995
2-May-12	3070	4970	4300	6760	11290	11560	11050	11960	11880	14940	6340	8200	11760	9083
11-May-12	3060	4780	4500	6800	12130	12250	12460	12870	12870	14600	5770	8390	12180	9435
15-May-12	3070	4310	3550	6560	12950	13050	13260	13570	14160	16090	3810	7290	12300	9536
23-May-12	2960	4150	4570	5920	13390	13370	12780	12940	13830	15350	3660	6860	11840	9355
8-Jun-12	2810	3480	5860	4090	10510	10570	11860	12030	13440	14770	3780	8240	13930	8875
12-Jun-12	3030	3350	5710	3850	9870	9850	10930	11110	12670	13650	3820	8360	13340	8426
19-Jun-12	3090	3460	6050	3850	10130	10120	10990	11220	12800	13610	5440	9880	14000	8818
28-Jun-12	2990	3350	5880	3690	10220	10200	10670	10860	12310	13040	6170	9320	12480	8552
4-Jul-12	3130	3440	5880	3840	10460	10420	11130	11460	12740	13540	5170	9320	13570	8777
11-Jul-12	2960	3330	6000	3690	10460	10450	10910	11110	12450	12940	6900	10680	14810	8976
25-Jul-12	2750	3040	5690	3610	10850	10750	11020	11360	12140	12460	8230	12310	15940	9242
2-Aug-12	2830	3130	5660	4020	10950	10960	11050	11420	12020	12270	8800	12570	16120	9369
8-Aug-12	2830	3110	5670	4280	11250	11150	11260	11610	12060	12360	9150	12740	15790	9482
15-Aug-12	2860	3150	5600	4670	11170	11110	11190	11620	11980	12120	9630	13140	16180	9571
31-Aug-12	5270	5870	9780	10390	21900	21800	21900	22700	23000	23500	16500	23500	30400	18193

*New conductivity probe August 31, 2012, new values ~2x greater than old probe.



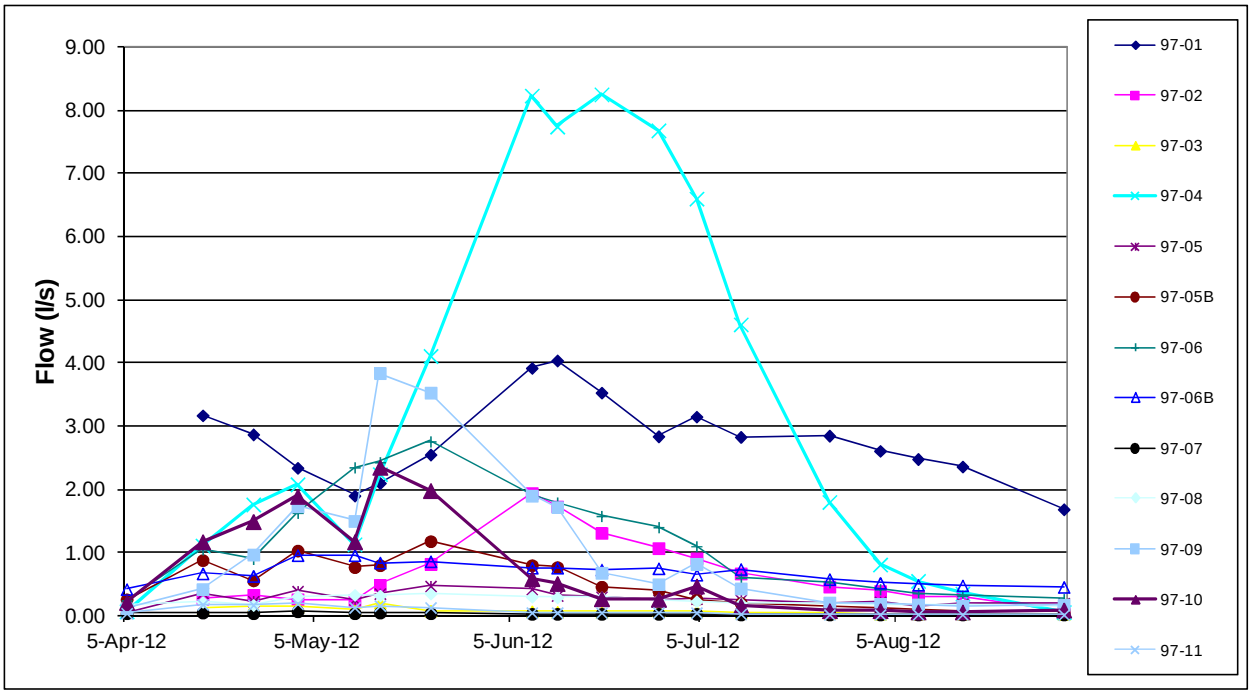


Goldcorp Canada - Equity Division

Main Waste Dump - Seep Flow Rates 2012

Seep Flow (l/sec)

	97-01	97-02	97-03	97-04	97-05	97-05B	97-06	97-06B	97-07	97-08	97-09	97-10	97-11	Sum
5-Apr-12				0.07	0.05	0.26	0.24	0.42	0.04	0.17	0.12	0.21	0.04	1.62
17-Apr-12	3.17	0.27	0.12	1.11	0.36	0.88	1.05	0.67	0.05	0.22	0.42	1.17	0.18	9.67
25-Apr-12	2.87	0.33	0.16	1.76	0.23	0.56	0.90	0.63	0.04	0.17	0.97	1.49	0.17	10.28
2-May-12	2.34	0.26	0.15	2.08	0.39	1.03	1.63	0.96	0.07	0.31	1.73	1.89	0.19	13.03
11-May-12	1.90	0.25	0.10	1.13	0.26	0.77	2.35	0.96	0.04	0.33	1.50	1.17	0.13	10.89
15-May-12	2.10	0.49	0.21	2.24	0.35	0.80	2.43	0.84	0.05	0.32	3.84	2.35	0.16	16.18
23-May-12	2.55	0.82	0.08	4.11	0.47	1.18	2.76	0.86	0.04	0.35	3.53	1.98	0.13	18.86
8-Jun-12	3.92	1.94	0.07	8.23	0.42	0.80	1.91	0.76	0.03	0.30	1.90	0.59	0.05	20.92
12-Jun-12	4.04	1.73	0.06	7.74	0.32	0.77	1.79	0.76	0.03	0.29	1.72	0.51	0.05	19.81
19-Jun-12	3.53	1.31	0.06	8.25	0.30	0.46	1.58	0.73	0.03	0.29	0.68	0.27	0.05	17.54
28-Jun-12	2.84	1.07	0.08	7.68	0.25	0.39	1.40	0.75	0.03	0.26	0.50	0.26	0.05	15.56
4-Jul-12	3.15	0.91	0.07	6.60	0.27	0.26	1.10	0.65	0.03	0.23	0.82	0.47	0.05	14.61
11-Jul-12	2.83	0.67	0.05	4.61	0.25	0.20	0.60	0.74	0.02	0.20	0.43	0.16	0.03	10.79
25-Jul-12	2.85	0.46	0.04	1.80	0.19	0.14	0.53	0.58	0.02	0.19	0.21	0.08	0.02	7.11
2-Aug-12	2.61	0.39	0.03	0.81	0.22	0.11	0.42	0.52	0.02	0.17	0.19	0.08	0.02	5.59
8-Aug-12	2.48	0.31	0.03	0.55	0.16	0.09	0.36	0.49	0.02	0.18	0.18	0.06	0.02	4.93
15-Aug-12	2.36	0.29	0.03	0.35	0.19	0.07	0.32	0.48	0.02	0.18	0.16	0.06	0.02	4.53
31-Aug-12	1.68	0.07	0.03	0.06	0.20	0.07	0.26	0.46	0.02	0.14	0.17	0.09	0.02	3.27



PUMP RECORDS - 2012

Component	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	YTD
Main Pond							
to Storage	33,490	22,019	21,731	93,851	201,546	131,727	504,363
to Treatment	0	0	0	0	34,428	46,602	81,030
Total	33,490	22,019	21,731	93,851	235,974	178,329	585,393
LDS Treatment Plant							
from Storage	0	0	0	0	0	0	0
from Main Pond	0	0	0	0	0	0	0
ARD treated (LDS)	0	0	0	0	0	0	0
water from Diversion Pond	0	0	0	0	0	0	0
sludge from Diversion Pond	0	0	0		0	0	0
HDS Treatment Plant							
from Storage	0	0	106,413	119,370	257,094	244,053	726,930
from Main Pond	0	0	0	0	34,428	46,602	81,030
ARD treated (HDS)	0	0	106,413	119,370	291,522	290,655	807,960
HDS sludge to Main Zone pit	0	0	15,251	12,258	15,469	10,242	53,220
Total ARD Treated	0	0	106,413	119,370	291,522	290,655	807,960
#1 Dam Seepage to Storage	5,100	5,209	5,386	9,298	30,486	60,428	115,908
Getty Creek to Collection	1,539	1,310	1,221	29,331	31,071	9,968	74,440
Emergency Pond to Bessemer	0	0	0	0	0	121,381	121,381
Emergency Pond to Storage	0	0	0	0	0	0	0

Component	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	YTD
Main Pond							
to Storage	80,000	61,101	29,738	37,816	33,076	32,943	779,036
to Treatment	358						81,388
Total	80,358	61,101	29,738	37,816	33,076	32,943	860,425
LDS Treatment Plant							
from Storage	0	0	0	0	0	0	0
from Main Pond	0	0	0	0	0	0	0
ARD treated (LDS)	0	0	0	0	0	0	0
water from Diversion Pond	53,315	158,466	15,464	0	0	0	227,244
sludge from Diversion Pond	0	0	0	0	0	0	0
HDS Treatment Plant							
from Storage	79,158	68,168	11,948	0	97,665	0	983,869
from Main Pond	358	0	0	0	0	0	81,388
ARD treated (HDS)	79,516	68,168	11,948	0	97,665	0	1,065,257
HDS sludge to Main Zone pit	3,530	3,424	882	0	8,890	0	69,945
Total ARD Treated	79,516	68,168	11,948	0	97,665	0	1,065,257
#1 Dam Seepage to Storage	25,079	6,443	4,234	7,598	7,943	7,543	174,749
Getty Creek to Collection	6,023	3,374	1,315	1,204	1,457	972	88,784
Emergency Pond to Bessemer	23,660	0	0	0	0	0	145,041
Emergency Pond to Storage	0	0	0	0	0	0	0

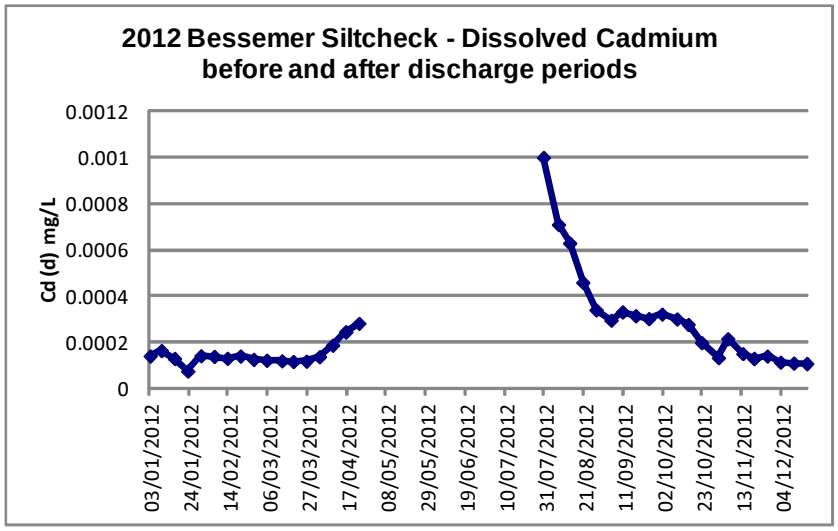
Metal Loading to Foxy Creek

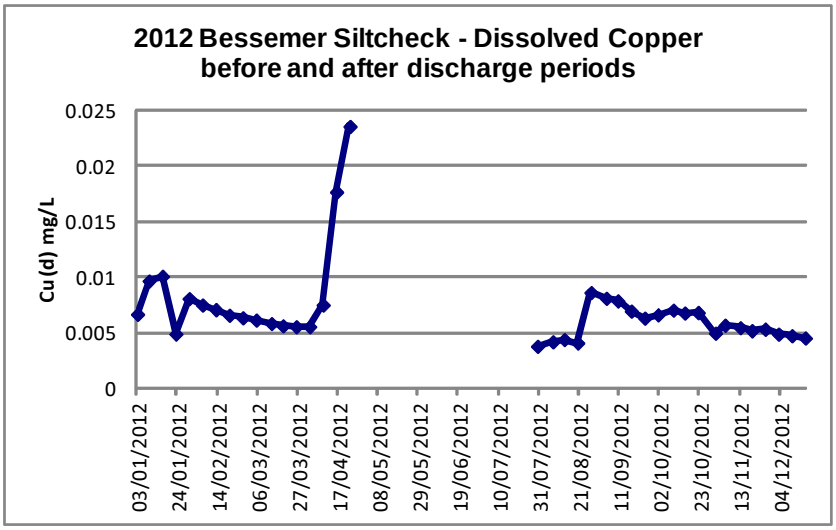
Date	Discharge Water Chemistry						Loading Totals				
	Main Zone Pit (discharge)					Monthly Discharge Total					
	As (d)	Cu (d)	Cd(d)	Zn(d)	SO_4(d)		As (d)	Cu (d)	Cd (d)	Zn (d)	SO_4 (d)
	mg/L	mg/L	mg/L	mg/L	mg/L	m^3	Kg	Kg	Kg	Kg	Tonnes
Jul-12	0.0003	0.001	0.0013	0.004	2000	170148	0.043	0.174	0.222	0.621	340
Jun-12	0.0003	0.001	0.0015	0.007	2058	270000	0.068	0.338	0.392	1.877	556
May-12	0.0003	0.003	0.0017	0.031	2050	189102	0.047	0.612	0.325	5.782	388
2012							**0.158**	**1.124**	**0.939**	**8.279**	**1283**
Oct-11	0.0004	0.002	0.0007	0.004	2037	117170	0.049	0.244	0.086	0.410	239
Sep-11	0.0005	0.003	0.0008	0.003	2023	144718	0.072	0.362	0.114	0.362	293
Aug-11	0.0005	0.002	0.0009	0.003	2016	215393	0.097	0.485	0.199	0.663	434
Jul-11	0.0003	0.002	0.0012	0.005	2170	288000	0.090	0.439	0.350	1.476	625
Jun-11	0.0004	0.002	0.0015	0.004	2088	270000	0.118	0.591	0.409	0.945	564
May-11	0.0004	0.004	0.0010	0.021	2060	67763	0.025	0.258	0.066	1.395	140
2011							**0.452**	**2.379**	**1.224**	**5.251**	**2294**
Jun-10		0.001	0.0011	0.005	1993	219188		0.219	0.241	1.096	437
May-10		0.002	0.0011	0.013	2001	230952		0.462	0.254	3.002	462
Apr-10		0.004	0.0010	0.030	1986	34381		0.138	0.034	1.031	68
2010								**0.819**	**0.530**	**5.130**	**967**
Jul-09		0.002	0.0008	0.003	1944	184424		0.369	0.148	0.553	359
Jun-09		0.002	0.0011	0.011	1996	267525		0.535	0.294	2.943	534
May-09		0.003	0.0011	0.023	1999	170156		0.510	0.187	3.914	340
2009								**1.414**	**0.629**	**7.410**	**1233**
Sep-08		0.002	0.001	0.006	1987	63409		0.109	0.081	0.378	126
Aug-08		0.001	0.002	0.003	1940	35341		0.031	0.056	0.088	69
Jul-08		0.002	0.001	0.008	1925	22936		0.041	0.022	0.173	44
Jun-08		0.002	0.001	0.003	1997	224098		0.408	0.222	0.560	448
May-08		0.002	0.001	0.011	2012	175125		0.424	0.162	1.938	352
2008								**1.014**	**0.543**	**3.138**	**1039**
Nov-07		0.002	0.0017	0.012	1981	251726		0.605	0.417	3.040	499
Oct-07		0.003	0.0014	0.007	1990	46082		0.120	0.064	0.316	92
Sep-07		0.002	0.0012	0.008	1977	74883		0.112	0.090	0.584	148
Aug-07		0.002	0.0012	0.009	1998	258744		0.543	0.310	2.225	517
Jul-07		0.002	0.0016	0.009	1976	250309		0.447	0.389	2.289	495
Jun-07		0.003	0.0021	0.012	1931	254209		0.763	0.534	3.000	491
May-07		0.002	0.0012	0.010	1960	81900		0.140	0.094	0.819	161
2007								**2.731**	**1.898**	**12.273**	**2401**
Jun-06		0.003	0.0017	0.024	1996	171357		0.444	0.292	4.030	342
May-06		0.003	0.0023	0.028	1995	227669		0.695	0.524	6.332	454
Apr-06		0.002	0.0030	0.021	2015	7838		0.013	0.023	0.162	16
2006								**1.151**	**0.839**	**10.524**	**812**
Nov-05		0.003	0.0019	0.020	2185	125361		0.313	0.240	2.454	274
Oct-05		0.002	0.0016	0.017	2098	243245		0.453	0.400	4.047	510
Sep-05		0.003	0.0014	0.016	2350	9375		0.026	0.013	0.150	22
Jun-05		0.003	0.0010	0.017	2106	184503		0.462	0.189	3.191	389
May-05		0.003	0.0011	0.022	2066	263275		0.834	0.282	5.800	544
Apr-05		0.002	0.0008	0.014	2054	30786		0.065	0.023	0.430	63
2005								**2.153**	**1.147**	**16.073**	**1802**
Jun-04		0.001	0.0013	0.007	2107	163134		0.117	0.208	1.145	344
May-04		0.001	0.0016	0.012	2022	224386		0.299	0.365	2.742	454
Apr-04		0.002	0.0018	0.036	2062	80955		0.132	0.144	2.939	167
2004								**0.548**	**0.718**	**6.826**	**964**
May-03		0.002	0.0021	0.009	2054	138568		0.225	0.291	1.264	285
Apr-03		0.002	0.0040	0.028	2013	10193		0.020	0.041	0.289	21
2003								**0.246**	**0.332**	**1.553**	**305**

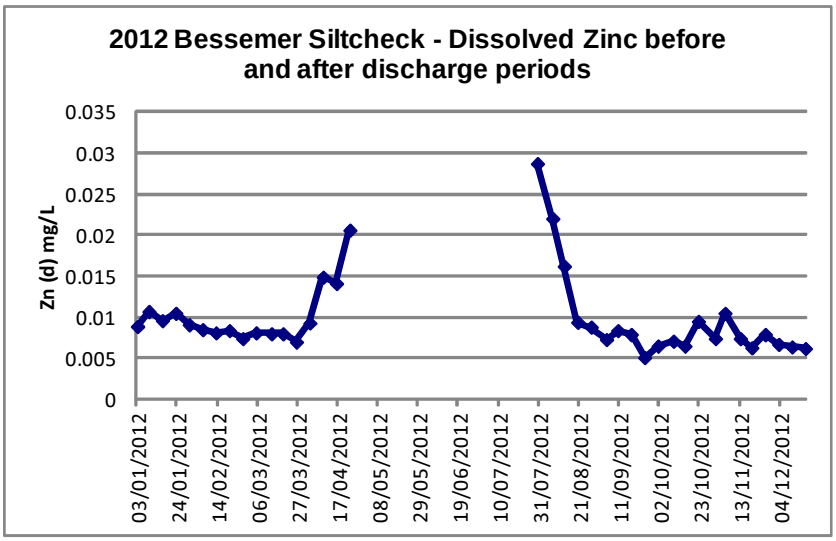
c:/excel/H2Obal/discharge compilation.xls

Metal Loading to Buck Creek

Date	Discharge Water Chemistry						Loading Totals				
	Main Zone Pit (discharge)					Monthly Discharge Total					
	As (d)	Cu (d)	Cd(d)	Zn(d)	SO_4(d)		As (d)	Cu (d)	Cd (d)	Zn (d)	SO_4 (d)
	mg/L	mg/L	mg/L	mg/L	mg/L	m^3	Kg	Kg	Kg	Kg	Tonnes
Jul-12	0.0003	0.001	0.0013	0.004	2000	302908	0.076	0.310	0.396	1.106	606
Jun-12	0.0003	0.001	0.0015	0.007	2058	712108	0.178	0.890	1.034	4.949	1465
May-12	0.0003	0.003	0.0017	0.031	2050	610418	0.153	1.976	1.048	18.664	1251
Apr-12	0.0004	0.002	0.0009	0.004	1993	129062	0.055	0.237	0.121	0.482	257
2012							**0.462**	**3.413**	**2.600**	**25.200**	**3580**
Oct-11	0.0004	0.002	0.0007	0.004	2037	153832	0.064	0.320	0.113	0.538	313
Sep-11	0.0005	0.003	0.0008	0.003	2023	200950	0.100	0.502	0.158	0.502	406
Aug-11	0.0005	0.002	0.0009	0.003	2016	335347	0.151	0.755	0.310	1.033	676
Jul-11	0.0003	0.002	0.0012	0.005	2170	568165	0.178	0.866	0.690	2.912	1233
Jun-11	0.0004	0.002	0.0015	0.004	2088	476420	0.209	1.042	0.722	1.667	995
May-11	0.0004	0.004	0.0010	0.021	2060	531295	0.199	2.024	0.521	10.934	1094
Apr-11	0.0004	0.002	0.0009	0.009	1945	31875	0.012	0.060	0.029	0.282	62
2011							**0.849**	**5.250**	**2.430**	**17.331**	**4466**
Jun-10		0.001	0.0011	0.005	1993	286023		0.286	0.315	1.430	570
May-10		0.002	0.0011	0.013	2001	583364		1.167	0.642	7.584	1167
Apr-10		0.004	0.0010	0.030	1986	286023		1.144	0.286	8.581	568
2010								**2.597**	**1.242**	**17.595**	**2305**
Oct-09		0.001	0.0008	0.01	1940	50913		0.051	0.041	0.509	99
Jul-09		0.002	0.0008	0.003	1944	134543		0.269	0.108	0.404	262
Jun-09		0.002	0.0011	0.011	1996	406903		0.814	0.448	4.476	812
May-09		0.003	0.0011	0.023	1999	579440		1.738	0.637	13.327	1158
Apr-09		0.002	0.0009	0.003	1997	73688		0.147	0.066	0.221	147
2009								**3.020**	**1.300**	**18.937**	**2478**
Sep-08		0.002	0.0013	0.006	1987	49373		0.085	0.063	0.295	98
Aug-08		0.001	0.0016	0.003	1940	35341		0.031	0.056	0.088	69
Jul-08		0.002	0.0010	0.008	1925	12457		0.022	0.012	0.094	24
Jun-08		0.002	0.0010	0.003	1997	268099		0.488	0.265	0.670	535
May-08		0.002	0.0009	0.011	2012	574380		1.391	0.530	6.356	1156
Apr-08		0.008	0.0021	0.090	2070	16235		0.122	0.033	1.468	34
2008								**2.140**	**0.960**	**8.971**	**1915**
Nov-07		0.002	0.0017	0.012	1981	282806		0.680	0.469	3.415	560
Oct-07		0.003	0.0014	0.007	1990	124411		0.324	0.172	0.854	248
Sep-07		0.002	0.0012	0.008	1977						
Aug-07		0.002	0.0012	0.009	1998	138413		0.291	0.166	1.190	277
Jul-07		0.002	0.0016	0.009	1976	446048		0.797	0.693	4.079	881
Jun-07		0.003	0.0021	0.012	1931	596414		1.789	1.252	7.038	1152
May-07		0.002	0.0012	0.010	1960	716521		1.225	0.824	7.165	1404
Apr-07		0.003	0.0013	0.027	1988	314381		0.819	0.416	8.381	625
2007								**5.926**	**3.992**	**32.123**	**5147**
Jun-06		0.003	0.001705	0.024	1996	252302		0.653	0.430	5.934	504
May-06		0.003	0.0023	0.028	1995	551373		1.683	1.268	15.334	1100
Apr-06		0.002	0.0030	0.021	2015	96177		0.159	0.285	1.991	194
2006								**2.495**	**1.983**	**23.258**	**1797**
Nov-05		0.003	0.001912	0.020	2185	161488		0.404	0.309	3.162	353
Oct-05		0.002	0.001645	0.017	2098	267838		0.499	0.441	4.456	562
Sep-05		0.003	0.00138	0.016	2350	13701		0.037	0.019	0.219	32
Jun-05		0.003	0.0010	0.017	2106	211894		0.531	0.217	3.665	446
May-05		0.003	0.00107	0.022	2066	572409		1.814	0.612	12.611	1182
Apr-05		0.002	0.000763	0.014	2054	203660		0.429	0.155	2.846	418
2005								**3.713**	**1.753**	**26.959**	**2994**
Dec-04		0.001	0.00145	0.008	2015	49123		0.061	0.071	0.393	99
Nov-04		0.002	0.001507	0.013	2042	215278		0.459	0.324	2.897	440
Oct-04		0.002	0.001281	0.012	2046	236550		0.571	0.303	2.871	484
Sep-04		0.001	0.001382	0.019	2108	179976		0.246	0.249	3.381	379
Aug-04		0.001	0.0013	0.003	2070						
Jul-04		0.001	0.00117	0.003	2150						
Jun-04		0.001	0.001277	0.007	2107	231671		0.166	0.296	1.626	488
May-04		0.001	0.001627	0.012	2022	480362		0.640	0.781	5.871	971
Apr-04		0.002	0.001783	0.036	2062	337576		0.551	0.602	12.254	696
2004								**2.695**	**2.626**	**29.292**	**3557**
Nov-03		0.002	0.0021	0.031	2066	174034		0.308	0.369	5.407	360
Oct-03		0.002	0.0014	0.012	2026	242968		0.378	0.329	2.840	492
Sep-03		0.002	0.0016	0.006	2057	61691		0.103	0.097	0.365	127
Aug-03		0.002	0.0014	0.006	1998						
Jul-03		0.001	0.0015	0.008	2086	117764		0.168	0.180	0.967	246
Jun-03		0.001	0.0022	0.005	2034	322667		0.394	0.713	1.649	656
May-03		0.002	0.0021	0.009	2054	610500		0.992	1.282	5.571	1254
Apr-03		0.002	0.0040	0.028	2013	126328		0.253	0.510	3.579	254
2003								**2.596**	**3.479**	**20.379**	**3389**


2012 Bessemer Siltcheck - Dissolved Cadmium before and after discharge periods
Cd (d) mg/L
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
03/01/2012
24/01/2012
14/02/2012
06/03/2012
27/03/2012
17/04/2012
08/05/2012
29/05/2012
19/06/2012
10/07/2012
31/07/2012
21/08/2012
11/09/2012
02/10/2012
23/10/2012
13/11/2012
04/12/2012


2012 Bessemer Siltcheck - Dissolved Copper before and after discharge periods
Cu (d) mg/L
0.025
0.02
0.015
0.01
0.005
0
03/01/2012
24/01/2012
14/02/2012
06/03/2012
27/03/2012
17/04/2012
08/05/2012
29/05/2012
19/06/2012
10/07/2012
31/07/2012
21/08/2012
11/09/2012
02/10/2012
23/10/2012
13/11/2012
04/12/2012


2012 Bessemer Siltcheck - Dissolved Zinc before and after discharge periods
Zn (d) mg/L
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
03/01/2012
24/01/2012
14/02/2012
06/03/2012
27/03/2012
17/04/2012
08/05/2012
29/05/2012
19/06/2012
10/07/2012
31/07/2012
21/08/2012
11/09/2012
02/10/2012
23/10/2012
13/11/2012
04/12/2012

Lime Efficiency Calculation for the HDS Treatment Plant

Lime consumption for treatment run:

Lime consumption (t) = lime shipped + lime in storage before run – lime in storage after run

Unit consumption of lime for treatment run:

Unit consumption (kg/m^3) = mass of lime consumed (kg)/ Volume of ARD treated (m^3)

Average acidity of ARD for treatment run:

Avg. acidity (mg/L) = $(\sum x_i + x_{ii} + \ldots + x_n) / n$

Unit consumption of calcium for treatment run:

Unit Ca consumption ($kg\ Ca/m^3$) = Avg. acidity * Ca mole fraction (0.56) / 1000 L/m^3

Lime usage efficiency for treatment run:

Efficiency (%) = unit Ca efficiency / unit lime consumption

Lime usage efficiency with 10% grit adjustment for treatment run:

Adjusted efficiency = unit Ca efficiency * 0.90 / unit lime consumption

Month	ARD (m3)	lime consumption (tonnes)	unit consumption (kg/m3)	average monthly ARD acidity	unit Ca consumption (kg Ca/m3)	efficiency (%)	adjusted efficiency (%)
January	0	0.00					
February	0	0.00					
March	106,413	630.84	5.93	9705	5.43	91.68	101.86
April	119,370	585.23	4.90	8900	4.98	101.66	112.96
May	291,522	1129.40	3.87	7248	4.06	104.77	116.41
June	290,655	754.13	2.59	4279	2.40	92.36	102.62
July	79,336	261.43	3.30	5000	2.80	84.97	94.41
August	68,168	223.41	3.28	4995	2.80	85.35	94.83
September	11,948	59.29	4.96	5580	3.12	62.97	69.97
October	0	0.00					
November	97,665	380.92	3.90	6560	3.67	94.19	104.66
December	0	0.00					
2012 Total/average	1,065,077	4,024.64	4.09	6533	3.66	89.74	99.71

APPENDIX IV

ENVIRONMENTAL COSTS

ENVIRONMENTAL COSTS

CODE	ACTUAL 2004	ACTUAL 2005	ACTUAL 2006	ACTUAL 2007	ACTUAL 2008	ACTUAL 2009	ACTUAL 2010	ACTUAL 2011	ACTUAL 2012	BUDGET 2013
RECLAMATION/ENVIRONMENTAL -515										
120-SALARIES OPERATING	54531	66107	55461	57914	56826	66996	63653	65352	69804	77000
130-SALARIES REPAIR & MAINTENANCE	2597	6030	7505	7487	14104	23899	24680	24789	25350	26800
200-SUPPLIES	8	1982	756	126	1329	3125	287	1489	903	1800
400-SERVICES PURCHASED	2141	2846	23158	18464	16359	19062	19214	43423	60279	17300
TOTAL	59277	76965	86879	83991	88618	113081	107834	135054	156335	122900
EFFLUENT COLLECTION -516										
120-SALARIES OPERATING	33173	30112	29869	23676	43237	28240	35478	36700	56945	58600
130-SALARIES REPAIR & MAINTENANCE	23044	34823	22270	40356	25428	24095	27045	27364	30493	33900
200-SUPPLIES	1027	5828	2457	9060	4509	1846	28980	5796	6701	4500
224-PUMPS,VALV,PIPING	170	2263	221	13070	19331	-1598	3725	9622	5507	2900
400-SERVICES PURCHASED		56		916	3534	23371	4828	211	2499	900
510-POWER DISTRIBUTED ACCOUNTS	57641	46182	52394	73299	56254	32420	63273	81140	65225	54900
TOTAL	115055	119264	107211	160377	152293	108375	163330	160834	167370	155700
EFFLUENT TREATMENT-517										
120-SALARIES OPERATING	23548	20789	25414	21201	32737	18751	29410	31229	40045	43300
130-SALARIES REPAIR & MAINTENANCE	38903	34529	36222	33462	28207	50199	31878	32193	37474	39900
200-SUPPLIES	11199	1359	13778	13078	10984	18078	8637	17976	21927	12000
214-REAGENT-LIME	809052	1129520	694580	1768474	902489	1000603	1077313	1562729	1079870	1194000
300- FLOCCULANT	9288	7637	3910	8609	9043	5451	9979	17334	5778	11200
400-SERVICES PURCHASED	2291	3408	4292	4308	4419	2135	1313	8559	7254	6000
510-POWER	40905		moved to 523-510							
520- NATURAL GAS	5544	1404	moved to 523-520							
TOTAL	940730	1198646	778196	1849132	987879	1095216	1158529	1670020	1192348	1306400
WATER MONITORING-518										
120-SALARIES OPERATING	49873	50758	51710	47066	58062	43666	62420	64064	64661	67400
200-SUPPLIES	348	126	689	1024	430	904	710	48	725	400
400-SERVICES PURCHASED	87434	87924	42145	107603	62984	70869	51427	98893	83266	90400
TOTAL	137655	138808	94544	155693	121476	115439	114557	163005	148652	158200
A.R.D. SLUDGE REMOVAL -519										
120-SALARIES OPERATING	20644	14713	18100				2057	1932	1837	2000
130-SALARIES REPAIR & MAINTENANCE	6231	3699	6400				2057	1932	1837	2000
200-SUPPLIES	2710	66	39							400
224-PUMPS,VALV,PIPING		1464	123							400
400-SERVICES PURCHASED										
510-POWER	11855	10597	8728	15201	9710	10790	10020	27302	17189	13000
TOTAL	41440	30539	33389	15201	9710	10790	14134	31166	20863	17800
OVERHEAD ACCOUNTS - 520										
100-SUPERVISION			3625	0						0
120-SALARIES OPERATING	10929	5817	10959	30764	13692	16806	18099	18350	20941	22100
130-SALARIES REPAIR & MAINTENANCE	2344	1216	1823	3057	1544	5232	1234	1288	1102	1900
200-SUPPLIES	773	841	3953	3460	4688	2870	1680	659	540	2800
380-FREIGHT	5548	3213	1385	3067	3421	2181	2570	5095	4286	4400
400-SERVICES PURCHASED	2332	689	6434	7117	820	1240	361	6319	981	900
407-INSURANCE	51727	44621	15726		60662	78371	24077	27938	38612	34200
411-EMPLOYEE WELFARE & SAFETY	7579	9867	5456	3510	7503	9466	12524	12861	16197	17200
413-OVERHEAD ON SALARIES	31662	40520	40200	41271	42600	43038	47154	48290	55108	58800
414-PERMITS,LEASES,LICENCES	12547	8366	10016	2218	18673	28867	26140	4948	30147	20200
415-COMMUNICATIONS	5537	4610	6288	7350	6020	6360	6032	5935	6135	6000
416-TRAVEL	1260	2267	2770	1317	4152		12957	16085	17259	6000
417-DONATIONS										
418-ALL MOBILE EQUIPMENT	31421	19227	15014	54203	24345	35772	28004	42544	77186	56400
419-DOMESTIC WATER										
420-DIESEL & PROPANE	33117	26688	36369	37986	31910	26330	23879	38465	36948	37800
421-LUBRICANTS & FILTERS	4238	2878	1839	3772	7438	4570	4972	4548	4418	5400
422-MEALS	276	476	146	89	104		861	49	1206	500
423-SAFETY/ FIRST AID	1024	180	3157	3180	855	436	668	3962	1306	2000
424-HEAD OFFICE COSTS	123657	363	6827	8841			10260	2833	4076	3000
TOTAL	325971	171839	168362	211202	228427	261540	221472	240168	316449	279600
SHOP/OFFICE COMPLEX - 521										
130-SALARIES REPAIR & MAINTENANCE	1048	687	2627	882	1544	319	1543	1610	1470	1500
200-SUPPLIES	2306	1896	2718	2886	2128	2634	6187	107	3033	2400
400-SERVICES PURCHASED					349		176			200
510-POWER	7240	6249	10714	11598	6369	7028	9498	10987	9069	8200
520-NATURAL GAS(HEAT)	4890	5129	8248	6577	5761	7752	7024	8284	7851	8200
TOTAL	15484	13961	24307	21943	16151	17733	24428	20988	21422	20500
EXTRA COSTS - 522										
200 - SUPPLIES				10454				18905		
380 - FREIGHT				708						
400 - SERVICES PURCHASED				26278				65768		
522 - SERVICES - LABOUR										
TOTAL				37440				84673		
HDS PLANT - 523										
130- SALARIES REPAIR & MAINTENANCE	1019		400	0	1544	0	1543	1610	1470	1500
510- POWER	19863	40190	42015	58656	37017	39163	51642	75467	57735	49000
520- NATURAL GAS	14701	12696	18458	7048	8595	12493	11543	12564	9243	15700
TOTAL	35583	52886	60873	65704	47156	51656	64728	89641	68447	66200
LDS PLANT - 524										
510- POWER		19925	19708	29766	19774	18521	27898	35242	26381	24000
520- NATURAL GAS		1171	4959	3019	4299	753	384	387	1099	2200
TOTAL		21096	24667	32785	24073	19274	28282	35629	27480	26200
TOTAL	**1671195**	**1824004**	**1378429**	**2633468**	**1675783**	**1793105**	**1897293**	**2631177**	**2119367**	**2153500**

*** All costs in this file - bond costs in bond folder**

wages based on SAP and budget allocation

APPENDIX V

MISCELLANEOUS ITEMS

Contents (in order of appearance):

EQUITY MINE PUBLIC ADVISORY COMMITTEE (EMPAC)

MEETING MINUTES

November 8, 2012

Final Version: March 19, 2013

Present:

Mike Aziz – Goldcorp Canada
David Belford - Office of the Wet'suwet'en
Kim Bellefontaine – Ministry of Energy, Mines & Natural Gas
Glenda and Hap Ferris – Local Landowners
Normand Legare – Environment Canada
Deb Portman – Environment Canada (morning only)
Bill Price – Natural Resources Canada
Craig Stewart – Ministry of Environment

Regrets:

District of Houston

Materials Distributed at the Meeting:

- Presentation Handouts "EMPAC Meeting - Smithers, November 8, 2012" (MA)

1. No Edits to Meeting Minutes of October 26, 2011

2. Review of Previous Action Items from meeting of October 26, 2011

Previous Action Item #1 – completed - MA updated the emergency contact list in OMS with recommended changes and submitted to EMPAC on September 13, 2012. See Slide #4 of EMPAC November 8, 2012 agenda package.

Action Item #1 – MA to update the emergency contact list in OMS with the following changes and determine how to update this list periodically without reissuing the whole OMS:

a) Update Normand Legare as Environment Canada contact
b) Add local landowner for Foxy Creek. GF and HF will be local landowner contacts for Buck Creek
c) Add new VP for Goldcorp

Previous Action Item #2 – In progress. Some of the Equity claims have shrunk and shifted on the claim maps and MA believes this is incorrect. The claim size and dimensions needs to be resolved before a reserve can be applied for. GF noted that historic exploration drill holes in upper Buck Creek have been discharging orange water for decades with no mitigation. DB commented on the impact of numerous natural gas pipelines going through the area.

Action Item #2 – MA to get resolution to claim area issues and pursue mineral reserve with Mineral Titles.

Previous Action Item #3 - completed - AMEC figure 3 from Annual Geotechnical report provided for EMPAC members prior to meeting. Site map scale too small for inclusion of details around Main Pond

slope so will use AMEC map which is supplied annually in the geotechnical report.

Previous Action Item #4 –not completed – carryover.

Action Item #3 - MA will incorporate important information on snowpack analysis, snowmelt dynamics, and steps for early identification of, and management/emergency planning of peak run-off conditions into the Environmental Management System. A copy of the memorandum will be sent to EMPAC members.

Previous Action Item #5 – not completed – carryover.

Action Item #4 – GF and BP will establish a table of important site issues to be tracked in the future with listing of measurable site indicators where possible (eg. groundwater plume towards Bessemer Creek).

Previous Action Item #6 – not completed – carryover.

Action Item #5 - MA will incorporate information on the disposal location for potentially contaminated sediments in the Environmental Management System. A copy of the memorandum will be sent to EMPAC members.

Previous Action Item #7 – MA will re-plot April to June data (slide 7), including loadings - completed. Slide #5 of EMPAC November 8, 2012 agenda package.

Previous Action Item #8 – not completed – carryover.

Action Item #6 - MA will update the contingency for the EMS to clearly state that it is for emergency situations (i.e. change wording to more appropriate terms). Include rationales and assessment for chemistry, flow and understanding the various aspects of the site and receiving environment before making a decision.

Previous Action Item #9 – completed – MA included Fig 4.3 with annual total precipitation on a July to June basis.

Action Item #7 - MA to include July to June normalized precipitation data to enable comparison to lime use.

Previous Action Item #10 – completed - MA will report metals and toxicity testing for emergency pond in future annual reports – provided in 2011 annual report pg 5-12 and table 7-2.

Previous Action Item #11 – completed - As loadings were presented in the annual report. Comparisons to As loadings over the last 5 years is not possible due to poor detection limits in the past. Slide #6 EMPAC November 8, 2012 agenda package.

Action Item #8 – In future, MA to include trend analysis of As loadings by year where data is sufficient.

Previous Action Item #12 –completed. MA to provide BP and KB with available data for seep chemistry for the Bessemer Dump – provided November 2, 2011.

Previous Action Item #13 –not completed – discussed below (MA to commission a review on the deteriorating WQ trends in STP).

Previous Action Item #14 – not completed – carry over. Additional discussion included links of hydrology information to climate change, geotechnical integrity of (and hazards to) mine structures, and the need for upgrades of components to prevent failures. Also discussed peak flow, run-off factors and the frequency of events in the future. GF noted that the historic record does not necessarily represent future conditions (intensity and frequency of storm events, climate trends) and that geotechnical designs will need to be reviewed and updated as necessary.

Action Item #9 - MA to determine what run-off factor was used in the 2010 hydrology review and update the run-off factor reported in the annual report if necessary.

Previous Action Item #15 - completed - MA to update first paragraph in Section 4.4 to reflect the use of Ceriodaphnia as a primary bioassay. Provided in 2011 annual report.

Previous Action Item #16 - completed - MA to clarify what the dilution rate for MZP discharge is in second paragraph in Section 4.4. Provided in 2011 annual report.

Previous Action Item #17 - completed. Piezometer RH-82 has been salvaged using a smaller bailer.

Previous Action Item #18 - not completed – carryover.

Action Item #10 - MA will study ground water issues in the area of RH90-16 and consider the need for more groundwater wells.

Previous Action Item #19 - completed. CS recently circulated MOE EEM review to EMPAC and reviewed its recommendations. It is hoped that Patrick Williston will be able to attend the next meeting.

Action Item #11 - CS to ask Patrick Williston to attend the next meeting and to ask why he recommends nitrogen be monitored but not other nutrients, especially phosphorus.

Previous Action Item #20 - completed - MA to send MR electronic copies of annual report and Bustard report for Office of Wet'suwet'en in Smithers. Copies sent October 27, 2011.

Previous Action Item #21 - completed - CS to share MOE comments on benthic report with EMPAC members once completed. Comments sent prior to meeting.

Previous Action Item #22 - completed - MA to share pdf of presentation with EMPAC. Presentation sent October 31, 2011.

Previous Action Item #23 - completed. The size of the 2011 total precipitation was reported in Appendix G of the Annual Dam Safety Review as a 1 in 100 year event. Snow was average until mid April and then lots of rain occurred between April and July. GF noted it was a very unusual event and that the Buck Road washed out in two places.

Action Item #12 - MA to follow up on recommendation in Appendix F of the AMEC report, to re-evaluate the design criteria of ditches.

Previous Action Item #24 - ~~not completed – carryover.~~ Completed immediately after meeting. - BP will give Red Dog contact information to Mike. MA to get information on Red Dog's bag delivery system for hydrated lime (process, cost, issues etc.) Update: MA talked to Lhoist about Red Dog delivery. Lime is quicklime delivered in 400 shipping containers with 20 tonnes each = 8000 tonnes annually. Issues with handling, storage, water leakage into containers, but no better option for Red Dog.

Previous Action Item #25 - not completed – carryover.

Action Item #13 - MA to add alternate route options to the EMS with a map showing road names. Suggestions to use Backroads Recreation Atlas for maps or contact forestry companies for digital road files.

Previous Action Item #26 - not completed – Scott Jackson was not able to attend the EMPAC meeting. GF suggested it would be valuable to have Scott empirical hydrology data and compare to previous assessments. Also to examine rain on snow events, evaluate run-off coefficient etc.

Action Item 14 - CS will ask Scott Jackson to attend next EMPAC meeting as domain expert in hydrology to discuss general use and projection of hydrology information that might be useful to committee discussions.

Action Item 15 - GF will send further clarifications to MOE regarding suggested hydrology issues to look at.

Previous Action Item #27 - completed – High acidity of June 23, 2011 sample for Emergency Pond removed due to decimal point problem.

Previous Action Item #28 - completed - MA to generate trends on Waterline Pit water quality data at various depths and report on parameters the same as MZP. Plots provided on pages 5-23 and 5-24 of 2011 annual report.

Previous Action Item #29 - not completed - on agenda below. (See Bessemer Siltcheck sediment sampling).

Previous Action Item #30 - completed. - MA will forward the Willowstick report when complete. Copies mailed to EMPAC on March 20, 2012.

3. 2011 Annual Report Review & Site Status

Refer to Presentation handouts. Committee members thanked MA for the multiple additions to this year's annual report; it is a very valuable and informative document. Highlights of the 2011 Annual Report were presented by MA (see Section 2 of report). Precipitation for 2011 was the highest on record (909.2 mm), Snow Pack ranked the 4th highest in 25 years. Peak flows occurred between May 20 and June 8, 2011. ARD treatment volumes were the second highest on record after 2007, with 1.108M m3 treated. Calendar year lime use was above average at 6315 tonnes and July to June lime consumption was above average at 5974 tonnes. Spring freshet reports were issued from April 21 to July 8.

Discussion on the annual report led to the following recommendations for addressing in next year's report:

Action Item #16 - MA to enhance the Introduction of the Annual Report to be more reflective of Goldcorp corporate ownership of site and their responsibilities to fund and manage ongoing liabilities. Wording should also be modified to more accurately reflect the purpose of the financial security to cover all aspects of site management (collection system, treatment system, monitoring, maintenance etc.)

Action Item #17 – MA to explain how treatment plant efficiency is calculated (for example 114% using 10% grit) and explain how it has changed over time. Is less alkalinity going to the MZP pit over time? What are the potential implications for sludge stability?

Site acidity trends were discussed. The challenges of accurately recording acidity and acidity loadings were noted by MA as drainages are combined and measurements are typically done monthly. EMPAC members expressed concern that acidity could be increasing and would like data presented by source over time to better evaluate this.

Action Item #18 – MA to add graphs of acidity concentrations and acidity loadings over time for C-7, C-8, C-11, Bessemer Dump, TPF, and seep 97-05.

Overall the site performed well in the 2011 event (emergency pond, treatment system, ditches on cover etc.). There were 10 unplanned power outages, but gensets functioned well. Gypsum scaling is a maintenance issue that needs to be proactively cleaned out, especially going into a high flow year. MA is investigating upgrades to the #1 Dam pumping system.

Action Item #19 – MA to provide update on planned upgrades to #1 Dam pumping system.

Metal loadings to Buck Creek have been decreasing over time, even during peak discharge periods. The reason is unclear. A reason could be less loadings from MZP possibly from Zn precipitating in the sludge. This warrants future tracking.

Action Item #20 - MA to evaluate why there is decreased Zn loading from MZP to Buck Creek.

A spike of elevated Cu and Zn concentrations in the tailings impoundment was noted. MA stated this could be due to ice cover which tends to correspond with increase in Zn.

Action Item #21 - MA to check raw data and confirm samples with spikes were collected during winter ice conditions.

It was questioned why the highest acid load for main pond is not reflected as the highest lime consumption data. MA explained that the main pond data is not as good as it is only collected once per month. Lime use in the plant is the best indication of acidity trends. Changes in loadings from dump seepage may help to understand what's happening inside of the dump.

Action Item #22 - MA to add average Fe and As loading for the Main Pond.

Concerns continue to be expressed by MOE and others regarding contaminated groundwater moving towards Bessemer Creek. Piezometer 90-12 shows increasing sulphate trend, and other wells show high concentrations of metals.

Action Item #23 – MA to consider additional monitoring and the need for additional mitigation in this area.

It was noted that there is a downward trend in alkalinity in MZP over time and there is concern that there could be possible existing or future changes to acid inputs from WP. MA commented that flows from WP to MZP are not tracked but appear to remain relatively constant. WP does turn over. Two profiles are done per year in MZP, one profile is done in WP.

Action Item #24 – MA to add alkalinity/acidity to analysis of all samples from the WP and include graph of alkalinity in MZP over time.

The Fish Study conclusions were discussed. GF expressed concerns that fish tissue data is collected at Foxy, Goosly, Crow etc, but is not collected in Upper Buck Creek. This data is important to establish trends in fish tissue in concentrations, and is especially important in a high discharge/flow year. MA noted that there are concerns that there are insufficient numbers of fish in Buck to allow sampling every year. CS explained that there is no official trigger for increased fish tissue monitoring, but there is discretion to change sampling. The current program may not be capture every change, but it should be possible to get an overall trend. It was noted that metal concentrations were also up in the Crow control.

Action Item #25 - MA will ask Dave Bustard if it is possible to increase fish tissue sampling to every year or every other year in Upper Buck Creek.

Action Item #26 – MA to ask whether there is a population exchange between fish in Crow and Foxy Creeks as they are showing similar fish tissue concentration trends.

4. 2012 Status - Year to Date

See presentation handouts. Weekly updates were provided from April 13 to June 15 2012. The snowpack for 2012 was higher than 2011 and the 4th highest on record. There was extended run-off in the Spring of 2012 with peak collection in May. There was still snow on the #1 Dam until July. Lime consumption to date (end of October) is 3614 tonnes.

Water quality in the emergency pond was good enough to directly discharge to Buck Creek. Tests of pH, conductivity and periodic cerrio-daphnia testing are completed. Bessemer Creek continues to be sampled for water quality when the pit is not discharging. BP noted that MZP discharge is the main source of Cd and Zn to Bessemer, but not copper.

There was a significant thunderstorm during August 2012 that was rated as a 1:500 year event. The diversion ditches performed well. Some debris needed to be cleaned from the main ARD ditch. Culverts

in the Boneyard ditch were very close to limits.

<u>Action Item #27</u> - MA to provide update on upgrades to culverts in Boneyard ditch.

5. Lime Consumption and Costs

The lime use trigger may be exceeded next year if it is a reasonably high precipitation year. Lime costs have also gone up substantially and are approaching the trigger. This will be discussed in the next annual report and at the next EMPAC.

6. Main Pond Arsenic and Iron Trends

A table on As and Fe concentrations and loadings from the Main pond over time was presented. This will be incorporated into the next annual report.

<u>Action Item #28</u> - MA will add Al and SO_4 concentrations and loadings to the table and annual report. MA will check Kevin Morin's report to determine if there are other acidity sources that should be added to the table.

7. NP and Site Rock Types

The NP data was presented. For the Main Pond metal trends from Kevin Morin's report it was observed that some of the high concentrations are on a downward trend, but that overall the highest loading occurs at the lower concentrations and that the lower concentrations have been increasing steadily over time.

8. Southern Tail Pit Water Quality

The water quality of Southern Tail Pit (STP) continues to change with decreasing trends of alkalinity and pH and increasing concentration of Cu, Zn , Cd and SO_4. ARD onset appears likely in the near future. This water is currently collected and treated with the current treatment system. MA estimated that approximately 17 MT of waste rock (or 26% of total waste rock) has been backfilled in STP; 12MT is unflooded and 5MT is flooded at lower depths. This suggests that if all of the STP waste rock were to generate similar acidity as the rest of the site, total lime use could increase by 1170 tonnes to 5670 tonnes.

GF questioned whether acid water from upper benches could come in contact with precipitated metals in the Southern Tail flooded pit and could remobilize or flush additional contaminants. Would increased metal loadings cause problems for treatment? Does Southern Tail pit waste rock differ geochemically from other waste rock at the site (onset time, acidity, metals). The difficulties in assessing waste rock weathering behaviour and cover performance deterioration was discussed. Increased weathering and decreased cover performance is expected over time.

EMPAC members stressed the importance of understanding the implications of acidification of STP discharge and seepage (seeps 1, 2 and 3 are from STP and are increasing) to all site management aspects and to ensure these are proactively planned for and can be adequately managed. It was suggested that a series of sensitivities be looked at for a series of flow and acidity scenarios for discharge and sump seepage (ie. average and peak) and to evaluate the implications for water collection, water conveyance, water storage, treatment plant performance, dilution and discharge requirements, reagent use, reagent supply, power, maintenance, monitoring, costs etc. A projection of expected future conditions is required. Are there vulnerabilities in the current system that should be upgraded? Should emergency site discharge protocols be changed? What are key unknowns? What additional monitoring data should be collected to better plan for ARD onset (e.g. acidity concentrations by mine component)?

<u>Action Item #29</u> - MA with retain professional services to assess the potential impacts of acidification of STP water and seepage to all aspects of site management. This work will be

completed in time for the next bonding review in 2015.

9. Sulphate Update

Sulphate data for discharge and receiving environment was presented in a table. Recent changes to the draft sulphate guideline should be incorporated into the table (i.e. hardness factor).

Action Item #30 - MA will incorporate the maximum sulphate concentrations measured in the receiving environment during site discharge and will also integrate the hardness factored sulphate water quality guideline for receiving environment locations.

10. Bessemer Creek Siltcheck Dam

Due to changes in the CDA Dam Safety Guidelines, the Bessemer Siltcheck dam no longer meets the design flow requirements for passing flows between 1/3 of the 1:1000 years storm event and the PMF. Short term remediation of the spillway bulge was successfully undertaken in 2011. Three options have been identified to meet the new CDA guidelines including reconstructing a new dam and spillway, complete removal of the dam and spillway and a reduction in height of the Siltcheck dam. MA favours a reduction in height as the Siltcheck serves as a good control point and compliance point and does not want to construct a bigger dam. Before work can proceed, an application must be submitted to Chief Inspector of Mines; it will undergo a geotechnical review and will also be circulated to EMPAC members for review and comment before a permitting decision is made.

Built up sediment must first be excavated from the pond. This area currently appears on Finley's claims due to shifted claim boundary problem which should be resolved in the near future (see action item #2). Twelve samples from 6 locations were submitted for geochemical testing. The materials do not appear to have a significant potential for ARD. The only elevated parameter is As. The clean out of the pond is considered to be a maintenance issue that does not appear to have large environmental risk associated with it. GF requested that the sediment storage area be clearly identified in applications and any approvals granted and that the disposal not pose any risks or hazards to wildlife.

Action Item #31 - MA will submit a memo to MOE outlining its plan for cleanout and storage of the Siltcheck sediment. EMPAC members will be copied on the correspondence.

11. Upper Buck Creek Site

Upper Buck Creek Site water quality was presented. There is concern due to historic borehole discharges through time that this site may not be useful as a control monitoring location. This is compounded by approval (and future construction during 2013-14) of natural gas pipeline/s immediately adjacent to Upper Buck that run parallel for many kilometers which may adversely affect Upper Buck Creek water quality. Additional pipelines are proposed for the same route over the next twelve years. It was noted that water quality has been fairly consistent since 2002.

12. Groundwater Work Plan

The Willowstick report suggests zones of groundwater movement in the northeast corner of the STP and beneath the plug west of the MZP. The report suggests additional piezometers and geophysical studies in the neck area. EMPAC members found the report difficult to understand and felt they did not have expertise to fully evaluate. EMPAC members are interested in understanding the groundwater regime on the minesite and to see if groundwater studies could help to evaluate where the cover was deteriorating. It was suggested that a peer review of this report would be an appropriate first step before proceeding with future work.

Action Item #32 - MA to investigate a peer review of the Willowstick report.

<u>Action Item #33</u> - MA to check the historical record and evaluate whether the increased flows from the Bessemer Dump seepage corresponded to water levels rising in the MZP.

13. Geotechnical Structures

MA reviewed the most recent classification updates on dam structures on the site. KB questioned why the main ARD containment ponds were not rated as high or very high due to environmental consequences of a failure. Does the classification consider the consequence of significant environmental impacts or extreme events? What is the classification of the Surge pond?

<u>Action Item #34</u> – KB will follow-up dam classification aspects of Equity structures with the Ministry's Senior Geotechnical Engineer.

14. Next Scheduled EMPAC Meeting

Tentatively set for **October 17, 2013** in Smithers**.**

15. Summary of New Action Items

Action Item #1 – MA to put update the emergency contact list (see detailed notes for additions/changes) and determine how to update the list periodically without reissuing the whole OMS.

Action Item #2 – MA to get resolution to claim area issues and pursue mineral reserve with Mineral Titles.

Action Item #3 - MA will incorporate important information on snowpack analysis, snowmelt dynamics, and steps for early identification of, and management/emergency planning of peak run-off conditions into the Environmental Management System. A copy of the memorandum will be sent to EMPAC members.

Action Item #4 – GF and BP will establish a table of important site issues to be tracked in the future with listing of measurable site indicators where possible (eg. groundwater plume towards Bessemer Creek).

Action Item #5 - MA will incorporate information on the disposal location for potentially contaminated sediments in the Environmental Management System. A copy of the memorandum will be sent to EMPAC members.

Action Item #6 - MA will update the contingency for the EMS to clearly state that it is for emergency situations (i.e. change wording to more appropriate terms). Include rationales and assessment for chemistry, flow and understanding the various aspects of the site and receiving environment before making a decision.

Action Item #7 - MA to include July to June normalized precipitation data to enable comparison to lime use.

Action Item #8 – In future, MA to include trend analysis of As loadings by year where data is sufficient.

Action Item #9 - MA to determine what run-off factor was used in the 2010 hydrology review and update the run-off factor reported in the annual report if necessary.

Action Item #10 - MA will study ground water issues in the area of RH90-16 and consider the need for more groundwater wells.

Action Item #11 - CS to ask Patrick Williston to attend the next meeting and to ask why he recommends nitrogen be monitored but not other nutrients, especially phosphorus.

Action Item #12 - MA to follow up on recommendation in Appendix F of the AMEC report, to re-evaluate the design criteria of ditches.

Action Item #13 - MA to add alternate route options to the EMS with a map showing road names.

Suggestions to use Backroads Recreation Atlas for maps or contact forestry companies for digital road files.

Action Item 14 - CS will ask Scott Jackson to attend next EMPAC meeting as domain expert in hydrology to discuss general use and projection of hydrology information that might be useful to committee discussions.

Action Item 15 - GF will send further clarifications to MOE regarding suggested hydrology issues to look at.

Action Item #16 - MA to enhance the Introduction of the Annual Report to be more reflective of Goldcorp corporate ownership of site and their responsibilities to fund and manage ongoing liabilities. Wording should also be modified to more accurately reflect the purpose of the financial security to cover all aspects of site management (collection system, treatment system, monitoring, maintenance etc.)

Action Item #17 – MA to explain how treatment plant efficiency is calculated (for example 114% using 10% grit) and explain how it has changed over time. Is less alkalinity going to the MZP pit over time? What are the potential implications for sludge stability?

Action Item #18 – MA to add graphs of acidity concentrations and acidity loadings over time for C-7, C-8, C-11, Bessemer Dump, TPF, and seep 97-05.

Action Item #19 – MA to provide update on planned upgrades to #1 Dam pumping system.

Action Item #20 - MA to evaluate why there is decreased Zn loading from MZP to Buck Creek.

Action Item #21 - MA to check raw data and confirm samples with spikes were collected during winter ice conditions.

Action Item #22 - MA to add average Fe and As loading for the Main Pond.

Action Item #23 – MA to consider additional monitoring and the need for additional mitigation in this area.

Action Item #24 – MA to add alkalinity/acidity to analysis of all samples from the WP and include graph of alkalinity in MZP over time.

Action Item #25 - MA will ask Dave Bustard if it is possible to increase fish tissue sampling to every year or every other year in Upper Buck Creek.

Action Item #26 – MA to ask whether there is a population exchange between fish in Crow and Foxy Creeks as they are showing similar fish tissue concentration trends.

Action Item #27 - MA to provide update on upgrades to culverts in Boneyard ditch.

Action Item #28 - MA will add Al and SO4 concentrations and loadings to the table and annual report. MA will check Kevin Morin's report to determine if there are other acidity sources that should be added to the table.

Action Item #29 - MA with retain professional services to assess the potential impacts of acidification of STP water and seepage to all aspects of site management. This work will be completed in time for the next bonding review in 2015.

Action Item #30 - MA will incorporate the maximum sulphate concentrations measured in the receiving environment during site discharge and will also integrate the hardness factored sulphate water quality guideline for receiving environment locations.

Action Item #31 - MA will submit a memo to MOE outlining its plan for cleanout and storage of the Siltcheck sediment. EMPAC members will be copied on the correspondence.

Action Item #32 - MA to investigate a peer review of the Willowstick report.

Action Item #33 - MA to check the historical record and evaluate whether the increased flows from the Bessemer Dump seepage corresponded to water levels rising in the MZP.

Action Item #34 – KB will follow-up dam classification aspects of Equity structures with the Ministry's

Senior Geotechnical Engineer.

Minute Recorder: Kim Bellefontaine, EMNG