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and
Reclamation Report
2005

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and
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Prepared by:

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1.0 INTRODUCTION

Imperial Metals Corporation is 100% owner/operator of the Mount Polley Mine, an open pit copper-gold mine, located approximately 60 km northeast of Williams Lake, B.C. (Figure 1). Access to the mine site from 150 Mile House is north along secondary highway No. 115 for 60 km to Morehead Lake and South from the Bootjack Lake turn-off for another 12 km on the site access road to the property. The mine is positioned on a ridge dividing the Polley Lake / Hazeltine Creek and Bootjack Lake / Morehead Creek watersheds, both of which are tributaries of the Quesnel River.

A Reclamation and Closure Plan for the Mount Polley Project was approved by the Ministry of Energy and Mines (previously the Ministry of Employment and Investment) resulting in the issuance of Permit M-200 in July of 1997, last amended October 2004, which approves Mining and Reclamation Program for the Northeast Zone and Approving Mine Restart. The mine received a Ministry of Water, Land and Air Protection effluent permit PE 11678 (previously the Ministry of Environment, Lands and Parks) issued under the provisions of the "Waste Management Act" in May of 1997 and last amended in February 2002. This permit authorizes the discharge of concentrator tailings, mill site runoff, mine rock runoff, open pit water, and septic tank effluent from the ore concentrator. The 2002 amendment also permits the discharge of effluent from the tailings seepage ponds. In early 2005, this permit will need to amended to consider any changes resulting from the mine restating.

This open pit mine is on a phased development schedule, ultimately involving the creation of four and possibly five pits. The current project infrastructure consists of the mill site, three open pits, three rock disposal sites (RDS) and a tailings storage facility (TSF), as well as the main access road, power line, tailings pipeline and sediment control ponds. Construction activities in 1995 consisted primarily of clearing the mill site. Construction of the whole facility began in 1996, and the mill was commissioned in June 1997. The first full year of mining and milling took place at Mount Polley in 1998. The last full year of mining and milling took place in 2000, with the mine suspending operations in October 2001.

All data collected throughout each year under permit PE 11678 is submitted in an Annual Environmental Report by April 30th of the year following the reporting period. This includes a report on the construction and performance of the tailings impoundment and dam; reclamation activities; and an evaluation of the impacts of the operation on the receiving environment. For the M-200 permit, an Annual Reclamation Report outlining the results of all geological characterization, material characterization test work, and water quality monitoring is submitted by March 31st of each year. Also provided in this report are details of the reclamation plan and a summary of the disturbance and reclamation activities for the previous years and for five subsequent years. For the reporting year 2000, these two reports were first combined into one for submission to the Ministry of Energy and Mines and to the Ministry of Water, Land and Air Protection, in order to satisfy the requirements of the respective permits. For the reporting year 2004, this reporting format of a combined report for both Ministries has been continued.

1.1 RECLAMATION OBJECTIVES

In accordance with the BC Mines Act and the Health, Safety and Reclamation Code for Mines in British Columbia, the primary objective of the Reclamation Plan is to *"return all mine-disturbed areas to an equivalent level of capability to that which existed prior to mining on an average property basis, unless the owner, agent or manager can provide evidence which demonstrates to the satisfaction of the chief inspector the impracticality of doing so*".

To support mine planning, operations and reclamation, a comprehensive environmental baseline-monitoring program was designed and carried out in 1995 and 1996 to expand upon previous studies conducted in 1989/1990 (HKP 1996b, c, 1997; Blashill, 1996, 1997; ITM 1997). The environmental baseline studies document pre-development land use and conditions of the aquatic and terrestrial ecosystem. This provides the foundation upon which the operational and post–closure monitoring programs are based and reclamation activities are developed, such that the land may be returned to its original capability once mining has ceased. Environmental monitoring is on-going, fulfilling both the requirements of the M – 200 permit by the Ministry of Energy and Mines (MEM) and the effluent permit PE 11678 by the Ministry of Water, Land and Air Protection (MWLAP).

For the Mount Polley project area, the primary end land uses of the reclamation plan are wildlife habitat and commercial forestry. Reclaimed areas will be capable of supporting secondary uses of the wildlife resource, such as hunting, guide-outfitting, trapping and outdoor recreation. Perpetuating, and, if possible, enhancing biodiversity is an important wildlife consideration. The following goals are implicit in achieving this primary objective:

- Long-term preservation of receiving water quality within and downstream of the receiving environment of the decommissioned operations;
- Long-term stability of engineered structures, including the rock disposal sites, tailings storage facility and open pits, as well as all exposed erodible materials;
- Natural integration of disturbed lands into surrounding landscape and, to the greatest possible extent, restoration of the natural appearance of the area after mining ceases;
- Establishment of a self-sustaining vegetative cover, consistent with the end land uses of wildlife habitat, commercial forestry, and outdoor recreation; and
- Removal and proper decommissioning of all secondary access roads, structures and equipment that are not required after the mine closes

To achieve these goals, reclamation planning must be flexible enough to allow for modifications to the mine plan, and to incorporate results from ongoing reclamation research programs into the plan. For instance, in 1998, a reclamation research test plot was established on the East 1170 RDS to monitor the effects of soil thickness and various other parameters on plant growth. Cells comprising new treatments were added to the test plot in 1999, and some of the cells that were planted in 1998 were repeated in the 1999 plots with the original prescriptions. In 2000, Phase II of the Reclamation Research program was initiated, with additional plots established on re-sloped areas of the 1170 RDS.

1.2 ENVIRONMENTAL MONITORING

The main objective of the environmental monitoring program is to evaluate all data collected, so that site-specific objectives can be developed, which would focus on protecting the environment. Sampling procedures follow those that are described in the “British Columbia Field Sampling Manual for Continuous Monitoring plus the Collection of Air, Air Emission, Water, Wastewater, Soil, Sediment, and Biological Samples” and the Mount Polley “Quality Assurance/Quality Control Manual – 2001”.

Water sampling and analysis is conducted throughout the year at surface and groundwater locations specified in Table 1 and at times specified in Table 2 of Permit PE 11678. The locations of all surface and groundwater monitoring sites are shown in Figure 2. Flow measurements are recorded at surface water stations specified in Section 3.3 of permit PE 11678. Static water levels are also recorded in groundwater monitoring wells at the time of sampling.

The Handar 555 weather station measures continuous wind speed and direction, daily precipitation, daily evaporation and temperature. This data is downloaded on a regular schedule and saved at the minesite for summarization at year-end.

Under Section 3.2 of the permit, a biological monitoring program is conducted once every three years, starting in 1999. The first of these reports was submitted with the 1999 Annual Environmental Report. The second of these reports was conducted in 2002 and was submitted with the Annual Environmental and

Reclamation Report 2002.

2.0 ENVIRONMENTAL PROTECTION & RECLAMATION PROGRAM

2.1 RECLAMATION FACILITIES AND STAFF

During operations, the Mount Polley reclamation research program and annual reclamation initiatives are under the direction of the Environmental Superintendent, who reports to the General Manager. The environmental technician, the survey crew, and a special projects coordinator also contribute to any reclamation activities undertaken at Mount Polley. Some programs also draw on the advice of reclamation specialists, including government and industry staff, Professional Agrologists and Registered Professional Foresters, for work such as soils inventory, classification and mapping.

In-house reclamation activities conducted by Mount Polley include:

- Drafting and surveying;
- Site preparation, land contouring;
- Installation of diversion ditches, drainage works and settling ponds;
- Placement of stockpiled materials on reclamation sites;
- Seeding of domestic grass-legume cover crops; and
- Monitoring/Reporting.

Mount Polley also has much of the heavy equipment necessary to carry out the reclamation activities, such as bulldozers, backhoes and haulage trucks, and will rent additional equipment, such as hydroseeders, harrows, plows and diskers, as they are needed.

Since operations have ceased in October 2001, the personnel at the site have been reduced to a skeleton crew. As a result, experienced individuals are hired as need to help in any reclamation initiatives. In the fall of 2004 Imperial Metals Corporation made a decision to commence operations in the first quarter of 2005.

2.2 RECLAMATION ACTIVITIES – 2004

2.2.1 STABILITY OF WORKS

2.2.1.1 ROCK DISPOSAL SITES

Examinations are made in accordance with section 6.12.1 of the "Health, Safety and Reclamation Code for Mines in British Columbia". A variance was granted by MEM on February 9, 2001. Mount Polley operates in accordance with the terms and reference of this variance. The rock disposal sites (RDS) that are monitored are the East RDS, the North RDS and the Cariboo Pit RDS.

2.2.1.2 TSF AND ASSOCIATED WORKS

The last inspection of the TSF and associated works took place in late August 2004 by Knight Piésold Ltd. Data collected through the end of 2004 was included in the report. The findings are documented in the report entitled*, "Report on 2004 Annual Inspection" (Ref. No. VA101-01/7-1*). This report was submitted to the Ministry of Energy and Mines and the Ministry of Water, Land, and Air Protection in February 2004.

2.2.2 RE-VEGETATION TREATMENTS & FERTILIZER APPLICATIONS

Some exploration work, in the form of trenching, was conducted in the summer and fall of 2004 in the area referred to as the Northeast Zone (NE Zone). When the sampling of the trenches was complete, they were re-contoured and seeded with a vegetative mixture that has been typically used at the Mount Polley site since 1997. No fertilizer was placed on these trenches.

The total area that has been seeded/planted throughout the minesite is 94.46 Ha, while the area fertilized is 79.77 Ha. This data is summarized in Table 3.1.1-1.

2.2.3 ROCK DISPOSAL SITE RECLAMATION

No reclamation was conducted on the East, North and Cariboo Pit Rock

Disposal Sites at Mount Polley during 2004. However, results of the reclamation work from previous years dating back to 1998 can be seen in Photo Plates 1 thru 3.

2.2.4 WATERCOURSE RECLAMATION

No further changes to the watercourses at the Mount Polley minesite were made during 2004. All diversion ditches and pipelines continue to operate as designed.

2.2.5 PIT RECLAMATION

No reclamation was conducted on the Cariboo, Bell and Springer Pits at Mount Polley during 2004. Since Mount Polley is in Care and Maintenance mode, it is expected that mining will resume once it is more economically feasible to do so. As a result, the existing pits will remain un-reclaimed, so that mining can easily commence once these conditions are met.

2.2.6 TAILINGS STORAGE FACILITY (TSF) RECLAMATION

No reclamation was conducted at the TSF in 2004. However, the results of the reclamation test work from previous years can be seen in Photo Plate 4.

2.2.7 ROAD RECLAMATION

No reclamation of roads was conducted during 2004.

2.2.8 SECURING OF MINE OPENINGS

As the Mount Polley Mine consists exclusively of open pits, there are no mine openings to secure.

2.2.9 METAL UPTAKE IN VEGETATION

No work on metal uptake in vegetation at the Mount Polley minesite was carried out during 2004. Once operations resume at Mount Polley, a cursory review of the conditions of metal uptake will likely occur to determine what, if any, metal uptake has occurred on an average property basis.

2.2.10 CHEMICAL, REAGENT OR SPILL WASTE DISPOSAL

No chemicals, reagents or spill waste was generated at Mount Polley during 2004. As a result, nothing was removed or disposed of during this period.

2.2.11 ACID ROCK DRAINAGE/ METAL LEACHING PROGRAM

The ARD/ML monitoring program for the Mount Polley Mine has recommenced in 2005 since the mine restart. It characterizes all material types that will be handled during the mine life. With the acquisition of a new LECO analytical machine, the site is able to best manage mine waste to proper storage sites and construction usage when required. The following sub-sections cover general discussions regarding the present program.

2.2.11.1WASTE ROCK

Until the end of July 2000, the following procedures were followed to assess the acid generating and metal leaching potential of the waste rock in the Cariboo and Bell pits:

On each bench, samples of drill cuttings were collected from each blasthole at an average spacing of 7.5m by 7.5m over the 10m length of the hole. Each sample was assayed to determine the content of total copper, non-sulphide copper, iron, and gold. Areas of ore and waste were identified by kriging assay values and calculated millhead values. The Mine Geologist then established grade boundaries based on the calculated millhead values. For purposes of ARD-ML monitoring, between 15 and 30 of these samples from a group of 60 to 150 are selected to be representative of a certain area of waste. Each selected sample is a split of the original sample analyzed by the mine assay lab. Samples are grouped within a certain area according to lithology, total copper content, and degree of oxidation (measured using the ratio of non-sulphide copper to total copper).

Starting in August 2001, the sampling and monitoring procedures described above were modified. Blasthole sampling ceased in the Cariboo Pit and was replaced with post – blast sampling on a monthly basis. A sample was collected from each waste rock type and submitted for ARD / ML analysis. Blasthole sampling also ceased in the Bell Pit during this period of time and was replaced with post – blast sampling on a monthly basis. Permit conditions called for continued blasthole sampling in the Bell Pit, however, due to a communication error with the assay lab, all blastholes from August 2000 thru March 2001 were discarded. As a result, only post – blast samples were available for analysis. Blasthole sampling of the Bell Pit resumed in March of 2001 once this error in sampling was identified.

No mineralogical analyses were conducted on waste rock material in 2000. However, analyses are presently being conducted on two waste rock samples that were originally used for humidity cell testing and the results will be submitted once they have been received as an amendment to this document.

Twelve composite samples representing waste blastholes and twelve samples representing post-blast waste were collected from the 1080 to 1130 benches of the Cariboo Pit. In addition, one composite sample representing waste blastholes and nine samples representing post-blast waste were collected from the 1190 to 1200 benches of the Bell Pit. Figures 3.2.3.1 – 2 through 3.2.3.1 – 6 & figure 3.2.3.1 – 8 delineate the areas represented by each of the composites. These samples were submitted to Chemex Lab for acid-base accounting, elemental scan and metal solubility analysis. Tables 3.2.3.1 – 1 to 3.2.3.1 – 5 present the analytical data.

From January to December 2000, 8,111,877 tonnes of waste rock were removed from the Cariboo Pit with the following general characteristics: a median total copper grade of 0.141%, a median NPR value of 9, a range of NPR values from 3 to 83 and a range of copper metal solubility values from 6.7ppb to 36.3ppb. In addition, elemental scan data was compared to crustal averages with the following general trends: Ag, Al, As, Ba, Cu, Hg, K, Mo, Na, P, Sb, Se, Sr, Ti & V exceeded crustal averages in most cases; Bi, Ca, Cd, Cr, Fe, Mn, Pb & Zn exceeded crustal averages in some cases; and Be, Co, Mg, Ni & W never exceeded crustal averages. A majority of this material was deposited in the East Rock Disposal Site (East RDS), while a small amount of the material, 342,900 tonnes, was used for road building around the minesite.

From November 2004 January to May 2005, XXXXXX tonnes of waste rock were removed from the Bell Pit for the construction of the haul road access to the Northeast Zone Pit (NEZ pit). The material placed along the haul road had the following general characteristics: a median total copper grade of 0.0347%, a median NPR value of 6.3 and a range of NPR values from 1.4 to 12.20. see Table 2.2.1.

On August 2nd, 2005, the mine received an amendment to the M-200 permit approving the haul road construction from the NEZ to the tailings storage facility (TSF). For the last two quarters in 2005, the mine placed XXX,XXX tonnes of waste rock from the NEZ pit. The material placed along the haul road had the following general characteristics: a median total copper grade of 0.0870%, a median NPR value of 3.5 and a range of NPR values from 2.2 to 8.9. see Table 2.2.2.

2.2.11.2 LOW GRADE ORE

For the period of January to July 2000, sampling procedures for low-grade ore in the Cariboo Pit followed the same procedures as for waste. Tables 3.2.3.2 – 1 to 3.2.3.2 – 3 present the analytical data. In total, six samples were collected for low-grade ore from the Cariboo Pit. During this period, 713,437 tonnes of material were deposited into the low-grade stockpile. This material had the following general characteristics: a median total copper grade of

0.132%, a median NPR value of 8, a range of NPR values from 2 to 93 and a range of copper solubility values from 1.4ppb to 7.3ppb. In addition, elemental scan data was compared to crustal averages with the following general trends: Ag, Al, As, Ba, Cu, K, Na, P, Sr & Ti exceeded crustal averages in most cases; Bi, Hg, Mo, Sb & V exceeded crustal averages in some cases; and Be, Ca, Cd, Co Cr, Fe, Mg, Mn, Ni, Pb, W & Zn never exceeded crustal averages.

Sampling procedures were modified for the low-grade ore for the period of August to December 2000. Samples were taken from the low-grade ore stockpile instead of from the blastholes of the pre-blasted low-grade ore. Tables 3.2.3.2 – 4 to 3.2.3.2 – 6 present the analytical data. In total, three samples were taken from the low-grade ore stockpile. During this period, 341,568 tonnes of material were deposited into the low-grade stockpile. This material had the following general characteristics: a median total copper grade of 0.247%, a median NPR value of 11, a range of NPR values from 7 to 224 and a range of copper solubility values from 9.6ppb to 35.3ppb. In addition, elemental scan data was compared to crustal averages with the following general trends: As, Ba, Cu, Hg, K, Mo, Se, Ti & V exceeded crustal averages in most cases; Al, Bi, Cr, Fe, Na, Ni, P, Sb & Sr exceeded crustal averages in some cases; and Ag, Be, Ca, Cd, Co, Mg, Mn, Pb, W & Zn never exceeded crustal averages.

2.2.11.3RB

Sampling procedures for materials from the rock borrow that was used for construction of the embankments of the Tailings Storage Facility (TSF) is as follows: samples of the material placed in the embankments were taken every 50,000 tonnes and subjected to standard ABA Table 2.2.3. The material used for the dam was placed upstream and was classified as a coarse bearing layer, (CBL)

In June 2005, approximately 150,000 tonnes of rock were removed from the rock borrow with the following general characteristics: a median NPR value of 550 and a range of NPR values from 4.8 to 2720.

2.2.11.4Tailings

At the end of each month, tailings samples were composited to represent the tonnage of tailings deposited to the tailings storage facility. Tables 2.2.4 – present the ABA data for each of these samples.

No mineralogical analyses were conducted on tailings material in 2005.

From March to December 2005, XXX,XXX tonnes of tailings were deposited into the TSF. The composite tailings sample had a median NPR value of 8.4 and a range of NPR values from 4 to 11.5.

2.2.11.5Soils and Till

Sampling procedures for materials from the natural material removed from the NEZ pit is as follows: grab samples of the material placed in the soil dump located north of the NEZ dump, each sample is subjected to standard ABA Table 2.2.4. The material will be used for the final reclamation of the NEZ haul roads.

In 2005, XXX,XXX tones of soil/till were stockpiled from the NEZ pit, the median NPR value of the soil sampled was 44.97 a range of NPR values from 35.43 to 54.52.

2.2.11.6 Geological Characterization

CARIBOO AND BELL PITS

Without exception, the ore-waste contacts in the Cariboo and Bell Pits are sharp and structurally controlled. The twelve major faults in the pits are very linear structures that juxtapose the monzonite and diorite against the mineralized breccia; therefore, grade control in the Cariboo and Bell Pits is fairly straightforward. Figure 3.2.3.1 – 1 identifies the boundaries of the Cariboo and Bell pits, the geological zones of each pit and the "zone of elevated pyrite" at the edge of the Bell Pit. Cross-sections of each of the pits with the corresponding depth of oxidized zone are not included with this report. They will be provided with an amendment to this report later in 2001.

ORE

In general, high-grade feed from the Cariboo and Bell Pits consists of pink, potassically-altered breccia. Clasts within the breccia are angular and of varying lithology, ranging from black, fine-grained volcanic to grey, porphyritic intrusive; the matrix is medium-grained plagioclase porphyry monzonite. Plagioclase phenocrysts in the matrix are strongly clay-altered and are texturally similar to those in the grey, unaltered plagioclase porphyry to the south of the pit. Veins and veinlets of calcite, epidote, actinolite and microcline, present throughout the breccia, are more abundant in more strongly mineralized rock.

Magnetite content within the breccia matrix is highly variable depending on location and correlates strongly with copper and gold grades. Very high-grade (Cu-Au) magnetite pipes occur in the South and East Lobe zones; these pipes were mistaken as supergene mineralization in the early stages of exploration.

Copper mineralization occurs mostly as disseminated chalcopyrite. Minor chalcopyrite also occurs in fractures and veinlets. Minor bornite and trace quantities of covellite, chalcocite and digenite are present in more strongly altered rock. Copper oxides (true oxides, carbonates and silicates) are present in varying quantities throughout the pit. Malachite/azurite occurs as powdery fracture-fill. Chrysocolla occurs in fractures and veinlets and as blebs to 2 cm.

Ore Classification

Ore in the Cariboo Pit can be divided into four distinct zones: the **South Zone**, the **Central Zone**, the **North Zone** and the **East Lobe Zone**. The **Bell Zone** is an extension of the North Cariboo Zone; an unmineralized fault-bounded section of monzonite divides the zones.

The **South Zone** ore is softer, more altered and relatively higher-grade, with larger blebs and veinlets of chalcopyrite. It has a moderate oxide to total copper oxide ratio of 10 to 30%. The ore has a moderate to high magnetite content and contains several post-mineralization, copper/gold-rich magnetite pipes. The magnetite pipes are two to three meters in diameter.

The **Central Zone** is fault-bounded and highly oxidized. The ore is strongly altered with common secondary biotite. It has a moderate to high oxide to total copper ratio of 30 to 60 %. Chrysocolla comprises 5 to 15% of the copper mineralization. Chalcopyrite is very finely disseminated.

The **East Lobe Zone** ore has the highest copper-gold grades and magnetite content. The zone contains several large magnetite pipes (up to twenty meters in diameter), and in many areas the breccia matrix is composed entirely of magnetite. Copper mineralization occurs as disseminated and veined, and occasionally massive chalcopyrite. Minor quantities of bornite, chalcocite, covellite and digenite also occur. It has a moderate oxide to total copper ratio of 20 -35 %, but unlike in the Central Zone, chrysocolla is rare.

This zone is mostly mined out, with the magnetite feeders having been truncated at depth. The main mineralization occurred between the 1140 and 1100 benches.

The **North Cariboo Zone** and **Bell Zone** ore is typically hard, with the breccia matrix appearing less altered than elsewhere in the Cariboo Pit. Mineralization occurs as finely disseminated chalcopyrite; other copper sulfides are rare. It has a low oxide to total copper ratio of 2 to 10 %. Chrysocolla is rare to absent.

From surface mapping and drill hole logging it appears that pyrite occurs in slightly elevated amounts (0.5-2%) in one structural controlled block of breccia in the northeast section of the Bell Zone. This faulted zone has been erroneously termed as a ‘phyllic or pyrite halo’, as described in the idealized **Lowell and Guilbert Porphyry Model** (1970), but is in fact still part of the potassic core of the Mount Polley deposit. The Mount Polley deposit more closely resembles the **Diorite Porphyry Model** (Holliter 1975, Evans 1980) than the Lowell and Guilbert model, as it lacks both the phyllic and argillic alteration phases.

> *"The diorite model deposits differ in a number of ways from the Lowell-Guilbert model; one of the main reasons is that the sulphur concentrations are relatively low in the mineralizing fluids. As a result, very little of the iron oxides in the host rock are converted to pyrite and most of the iron remains in the chlorites and biotites, while excess iron tends to occur as magnetite which may be present in all alteration zones"* (Evans 1980).

The economics of this block of breccia is currently being evaluated; it may not be included in the newest Bell Pit design. If copper prices improve and this zone is to be mined, a sampling program will be put in place to insure ARD monitoring. At present the planned procedure is to sample every sixth hole (within the zone and to an outer radius of 10m) with geochemical characterization to be conducted on each sample.

<u>WASTE</u>

The Polley Stock is a northwesterly, elongated stock approximately five kilometres long that occurs between Bootjack and Polley lakes. The stock is a multi-phase pluton with a composition ranging from diorite through monzonite to porphyritic monzonite. The waste rock in the Cariboo Pit is composed of all phases of the Polley Stock, with approximately 50% **monzonite**, 30% **plagioclase porphyry monzonite**, and 20% **diorite**. The waste rock in the planned Bell Pit is composed of approximately 50% **diorite**, 40% **monzonite/plagioclase porphyry monzonite**, and 10% **volcanic**.

<u>Waste Classification</u>

Monzonite forms most of the east, west and north walls of the Cariboo Pit and the south and east walls of the Bell Pit. This unit is a relatively fresh, white-grey/pink-grey, medium-grained (1-3 mm), equigranular to weakly feldspar-phyric intrusive. It is composed of potassium feldspar and plagioclase feldspar (mostly albite and orthoclase) with accessory minerals including magnetite, augite, biotite, calcite, apatite and epidote.

Plagioclase Porphyry Monzonite forms the south wall of the Cariboo Pit and is distributed as elongate faulted blocks in the Bell Pit. This unit is a fresh, grey intrusion with a medium-grained monzonitic groundmass and white plagioclase phenocrysts. The rock has a moderate to intense porphyritic texture.

Diorite occurs at the centre of the Cariboo Pit in three distinct structurally controlled blocks, and forms the west wall in the Bell Pit. The unit is a fresh, blue-grey/salt-and-pepper, fine to medium-grained, equigranular to porphyritic intrusion. It is mostly composed of plagioclase feldspar with minor pyroxene; accessory minerals include magnetite, biotite, calcite and apatite.

Volcanics occur as a shallow faulted block in the centre of the Bell Pit. The unit is fresh, dark green/grey andesite with a fine-grained matrix. The matrix is mainly composed of pyroxene and plagioclase.

ZONE OF ELEVATED PYRITE

An area with slightly elevated pyrite values (>1-2%) has been identified just outside the northeast edge of the Bell Pit based on observations of pyrite concentrations in drill core (Figure 3.2.3.1 – 1). As active mining approaches this area, the outline will be staked out on the ground, and ARD / ML sampling techniques will be modified as outlined in the M-200 permit conditions.

2.2.11.7 Drainage Monitoring Program

For the M-200 permit, water samples are collected from drainage originating from the Rock Disposal Site (RDS Seep), the open pit sump (pit), Tailings Supernatant Pond (E1), SESP (E2) and inflow to the SESP (E2 u/s). Composite samples of the foundation drains (E5) of the TSF are collected three times per year. These samples are analysed for total metals using ICP scan and for conventional parameters such as nutrients, pH, and alkalinity. Results are shown in Tables xxxx– xxxx

2.2.11.8 ARD/ML Research - Kinetic Testing

Kinetic information is a critical part of drainage chemistry prediction that provides a measure of the dynamic performance or " reactivity" of the material being tested. Kevin Morin of Mine Site Drainage Assessment Group (MDAG) has been retained by MPMC to interpret results of the kinetic-testing program and suggest other recommended testing, if required.

Six humidity cell tests are currently operating at Vizon SciTec Inc. Four tests were started on July 19, 2004 on the Northeast Zone samples, providing 80 weeks of data at the time of this report. These tests contain the following drill core samples of waste rock and ore:

HC2 – Plagioclase Phric Monzodiorite (PPp) 31576

HC3 – Breccia(chloritic) (BXc) 32491

HC4 – BX Breccia ore 31943

HC5 – PPp ore on both side(will probably go to mill) 32519

Two more tests were started on September 26, 2005 for the Southeast Zone and thus only 18 weeks of data was available from these tests at the time of this report. These tests contain drill core chips from the following samples:

HC6 – Monzonite SE-05-17 Comp #1

HC7 – Monzonite SE-05-30 Comp

The following summarized a report by SRK Consulting , a full report can be found in Appendix 1.

Site Specific Criterion to Classify PAG Rock

Based on these results, a site specific TIC/AP ratio of 2.1 is appropriate and more-or-less consistent with the value of 2 used to assess the data in 2004 and 2005. Testing of a sample containing higher sulphur concentrations could produce a higher sulphate release rate resulting in better definition of the site specific NP/AP criterion. It appears that sulphate release is correlated with sulphur content of the rock (Figure 5). In Figure 5, it appears that the Southeast Zone is more reactive than the Northeast Zone, but this is a partly an artifact of the duration of testing. The Southeast Zone samples are both showing declining sulphate release at the beginning of the test.

Delay to Onset of ARD

Delay to onset of ARD is a function of TIC (i.e. the total carbonate mineral reservoir available) and the oxidation rate of sulphides (i.e. the rate at which acid is generated to dissolve the carbonates). Therefore, delay is related to TIC/AP. For the three samples classified as PAG (HCT 2, 6 and 7) based on comparison of the average $(Ca+Mg)/SO_4$ ratio and TIC/AP, the time to deplete TIC is estimated to be 83 years for the Northeast Zone sample and 11 and 12 years for Southeast Samples HC6 and 7, respectively. The result for the Northeast Zone represents the relatively stable conditions in the cell, and is probably a reasonable estimate for PAG material. The Southeast Zone calculation is based on average sulphate release rates calculated early in the test and is probably an over-estimation for these particular samples. However, as noted previously, these samples have lower AP than typical rock from the Southeast Zone and TIC can be expected to deplete faster at higher APs.

Delay times indicated by laboratory tests tend to over-estimate actual delay under site conditions due to factors such as rapid flushing of carbonate minerals and higher temperatures under laboratory conditions. Both Northeast and Southeast Zones probably indicate that delay times are "in the order of decades", but the Southeast Zone rock would likely generate ARD in a shorter time frame than the Northeast Zone due to the lower TIC/AP (SRK 2005).

Neutral pH Contaminant Leaching

As noted above, interpretation of neutral pH leaching for many parameters is constrained by the detection limits used for analysis of leachates. For these parameters, the last three cycles with lower detection limits were used to calculate average release rates (in mg/kg/week). All parameters were then compared with static characteristics. Rates were compared with sulphur to evaluate correlation of heavy element release with sulphide oxidation, and with the elements themselves to determine if release rates are related to absolute concentrations in the rock.

In general, there is a lack of correlations between release rates and sulphur and bulk characteristics of the rock. Molybdenum is the only element showing a strong correlation between release and bulk composition (Figure 6). A weak correlation of copper release with copper content was apparent when the two zones are considered separately (Figure 7). Again, the different testwork durations gives the impression that Southeast Zone rock releases copper more rapidly than Northeast Zone which may not be the case..

ARD/ML Research – Assessment of Possible Metal Leaching issues for non-Acidic Conditions.

The approach taken consisted of two components:

- An evaluation of the enrichmnent of elements in the Mount Polley rocks to develop a list of elements that may may been introduced by hydrothermal mineralization, and therefore mayt be oxidizable and/or leachable

- Comparison of water chemistry for groundwater in the mineralized area (assumed to unimpacted by minning)with chemistry of water in contact with waste rock to see which parameters are possibly being released by weathering of waste rock. Groundwater can be expected to be impactred by natural weathering processes in Mount Polley but waste rock impacted water will show the differential effect caused by exposure during mining.

Conclusion by SRk are summarized below, a full report can be found in Appendix 2.

It is concluded that some elements susceptible to leaching under non-acidic condtionbs (antimony, arsenic, molybdenum and selenium) are enriched at Mount Polley as a result of minerilizing processes, and these elelments are present at relatively elevated concentrationd in surface water compared to groundwater. However Selenium and to a much lesser degree anitmony appears to be readily leachable at concentrations over 100 times the concentration in groundwater. It shuld be noted that observed anitomony concentrations are gernerally lower than or only maginally above most restrictive freshwater guidelines (0.02 mg/L in BC) and therefore that antimony leaching is probably not an issue.

2.3 SURFACE WATER MONITORING

Surface water sampling and analysis was conducted in accordance with sub-section 3.1 of the Mount Polley Effluent Permit PE 11678. Grab samples were taken from sampling locations and at a frequency listed in Table 1 of the permit and analyzed for the parameters listed in Table 2.

The calibration, sampling, filtering, preservation and shipping procedures used for the monitoring program are outlined in the "Quality Assurance/ Quality Control Manual 2001". The sampling program included monthly sampling at six sites (E4, E7, W4, W7, W8 & W8z), quarterly sampling at eight sites (E1, E8, W1, W3a, W5, W12 & W13), bi-annual sampling at one site (W11) and five weekly intensive sampling periods during spring freshet and fall turnover at four monitoring sites (W4, W7, W8 & W8z). Samples were submitted to Philip Analytical Services for analysis of physical parameters (turbidity, alkalinity, total suspended solids, dissolved sulphate, hardness, and D.O.C), nutrients (nitrate plus nitrite, ammonia & ortho-phosphorus) and total metals. Dissolved aluminum, copper and iron were also analyzed.

There were two additional sites monitored monthly, periodically or if there was a flow. The site names are MP1 (East RDS seep) and E9 (Bell Pit Water). The water that makes up MP1 is typically diverted by the waste dump diversion ditch (WDDD) and pumped back to the Cariboo Pit, mostly during spring runoff. Further, the water in the Bell Pit has been slowly filling. It was sampled once during 2004.

2.3.1 SITE E1 – TAILINGS SUPERNATANT

Table 2.3.1 (3 pages) summarizes the results of the water quality data from 1997 to 2003 for site E1 (Tailings Supernatant). Since the water quality of this site has changed considerably since the cessation of activities at the mine, the data has been summarized into two different groups. The Operational data set runs from 1997 thru 2001, while the Post-Operational data set runs from 2002 thru 2004. Some of the parameters from these data sets have been graphically represented and can be found in figures 2.3.1-1 thru 2.3.1-2. Finally, the analytical reports for the 96-hour LC_{50} toxicity (rainbow trout) tests can be found in

APPENDIX II of this report. A few key parameters are discussed in the following paragraphs.

Dissolved Sulphate values reached a high of nearly 180 mg/L at the end of 2001, when operations stopped. Since then, values have dropped to a median of 80 mg/L. Levels of Nitrate & Nitrite in the tailings supernatant had increased up to the end of 2001, but have since fallen back off to levels below 0.2 mg/l. Total suspend solids have been traditionally high at this site, due to the continuous depositions of the tailings. However, as expected, with the cessation of tailings deposition, the values for TSS have dropped nearly to method detection limits of 4 mg/L.

The levels of both Total Copper (T-Cu) and Dissolved Copper (D-Cu) have been steadily decreasing in the tailings supernatant since mining activities stopped at the end of 2001. T-Cu has decreased to an average of less than 0.020 mg/l during the period of 2002-2004. Further, D-Cu has decreased to below 0.012 mg/l during this same period. Other metals, such as T-Se and T-Fe, have also decreased during the post-operational monitoring period.

2.3.2 SITE E4 – MAIN EMBANKMENT SEEPAGE POND

Table 2.3.2 (3 pages) summarizes the results of the water quality data from 2001 to 2003 for site E4. Further, figures 2.3.2-1 thru 2.3.2-2 contain the graphical representation of selected parameters from 2001 to 2004. Finally, the analytical reports for the 96-hour LC_{50} toxicity (rainbow trout) tests can be found in APPENDIX II of this report. As there has only been 3.5 years of data collected for this site, few conclusions can be drawn using this statistical data. However, as this is one of the two locations where there is a discharge from the minesite, a more detailed discussion of the parameters monitored for discharge limits is included in this section.

The discharge limit for non-filterable residue (TSS) is 25 mg/l. All samples taken in 20043 were below this discharge limit. All samples collected in 2004 were less than 10 mg/L.

The discharge limit for water volume at this site is 2000 m^3/day. The water volume discharge at E4 has never exceeded this limit. In fact, the peak discharge during spring freshet remained below 500 m^3/day and was typically around 200 m^3/day for the remainder of the year.

Eleven (11) samples were taken from this location during 2004 and tested for toxicity three (3) times. All data for this site showed 100% survival of rainbow trout.

Nitrate (as Nitrogen) has a discharge limit of 10 mg/l for this site. All samples taken in 2004 were below this discharge limit. In fact, nearly all samples were less than 2 mg/L.

Ortho-phosphorus (as Phosphorus) has a discharge limit of 0.05 mg/l for this site. All samples taken in 2004 were below this discharge limit. In fact, many samples were less than the MDL of 0.005 mg/L.

Dissolved sulphate has a discharge limit of 100 mg/l for this site. All samples taken in 2004 were below this discharge limit. Most samples fell between the range of 30 mg/L & 90 mg/L.

Total Copper (T-Cu) has a discharge limit of 0.020 mg/l for this site. All samples taken in 2004 were below this discharge limit. Most samples fell between the range of 0.003 mg/L & 0.006 mg/L.

Total Iron (T-Fe) has a discharge limit of 1.0 mg/l for this site. All samples taken in 2004 were below this discharge limit. In fact, all samples were below 0.3 mg/L.

Total Selenium (T-Se) has a discharge limit of 0.01 mg/l for this site. All samples taken in 2004 were below this discharge limit. In fact, all samples were below 0.0020 mg/L.

2.3.3 SITE E5 – MAIN EMBANKMENT DRAIN COMPOSITE

This site was scheduled to be sampled on a quarterly schedule. However, as the drain elevations that must be sampled are below the elevation of the discharge pipe from the seepage pond, the drains have not been available for sampling since the sustained discharge began at the Main Embankment Seepage Pond in October 2002. As a result, there were no samples taken during 2004. When operations resume at the mine, the discharge at the seepage pond will likely cease and sampling at station E5 can resume.

2.3.4 SITE E7 – PERIMETER EMBANKMENT SEEPAGE POND

Table 2.3.4 (3 pages) summarizes the results of the water quality data from 2001 to 2003 for site E7. Further, figures 2.3.4-1 thru 2.3.4-2 contain the graphical representation of selected parameters from 2001 to 2004. Finally, the analytical reports for the 96-hour LC_{50} toxicity (rainbow trout) tests can be found in APPENDIX II of this report. As there has only been 3.5 years of data collected for this site, few conclusions can be drawn using this statistical data. However, as this is one of the two locations where there is a discharge from the minesite, a more detailed discussion of the parameters monitored for discharge limits is included in this section.

The discharge limit for non-filterable residue (TSS) is 25 mg/l. All samples taken in 2004 were below this discharge limit. In fact, most samples were less than the MDL of 4 mg/L, with a maximum of 9 mg/L in October and December.

Two (2) samples were taken from this location during 2004 and tested for toxicity. All data for this site showed 100% survival of rainbow trout.

Nitrate (as Nitrogen) has a discharge limit of 10 mg/l for this site. All samples taken in 2004 were below this discharge limit. In fact, nearly all samples were at the MDL of 0.02 mg/L except in December in 2004 were the Nitrate was 1.5 mg/L.

Ortho-phosphorus (as Phosphorus) has a discharge limit of 0.05 mg/l for this site. All samples taken in 2004 were below this discharge limit. In fact, all but one of the samples were less than the MDL of 0.005 mg/L.

Dissolved sulphate has a discharge limit of 100 mg/l for this site. Samples collected in 2004 were in the 150 mg/L range. However, since there is only discharge from this site during spring freshet periods, no water was being discharged when the levels exceeded the 100 mg/L limit.

Total Copper (T-Cu) has a discharge limit of 0.020 mg/l for this site. All samples taken in 2004 were below this discharge limit. In fact, nearly all samples were below 0.005 mg/L.

Total Iron (T-Fe) has a discharge limit of 1.0 mg/l for this site. All samples taken in 2004 were below this discharge limit. In fact, all samples were below 0.50 mg/L.

Total Selenium (T-Se) has a discharge limit of 0.01 mg/l for this site. All samples taken in 2004 were below this discharge limit except for October and December (0.011 and 0.12mg/L respectively). There was no discharge from the pond during this period. Most samples collected were below 0.0030 mg/L.

2.3.5 SITE E8 – CARIBOO PIT

Table 2.3.5 (3 pages) summarizes the results of the water quality data from 1998 to 2003 for site E8. Further, figures 2.3.5-1 thru 2.3.5-2 contain the graphical representation of selected parameters from 1998 to 2004. A few key parameters are discussed in the following paragraphs. It should be noted that this site has sources of water from many different locations. It primarily receives water from the surrounding watershed, which drains the pit area and Cariboo Pit RDS. Secondly, water has been pumped from the Tailings Pond during the fall period of 2001, as well as the spring periods of 2002 & 2004. Thirdly, water is pumped from the diversion ditch below the East RDS, which is primarily made up of water from the site labeled MP1 (East RDS Seep). Each of these water inputs will affect the water at site E8 and needs to be considered when viewing the data from this site.

During the monitoring period from 1998 thru 2004, dissolved sulphate values have ranged from 95 mg/L to 130 mg/L. Levels of Nitrate & Nitrite in the Cariboo Pit supernatant have fallen off significantly since mining finished at the end of 2001. Values in 2004 remained low, with all data points below 2 mg/L.

Since mining operations ceased in late 2001, values for T-Cu have remained below 0.07 mg/L, and this trend continued for 2004. Further, T-Se has fallen off to below 0.02 mg/L, with one sample below 0.005 mg/L.

2.3.6 SITE E9 – BELL PIT

Table 2.3.6 (3 pages) summarizes the results of the water quality data from 2001 to 2004 for site E9. Further, figures 2.3.6-1 thru 2.3.6-2 contain the graphical representation of selected parameters from 2001 to 2004. A few key parameters are discussed in the following paragraphs.

During the final days of mining in late 2001, dissolved sulphate levels where around 200 mg/L, but have been moving towards 300 mg/L, through 2002 & 2004. This is likely due to the fact that the Bell Pit was never completely mined out. The bottom bench ended in high grade ore and there remains a significant ore body in this pit. Dissolved sulphate levels will likely remain high and may continue to rise, for the foreseeable future.

Levels of Nitrate & Nitrite in the Bell Pit water peaked at nearly 65 mg/L in August 2001, as mining operations were winding down. Since that time, values have fallen steadily to below 15 mg/L during the post-operational time period and have been around 4 mg/L for 2004.

T-Cu has been very consistently around 0.02 mg/L for the post-operational period. However, T-Mo has been on a steady increase to a high of nearly 0.23 mg/l during 2002 & 2004. Finally, T-Se has remained relatively flat around 0.03 mg/l. As can be seen from all these examples, nearly all of the dissolved metals follow and track the total metals very closely, indicating that most of the metals are in the dissolved form.

2.3.7 SITE MP1 – EAST ROCK DISPOSAL SITE SEEPAGE

Table 2.3.7 (3 pages) summarizes the results of the water quality data from 1998 & 2000 to 2003 for site MP1. Further, figures 2.3.7-1 thru 2.3.7-2 contain the graphical representation of selected parameters from 1998 & 2000 to 2003. A few key parameters are discussed in the following paragraphs. The source of this sample is groundwater that has come to the surface under the base of the East RDS. As the East RDS advanced, this small water source was covered over by the rock of the East RDS and now interacts with this waste rock. As a result, it is a good indicator of the water quality coming from the RDS.

Levels of Nitrate & Nitrite in this seepage sample have also increased over time and seem to fluctuate seasonally. For 2003, the range of this parameter starts at about 12 mg/L and rises to a high of about 34 mg/L. These levels are expected to eventually drop off over time, as the Nitrate from the rock is flushed from the dumps.

T-Cu has decreased significantly since mining operations have ceased. In 2004, values of T-Cu have been below 0.02 mg/L. T-Fe has also decreased during this time period and has leveled out below 0.1 mg/L. In an opposite trend, T-Mo has increase some since the cessation of mining activities and has ranged from 0.04 mg/L & 0.06 mg/L. Additionally, T-Se has been on the rise, with 2003 ranges from 0.12 mg/l to 0.34 mg/l.

2.3.8 SITE W1 – MOREHEAD CREEK

Table 2.3.8 (3 pages) summarizes the results of the water quality data from 1997 to 2004 for site W1. It also computes the mean baseline data, from the periods 1990, 1995 & 1996. Further, figures 2.3.8-1 thru 2.3.8-2 contain the graphical representation of selected parameters from 1997 to 2004. A few key parameters are discussed in the following paragraph.

Dissolved sulphate values have remained at or below the baseline of 3.1

mg/L, with a peak in 2004 of 3 mg/L in September 2004. Levels of Nitrate & Nitrite have also remained close to the baseline value of 0.024 mg/L, with one exception as high as 0.06 mg/L. Finally, T-Cu values have always been close to the baseline of 0.006 mg/L and for 2004, Average value for 2004 was 0.007 mg/L with a peak of 0.0086 mg/L.

2.3.9 SITE W3a – MINE DRAINAGE CREEK AT MOUTH

When the baseline-monitoring program was established for the year 1995, a sampling location for Mine Drainage Creek was put in just below the minesite and it had the site code of W3. This site was monitored during the baseline periods of 1995 & 1996. In addition, when the operational monitoring program started in 1997, this same location was sampled until April 2000. Starting in May 2000, the sampling location for Mine Drainage Creek was moved to a new location named Mine Drainage Creek at Mouth and it had the site code of W3a. The new location is at the end of the creek, just before it empties into Bootjack Lake. All data after May 2000 was sampled from this new location.

When the mine began operations in 1997, the water from the site that normally fed into this creek was intercepted and collected, so as to minimize the water from the operations entering this system. As a result, the original sampling location (W3) had a significant decrease in flow volume, so much so that samples could only be collected during spring runoff, and sometimes during fall turnover. So, in spring 2000, it was decided to move the sampling location to the end of the creek (W3a). Flow volume at this location occurred year round, so more samples could be collected throughout the year from this creek system.

Table 2.3.9 (3 pages) summarizes the results of the water quality data from 1997 to April 2000 for W3 and from May 2000 to 2004 for site W3a. It also computes the mean baseline data, from the periods 1995 & 1996. Further, figures 2.3.9-1 thru 2.3.9-2 contain the graphical representation of selected parameters for these same time periods. A few key parameters are discussed in the following paragraphs.

When sampling of W3a commenced in May 2000 and until operations ceased at the end of 2001, values for dissolved sulphate ranged from 5 mg/L to 15 mg/L. However, during the post-operating period, levels of dissolved sulphate have increased to about 68 mg/L and 2003. In 2004 the average sulphate value was 26.3 mg/L with a peak of 47.5 mg/L . As water from the minesite does not discharge to this creek system, it is not expected that the increased levels of dissolved sulphate are coming from the minesite, but this belief should be confirmed with continued monitoring studies.

Nitrate + Nitrite values have dropped some in 2004 to below 0.20 mg/L, Additionally, ortho-phosphorus values have fallen to MDL levels of 0.005 mg/L in 2004.

T-Cu has remained flat during 2004, with values around 0.028 mg/L. This is below the mean baseline value of 0.0348 mg/L, but since the baseline values where collected further upstream in the creek system at site W3, it is not surprising that the T-Cu values further downstream in the creek system have a lower concentration. Further, since the water from the minesite continues to be diverted from reaching this creek system, none of the water with higher concentrations of copper that originated at the ore body is able to raise the copper concentrations in the creek at this site. That is, by diverting and using the water from the ore body, copper concentrations in this creek system have decreased to below baseline values.

2.3.10 SITE W4 – NORTH DUMP CREEK

Table 2.3.10 (3 pages) summarizes the results of the water quality data from 1997 to 2003 for site W4. It also computes the mean baseline data, from the periods 1990, 1995 & 1996. Further, figures 2.3.10-1 thru 2.3.10-2 contain the graphical representation of selected parameters from 1997 to 2004. A few key parameters are discussed in the following paragraphs.

Dissolved sulphate values have rising since the cessation of mining activities at the end of 2001. With the exception of one sample in November 1998, all samples during the operating period were around the mean baseline of 6.4 mg/L. However, during the post-operating period starting in 2002, most samples have increased to two or three times the mean baseline level. The highest ever value was recorded in October 2003 at 61.9 mg/L. The samples that followed this date in 2004 ranged from 16 to 52 mg/L. The average value is in the order of 30 mg/L. All but three of the samples from this site have been below the Approved and Working Quality Criteria (AWQC) 30-Day Average value that has been set at 50 mg/L. Further, all samples are below the (AWQC) Maximum value of 100 mg/L. It should be noted that the start of the elevated levels of dissolved sulphate in this creek coincide with the development of the Bell Pit & North RDS, which occurred almost exclusively in 2001. While there is no discharge of water from the Bell Pit itself, there is runoff from the North RDS that drains into this creek system. Site W4 is presently sampled monthly, as well as for five consecutive weeks during spring runoff and during fall turnover, so there is excellent cover of monitoring from this location.

Nitrate + Nitrite values have mostly remained flat throughout the monitoring period of this site. Levels have been at or below the mean baseline value of 0.123 mg/L, all samples reported values of 0.02 mg/L.

T-Cu values have always remained below the mean baseline of 0.035 mg/L throughout the operational & post-operational monitoring period. For the post-operating period starting in 2002, T-Cu has fluctuated between 0.003 mg/L to 0.015 mg/L. The average value in 2004 was 0.0095 mg/L. T-Iron has typically been at or below the baseline level of 0.097 mg/L during the operational & post-operational monitoring period, with only a few exceptions. In 2004, the average T-Iron was 0.16mg/L. was

Specifically, in the spring freshet periods of 2001 & 2002, T-Fe was in the order of 0.50 mg/L, which is about half an order of magnitude higher than the majority of the other samples from this site. Spring freshet 2004 saw a peak of 0. 25 mg/L, which is typical of the spring freshet values experienced during baseline.

2.3.11 SITE W5 – BOOTJACK CREEK ABOVE HAZELTINE CREEK

Table 2.3.11 (3 pages) summarizes the results of the water quality data from 1997 to 2004 for site W5. It also computes the mean baseline data, from the periods 1990, 1995 & 1996. Further, figures 2.3.11-1 thru 2.3.11-2 contains the graphical representation of selected parameters from 1997 to 2004. A few key parameters are discussed in the following paragraphs.

Dissolved sulphate values have typically ranged between 2 mg/L & 12 mg/L, with only a few exceptions. October 1998 had a value of 35.5 mg/L and 2001 had two elevated levels, with 58.7 mg/L in September & 38.3 mg/L in December. For 2004, values have been closer to the mean baseline of 5.1 mg/L. Overall, most samples appear to be remaining close to the mean baseline values of this monitoring site, the average value was 3.8mg/L.

Nitrate + Nitrite values have nearly all remained below the mean baseline concentration of 0.186 mg/L. The average value for 2004 was 0.03mg/L.

T-Cu values have remained very flat throughout the monitoring period of 1997 to 2004, with all but one sample falling between the range of 0.001 mg/L & 0.014 mg/L. Only one sample in 1999 had a value outside this range at 0.0258 mg/L. In 2004 T-Cu values ranged from 0.004 – 0.007mg/L.

2.3.12 SITE W7 – UPPER HAZELTINE CREEK

Table 2.3.12 (3 pages) summarizes the results of the water quality data from 1997 to 2004 for site W7. It also computes the mean baseline data, from the periods 1990, 1995 & 1996. Further, figures 2.3.12-1 thru 2.3.12-

2 contain the graphical representation of selected parameters from 1997 to 2004. Because this site receives water from the discharge of the perimeter embankment seepage pond, it is the sample location for the receiving environment from this discharge site. As a result, a more detailed review of the data at this site can be seen in the graphs discussed above. A few key parameters are discussed in the following paragraphs.

Dissolved sulphate typically ranged between 2 mg/l & 12 mg/l throughout the monitoring period of 1997 to 2004. However, starting in the fall of 2003, concentrations have risen to a new high of 22.9 mg/L. The concentration ended the year back within the more typical range, with a value of 12 mg/L. At no time throughout the year did the concentration of dissolved sulphate exceed the AWQC 30-Day Average and Maximum limits (50 mg/L & 100 mg/L, respectively).

Nitrate (N) has typically ranged between 0.005 mg/l and 0.23 mg/l, with a peak of 0.414 mg/l in December 1998. Most values are very close to the mean baseline of 0.041 mg/L. In 2004, the N value ranged between 0.025 to 0.05mg/L.

Ortho-phosphorus typically remained at or below the mean baseline of 0.008 mg/l, with several peaks as high as 0.08 mg/l in 2001. For 2003, one sample in August had a concentration of 0.055 mg/L, but this has since fallen off back to below baseline levels by the end of 2004.

Non-filterable residue (TSS) has always been around the method detection limit of 4 mg/l, with some peaks around 19 mg/l in 1998 and March 2002. For 2003, one sample had a concentration of 12 mg/L, while all others remained close to the MDL of 4 mg/L.

T-Cu has remained very close to the mean baseline of 0.0032 mg/l throughout the discharge period in 2004. All samples have remained below the AWQC Maximum value of 0.00752 mg/L.

T-Fe has ranged as high as 1 mg/l (2000), but typically fluctuates between

0.1 mg/L & 0.5 mg/l. For 2004, one sample was as high as 0.4 mg/L, but levels have returned back to below mean baseline concentrations of 0.12 mg/L.

T-Se is usually at the method detection limit, but had gone as high as 0.0011 mg/l in 2004.

Dissolved sulphate had an average value of 6 mg/L with a peak value of 11 mg/L. Further, the concentrations that have been seen are far below the AWQC 30-Day Average value of 50 mg/L. Continued monitoring of this site on a monthly timetable, as well as consecutive sampling of five weeks in the spring freshet and fall turnover periods will be able to identify further changes to this or other parameters, if any, due to the discharge from the perimeter embankment seepage pond.

2.3.13 SITE W8 – NORTHEAST EDNEY CREEK TRIBUTARY

Table 2.3.13 (3 pages) summarizes the results of the water quality data from 1997 to 2004 for site W8. It also computes the mean baseline data, from the periods 1995 & 1996. Further, figures 2.3.13-1 thru 2.3.13-2 contain the graphical representation of selected parameters from 1997 to 2004. Because this site receives water from the discharge of the main embankment seepage pond, it is the sample location for the receiving environment from this discharge site. As a result, a more detailed review of the data at this site can be seen in the graphs discussed above. A few key parameters are discussed in the following paragraphs.

The mean baseline for dissolved sulphate at this site is 3.2 mg/L. All samples prior to the discharge from the seepage pond in 2002 were at the mean baseline concentration. However, since discharge began in June 2002, concentrations of dissolved sulphate rose significantly, with the highest level seen in July 2002 at 44.2 mg/L. Since this time, dissolved sulphate has fallen off some, with a low of 13 mg/L in April 2003 and a year-end concentration of 37 mg/L. In 2004, the sulphate concentrate ranged from 5 to 51mg/L.

As was the case with dissolved sulphate, concentrations of Nitrate (N) have increased significantly since discharge from the seepage pond began in 2002. Prior to the discharge, concentrations were typically below 0.25 mg/L. However, since the discharge began, levels increased to as high as 1.91 mg/L, as was the case in June 2002. For 2004, concentrations have decrease somewhat, with a low of 0.04 mg/L and a year-end concentration of 0.32 mg/L.

Ortho-phosphorus typically remained below 0.01 mg/l prior to the discharge in 2002, with several peaks as high as 0.04 mg/l. Since the discharge in 2002, concentrations of ortho-phosphorus have remained below 0.02 mg/l.

Non-filterable residue (TSS) has always been around the method detection limit of 4 mg/l, and this trend continued when discharges began in June 2002. In 2004, peak values ranged between 16 and 24mg/L.

T-Cu has remained constant around 0.004 mg/l before and after the discharge period in 2002.

T-Fe has fluctuated below 0.5 mg/l prior to the discharge from the seepage pond, and this trend continued through 2002 & 2004. In 2004, iron had a peak value of 1.35 mg/L.

T-Se is usually around 0.0005 mg/l and no changes were seen after the start of discharge from the seepage pond in 2002.

It appears that only dissolved sulphate & nitrate have increased some in this creek due to the discharge from the main embankment seepage pond. However, the increases that have been seen are far below the AWQC 30-Day Average values of 50 mg/L for dissolved sulphate & 40 mg/L for nitrate. Continued monitoring of this site on a monthly timetable, as well as consecutive sampling of five weeks in the spring freshet and fall turnover periods will be able to identify further changes to this or other parameters, if any, due to the discharge from the main embankment seepage pond.

2.3.14 SITE W8z – SOUTHWEST EDNEY CREEK TRIBUTARY

Table 2.3.14 (3 pages) summarizes the results of the water quality data from 1997 to 2004 for site W8z. Further, figures 2.3.14-1 thru 2.3.14-2 contain the graphical representation of selected parameters from 1997 to 2003. A few key parameters are discussed in the following paragraph. It should be noted that this is a control site, as it is not downstream of any mine component at Mount Polley.

Dissolved sulphate values have a range of 1 mg/L & 8 mg/L, and the samples from 2004 continued to keep within this range. Additionally, Nitrate + Nitrite values have nearly all been below 0.5 mg/L and this trend continued through the end of 2004. In 2004, Nitrate + Nitrite was consistently below 0.1mg/L. Finally, T-Cu values have typically been below 0.008 mg/L, in 2004 T-Cu was consistently below 0.004mg/L.

2.3.15 SITE W11 – LOWER EDNEY CREEK U/S OF QUESNEL LAKE

Table 2.3.15 (3 pages) summarizes the results of the water quality data from 1997 to 2004 for site W11. It also computes the mean baseline data, from the period 1995. Further, figures 2.3.15-1 thru 2.3.15-2 contain the graphical representation of selected parameters from 1997 to 2004. A few key parameters are discussed in the following paragraph. One point to note is that this site is a far-field site, selected for comparisons to the sites downstream from the mine disturbance. As with the control site W8z, it is not likely to show any effects from the mine operations.

Dissolved sulphate values have typically been below 12 mg/l and this trend continued in 2004, with the year-end value only slightly above this limit, at 14.9 mg/L. Additionally, Nitrate + Nitrite values have typically remained around the mean baseline of 0.039 mg/L, with a peak of 14.4 mg/L in 1999. For 2004, this trend continued, with a high of only 0.06 mg/L. Finally, T-Cu values have risen as high as 0.00612 mg/L, as they did in 1997. However, throughout 2004, T-Cu concentrations never exceeded the mean baseline level of 0.003 mg/L.

2.3.16 SITE W12 – 6K CREEK AT ROAD

Table 2.3.16 (3 pages) summarizes the results of the water quality data from 1997 & 1999 to 2004 for site W12. It also computes the mean baseline data, from the periods 1990 & 1995. Further, figures 2.3.16-1 thru 2.3.16-2 contain the graphical representation of selected parameters from 1997 & 1999 to 2004. A few key parameters are discussed in the following paragraph.

Dissolved sulphate values have nearly all been below 8 mg/L, with most samples keeping close to the mean baseline of 3.6 mg/L. Samples from 2004 continued with this trend. Additionally, Nitrate + Nitrite values always remained below 0.22 mg/L, and all samples for 2004 continued to be well below this maximum. Finally, T-Cu values have typically been at or below the mean baseline of 0.011 mg/L, and for samples in 2004, levels were all below this mean baseline, reaching no higher than 0.010 mg/L.

2.3.17 SITE W13 – 9.5K CREEK ON BJFSR

Table 2.3.17 (3 pages) summarizes the results of the water quality data from 2000 to 2004 for site W13. Further, figures 2.3.17-1 thru 2.3.17-2 contain the graphical representation of selected parameters from 2000 to 2004. A few key parameters are discussed in the following paragraph. It should be noted that this site was added to the monitoring program to find any effects that may come from the mining of the Springer Pit. As this pit development has not yet occurred, no changes to the water quality at this site are expected. However, the data collected so far will be valuable baseline data, should the development of the Springer Pit go ahead.

Dissolved sulphate values have a range of 2 mg/L to 2.5 mg/L. Additionally, Nitrate + Nitrite values have nearly all been below 0.02 mg/L. Finally, T-Cu values have ranged between 0.019 mg/L & 0.022 mg/L throughout 2004.

2.4 GROUNDWATER MONITORING

Groundwater sampling and analysis was conducted in accordance with sub-section 3.1 of Effluent Permit PE 11678. Grab samples were taken from sampling locations and at a frequency listed in Table 1 and analyzed for the parameters listed in Table 2 of the permit.

The sampling, filtering, preservation and shipping procedures used for the monitoring program are outlined in the "Quality Assurance/ Quality Control Manual 2001". Field pH, temperature and conductivity were measured at the time of sampling using the WTW Multimeter.

In 1995, groundwater-monitoring well 1995 series were installed in the vicinity of the open pits and mill site. Two of these wells (95R-4, 95R-5) continue to be monitored. In 1996, the B.C. Ministry of Water, Land and Air Protection requested the establishment of additional monitoring wells down-gradient from the pit, Rock Disposal Site and Tailings Storage Facility, in order to sample aquifers in both surficial deposits as well as bedrock. They included the establishment of background wells up-gradient of any potential impacts by mining activities. Nine groundwater monitoring locations were established in 1996: six of these sites are multi-level, consisting of "A" (deep) wells and "B" (shallow) wells, while the remaining three sites monitor a single depth. A commitment to install three additional multi-level monitoring locations along the southeast embankment of the TSF was made in 1996. These wells were installed in 2000. The locations of the monitoring wells are shown in Figure 2.

Objectives of the groundwater-monitoring program include the following (Knight Piésold Ltd., 1996):

- To determine the direction and volume of groundwater flow from the minesite and other disturbed areas to receiving waters.
- To identify the locations of all surficial and deep groundwater aquifers

underlying the mine site and their points of discharge to surface water.

- To establish background groundwater quality in aquifers prior to mine development; and
- To calculate seepage and groundwater contamination dilution ratios in surface receiving waters in order to minimize impacts.

Samples were submitted to Philip Analytical Services for water chemistry analysis, including: physical parameters (alkalinity, sulphate and hardness), nutrients (nitrate plus nitrite, ammonia and ortho-phosphorus) and dissolved metals. The statistical results from 1997 to 2004 are graphed and discussed in the following sections.

2.4.1 95R-4 (Springer Pit Well)

95R-4 is located at Bootjack 10 km. Table 2.4.1 summarizes the results of the water quality data from 1997 to 2003 for this well. In addition, the mean baseline from samples in 1995 & January 1997 is included for comparison purposes. Further, figures 2.4.1-1 & 2.4.1-2 contain the graphical representation of selected parameters from 1997 to 2004. A few key parameters are discussed in the following paragraph.

Nitrate + Nitrite peaked at the end of 2002 at nearly 0.04 mg/L, but has since dropped back to baseline levels of 0.004 mg/L, which is the MDL of this parameter. Further, dissolved sulphate continues to be below the mean baseline value of 17.4 mg/L. Finally, dissolved metal concentrations remained relatively flat throughout the monitoring period of 1995 thru 2004.

2.4.2 95R-5 (Lower Southeast RDS Well)

95R-5 is located along Polley Lake FSR road, Northwest of the East Rock Disposal Site. Table 2.4.2 summarizes the results of the water quality data from 1997 to 2004 for this well. In addition, the baseline from one sample collected in 1995 is included for comparison purposes. Further, figures 2.4.2-1 thru 2.4.2-1 contain the graphical representation of selected parameters from 1997 to 2004. A few key parameters are discussed in the following paragraph.

Nitrate + Nitrite levels have only exceeded the baseline sample of 0.010 mg/L on one occasion in 2004 (0.011mg/L). At the end of 1999, one sample had a value of 0.06 mg/L and another sample at the end of 2001 had a value of 0.035 mg/L. Further, dissolved sulphate has remained flat with averages around 20 mg/l, which is far below the baseline value of 36.4 mg/L. Finally, dissolved metal concentrations remained relatively flat throughout the monitoring period of 1995 thru 2004.

2.4.3 GW96-1A (TSF North Well – Deep)

GW96-1A is located down gradient of the seepage collection pond of the Perimeter Embankment. Table 2.4.3 summarizes the results of the water quality data from 1997 to 2004 for this well. Further, figures 2.4.3-1 thru 2.4.3-2 contains the graphical representation of selected parameters from 1997 to 2004. A few key parameters are discussed in the following paragraph.

Nitrate + Nitrite has fluctuated over the monitoring period as high as nearly 0.30 mg/L. For 2004, the level was around 0.03 mg/L. Further, dissolved sulphate values have remained very consistent throughout this time frame, fluctuating between 45 mg/L & 60 mg/L. This pattern continued through 2004. Dissolved copper, on the other hand, has risen some over the monitoring period, from lows reaching down to the MDL of around 0.0001 mg/L in 1998 to around 0.002 mg/L during 2002, 2003 and 2004. Finally, all other dissolved metal concentrations remained relatively flat throughout the monitoring period of 1997 thru 2004.

2.4.4 GW96-1B (TSF North Well – Shallow)

GW96-1B is located down gradient of the seepage collection pond of the Perimeter Embankment. Table 2.4.4-1 summarizes the results of the water quality data from 1997 to 2004 for this well. In addition, the baseline from one sample collected in 1996 is included for comparison purposes. Further, figures 2.4.4-1 thru 2.4.4-2 contain the graphical representation of selected parameters from 1997 to 2004. A few key parameters are discussed in the following paragraph.

Nitrate + Nitrite has remained at or below the baseline value of 0.041 mg/L for the entire monitoring period, with the exception of one sample in 1998 & one in 1999. Further, dissolved sulphate concentrations have been on a steady decline, ranging from around 40 mg/L in 1997 to around 30 mg/L in 2004. Finally, dissolved metal concentrations remained relatively flat throughout the monitoring period of 1997 thru 2004.

2.4.5 GW96-2A (TSF East Well – Deep)

GW96-2A is located approximately 900 m Southeast from the GW96-1 monitoring wells and is designed to monitor any groundwater effects from the Tailings Storage Facility on Hazeltine Creek. Table 2.4.5 summarizes the results of the water quality data from 1997 to 2004 for this well. In addition, the baseline from one sample collected in 1996 is included for comparison purposes. Further, figures 2.4.5-1 thru 2.4.5-2 contain the graphical representation of selected parameters from 1997 to 2004. A few key parameters are discussed in the following paragraph.

Nitrate + Nitrite has remained flat throughout the monitoring period of 1997 to 2003, with a range of only 0.01 mg/L to 0.06 mg/L. During 2004, values never exceeded 0.005 mg/L. Further, dissolved sulphate values remained close to the baseline level of 23 mg/L, with 2004 values between 10 mg/L & 15 mg/L. Finally, all other dissolved metal concentrations remained relatively flat throughout the monitoring period of 1997 thru 2004.

2.4.6 GW96-2B (TSF East Well – Shallow)

GW96-2B is located approximately 900 m Southeast from the GW96-1 monitoring wells and is designed to monitor any groundwater effects from the Tailings Storage Facility on Hazeltine Creek. Table 2.4.6 summarizes the results of the water quality data from 1997 to 2004 for this well. In addition, the baseline from one sample collected in 1996 is included for comparison purposes. Further, figures 2.4.6-1 thru 2.4.6-2 contains the graphical representation of selected parameters from 1997 to 2004. A few key parameters are discussed in the following paragraph.

Nitrate + Nitrite levels have nearly always been at just above the MDL of 0.005 mg/L and this trend continued for 2004. Further, dissolved sulphate has remained very flat, with a range of only 2 mg/L to 8 mg/L. For 2004, the samples had values of around 10 mg/L to 12 mg/L. Finally, all other dissolved metal concentrations remained relatively flat throughout the monitoring period of 1997 thru 2004.

2.4.7 GW96-3A (TSF Southeast Well – Deep)

GW96-3A is located down gradient of the seepage collection pond of the Main Embankment. Table 2.4.7 summarizes the results of the water quality data from 1997 to 2004 for this well. Further, figures 2.4.7-1 thru 2.4.7-2 contains the graphical representation of selected parameters from 1997 to 2004. A few key parameters are discussed in the following paragraphs.

Average pH has fluctuated significantly, from 7.5 to 12.5 over the monitoring period of 1997 to 2004. This parameter has been graphed with dissolved aluminum, so as to show the relationship between the levels of dissolved aluminum and pH in any given sample. As can be seen, when the pH rises to levels of 12, the concentration of dissolved aluminum also increases to extremely levels, reaching to more than 2 mg/L, in one case. However, when the pH drops to more typical levels, such as 7.5 or 8, then the concentration of dissolved aluminum drops to below 0.05 mg/L.

Nitrate + Nitrite has usually remained below 0.1 mg/L, with only one sample in late 1999 peaking at nearly 0.26 mg/L. Further, dissolved sulphate has fluctuated significantly over the monitoring period of 1997 to

2004, ranging from 25 mg/L to 325 mg/L. There does not seem to be an apparent trend in this parameter at this time.

Dissolved copper seems to have risen some over this monitoring period, moving from 0.001 mg/L to around 0.0045 mg/L. However, all other dissolved metal concentrations remained relatively flat throughout the monitoring period of 1997 thru 2004.

It should be noted that this well has a very slow recharge rate, and in some cases, it is not possible to purge the well more than once in order to collect a sample in a timely manner. As a result, the results from this well should be viewed with caution and should be evaluated in connection with data from other wells in the vicinity of the TSF.

2.4.8 GW96-3B (TSF Southeast Well – Shallow)

GW96-3B is located down gradient of the seepage collection pond of the Main Embankment. Table 2.4.8 summarizes the results of the water quality data from 1997 to 2004 for this well. Further, figures 2.4.8-1 thru 2.4.8-2 contains the graphical representation of selected parameters from 1997 to 2004. A few key parameters are discussed in the following paragraph.

Nitrate + Nitrite has remained at or near the MDL of 0.005 mg/L for nearly all of the monitoring period, with the only exception in late 1999, where the sample had a value of around 0.075 mg/L. Further, dissolved sulphate has remained flat, averaging between 6 mg/l and 8 mg/l, with the most recent values in 2004 at 6 mg/l. Finally, all dissolved metal concentrations remained relatively flat throughout the monitoring period of 1997 thru 2004.

2.4.9 GW96-4A (TSF Southwest Well – Deep)

GW96-4A is located down gradient of the south and main embankments. Table 2.4.9 summarizes the results of the water quality data from 1997 to 2004 for this well. In addition, the baseline from one sample collected in

1996 is included for comparison purposes. Further, figures 2.4.9-1 thru 2.4.9-2 contains the graphical representation of selected parameters from 1997 to 2004. A few key parameters are discussed in the following paragraphs.

Nitrate + Nitrite has remained very flat, at or below the MDL of 0.005 mg/L. Further, dissolved sulphate has continued the trend since 1999 of keeping below about 5 mg/L. In 2004, this trend to continue below 5mg/L.

Dissolved copper typically remained below 0.0024 mg/L, with only one exception. At the end of 2002, one sample had a value of 0.0054 mg/L, but this level returned back to the previous range below 0.0024 mg/L in 2003. In 2004, D-Cu decreased below baseline concentrations. All other dissolved metal concentrations, on the other hand, remained relatively flat throughout the monitoring period of 1997 thru 2004.

2.4.10 GW96-4B (TSF Southwest Well – Shallow)

GW96-4B is located down gradient of the south and main embankments. Table 2.4.10 summarizes the results of the water quality data from 1997 to 2004 for this well. In addition, the mean baseline from two samples collected in 1996 is included for comparison purposes. Further, figures 2.4.10-1 thru 2.4.10-2 contains the graphical representation of selected parameters from 1997 to 2004. A few key parameters are discussed in the following paragraphs.

Nitrate + Nitrite has remained below the mean baseline of 0.013 mg/L, with only one exception in 1999, which had a value of 0.031 mg/L. Further, dissolved sulphate has remained at or below the mean baseline of 2.5 mg/L for the entire monitoring period.

Dissolved copper typically remained close to the mean baseline of 0.0005 mg/L throughout the monitoring period. However, two samples, each at the end of 2002 & 2003 were slightly elevated, with 0.0022 mg/L in 2002 & 0.0014 mg/L in 2003. In 2004, there was a peak measured at

0.0009mg/L. All other dissolved metal concentrations, on the other hand, remained relatively flat throughout the monitoring period of 1997 thru 2004.

2.4.11 GW96-5A (TSF Control Well – Deep)

GW96-5A is located at the north end and upstream of the Tailings Storage Facility and is monitored as a control site. Table 2.4.11 summarizes the results of the water quality data from 1997 to 2004 for this well. In addition, the baseline from one sample collected in 1996 is included for comparison purposes. Further, figures 2.4.11-1 thru 2.4.11-2 contains the graphical representation of selected parameters from 1997 to 2004. A few key parameters are discussed in the following paragraphs.

Nitrate + Nitrite had a peak of 0.267 mg/L in 1998, but since that time and throughout 2004, nearly all samples have been below 0.02 mg/L. Further, dissolved sulphate in 2004 measured below baseline of 15 mg/L, with only one exception in 2001, which had a value of 115 mg/L. This data point is expected to be an analytical or data entry error, as it is one order of magnitude larger than the more typical values from this well.

Dissolved copper typically remained close to the mean baseline of 0.004 mg/L throughout the monitoring period. However, one sample in 2002 had a value of 0.0071 mg/L. All other dissolved metal concentrations, on the other hand, remained relatively flat throughout the monitoring period of 1997 thru 2004.

2.4.12 GW96-5B (TSF Control Well – Shallow)

GW96-5B is located at the north end and upstream of the Tailings Storage Facility and is monitored as a control site. Table 2.4.12 summarizes the results of the water quality data from 1997 to 2001 for this well. Further, figures 2.4.12-1 thru 2.4.12-2 contains the graphical representation of selected parameters from 1997 to 2001. As this well had been damaged, no samples have been extracted from it since the end of 2001. When and if the well can be repaired, it can again be included in the sampling program.

2.4.13 GW96-6 (Southeast RDS Well)

GW96-6 is located down gradient of the East Rock Disposal Site. Table 2.4.13 summarizes the results of the water quality data from 1997 to 2003 for this well. Further, figures 2.4.13-1 thru 2.4.13-2 contains the graphical representation of selected parameters from 1997 to 2004. A few key parameters are discussed in the following paragraph.

Nitrate + Nitrite has ranged from the MDL of 0.005 mg/L to 0.075 mg/L. Values for this parameter in 2004 were also within this range. Further, dissolved sulphate has remained constant, with averages around 25 mg/l. Only the first sample from this well was in excess of this average, with a value of 61 mg/L (1997). Finally, all dissolved metal concentrations remained relatively flat throughout the monitoring period of 1997 thru 2004.

2.4.14 GW96-7 (Southeast Sediment Pond Well)

GW96-7 is located down gradient of the Mill Site, half way down the tailings access road, near the Booster Pump Station. Table 2.4.14 summarizes the results of the water quality data from 1997 to 2004 for this well. In addition, the baseline from one sample collected in January 1997 is included for comparison purposes. Further, figures 2.4.14-1 thru 2.4.14-2 contains the graphical representation of selected parameters from 1997 to 2004. A few key parameters are discussed in the following paragraph.

Nitrate + Nitrite has been moving between 0.005 mg/L and 0.014 mg/L throughout the monitoring period, and this continued for 2004. Further, dissolved sulphate has remained constant with averages around 25 mg/l. Finally, all dissolved metal concentrations remained relatively flat throughout the monitoring period of 1997 thru 2004.

2.4.15 GW96-8A (Bootjack FSR @ 11 K Well – Deep)

GW96-8A is located on Bootjack Road at 10.75 km. Table 2.4.15 summarizes the results of the water quality data from 1997 to 2004 for this well. Further, figures 2.4.15-1 thru 2.4.15-2 contains the graphical representation of selected parameters from 1997 to 2004. A few key parameters are discussed in the following paragraph.

Nitrate + Nitrite has usually been below 0.1 mg/L, with only two samples in 1998 & 1999 that exceeded this concentration, up to nearly 0.2 mg/L. Further, dissolved sulphate has remained constant with concentrations ranging between 8 mg/l & 12 mg/l. Finally, all dissolved metal concentrations remained relatively flat throughout the monitoring period of 1997 thru 2004.

2.4.16 GW96-8B (Bootjack FSR @ 11 K Well – Shallow)

GW96-8B is located on Bootjack Road at 10.75 km. Table 2.4.16 summarizes the results of the water quality data from 1997 to 2004 for this well. Further, figures 2.4.16-1 thru 2.4.16-2 contains the graphical representation of selected parameters from 1997 to 2004. A few key parameters are discussed in the following paragraph.

Nitrate + Nitrite has fluctuated from 0.005 mg/L to 0.15 mg/L throughout the monitoring period, and this trend continued in 2004. Further, dissolved sulphate has narrowed its range somewhat, moving from lows of 2 mg/L & highs of 13 mg/L to a tighter range of 8 mg/L to 11 mg/L. Finally, all dissolved metal concentrations remained relatively flat throughout the monitoring period of 1997 thru 2004.

2.4.17 GW96-9 (TSF Southeast Pressure Well)

GW96-9 is located south of the Main Embankment. Table 2.4.17 summarizes the results of the water quality data from 1997 to 2004 for this well. Further, figures 2.4.17-1 thru 2.4.17-2 contains the graphical representation of selected parameters from 1997 to 2004. A few key parameters are discussed in the following paragraph.

Nitrate + Nitrite has fluctuated as high as 0.1 mg/L and the value for 2004 keeps within this range. Further, dissolved sulphate has remained below 5 mg/L, with the exception of one sample in 1999, which had a value of 57.1 mg/L. This value is one order of magnitude larger than all other samples from this well and is likely a data entry error from the lab. Finally, all dissolved metal concentrations remained relatively flat throughout the monitoring period of 1997 thru 2004.

2.4.18 GW00-1A (TSF Northwest Well – Deep)

GW00-1A is located downstream of the starter South Embankment at the TSF. Table 2.4.18 summarizes the results of the water quality data from 2000 to 2004 for this well. Further, figures 2.4.18-1 thru 2.4.18-2 contains the graphical representation of selected parameters from 2000 to 2004. A few key parameters are discussed in the following paragraph.

Nitrate + Nitrite has always been at the MDL of 0.005 mg/L, and this level continued for 2004. (0.007ave. mg/L) Further, dissolved sulphate has decreased from averages of 330 mg/l in 2000 to about 200 mg/l in 2004. Finally, all dissolved metal concentrations remained relatively flat throughout the monitoring period of 2000 thru 2004. However, T-Cu had had an increase from typical values of 0.0022 mg/L to 0.0033mg/L towards the end of 2004.

2.4.19 GW00-1B (TSF Northwest Well – Shallow)

GW00-1B is located downstream of the starter South Embankment at the TSF. Table 2.4.19 summarizes the results of the water quality data from 2000 to 2004 for this well. Further, figures 2.4.19-1 thru 2.4.19-2 contains the graphical representation of selected parameters from 2000 to 2004. A few key parameters are discussed in the following paragraph.

Nitrate + Nitrite has always been at the MDL of 0.005 mg/L, and this level continued for 2004. Further, dissolved sulphate has remained constant at around 10 mg/L. Finally, all dissolved metal concentrations remained relatively flat throughout the monitoring period of 2000 thru 2004.

2.4.20 GW00-2A (TSF West Well – Deep)

GW00-2A is located downstream of the starter South Embankment at the TSF. Table 2.4.20 summarizes the results of the water quality data from 2000 to 2003 for this well. Further, figures 2.4.20-1 thru 2.4.20-2 contains the graphical representation of selected parameters from 2000 to 2004. A few key parameters are discussed in the following paragraph.

Nitrate + Nitrite has risen to a high of 0.021 mg/L in 2003, but has since dropped back to it’s more typical concentration of the MDL at 0.005 mg/L in 2004. Further, dissolved sulphate has decreased from averages as high as 100 mg/l in 2000 to about 10 mg/l in 2004. Finally, all dissolved metal concentrations remained relatively flat throughout the monitoring period of 2000 thru 2004.

2.4.21 GW00-2B (TSF West Well – Shallow)

GW00-2B is located downstream of the starter South Embankment at the TSF. Table 2.4.21-1 summarizes the results of the water quality data from 2000 to 2003 for this well. Further, figures 2.4.21-1 thru 2.4.21-2 contain the graphical representation of selected parameters from 2000 to 2004. A few key parameters are discussed in the following paragraph.

Nitrate + Nitrite has risen from the MDL of 0.005 mg/L in 2000 to a high of 0.012 mg/L in 2004. Further, dissolved sulphate has decreased from averages as high as 18 mg/l in 2000 to a values around 5 mg/L in 2004. Finally, all dissolved metal concentrations remained relatively flat throughout the monitoring period of 2000 thru 2004.

2.4.22 GW00-3A (TSF Southwest Well – Deep)

GW00-3A is located downstream of the starter South Embankment at the TSF. Table 2.4.22 summarizes the results of the water quality data from

2000 to 2004 for this well. Further, figures 2.4.22-1 thru 2.4.22-2 contains the graphical representation of selected parameters from 2000 to 2004. A few key parameters are discussed in the following paragraph.

Nitrate + Nitrite has always been at the MDL of 0.005 mg/L, and this level continued for 2004. Further, dissolved sulphate has decreased from averages as high as 100 mg/l in 2000 to below 10 mg/l in 2003. In 2004, the sulphate settled in at a value of 20 mg/l. Finally, all dissolved metal concentrations remained relatively flat throughout the monitoring period of 2000 thru 2004. The exceptions are Dissolved Al and Cu were relative rate increase by 10 times for Al and 8 times for Cu.

2.4.23 GW00-3B (TSF Southwest Well – Shallow)

GW00-3B is located downstream of the starter South Embankment at the TSF. Table 2.4.23 summarizes the results of the water quality data from 2000 to 2004 for this well. Further, figures 2.4.23-1 thru 2.4.23-2 contain the graphical representation of selected parameters from 2000 to 2004. A few key parameters are discussed in the following paragraph.

Nitrate + Nitrite has risen from the MDL of 0.005 mg/L in 2000 to a high of 0.012 mg/L in 2004. Further, dissolved sulphate has decreased from as high as 12 mg/l in 2000 to 6 mg/l in 2003. Finally, all dissolved metal concentrations remained relatively flat throughout the monitoring period of 2000 thru 2004.

2.5 CLIMATOLOGY

As a requirement of Effluent Permit PE 11678, the collection of detailed meteorology data is a requirement. The main objective of the meteorology data collection program is to provide site-specific precipitation and evaporation data for use in water balance prediction. The automated weather station records prevailing wind speed and wind direction, temperature (at 1 metre & 5 metre elevations), precipitation, evaporation and solar radiation.

Due to technical difficulties with the weather station, however, no data was recorded for 2004.

2.5.1 WIND SPEED BY DIRECTION & PREVAILING WIND DIRECTION

2.5.2 TEMPERATURE – AVERAGE, MINIMUM AND MAXIMUM

2.5.3 PRECIPITATION

2.5.4 EVAPORATION

2.5.5 SOLAR RADIATION

2.5.6 WATERBALANCE

Table 2.5.6 (8 pages) contains the waterbalance spreadsheet for the period 2005 to 2011. A review of the waterbalance is included in the Annual Tailings Inspection report, referred to in section 2.2.1.2. In 2004, a water balance was developed for the Mount Polley Mine site to aid in water planning and to predict water surplus or deficit volumes after the resumption of the operations in 2005. This water balance updates an earlier water balance by adding new development areas (including Springer Pit, Wight Pit and the Northeast Rock Disposal Site, updating precipitation estimates, and modifying other aspect of the water balance to match the new mine plan.

2.6 HYDROLOGY AND HYDROGEOLOGY

Seven surface water sites were monitored for flow discharges throughout 2004 in the vicinity of the Mount Polley minesite. Monthly discharge graphs were generated for each of the monitoring stations listed below: W1a, W3a, W4, W5, W7, W8 and W12. No flow transect studies were conducted in 2004. Instead, staff gauge readings were recorded and applied to a formula determined from the previous years measurements that gave a stage discharge curve for each monitoring site. Staff gauges were covered in snow and ice from January to April and in November and December. Continuous water level data is recorded at Station W7 on Hazeltine Creek from approximately March to November of each year.

In addition to these surface water sites, there were 22 groundwater wells that were monitored for static water levels throughout 2004, also in the vicinity of the Mount Polley minesite. Graphs have been generated and are discussed in sub-section 2.6.8.

2.6.2 SITE W1A – UPPPER MOREHEAD CREEK

Figure 2.6.1 shows the flow measurement comparisons from 1997 to 2004. Spring freshet flows where below the volumes seen in 1999 thru 2001, but above the low flow year of 1998. Flows after spring freshet were in line with those seen in most of the previous years at this monitoring location.

2.6.2 SITE W3A – MINE DRAINAGE CREEK AT MOUTH

From 1995 through 1999, water volumes were monitored on this creek at site W3, which is located just downstream from the minesite. Starting in 2001, water volumes were monitored from a new location on this creek, labeled W3A. This location is at the end of the creek, immediately before it empties into Bootjack Lake. Figure 2.6.2 shows the flow measurement comparisons for monitoring site W3, with data from 1995 & 1997 to 2001 as well as the flow measurement comparisons for monitoring site W3A, with data from 2001 & 2004.

Since the data from W3A can really only be compared to the data collected from previous years at the same location, water volumes from 2004 will be compared to the only other data from this site, which is from 2001. Peaks in 2004 occurred in June and October.

2.6.3 SITE W4 – NORTH DUMP CREEK

Figure 2.6.3 shows the flow measurement comparisons from 1995 & 1997 to 2004. As was the case for site W1A, water volumes during the spring freshet period for 2004 were lower than for those in 1999 thru 2001, but were higher than those seen in the low flow year of 1998. Water volumes for the remained of the year were similar to previous years, the overall flow pattern was uniform with a gradual decrease towards year-end.

2.6.4 SITE W5 – BOOTJACK CREEK ABOVE HAZELTINE CREEK

Figure 2.6.4 shows the flow measurement comparisons from 1995 & 1997 to 2004. However, water volumes or the remainder of the year were similar to, although a little lower than, those from previous years.

2.6.5 SITE W7 – UPPPER HAZELTINE CREEK HYDROGRAPH

Figure 2.6.5 shows the flow measurement comparisons from 1995 & 1997 to 2004. This is a continuous flow measurement station, when temperatures are above freezing. Flows in 2004 were not similar to any of the previous year. Generally the runoff started late (June) and the volume of water volume was comparatively lower.

2.6.6 SITE W8 – NORTHEAST EDNEY CREEK TRIBUTARY

Figure 2.6.6 shows the flow measurement comparisons from 1995 & 1997 to 2004. Water volume and distribution were similar compared to previous years. There appear to be a larger flow in the fall.

2.6.7 SITE W12 – 6K CREEK AT ROAD

Figure 2.6.7 shows the flow measurement comparisons from 1997 to 2004. Overall, all flows for the year appeared to be higher, in what was considered a low flow year. Inspection of the staff gauge installation is warranted.

2.6.8 GROUNDWATER STATIC WATER LEVELS

Figure 2.6.8-1 contains the static water levels (SWL) for the wells 95R-4 & 95R-5, for the period 1996 to 2003.

- For well 95R-4, the SWL has been consistently around 11 metres, with only one exception in June 2000, when it was at 0 metres. As for well 95R-5, the SWL has been shifting between 2 metres & 0 metres, with no specific trend.

Figure 2.6.8-2 contains the static water levels for wells GW96-1A/1B, GW96-2A/2B, GW96-3A/3B & GW96-4A/4B for the period 1996 to 2003.

- For well GW96-1A, the SWL has been mostly between 15 metres & 20 metres, but has dropped as low as 40 metres in spring 2001 and as high as nearly 0 metres in summer 2001. As for well GW96-1B, the SWL has been very consistent at 13 metres, with a movement to nearly 0 metres in the summer of 2001. This peak matches perfectly with those seen in the twin well GW96-1A. In 2004 GW(^-1B had a value of 2.5 metres.
- For well GW96-2A, the SWL has been mostly at 30 metres, with only a few exceptions. In the summers of 2001 & 2003, the SWL moved to 5 metres, before returning to its more typical level of 30 metres. As for well GW96-2B, the SWL has been very consistent at 15 metres, with a movement to nearly 5 metres in the summers of 2001 & 2003. These peaks match perfectly with those seen in the twin well GW96-2A. In 2004 GW96-2B was 5 metres.
- For well GW96-3A, the SWL has fluctuated wildly, with a range of 42 metres to nearly 0 metres. In 2003 the water level was at 42 metres. As for well GW96-3B, the SWL has been very consistent at 0 metres, with a movement to nearly 5 metres in the summers of 2001 & 2004. These peaks match with similar peaks for wells GW96-1 & GW96-2.
- For well GW96-4A, the SWL has ranged from 0 metres down to nearly 4 metres. The most recent readings in 2004 are around 1 metre. As for well GW96-4B, the SWL has matched the SWL pattern of its twin well GW96-4A almost perfectly. The most recent values for 2004 are also around 1 metre.

Figure 2.6.8-3 contains the static water levels for wells GW96-5A/5B, GW96-6, GW96-7, GW96-8A/8B & GW96-9 for the period 1996 to 2003.

- For well GW96-5A, the SWL has been mostly between 5 metres & 0 metres, but has dropped as low as 13 metres in winter 2001. As for well GW96-5B, the SWL has been very consistent between 3 metres & 0 metres. No data points exists after 2001, as this well was damaged around this time.
- For well GW96-6, the SWL has been nearly always been at 0 metres, but it has dropped as low as 15 metres, as it did in spring 2000.
- For well GW96-7, the SWL has been very constant between 5 metres & 2 metres. The most recent values in 2004 were around 1 metre.
- For wells GW96-8A & GW96-8B, the SWL for both wells has always been 0 metres, and this continued for 2004.
- For well GW96-9, the SWL has ranged from 0 metres down to nearly 2.5 metres. The most recent readings in 2004 are around 0.9 metres.

Figure 2.6.8-4 contains the static water levels for wells GW00-1A/1B, GW00-2A/2B & GW00-3A/3B for the period 2000 to 2003.

- For well GW00-1A, the SWL has fluctuated between 8.5 metres & 0.5 metres, with the most recent values in 2004 at 7 metres. As for well GW00-1B, the SWL has been much flatter, ranging from 3.0 metres to 0.5 meters.
- For well GW00-2A, the SWL has remained fairly flat, with a range of about 6 metres to 3 metres. As for well GW00-2B, the SWL has followed its twin well GW00-2A almost perfectly, where the trend is only 0.5 metres lower than the deep well.
- For well GW00-3A, the SWL has fluctuated somewhat, with the

majority of the samples between 6 metres & 4 metres, but with several samples in 2002 & 2004 as low as 19 metres. As for well GW00-3B, the SWL has been very consistent at within the range of 6 metres to 4 metres.

2.7 RECLAMATION RESEARCH – 2004

No further formal reclamation research was conducted in 2004. Further, the research test plots on the 1170 RDS will be maintained, but will not be monitored in detail until operations resume at Mount Polley or the need arises to do so.

Phase III will likely focus on the reclamation of the TSF. One or several plots will be created to test various thicknesses of soil and the use of biosolids on the reclamation of the beach, as well as the success of a variety of species for the wetland portion of the TSF. The location of the plot for this research will be located in the vicinity of the TSF, but site personnel will choose the exact location during 2005.

3.0 MINING PROGRAM

A detailed Mine Plan was presented in the Reclamation and Closure Plan submitted to MEM and approved under Permit M-200.

3.1 SURFACE DEVELOPMENT TO DATE

3.1.1 AREAS OF DISTURBANCE TO END OF 2004

Since mining operations ceased in 2001, there was almost no new disturbance were created in 2003. The only exception is the exploration work in the Northeast Zone (NE Zone) that was conducted toward the end of 2003. The disturbed areas drawing (figure 3 – inside-front cover of report) has been updated from the 2002 drawing to include this new disturbance from the exploration program. Areas of disturbance were determined from analysis of an orthophoto taken in July 2001, just prior to the shut down of the mine, as well as a survey of the new disturbance mentioned above. Disturbed areas were identified and categorized by disturbance type, and then digitized into AutoCAD.

At the end of 2004, the total disturbed area in all categories was 503.93 Ha. Surface areas of the various disturbed reclamation units are outlined in Table 3.1.1-1 and are detailed by mine component in Table 3.1.1-2.

As no mining took place in 2004, there are no changes to the quantities of waste rock, tailings or low-grade ore from the year that mining ceased in 2001. However, the quantities to the end of mining in 2001 can be viewed in table 3.1.1-3.

3.2 SURFACE DEVELOPMENT IN 2004

As discussed in the previous section, since mining operations ceased in 2001, almost no new disturbance was created in 2004. The only exception was 6.69 Ha of exploration trenching that took place in the area known as the NE Zone. A reevaluation of disturbed and reclaimed area was done. There were minor discrepancies to report. From year to year, the numbers of Hectares for each group may change slightly because I would take a closer look at certain areas and adjust the poly-lines to better capture some disturbances, thereby decreasing some areas while increasing others. The following changes are as follow:

- For the Waste Dumps in 2004, areas from un-reclaimed to reclaimed, and some areas from tops to slopes. But this difference of 6 Ha (more or less) comes from re-calculating the disturbance from the slopes (East, North & Cariboo Pit Dumps) to better reflect the actual area that will be reclaimed, assuming everything will be re-sloped to 2:1 or better. As a result, the areas increased for the slopes, thereby increasing the area for the Waste Dumps.

- For the Tailings Ponds, it increased by about 31 Ha which considers the tailings till borrows, till waste piles and tailings lay down area into this grouping from the Other category.

- The Other category, as a result, decreased by this same amount (31 Ha).

- The Exploration disturbance of 6.69 Ha for 2004 should have been included in the Permit Amendment Table, as the exploration was from 2003. Don't know why it was not, but that is half the difference in the over-all total disturbance that you're looking for.

So, in summary, the "Tailings Ponds" and "Other" categories changed in areas disturbed because some sub-categories from "Other" were re-filed with "Tailings Ponds". The overall increase of 13.06 Ha is made up equally of a re-calculation of the slope areas for the existing dumps and the exploration disturbance from 2003.

3.3 PROJECTED SURFACE DEVELOPMENT FROM 2004 TO 2008

3.3.1 AREAS OF DISTURBANCE

There will be no further projection of disturbance at Mount Polley until mining operations resume. However, tables 3.3.1-1 & 3.3.1-2 have been completed to demonstrate the projection of no further disturbance for the next five years and mine life.

3.3.2 SALVAGING AND STOCKPILING OF SURFICIAL MATERIALS

Soil salvage is a critical component of reclamation planning, as it will provide the soil material necessary to reclaim the mine site for desired end land uses. In 1997, Mount Polley prepared a Soil Salvage and Stockpile Protocol, SSSP-97, which addressed site-specific criteria relating to soil management.

No soil stripping, salvage or stockpiling occurred at the Mount Polley mine site in 2004. Present soil stockpiles are indicated on Figure 3 and are summarized with respect to area stripped, soil volumes recovered, source description and target depths for salvage in Table 3.3.2-1.

3.3.3 DRAINAGE CONTROL / PROTECTION OF WATERCOURSES

Knight Piésold (Ref. No. 1624/1, 1995) has developed an overall water management plan for the project. This plan had been changed in 2001 for the care and maintenance period. Please refer to the Annual Environmental and Reclamation Report 2001 for an update of the water management plan.

4.0 FUTURE RECLAMATION PROGRAMS

4.1 RECLAMATION RESEARCH FOR 2005

No formal reclamation research is planned for 2005.

5.0 RECLAMATION COST PROJECTIONS

Detailed cost projections for the end of 2004 have been completed. The summary tables and detailed categories of disturbance can be found in APPENDIX I - RECLAMATION BOND COSTING – 2004.