TECHNICAL REPORT

ON THE

MAIN ZONE OPTIMIZATION

HUCKLEBERRY MINE

OMINECA MINING DIVISION

BRITISH COLUMBIA, CANADA

Latitude 53°40'52" North
Longitude 127°10' 35" West
1:50,000 map sheet
093E 11E

Prepared for

Huckleberry Mines Ltd.
and
Imperial Metal Corporation

by

Kent Christensen, P. Eng.
Gerald R. Connaughton, P. Eng
Peter Ogryzlo, M.Sc., P.Geo.

November 22, 2011

The effective date of the exploration data is September 1, 2011

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1.0 SUMMARY

The Huckleberry Mine is located in Central British Columbia, Canada. The mine is owned one hundred per cent by Huckleberry Mines Ltd., whose ownership is in turn shared between Imperial Metals Corporation and the Japan Group, a consortium formed of Mitsubishi Materials Corporation, Marubeni Corporation, Furukawa Co. and Dowa Mining Co. Ltd. The mine produces copper and molybdenum, with accessory but lesser quantities of silver and gold from an open pit mine-mill complex. Production started in 1997 and is continuing at a rate of approximately 16,000 tonnes per day at the time of preparation of this report. The minerals are won from porphyry copper - molybdenum deposits located on the southern slopes of Huckleberry Mountain.

Operations were scheduled to wind down in 2007-2008. However, development of resources near the backfilled Main Zone Pit has extended the mine life to 2014. Continued exploration below and around the Main Zone Pit led to the development of a Measured plus Indicated mineral resource containing 180.7 million tonnes with grades of 0.315 % copper and 0.006% molybdenum. Not included in these categories is an Inferred mineral resource of 48.0 million tonnes with grades of 0.263% copper and 0.003% molybdenum. Details on the classification of this resource may be viewed below in Section 14 of this report.

Within this mineralized resource, the operators have defined resources of 39.7 million tonnes at a grade of 0.343% copper and 0.009% molybdenum using a 0.20% copper cutoff grade. These resources are contained within a pit shell known as the Main Zone Optimization (MZO) Pit. The development of these resources into reserves, and the feasibility of extracting them from the MZO pit are the subject of this technical report.

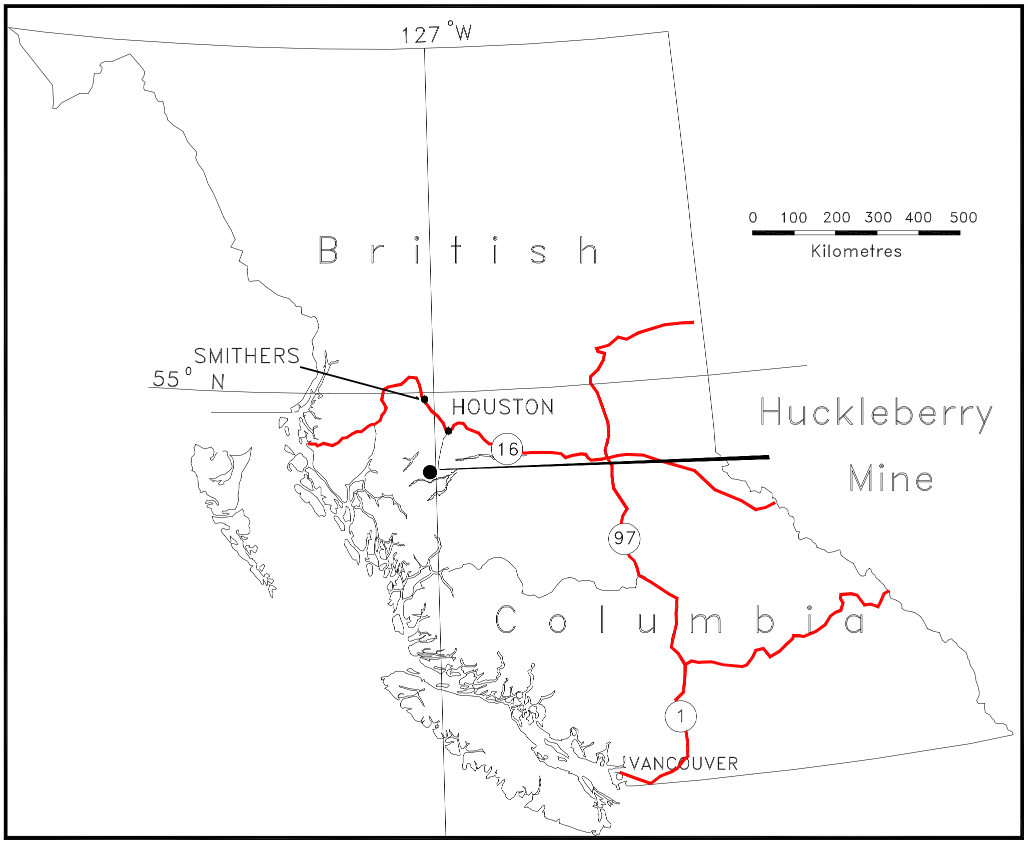


Figure 1.1 Location of the Huckleberry Mine

2.0 INTRODUCTION AND TERMS OF REFERENCE

The southern slopes of Huckleberry Mountain have attracted mineral exploration for close to fifty years owing to the surface occurrence of copper bearing minerals. Portions of the area have accordingly been explored by geochemical, geophysical and diamond drilling surveys. As a result of these surveys, two zones of mineralization were identified. The first of these, the Main Zone, was explored by various operators during the period 1962 to 1994. The East Zone was discovered during the course of site investigations in 1993, and was further explored from 1993-1997. These programs led to the development of mineral resource of 53.7 million tonnes grading 0.455%Cu, 0.013%Mo and 0.06g/t Au at a 0.30% Cu cutoff grade in the Main Zone, and 108.4 million tonnes grading 0.484% Cu, 0.014% Mo and 0.055 g/t Au in the East Zone (Jackson and Illerbrun, 1994). Plant construction began in 1996, and mining operations began in the East Zone Pit in

1997. Development of the Main Zone Pit began in 1999. Mining operations were scheduled for completion in 2007.

As the mineable reserves on site were being depleted, a review of the exploration potential around the Huckleberry mine site was undertaken. These investigations led to the development of the Main Zone Extension (MZX) Pit from 2004-2006, and commissioning of the pit in 2007. Huckleberry is extracting ore from the MZX Pit at the time of preparation of this report. A further expansion (the "Pushback Plan") of this pit will provide feed for milling operations until January 2014. Proven and Probable Reserves within the MZX Pit and its accompanying Pushback Plan were 11.75 million tonnes grading 0.359% copper as of December 31, 2010 (Imperial Metals Corporation website, June 2011).

Further exploration on the wedge of rock lying between the MZX pit and the backfilled Main Zone Pit, as well as around and beneath the Main Zone Pit have led to the development of a Measured plus Indicated resource of 180.7 million tonnes with grades of 0.315 % copper and 0.006% molybdenum. Pit shells have been generated on this resource with the view of producing a mineable reserve. The pit shell under review in this technical report is known as the Main Zone Optimization (MZO) Pit. The MZO Pit has the potential to extend mine life at Huckleberry an additional six to seven years.

For the purposes of generating a revised Ore Reserve Model (ORM) and of generating new pit geometries, the principal sources of information were the historical diamond drill data, the historical and current operating blasthole data, and new diamond drilling added to the databases in 2009 and 2010. The principal authors Kent Christensen P. Eng, Gerald Connaughton P.Eng. are employees of Huckleberry Mines Ltd. and are on site on a regular basis. Principal author Peter Ogryzlo M.Sc., P.Geo. visits the site several times in a calendar year, with the last site visit July 13 and 14, 2011.

3.0 RELIANCE ON OTHER EXPERTS

3.1 Reliance on experts for historical resource estimates

The authors of this technical report have relied on published estimates for historical mineral resources and reserves. These estimates were presented by James (1976) and Jackson and Illerbrun (1995) in Canadian Institute of Mining and Metallurgy Special Volumes 15 and 46.

Although the estimates were prepared by leading industry professionals, and went through rigorous technical and scientific review, the authors were not Qualified Persons as defined under National Instrument 43-101. The authors must disclaim responsibility for these estimates. Similarly, the mineral resource and mineral reserve estimates provided in the Huckleberry Mine Feasibility Study (1995) and Raymond (1997) were prepared by leading industry professionals. However, the estimates were prepared prior to the implementation of National Instrument 43-101 and the authors similarly disclaim responsibility for the historical estimates.

3.2 Reliance upon experts who are Qualified Persons

Kent T. Christensen P. Eng., Manager of Engineering and New Projects for Huckleberry Mines Ltd., is responsible for sections 15 – 16, 18 - 22, and 24 – 26 of this report. The studies summarized were done as part of the Application to Amend Mines Act Permit M-203 for inclusion of the Main Zone Optimization Pit and associated Tailings Management Facilty-3 in the Work Systems and Reclamation Plan. Kent has over seen and reviewed the contributions from:

- Golder Associates
    - Mines Act permit M-203 Amendment Application
    - Pit slope geotechnical investigation and criteria
    - Wildlife
    - Archeological
    - First Nations consultation
    - Hydrology
    - Site Monitoring Plan
- AMEC Earth and Environment
    - Geotechnical Investigation and Tailings Management Facility design
- SRK Consulting (Canada) Inc.
    - Baseline Water Quality
    - Geochemical Characterization
    - Closure Plan and Costs
- Hatfield Consultants Ltd.
    - Aquatic Resources Baseline

Kent has been managing the Main Zone Optimization project for HML since 2009. He is designated as a “Qualified Person” for Huckleberry Mines Ltd. and is responsible for this report in accordance with National Instrument 43-101.

Gerald Connaughton, P. Eng., Chief Metallurgist for HML, is responsible for the metallurgical testing and mineral processing information in the report, specifically sections 13 and 17. Gerry has been with the metallurgical department at HML since 2008 and has been involved with or over seen metallurgical testing of exploration and mill operations and is designated as a "Qualified Person" for this report in accordance with National Instrument 43-101.

Resource audits have been performed for Huckleberry Mines Ltd in 2008 and October 2010 by Gary Giroux P. Eng., a Qualified Person as defined under National Instrument 43-101 (Giroux, 2010). The audits were done on geological and assay data supplied by Huckleberry Mines Ltd. The authors rely upon the findings and opinions rendered in the audits.

3.3 Reliance on experts who are not Qualified Persons

Stephen Fujiwara, CA is Vice-President; Finance for Huckleberry Mines Ltd. Mr. Fujiwara is responsible for Sections 19, 21, and 22 covering Capital Cost Estimates, Operating Cost Estimates and Financial Analysis. Mr. Fujiwara is an experienced mining industry financial professional, but is not a Qualified Person as defined on National Instrument 43-101. The authors of this report rely upon his estimates and analysis.

Faisal Sayeed, B.Sc. is an employee of Huckleberry Mines Ltd, currently serving as Mine Geologist at the Huckleberry Mine. Mr. Sayeed is also an experienced industry professional, but is not a Qualified Person as defined on National Instrument 43-101. The authors of this report have relied upon Mr. Sayeed for the preparation of the section of this report on diamond drilling.

4.0 PROPERTY DESCRIPTION AND LOCATION

The Huckleberry Mine is located in central British Columbia near the 54th parallel of latitude. Tenure for mining purposes is secured by a Mineral Lease and a number of mineral claims.

The area covering the mine was first staked as the LEN group of mineral claims in 1962 by Kennco Exploration (Western) Limited. Through re-staking, conversion to a Mineral Lease, conversion to the BC Mineral Titles Online tenure system, and acquisition by staking, the property in 2011 consists of Mineral Lease 353594 covering 1911.7 hectares and 41 Mineral Claims covering approximately 2295 hectares for a total of approximately 4207 hectares. The claims and leases are located on the western margin of the Central Interior physiographic region of the Province of British Columbia, Canada on National Topographic System sheets 093E 11E or map sheets 093E 064, 065 and 075. The claims are centered at approximately Universe

Transverse Mercator (UTM) co-ordinates 618500E, 5956500N using North American Datum (NAD) 83, or latitude 53°40’52”N longitude 127°10’ 35”W. Huckleberry Mines Ltd. Vancouver, British Columbia V6C 1N5 holds one hundred per cent interest in the property. The mineral lease has been legally surveyed.

The original two-post mineral claims were converted to the modified grid system by abandonment and restaking. All the early claims were subsequently converted to the Mineral Titles Online (MTO) grid in June 2005. To support a regional exploration program, thirty-two claims were added east of the mine in 2006. As the MZO project developed, a new tailings facility was investigated which is known at Tailings Management Facility 3 (TMF-3). Tenure Number 849604 was acquired by staking the Emillie Mineral Claim west of the mine site in March 2011.

A listing of mineral tenures dates owned by Huckleberry Mines Limited and their expiry is presented below. A further three tenures on Whiting Creek are owned by Huckleberry Mines Ltd, but are not included in this review.

On May 18, 2011, an application for a Mineral Lease covering TMF-3 was submitted to the Ministry of Energy and Mines. The proposed Mineral Lease covers a portion of Mineral Claim 515321, which was accordingly reduced in size. The application for Mineral Lease was made over Tenure Numbers 855203 and 855204 which cover the Reach1 and T3 Mineral Claims respectively. These tenures were created by re-staking within the limits of Tenure Number 515321.

The location the Huckleberry mine in relation to property boundaries, known mineralized zones, forest service access roads and exploration access trails may be seen in Figure 4.1.

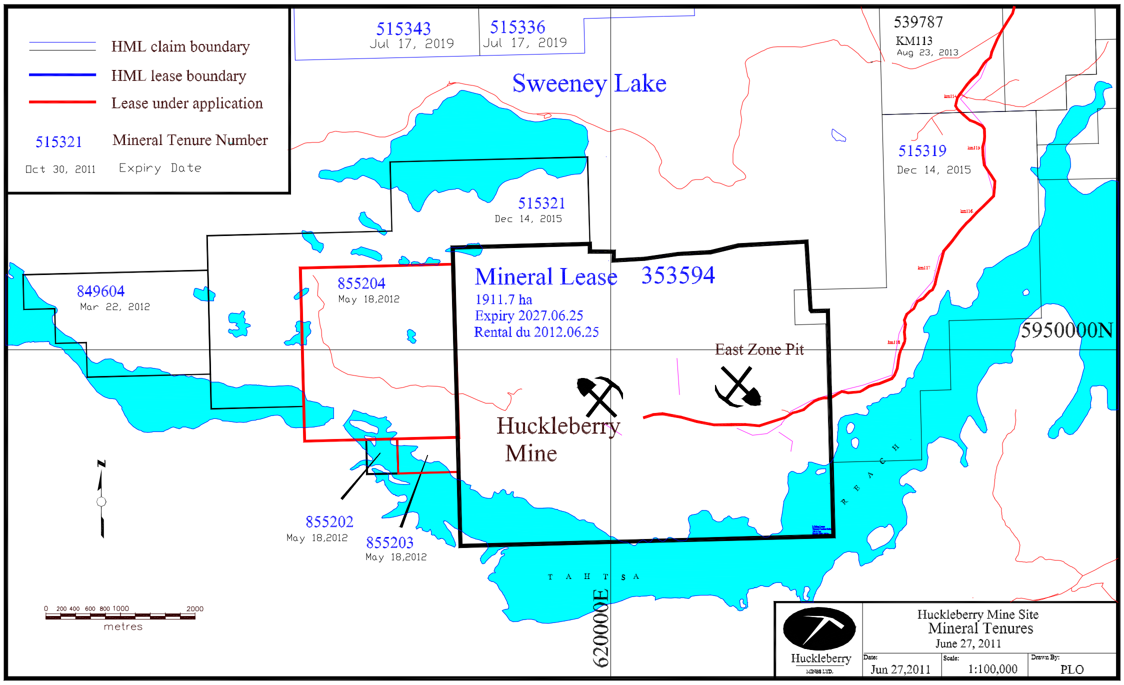


Figure 4. 1 Location and Mineral Tenures for the Huckleberry Mine

Mineral Tenures are only shown for the immediate area around the Mine Site, and are valid as of June 27, 2011.

The mineral lease, lease application, claims and surveyed district lots owned by Huckleberry Mines Ltd. lie within an area in which First Nations Statements of Interest have been expressed by the Cheslatta Carrier Nation, the Wet'suwet'en Nation, and the Carrier Sekani Tribal Council. Other First Nations that may have aboriginal interests in some or all the area covered by tenures owned by Huckleberry Mines Ltd. are the Office of the Wet'suwet'en, the Nee-Tahi-Buhn Indian Band, and the Skin Tyee Nation.

The rights of a registered owner of a mineral claim are subject to the Mineral Tenure Act of the Province of British Columbia. Under section 14 of the Mineral Tenure Act, a recorded holder may use, enter and occupy the surface of a claim or lease for the exploration and development or production of minerals or placer minerals, including the treatment of ore and concentrates, and all operations related to the exploration and development or production of minerals or placer minerals and the business of mining. Mining activity requires a permit under Section 10 of the Mines Act. Mining activities at the Huckleberry Mine are conducted under Mines Regulation Act Permit M-203 dated May 20, 1997 and its subsequent amendments.

Table 3.1 Summary of Mineral Tenures
Huckleberry Mines Ltd., Tahtsa Reach, British Columbia

Claim Name	MTO Tenure No.	Area Ha	Issue Date	Expiration Date
ML 353594	353594	1911.7	1997 June 25	2027 June 25
	515319	899.9	2005 June 27	2015 Dec 14
	515321	746.6	2005 June 27	2015 Dec 14
EMILLIE	849604	287.2	2011 Mar 22	2012 Mar 22
REACH1	855202	19.2	2011 May 18	2012 May 18
REACH2	855203	38.3	2011 May 18	2012 May 18
T3	855204	478.8	2011 May 18	2012 May 18
KM113	539787	382.7	2006 Aug 23	2013 Aug 23
KM111	539788	267.8	2006 Aug 23	2013 Aug 23
KM109W	539789	229.5	2006 Aug 23	2013 Aug 23
KM109	539790	478.0	2006 Aug 23	2013 Aug 23
KM107	539791	477.8	2006 Aug 23	2013 Aug 23
KM105	539792	477.5	2006 Aug 23	2013 Aug 23
KM105E	539793	477.5	2006 Aug 23	2013 Aug 23
KM107E	539795	477.8	2006 Aug 23	2013 Aug 23
KM109E	539796	478.0	2006 Aug 23	2013 Aug 23
SC1	539797	478.2	2006 Aug 23	2013 Aug 23
NEEDLE1	539799	477.5	2006 Aug 23	2013 Aug 23
NEEDLE2	539801	477.8	2006 Aug 23	2013 Aug 23
NEEDLE3	539802	478.0	2006 Aug 23	2013 Aug 23
NEEDLE4	539804	478.2	2006 Aug 23	2013 Aug 23
SP1	539805	477.5	2006 Aug 23	2013 Aug 23
SP2	539807	477.8	2006 Aug 23	2013 Aug 23
SP3	539808	478.0	2006 Aug 23	2013 Aug 23
SP4	539809	478.2	2006 Aug 23	2013 Aug 23
SC2	539810	478.4	2006 Aug 23	2013 Aug 23
KM101	539811	458.2	2006 Aug 23	2013 Aug 23
BETWEEN	539813	477.3	2006 Aug 23	2013 Aug 23
NEEDLE	539814	458.2	2006 Aug 23	2013 Aug 23
SKNY1	539815	458.1	2006 Aug 23	2013 Aug 23
SKNY2	539816	458.2	2006 Aug 23	2013 Aug 23
SKNY3	539817	458.4	2006 Aug 23	2013 Aug 23
SKNY4	539819	458.5	2006 Aug 23	2013 Aug 23
SKNY5	539821	458.7	2006 Aug 23	2013 Aug 23
SKNY6	539824	458.8	2006 Aug 23	2013 Aug 23
SKNY7	539825	458.9	2006 Aug 23	2013 Aug 23
SKNY8	539827	459.1	2006 Aug 23	2013 Aug 23
TW1	549103	267.9	2007 Jan 11	2013 Aug 23
TW2	549104	267.9	2007 Jan 11	2013 Aug 23
Total		**18506.0**		

In order to maintain the mineral tenures in good standing, certain obligations are laid out in the Mineral Tenure Act. In general, for mineral claims these obligations entail the timely performance of work or the payment of cash in lieu of work and timely submission of assessment reports and payment of applicable recording fees. Section 8 of the Mineral Tenure Act Regulations requires that the value of exploration and development work to maintain a mineral claim for one year is at least $4.00 per hectare during each of the first, second and third anniversary years, and $8.00 per hectare during each of the subsequent anniversary years. Mineral Leases are maintained in good standing by the annual payment of rental fees of $10 per hectare. In general, Huckleberry Mines Ltd. has annual financial obligations of $19,117 to maintain the lease covering the Huckleberry Mine in good standing. In the event that a Mineral Lease is created covering the proposed tailings management facility (TMF-3), Huckleberry Mines Ltd, may anticipate further annual obligations of $5,171 to maintain the lease.

The boundaries of the Mineral Leases covering the Huckleberry Mine and the District Lots covering the Huckleberry Mine have been established by legal survey.

Under Mines Act Reclamation Permit M-203 and subsequent amendments, Huckleberry Mines Ltd. is liable for reclamation of surface works at the Huckleberry and Huckleberry Mines. The permit at the time of preparation of this report requires the posting of $24,300,000 in reclamation security to be held by the Minister of Finance of the Province of British Columbia for the proper performance of the approved reclamation program. The amount of security required to be posted may be subject adjustment by the Ministry of Energy and Mines. The permit holder has obligations to reclaim land and watercourses to prevent significant impact of metal leaching and acid rock drainage, and to focus on wildlife habitat as end land use. Specific obligations are to remove structures; to reclaim the waste dumps, water courses, pits, tailings impoundments and roads; to monitor metal uptake in vegetation; to dispose of fuels and toxic chemicals; and to report on activities. The mine has excavated quantities of rock that may be Potentially Acid Generating (PAG), which has been incorporated into road beds, and upstream portions of dams within a containment area. Sites which are Potentially Acid Generating will require long term monitoring and management.

To perform further work, on claims outside the Mineral Lease, the registered owner must first file and receive approval of a Notice of Work and Reclamation as required by Section 10 of the Mines Act of the Province of British Columbia. Depending on the nature and extent of the work, the District Inspector may require the posting of additional reclamation securities before issuing a permit to conduct work.

Other permits governed by provincial and federal laws and regulations may be required as the project progresses. These permits may include, but are not limited to matters pertaining to development, mining, production, taxes, labour standards, occupational health, waste disposal, toxic substances, land use, environmental protection and mine safety.

The authors are not aware of any impediment to the application or approval of any further permits required to complete the proposed program of work at the Huckleberry mine sites. The authors are not aware of any other significant factors and risks that may affect access, title or the right or ability to perform further exploration, development and mining on the Huckleberry Mine property.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1Access to the Huckleberry and Huckleberry Mines

The property is located approximately 123 kilometres by road south of the town of Houston in the Central Interior of British Columbia.

From Houston, access to the property is by road using a two-wheel drive vehicle in fair weather, and a four-wheel drive vehicle in poor weather. Road access is achieved by first travelling west from Houston on Highway 16 to the intersection with the Morice Forest Service Road; thence south 56.5 km on the Morice FSR and the Morice Owen FSR to the intersection with the Morice

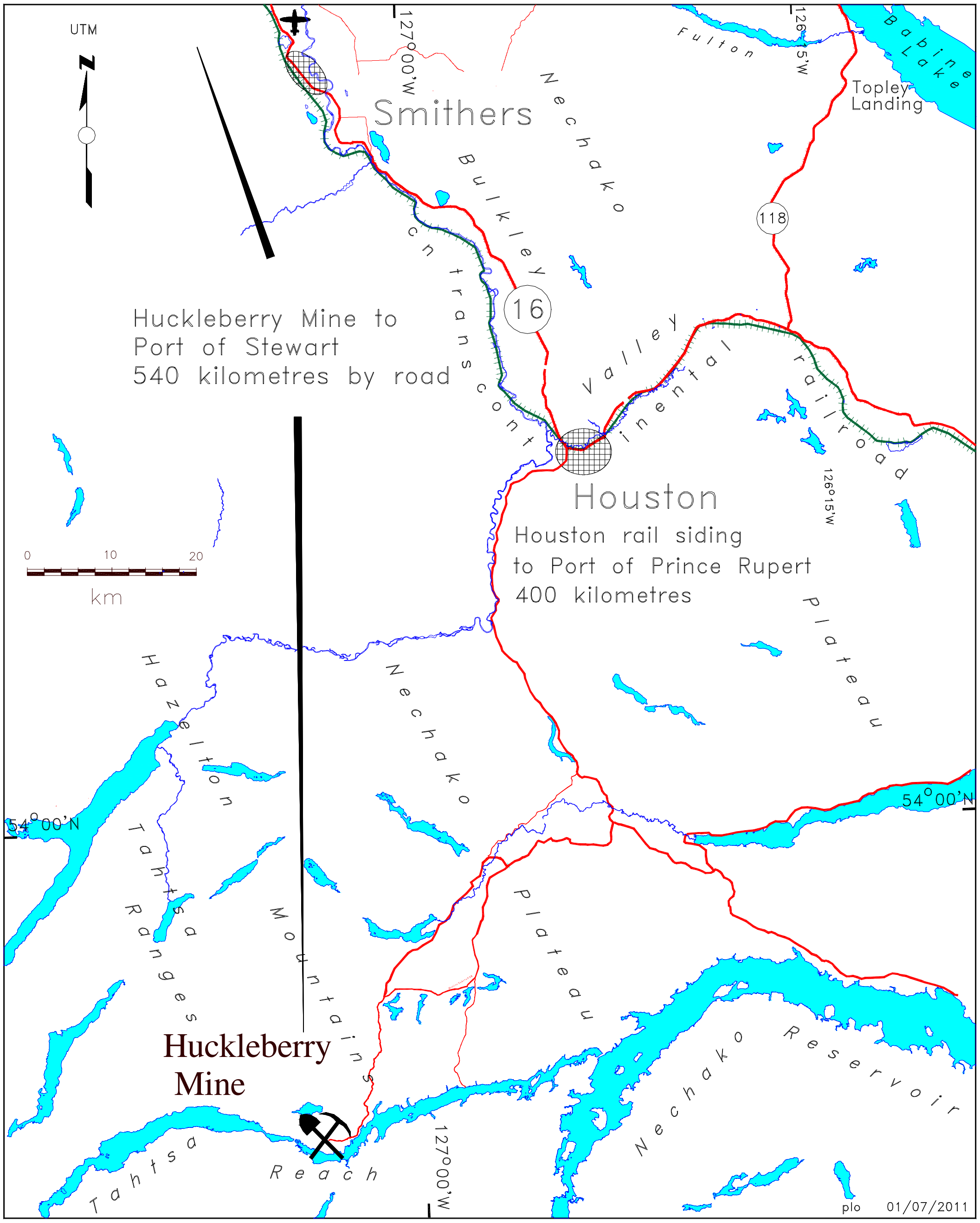


Figure 5. 1 Access to the Huckleberry Mine

Nadina Forest Service Road. Travel is then south and west along the Morice Nadina FSR/ Huckleberry Mine road a further 65 kilometres to the mine site.

The Huckleberry Mine was in operation at the time of preparation of this report, milling ore at a rate of 16,000 tonnes per day. A 288-person camp services the mine, and was used by the drilling crews working at the mine site.

5.2 Climate

Climate is transitional between that of the Coast Ranges and that of the Central Interior, with short cool summers, and long relatively mild winters. Annual temperature variation in the region is approximately –25 to +25 degrees Celsius. Snowpack in the winter ranges from approximately 1 to 4 metres, but has reached a maximum of 10 metres during the operating life of the mine. The operating season for ground based activities such as geological mapping, surface sampling and geophysical surveys would extend from approximately early May to late October. With adequate support, diamond drilling can be conducted year round.

Outside the clearing lines for the mine operations, the property is covered by a mature stand of mixed coniferous trees. The upper slopes of Huckleberry Mountain are covered with sub-alpine vegetation, talus and outcroppings of bedrock.

5.3 Local Resources

Adequate supplies of surface and ground water for exploration and mining are available. The Huckleberry Mine draws fresh water for domestic and mineral processing purposes from Tahtsa Reach, with a significant portion of the process water recycled from the tailings impoundments. Water use is subject to provincial and federal regulation. Land use for exploration and mining purposes is governed by the Mineral Tenure Act, the Mines Right of Way Act, the Mines Act and other applicable laws of the Province of British Columbia. Small gravel pits have been developed for the purpose of Forest Service road construction adjacent to the mine site. It is possible that these deposits of sand and gravel may be used to supply aggregate and road construction material for future development.

A 138 KVA power line connects the Huckleberry Mine to the BC provincial grid at the Houston substation.

The Huckleberry Mineral Tenures are located on Crown Land. The author is not aware of any private land holdings in the vicinity.

The author is not aware of any impediments to the further acquisition of surface rights for exploration and mining purposes.

5.4 Infrastructure

Houston, British Columbia is a major supply and industrial service centre for the mining and logging operations located in the area. Houston is serviced by the CNR transcontinental railway as well as by Highway 16, a major thoroughfare. Daily air service to Vancouver is available from Smithers, BC airport approximately 70 kilometres by road to the west of Houston. There is a municipal airstrip west of Houston for non-scheduled services, and helicopters may be hired locally. The town of Smithers, located approximately 65 km to the west of Houston is also a service centre for the mineral exploration industry, with diamond drilling contractors, air services, and professional exploration personnel.

Copper concentrate produced at Huckleberry is trucked to a loadout facility in the Port of Stewart, BC, approximately 540 kilometres by road from the mine. Concentrate from Huckleberry is then taken by sea to offshore smelters. Molybdenum concentrate is packed into bags, and is transported by road to a broker in Vancouver, BC. Employees engaged in mining operations live in various communities in the Bulkley Valley and across north central British Columbia, and are transported to the mine site by bus, or in private vehicles. While working, mine employees and contractors are housed in an onsite camp.

5.5 Physiography

The property lies at the eastern margin of the Hazelton Mountains, and is located in the Tahtsa Ranges physiographic region of central British Columbia. Relief is moderate to steep on the property with a maximum difference in elevation of approximately 700 metres, from a variable elevation of 853 metres on Tahtsa Reach, to 1526 metres on Huckleberry Mountain.

Ground cover is varied at the mine sites. Before the commencement of mining, Huckleberry was covered with an open forest of Balsam Fir, Lodgepole Pine and Engelmann Spruce. Marshes were present in low lying areas, and covered most of the East Zone at Huckleberry. Open slopes are covered with the huckleberries which gave rise to the name of Huckleberry Mountain and its mineral deposits. Talus slopes on Huckleberry Mountain are covered with barren rock and slide alder where moisture and soil conditions permit.

5.6 Main Zone Optimization infrastructure requirements

Surface rights for the Main Zone Optimization are covered under Mineral Lease 353594, which covers the current mining operations. The existing 138KVA line from the Houston substation to the mine site is adequate for current and planned mining and milling activities. Water supplies are permitted and established to support current mining and milling operations. The highly skilled personnel for ongoing mining activities are drawn from the local communities. Areas suitable for tailings storage were identified in the 1995 feasibility study. An application for Mineral Lease to cover the proposed tailings storage has been made to the Ministry of Energy and Mines. Adequate areas exist within the current and proposed containment areas for waste rock disposal.

6.0 HISTORY

6.1 Exploration and Mining History of the western Nechako Plateau

In general, the western edge of the Nechako Plateau has been actively explored since the early part of the 20th century. The Emerald Glacier Mine (MINFILE 093E001) is located in the Whiting Creek drainage approximately 10 km north of Huckleberry, and was one of the first mines developed in north central British Columbia. The mine intermittently exploited a high grade Ag-Pb-Zn vein between 1951 and 1968. Reported production was 2.6 million grams of Ag, 1,524 grams of gold, 1.7 tonnes Cd, 9 tonnes of Cu, 766 tonnes of lead and 892 tonnes of Zn extracted from 8,293 tonnes of ore. The ore was produced from a series of en-echelon polymetallic quartz veins cutting feldspathic sandstone and lesser siltstone and tuffaceous shale near the contact with overlying andesitic volcanic rocks and breccia.

A major thrust of exploration occurred in the late 1960s and early 1970s. This work led to the development of the Silver Queen underground mine (MINFILE 093L002) at Owen Lake, approximately 18 km northeast of the Poplar property. Silver Queen produced approximately 13.6 million ounces of silver, 98,152 ounces of gold and 5,049 tonnes of zinc with lesser credits for lead, copper and cadmium from approximately 190,000 tonnes of ore in 1972 and 1973.

Exploration during this period also led to the discovery of the Huckleberry Mine (MINFILE 093E 037), which was has been actively explored from 1963 to the present. The mine is located on the north side of Tahtsa Reach on the south slope of Huckleberry Mountain. Porphyry copper-molybdenum mineralization at Huckleberry is associated with an elliptical stock of the Late Cretaceous Bulkley Intrusions. Production began in 1997, and the mine was in production at the time of preparation of this report. The operation is a modern mine and mill industrial complex producing copper, molybdenum, silver and gold, and is well-serviced with road, power and water

The author has been unable to verify the above information regarding production from the surrounding deposits. The information is not necessarily indicative of the mineralization on the property that is the subject of this technical report.

6.1.1 Huckleberry Deposit Exploration, Development, and Operation

The deposit was discovered by Kennco Exploration (Western) Ltd, in the course of a pioneering exploration program during the nineteen fifties and nineteen sixties (James, 1976). Streams flowing into Tahtsa Reach returned copper concentrations of 200 ppm against a background of 40 to 80 parts per million. Follow-up stream sediment and soil sampling led to the discovery of concentrations of native copper on the margin of a pond over what is now know as the Main Zone deposit (J. Barakso, personal communication). These findings led to the discovery of chalcopyrite and malachite on a small hill at the foot of Huckleberry Mountain, and at the base of the slope in the area now known as the Main Zone Extension. The showings were staked in 1962 as the LEN claims, which are now incorporated into Mineral Lease 353594. Kennco drilled 290 metres in nine holes in 1962, 1417 metres in nine holes in 1970, and 870 metres in five holes in 1971. These drilling programs resulted in the discovery of the Main Zone Deposit.

The property was then optioned by Granby Mining Company Ltd. in 1972 (Imperial Metals, 2010). Granby continued development of the Main Zone Deposit over the next two years, drilling 16,190 metres in sixty-five holes (Jackson and Illerbrun, 1995). The property remained idle until 1988-1989 when Noranda Exploration Company Limited surveyed the entire property to assess the precious metal potential, identifying a gold-copper-arsenic assemblage in quartz veins in what has become known as the KM119 showings. Noranda's option was dropped, and in 1992 New Canamin Resources Ltd. optioned the property from Kennecott Canada. New Canamin continued development drilling on the Main Zone. During the course of site investigations for tailings disposal, DDH93-26 was drilled 1200 metres east of the Main Zone. The hole intersected ore grade mineralization at the top of bedrock, and returned 0.905% copper over 8 metres. This was the discovery hole on the East Zone deposit at Huckleberry. In 1993 a total of 58 holes totalling 10,647 metres were drilled on the East zone, and during 1994 a total of 137 holes totalling 10,173 metres were drilled, attempting to define reserves and outline the extent of the East zone deposit.

Construction of the Huckleberry facilities was completed in 1997, with the operation remaining in continuous production since then.

Beginning in 2004, the Huckleberry deposit became the subject of extensive review and re-evaluation. Following a compilation of all historical results in the spring of 2004, targets were set northeast of the East Zone Pit, and north of the mined out Main Zone pit. Six holes were drilled in each target, with ore grade intersections identified in both. The target north of the Main Zone was chosen for further exploration, and became known as the Main Zone Extension (MZX) deposit.

In June 2007, a pit slope failure occurred at the East zone pit. No injuries were sustained as employees and equipment had been moved to other workplaces when cracks in the highwall were noticed. A large volume of rock from the northern highwall of the East Zone was displaced into the pit, and ore production was terminated from the East Zone. The East Zone pit was nearing the end of its reserve life, and was scheduled to be completed in July 2007. Other parts of the mine were not affected by this slope failure, and milling continued with stockpiled ore being treated. Production was maintained from these stockpiles along with accelerated production from the new Main Zone Extension pit.

In 2009, Huckleberry completed an exploration program focused on drilling the Main Zone Stirrup target; a prism of rock which had not been adequately tested between the backfilled Main Zone pit and the currently producing Main Zone Saddle pit. The goal of this program was to ensure that all resources in the target area were adequately defined to allow economic evaluation. In addition, drilling tested the lateral and depth extent of the resource below the Main Zone pit. Of particular significance is DDH90ST-F which intersected 0.38% copper and 0.010% molybdenum over 486 metres from 12 to 498 metres. Since exploration began nearly 47 years ago, this is the longest intersection of continuous mineralization reported from Huckleberry. Resource models were constructed using the results of drilling below and around the Main Zone Pit. These models were used to generate pit designs which have become known as the Main Zone Optimization, which is the subject of this technical report.

6.2 Ownership History of the Huckleberry and Huckleberry properties

From the time of the first development on the Huckleberry deposit, the property has been managed by several operators.

Following the discovery of the Huckleberry deposit by Kennco Explorations (Western) Ltd. in the nineteen sixties, the deposit was optioned to Granby Mining Company Ltd. in 1972. With the acquisition of Zapata Granby by Noranda Mines Ltd. in 1982 the option was taken up by Noranda Exploration Ltd. Noranda subsequently relinquished the option.

New Canamin Resources Ltd. optioned the property from Kennecott Canada in 1992. Kennecott elected not to exercise its re-acquisition rights in May 1994 and New Canamin became sole owner of this property.

In July 1995, Princeton Mining Corporation acquired all the shares of New Canamin. A strategic alliance with the Japan Group was established to assist in financing the project. A feasibility study was commissioned by Princeton in early 1995 and completed by H.A. Simons in August 1995. In June 1996 the Japan Group purchased a 40% equity position in Huckleberry and entered into an agreement to provide US$60 million project loan financing based on the positive feasibility. Mitsubishi Materials Corporation, Dowa Mining Co. Ltd. and Furukawa Co. Ltd. also entered into a long term contract for the purchase of all copper concentrates from the Huckleberry mine. The British Columbia Government provided financial assistance in the form of a $15 million loan to Huckleberry for infrastructure including roads and power lines.

An additional $4.5 million of equity was injected into the project by Princeton and the Japan Group in November 1997. Marubeni Corporation provided a US$10 million loan to Huckleberry for working capital purposes. With financing in place the construction of the mine commenced in June 1996. The total cost to construct, install and commission the facilities was approximately $142 million. This included direct field costs of executing the Huckleberry project, plus the indirect costs associated with design, construction and commissioning. The Huckleberry mine started commissioning activities in September 1997 and achieved commercial production in October 1997.

In 1998, Imperial acquired the Huckleberry mine as a result of a plan of arrangement with Princeton Mining Corporation. Imperial held a 60% interest until June 1999 when 10% interest in the Huckleberry Mine was sold to the Japan Group, resulting in Imperial owning 50%.

In July 1998, the major stakeholders of Huckleberry entered into an economic plan sponsored by the British Columbia Job Protection Commission. The plan was for a period of two years from July 1998 to June 2000. All existing loans were restructured under the economic plan.

Copper prices continued to deteriorate and a second loan restructuring agreement was entered into in March 1999, deferring all principal and interest payments during 1999 and providing that the payment of principal and interest in 2000 and 2001 would be dependent on available cash. All deferred principal and interest charges were scheduled for repayment no later than January 1, 2002. Payment was subsequently rescheduled to June 30, 2003 to allow the parties to negotiate a further loan restructuring agreement. As part of the March 1999 loan restructuring agreement, a wholly owned subsidiary of Imperial provided a $2.5 million loan facility.

On December 1, 2003, management of the Huckleberry mine was transferred to Huckleberry. Imperial retained 50% equity ownership and acted in an advisory capacity on mine operations. In December 2004 Huckleberry repaid the $2.5 million of senior ranking debt owed to Imperial. In 2006, Huckleberry became debt free after having repaid $120.9 million of long term debt, including monies owed to the Province of British Columbia for assistance in construction of the power line to the mine.

6.3 Previous exploration - Geophysical surveying

Huckleberry is a porphyry copper –molybdenum deposit. This deposit type is characterized by annular concentric haloes of mineralization and alteration. As such, they commonly respond well to magnetic, electromagnetic and induced polarization geophysical surveys. Although outcrops of the Main Zone deposit were present, the East Zone deposit was “blind”, being covered by a blanket of glacial till, glaciolacustrine clay and marshy areas. Both deposits responded well to Induced Polarization exploration techniques, but the East Zone remained untested until site investigations began for placement of tailings. The biotite magnetite hornfels responds well to both ground and airborne magnetic techniques. The Main Zone and the Main Zone Extension are strongly magnetic, but the East Zone deposit appears as a pronounced magnetic low.

In 2009, the Huckleberry deposit was included as an In Fill Survey as part of the Quest West airborne geophysical survey (Geoscience BC, 2009). The In Fill surveys were done over the major deposits lying within the survey boundaries, so that the data could be used as a template or training set in evaluating and classifying anomalies elsewhere. Huckleberry responded well both electromagnetically and magnetically. As may be seen in Figure 6.1, the airborne survey effectively maps the deposits and structures. The survey has proven to be consistent with the historical ground surveys. The partially to completely filled circles represent conductor picks provided by the survey.

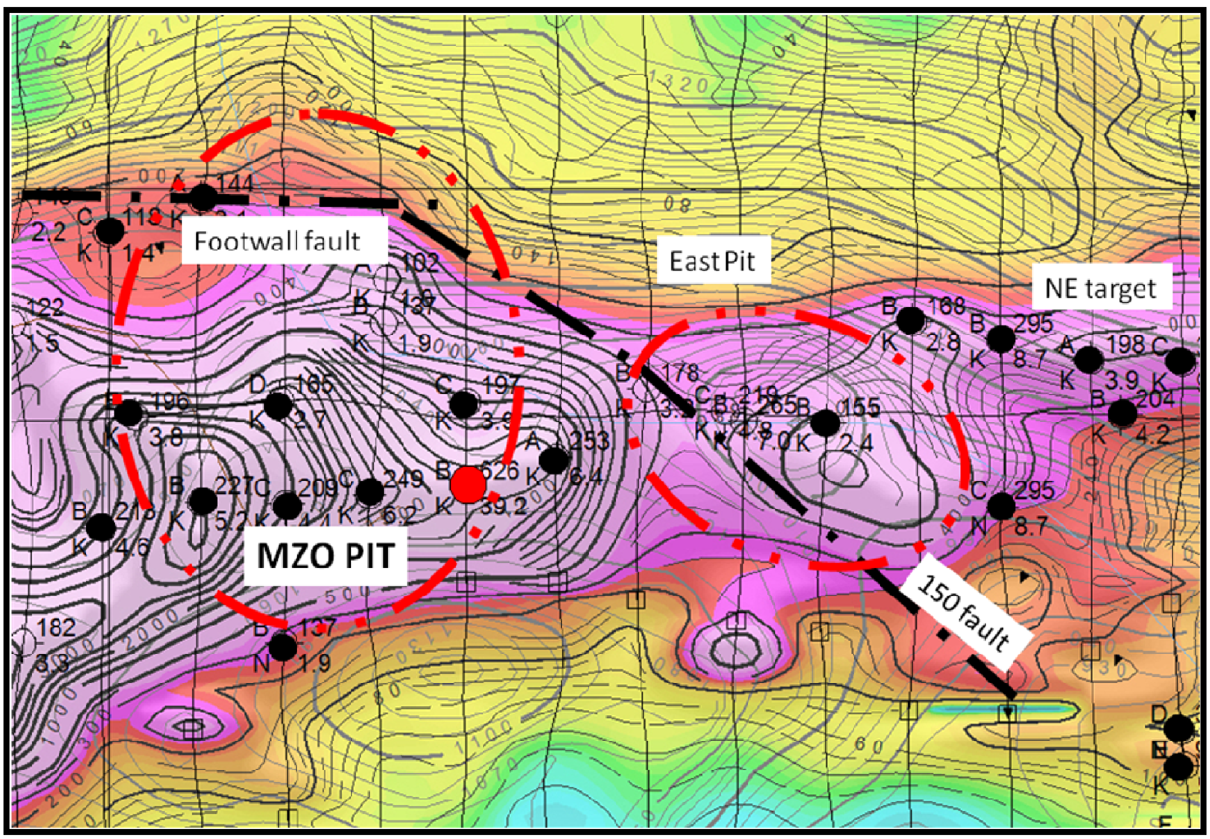


Figure 6. 1 Airborne electromagnetic response over Huckleberry deposit
Geoscience BC (2009).

The conductor pick in the southeastern portion of the Huckleberry Pit (red circle) lies near the end of the trace of DDH09ST-F which returned 498 metres of 0.38% copper and 0.01% molybdenum.

6.4 Previous exploration - Geochemical surveying

The initial discovery at Huckleberry was from follow-up of modest concentrations of copper in streams draining the deposits. Further examination led to the discovery of outcrops with chalcopyrite and malachite in the Main Zone and what was to become the Main Zone Extension. The Main Zone responded will to conventional soil sampling techniques, but the East Zone showed no response.

Research done in the nineteen nineties indicates that basal till may prove to be a superior sampling medium in searching for metal dispersal trains down-ice from mineral deposits. The down-ice dispersion of metals from the Huckleberry deposit has been well documented (Ferbey and Levson, 2001). However, the highest value (8924 ppm copper) reported in the survey was collected to the north and west of the Main Zone Pit, indicating a buried source of mineralization to the north. This sample was one of the pieces of evidence used in planning the 2004 drilling program which led to the discovery of the Main Zone Extension.

6.5 Interpretation of historical geophysical and geochemical exploration

The early geochemical surveys were invaluable in selecting drill targets at the Huckleberry deposit. Mineralized outcrops were present on the Main Zone but the East Zone did not outcrop, since it was covered with a blanket of till and glaciolacustrine clay. Geochemical response from the East Zone was negligible. Both deposit responded well to Induced Polarization geophysical surveys. The Main Zone Extension (MZX) was indicated in previous drilling, but only at depth, and was not included in pit shells. Follow up of basal till surveys with Induced Polarization led to the identification of a mineralized outcrop on the MZX, and the drilling of DDH04-297 which was mineralized from surface.

6.6 Previous Exploration – Diamond Drilling 1962-1997

The Huckleberry deposit was explored and developed by diamond during several campaigns by different operators beginning in 1962. Historical drill testing of the Huckleberry deposit is presented in the following table.

Table 6.1 Summary of drilling Huckleberry Deposit 1962-1997

Operator	Year	MZ Holes	Metres	EZ holes	Metres
Kennco	1962-1971	29	3,946		
Granby	1972-1974	65	15,938		
New Canamin	1992	34	4,685		
New Canamin	1993	38	4,885		
New Canamin	1993			60	10,704
New Canamin	1994	53	5,809		
New Canamin	1994			84	14,363
New Canamin	1995	2	366		
New Canamin	1995			6	1,097
Total to 1997 Production		**221**	**35629**	**150**	**26164**

From 1962 until mid-1993, drilling was conducted almost exclusively to develop resources around the Main Zone Stock. However, while testing for areas of potential tailings storage, DDH 93-26 intersected 0.905% copper over eight metres. This hole led to identification and development drilling of the East Zone deposit. Drilling continued on both targets with the goal of producing a feasibility study and a mineable reserve. The feasibility study was delivered in 1995, and production commenced in 1997. From discovery in 1962 to commissioning of the Huckleberry Mine in 1997, the deposits were tested by 61,793 metres of drilling in 371 holes.

6.7 Previous Exploration – Development Drilling 1997-2008

After commencement of commercial operations in 1997, short drilling campaigns were carried out to support production.

As reserves were scheduled to be exhausted in 2007, an exploration program was initiated in 2004 to search for new sources of mill feed. Targets were generated east of East Pit and North West of the mined out Main Zone Pit. Ore grade intersections were pulled from both targets. Diamond drill hole 04-297 was located on the North West target to test an Induced Polarization anomaly north of the Main Zone Pit. The hole was mineralized from surface and intersected 0.47% copper of 48.5 metres. As a result, the North West target was chosen for further testing.

Table 6.2 Summary of drilling Huckleberry Deposit 1998-2007

Operator	Year	MZ Holes	Metres	EZ holes	Metres
Huckleberry	1998	7	994		
Huckleberry	2000	5	305		
Huckleberry	2000			12	1,761
Huckleberry	2001	10	1,203		
Huckleberry	2001			8	765
Total to sustain production 1998-2001		**22**	**2,502**	**20**	**2,506**
Huckleberry	2004			9	1,254
Huckleberry MZX	2004	42	6,998		
Huckleberry MZX	2005	33	6,388		
Huckleberry MZX	2006	17	2,561		
Huckleberry MZX (DD and RC)	2007	38	4,874	5	541
Total for MZX Feasibility		**130**	**20,821**		

This program led to the development of a resource north of the Main Zone Pit which became known as the Main Zone Extension (MZX) Pit. With the closure of East Pit, production began from the MZX pit in early 2007. Including the drilling done from 1998 to 2001 to sustain operation, the MZX resource was defined using 23,323 metres of drilling in 152 holes.

As mining progressed on the MZX deposit, further modeling of the deposit led to the identification of a wedge of rock between the MZX pit and the backfilled Main Zone pit. This resource became known as the Main Zone Saddle (MZS) resource. Continued development drilling, and the incorporation of approximately 60,000 blasthole assays has since led to the definition of the Main Zone Optimization resource lying below and around the Main Zone Pit. This resource is the subject of this technical report and will be discussed further in the sections below.

6.8 Historical Mineral Resource and Mineral Reserve Estimates

Since discovery in the 1962, various operators have produced estimates of mineral resources and reserves for the Huckleberry deposit. **All of the following resource and reserve estimates were prepared prior to the implementation of National Instrument 43-101 Standards of Disclosure for Mineral Projects, and do not comply with that standard. A qualified person has not done sufficient work to classify the following historical estimates as current mineral resources or mineral reserves. Neither Huckleberry Mines Ltd. nor the reporting issuer, Imperial Metals Corporation, treat the following historical estimates as current mineral**

resources or mineral reserves. Each estimate was prepared by recognized industry professionals to standards existing at the time of preparation, and has been subject to many levels professional, scientific and academic review prior to dissemination in a refereed publication. As such, the estimates are considered to be relevant. As most or all of the material in these estimates was subsequently mined, the use of the term ore reserves is also relevant.

Following the first reported drilling program in 1962, by the end of 1974 the Main Zone at Huckleberry property had been tested by 19,844 metres of drilling in 94 holes. The presence of the East Zone was unknown at that time. The drilling led to a resource calculation by Granby Mining Corporation at a 0.30% copper cutoff grade to a depth of 220 metres:

Table 6.3 Huckleberry Main Zone Resources Granby 1974

Zone	Tonnes	Cu %	Au g/t	Ag g/t	Mo %
Main Zone	87,000,000	0.401			0.025

(James, 1976).

A feasibility study completed in 1995 reported a proven and probable geological resource at a cutoff grade of 0.30% copper as 53.7 million tonnes grading 0.445% copper in the Main Zone, and 108.4 million tonnes grading 0.484% copper in the East Zone. Further amendments to the ore reserve model reported the following resources prior to production in 1997 at a 0.30% copper cutoff grade:

Table 6.4 Huckleberry Main Zone and East Zone Resources New Canamin 1997.

Zone	Tonnes	Cu %	Au g/t	Ag g/t	Mo %
East Zone	109,743,474	0.484		2.82	0.014
Main Zone	53,842,332	0.441			
Total	**163,585,806**	**0.470**			

G. Raymond model reported by Marlow, 1997.

Mineable reserves at a 0.30% copper cutoff grade were reported as follows:

Table 6.5 Huckleberry Main Zone and East Zone Reserves 1995 Feasibility

Pit	Tonnes	Cu %	Au g/t	Ag g/t	Mo %
East Zone	66,131,500	0.523	0.061	3.043	0.014
Main Zone	24,241,000	0.484	0.066	2.181	0.013
Total	**90,372,500**	**0.513**	**0.062**	**2.812**	**0.014**

Simons, 1995.

The resources and reserves documented in the 1995 feasibility study led to the 1997 commissioning of the Huckleberry Mine.

The historic mineral resource estimates for the Huckleberry deposit referenced in this section were prepared prior to the implementation of National Instrument 43-101. However, this author has examined and tested the data on several occasions between 2004 and 2008, and has used the data to prepare several mineral resource and mineral reserve estimates. The author has also examined much of the historical diamond drill core, supervised the collection of several tens of thousands of samples, and has further verified the data through comparison of production and blasthole records. As a Qualified Person as defined under NI 43-101 the author has completed adequate testing of the Huckleberry Deposit and has conducted adequate review of the historical data to provide assurance as to the integrity of the data. The resource and reserve statements presented in this section do not define a current resource that is in compliance with NI 43-101. **Neither the authors nor Imperial Metals Corporation nor its subsidiary Huckleberry Mines Ltd. Inc. considers the historic resources to represent a current mineral resource.**

6.9 Production from the Huckleberry Mine

The Huckleberry Mine is in operation at the time of submission of this report. Ore is being processed from the Main Zone Extension (MZX) Pit and its stockpiles at a rate of approximately 16,000 tonnes per day. From startup in 1997 to January 1, 2011 aggregate production has been approximately 870 million pounds of copper, 8 million pounds of molybdenum, 105,000 ounces of gold and 3.4 million ounces of silver. These metals have been won from approximately 90 million tonnes of ore developed in the Main Zone, East Zone and Main Zone Extension pits. Approximately 250,000 ounces of silver are produced annually, and revenues from silver commonly surpass those from molybdenum. The concentrations of gold are low, but nonetheless are adequate to produces approximately 5,000 ounces of gold in concentrate per year.

7.0 GEOLOGICAL SETTING AND MINERALIZATION

7.1 Regional Geology

The Tahtsa Reach region is dominated by arcuate structures at various scales – from the regional scale arcs of Tahtsa, Troitsa and Ootsa Lakes to the kilometre scale curved faults that dissect the Huckleberry deposit. The regional N15^{o}W structural fabric of the Canadian Cordillera is largely absent. Imposed upon the arcuate features are northerly trending horsts and grabens. The Huckleberry and Whiting Creek deposits are located in an uplifted block of Jurassic volcanic rocks, flanked to the east by a downfaulted block of Middle Jurassic sedimentary rocks along the valley of Sibola Creek, and to the east by Cretaceous sedimentary rocks.

Huckleberry has two main centres of mineralization, the Main Zone Deposit and the East Zone Deposit. Each is associated with a Late Cretaceous intrusive, the Main Zone and East Zone stocks respectively. The stocks were emplaced into a pile of Lower Jurassic volcanic rocks, which have been pervasively altered to a biotite magnetite hornfels.

7.2 Regional Structural Style

The structural setting of Tahtsa Lake and Tahtsa Reach is one of dextral shear, compressional faulting, crustal extension and rifting. Compressional stresses from the amalgamation of the Stikine Terrane with ancestral North America led to the development of deep seated faults. Relaxation and extension following amalgamation were accompanied by the emplacement of calc-alkaline intrusive rocks with their accompanying zones of thermal and hydrothermal alteration. Extension was characterized by the formation of northerly trending horsts and grabens. Further compression and dextral shear resulting from subsequent collisional events led to the dismemberment of the Huckleberry Main Zone and East Zone deposits.

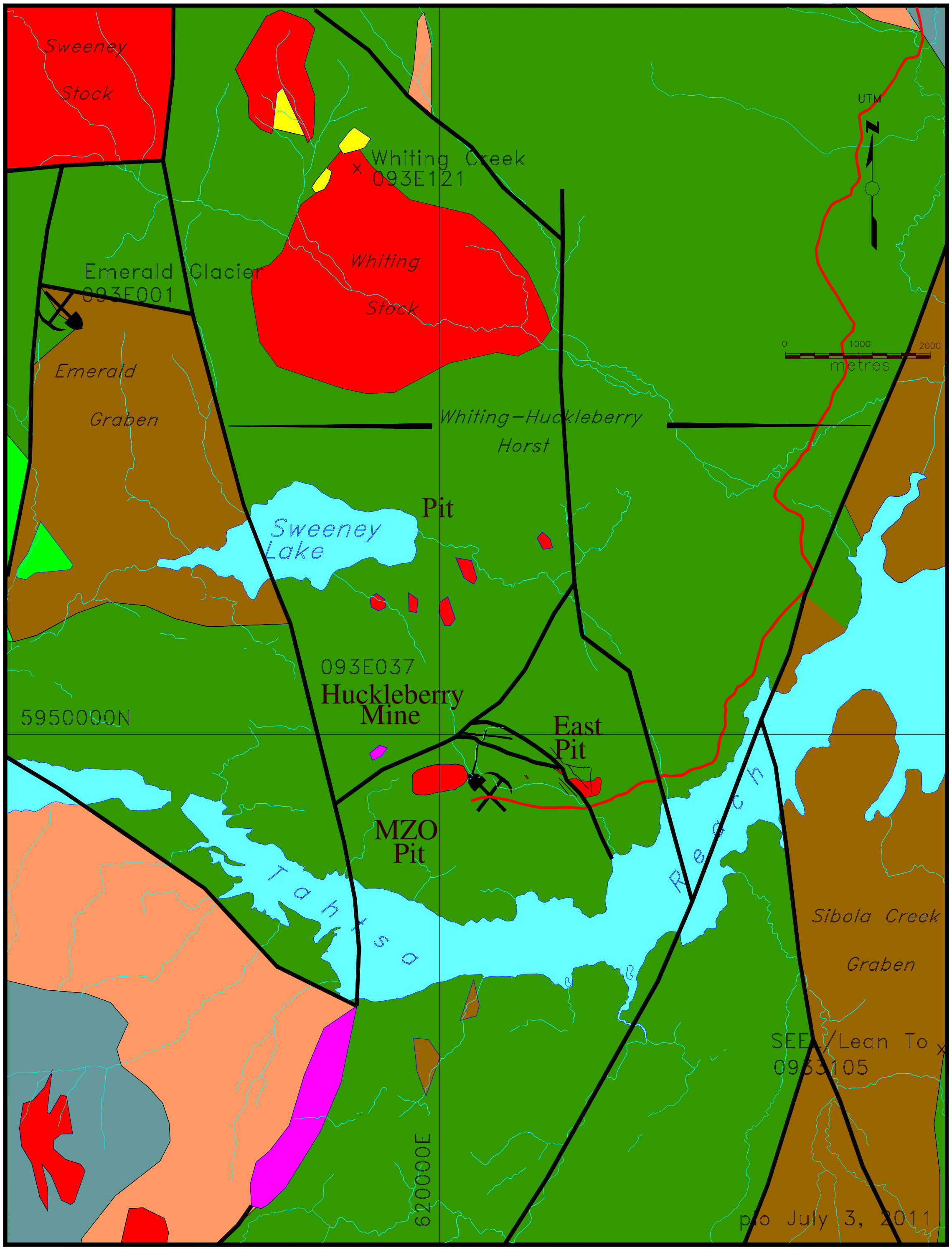


Figure 7. 1 Geology of Tahtsa Reach

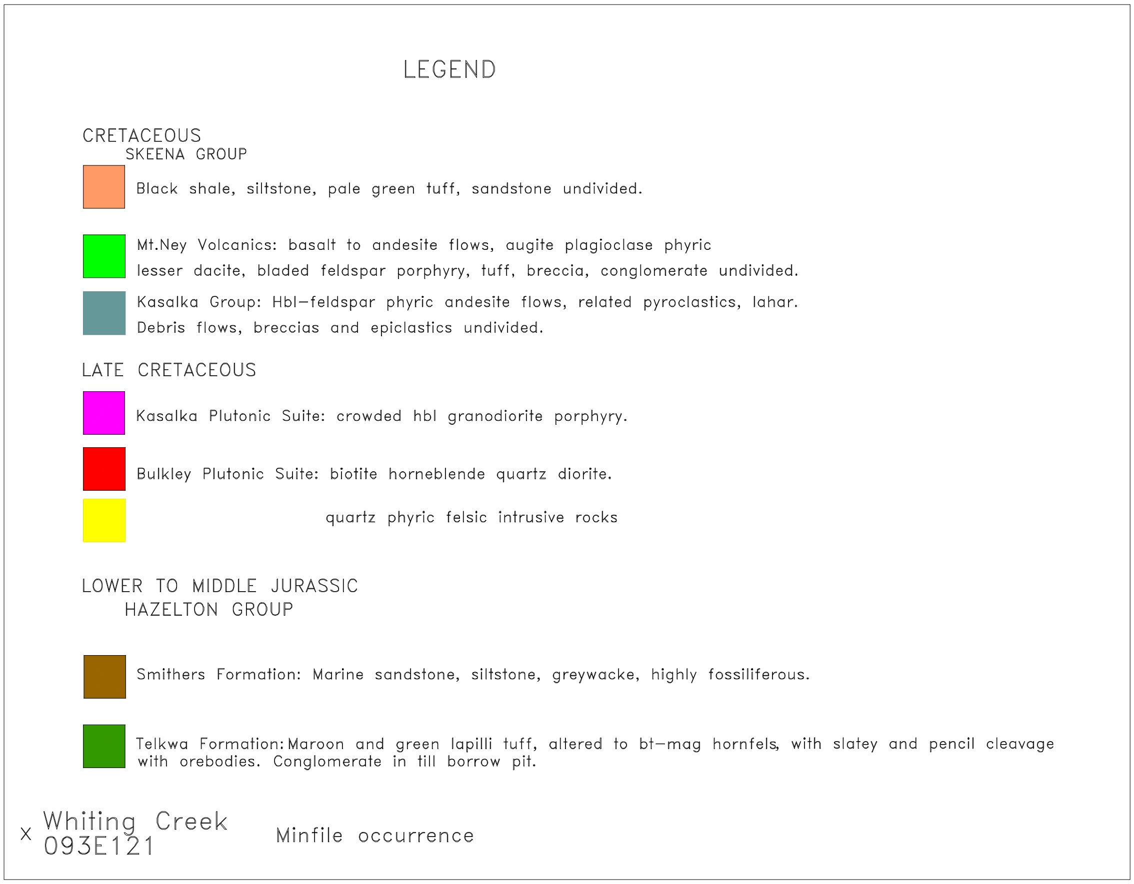


Figure 7. 2 Geology Legend.
Geology from McIntyre et al, (1994), McIntyre (2001), unpublished files of Huckleberry Mines Ltd, and mapping by P. Ogryzlo and F. Sayeed.

7.3 Local and Property Geology – Huckleberry Main and East Zone Deposits

The Main Zone and East Zone are zoned porphyry copper-gold deposits emplaced in a continental volcanic arc. The two deposits display similar styles of mineralization, which may be attributed to the depth of emplacement. The presence of basal conglomerates exposed west of Huckleberry in the till borrow pit and east of the mine above the fresh water intake indicate that the level of erosion may be near the base of the Hazelton Group. Similar conglomerates are exposed on Sterrett Island in Babine Lake, and are interpreted there to mark the base of the Jurassic section. The chalcopyrite-molybdenite ore assemblage with abundant magnetite indicates a sulphur-deficient environment for ore deposition.

7.3.1 Geology of the Huckleberry Porphyry Copper – Molybdenum Deposit

Huckleberry is a classic porphyry copper-molybdenum deposit spatially associated with multiple Late Cretaceous intrusive stocks. Symmetrical zones of Cu-Mo-Ag mineralization and hydrothermal alteration formed around the intrusions. The symmetry was subsequently modified significantly by dextral shear, which dismembered the MZX and East Zone deposits into a series of this fault slices

The Huckleberry Main Zone orebody, as defined by the 0.20 per cent copper contour, is crescent-shaped in plan, with the arc open to the west. Within this grade shell the mineralized arc length of the deposit is approximately 1400 metres with a width of approximately 400 metres. Total vertical extent of the Huckleberry mineralization is unknown, but likely extends below drill hole 09ST-F which bottomed in ore grade material at a depth of 380 metres below surface. Most of the deposit lies immediately east of the contact of the Main Zone stock with the surrounding country rock. Mineralization, however, extends well to the north of the Main Zone Stock where it forms the Main Zone Extension (MZX) deposit. The East Zone orebody similarly formed in and around the East Zone Stock. The intrusion and the enveloping mineralization were subsequently sheared into narrow fault slices, which elongated the deposit several hundred metres greater than its original east-west dimensions.

Surrounding the Huckleberry deposit is a pyrite halo some 5000 metres east-west by 1000 metres north-south. Pyrite content may average five per cent as fracture fillings, with lesser amounts as stringers and disseminations. A halo of intense hornfelsing has affected all rocks around the intrusive stocks. The lapilli tuff which formed most of the enclosing rocks has been pervasively altered to a biotite magnetite hornfels, with most primary textures obliterated. Lapilli are locally visible as indistinct “ghosts” of the original clasts.   The sulphide content makes some of the waste rock and tailings acid-generating under atmospheric conditions, where there is insufficient buffering by acid consuming minerals.

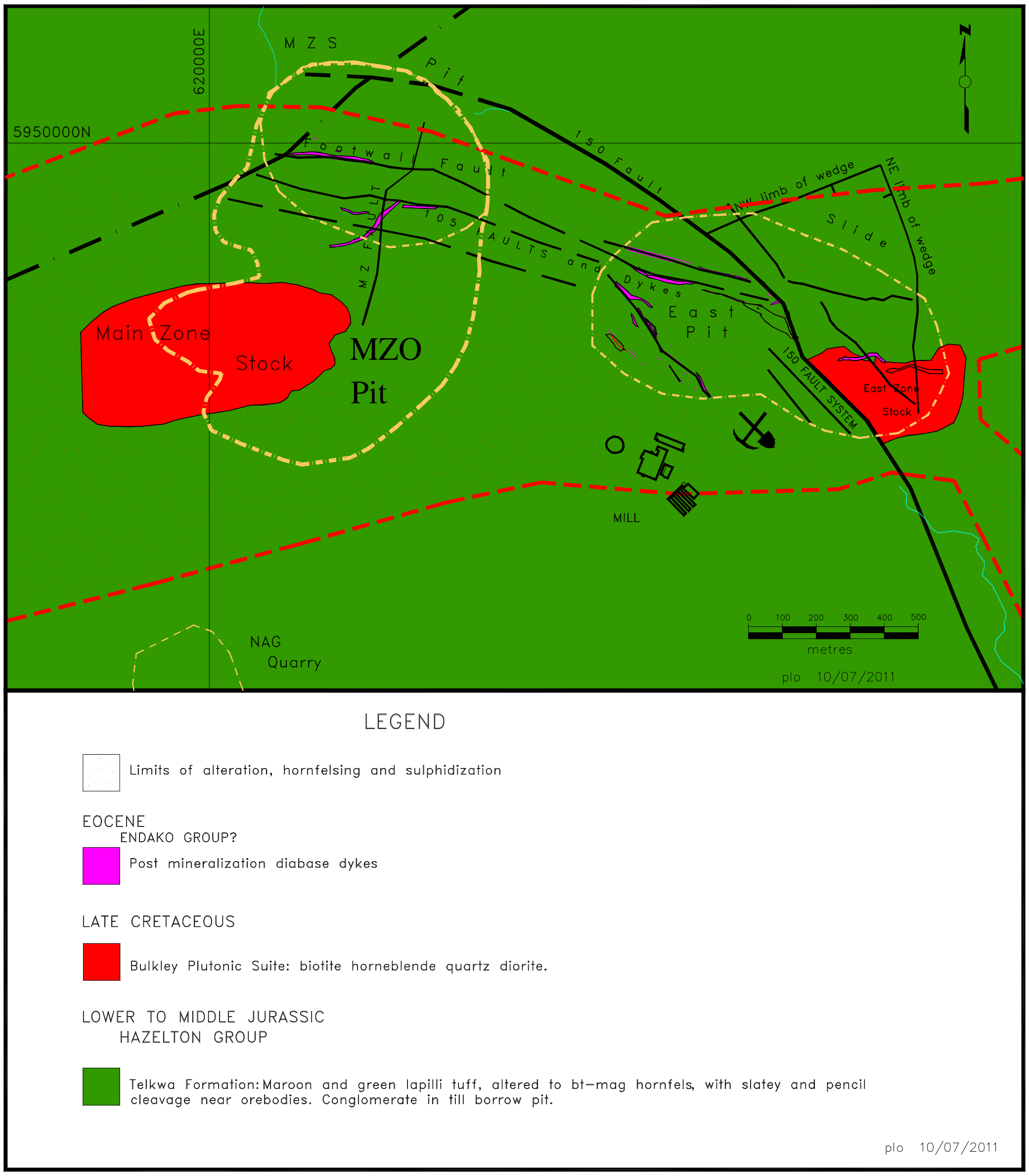


Figure 7. 3 Geology of Huckleberry Mine
Geology from files of Huckleberry Mines Ltd. Mapping by P. Ogryzlo, S. Blower, and F. Sayeed. Regional geology and stratigraphy from McIntyre (2001).

7.3.1.1 Petrology of the Host Rocks at Huckleberry

The oldest rocks exposed at Huckleberry are assigned to the Lower Jurassic Telkwa Formation of the Hazelton Group. This formation is best exposed in the NAG quarry at the Huckleberry Mine. The dominantly marine succession of the Telkwa Formation is exposed as variegated bands of maroon and green aquagene tuff. West of the Main Zone Pit, a coarse boulder conglomerate has been exposed by stripping of till in the till borrow pit. Within the Main Zone, MZX and East Zone pits, primary textures have been largely obliterated in the variegated tuff, with the matrix replaced by a biotite magnetite hornfels. Shaley beds within the tuff have developed slatey cleavage with the thermal metamorphism and structural adjustment, with the local development of pencil cleavage. As development progresses with the Main Zone Pushback (MZPO), the northern highwall of the pit has exposed relatively unaltered rocks of the Telkwa Formation which are potentially non-acid generating.

Mineralization is genetically associated with two plutons, the Main Zone Stock and the East Zone Stock. The former has been dated at 82.0 +|- 3 Ma, which places the intrusive rocks within the Cretaceous Bulkley Intrusions. The stocks are of granodiorite composition. The rock appears to have originally had an equigranular texture, and is composed of quartz, plagioclase feldspar and biotite. The feldspars have broken down with weathering and hydrothermal alteration into clay minerals.

Post mineralization or late stage mafic dykes cut the mineralized rocks. The dykes are tentatively placed with the Endako Group, and are considered to be feeders to the abundant floods of mafic volcanic rocks found east of the mine. They are from 1 to 10 metres in width, and may extend for several hundred metres along the 105 fault system (Figure 7.3). They have assisted in providing a relative date for the 150 fault system, and the 105 dykes have been deformed and dragged along the 150 fault, also providing a kinematic indicator of dextral shear. The dykes provide a challenge for ore reserve and ore control modelling, and provide similar challenges for selective mining to minimize dilution along the dyke margins. Molybdenum concentrations locally increase along the dyke margins. This may reflect a mineralizing event wherein molybdenum continued to be emplaced along the shears which control the dykes long after the main introduction of copper and molybdenum into the deposit.

7.3.1.2 Hydrothermal alteration in the Huckleberry Deposit

Hydrothermal alteration in the Huckleberry porphyry copper is best observed in the granodiorite intrusions, where feldspar minerals have been replaced with sericite, quartz and clay. The biotite magnetite hornfels in the thermal aureole surrounding the intrusions has been affected by hydrothermal alteration to a lesser extent. Sulphate minerals, namely gypsum and anhydrite are the most obvious hydrothermal minerals, and form encrustation, fracture fillings and disseminations within the host rocks.

7.4 Mineralization in the Huckleberry Deposit

Huckleberry is a porphyry copper-molybdenum deposit. As such, the mineralization is disseminated through large volumes of rock, both as fracture fillings and disseminations. Determinations of sample width versus true width may not be relevant for a disseminated deposit – the contacts of the deposit are better described as “assay wall”. That is to say, in the absence of a structural boundary, the economic limits of mineralization may be set where metal concentrations have decreased to an arbitrary level.

Metal production from Huckleberry as of January 1, 2011 has been approximately 870 million pounds of copper, 8 million pounds of molybdenum, 105,000 ounces of gold and 3.4 million ounces of silver. These metals have been recovered from approximately 90 million tonnes of ore. Recoveries average approximately 88.6 per cent for copper and 25.7 per cent for molybdenum. As gold and silver are not regularly analyzed for ore control, accurate estimates of recovery are not available. Concentrate grade to date averages approximately 27 per cent copper, with credits for gold and silver. The target for molybdenum concentrate grade is approximately fifty per cent.

Mineralization at Huckleberry envelops two Cretaceous Intrusions, the Main Zone Stock and the East Zone Stock. The Main Zone Deposit is kidney shaped in plan, wrapping around the east side of the Main Zone Stock with an arc length of 500 metres, a width of 150 metres, and has been tested up to 300 metres below surface. It is well defined in its southern and eastern edges but remains partly open to expansion on its northern margin. The East Zone deposit was circular in plan prior to dismemberment by faulting, with a concentric shell of mineralization overlapping the contacts of the East Zone Stock. Faulting along the 150 and 105 faults (Figure 7.3) has elongated the deposit to the southeast.

The principal copper mineral at Huckleberry is chalcopyrite, with minor bornite. Molybdenum occurs as molybdenite, which is found as disseminations and as clusters within quartz/gypsum veins. Molybdenite is generally low in chalcopyrite and appears to have been deposited separately and later than the copper mineralization. Gold occurs as discrete grains in embayments in chalcopyrite and pyrite. Although concentrations of gold and silver are low, precious metals nonetheless contribute a portion of the revenue stream.

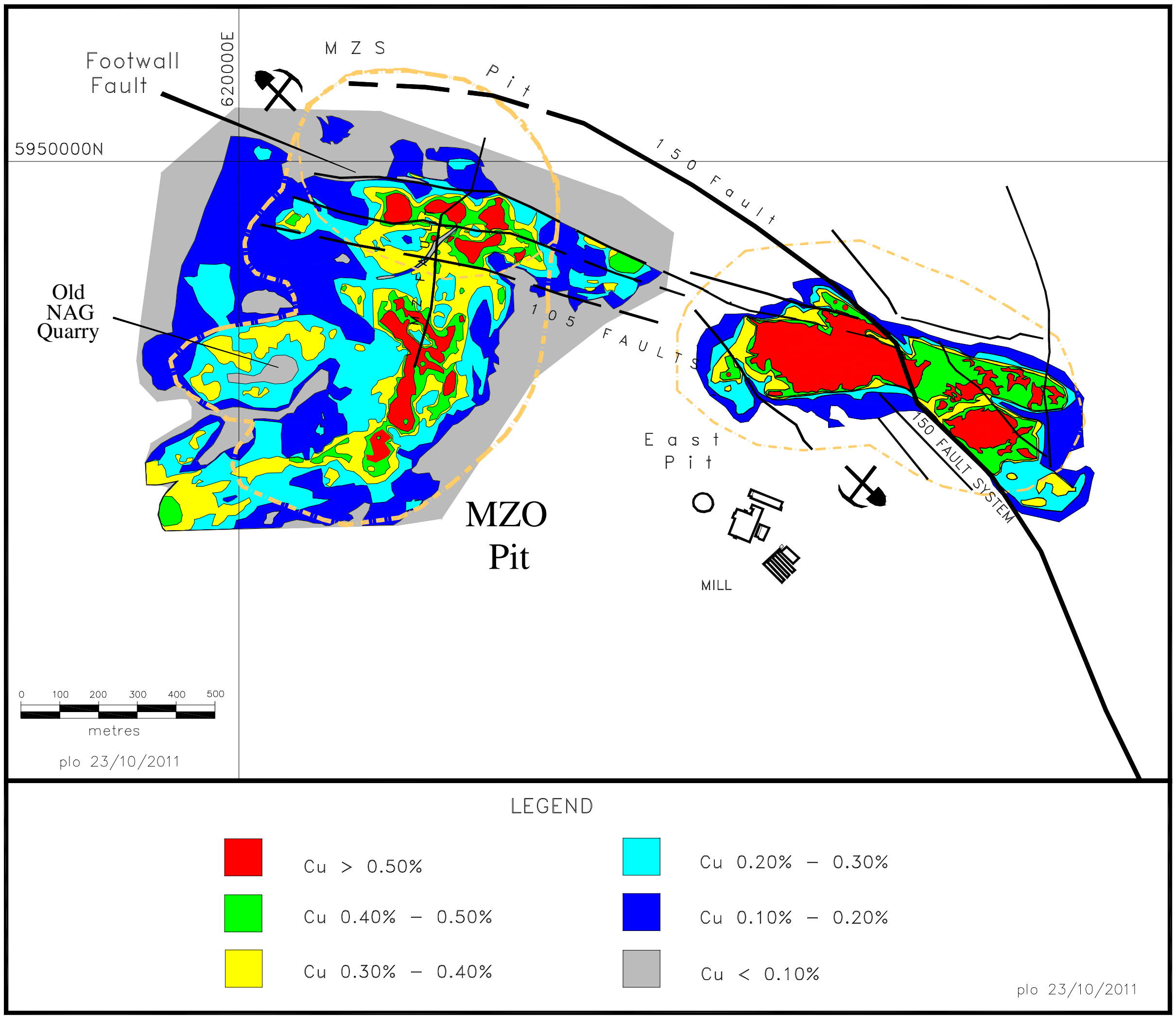


Figure 7. 4 Distribution of copper in the Huckleberry deposit
Copper grades from blastholes and diamond drilling. Model elevation is 946 metres for the Main Zone and East Zone deposits. Model elevation is approximately 1030 elevation for the central core of the Main Zone to illustrate copper distribution in the old NAG quarry. Blank areas are beyond the limits of sample data.

The concentric distribution of shells of copper mineralization around the Main Zone stock may be seen in Figure 7.4. Also apparent is a central shell of copper mineralization within the Main Zone stock. This distribution is derived from blast hole sampling, and has been only partially tested by diamond drilling. The truncation of copper grades to the southwest of the Main Zone is due to lack of sampling. The structural disruption of the mineralized zones in the MZX deposit is also apparent, with the truncation of grades along the Footwall Fault. The structural control on copper distribution in the East Zone may also be seen in Figure 7.4. The 105 and 150 faults have sliced and elongated the deposit in a NW-SE direction. Dykes exhibit deformation and drag along the 150 fault.

Sulphide mineralization appears as disseminations and fracture fillings. Mineralization occurs in all rock types but the majority of the copper ore lies within the biotite magnetite hornfels. The Main Zone Stock is also mineralized, but the concentrations of copper are one-half to one-third of what is present in the surrounding hornfelsed lapilli tuff. The highest copper grades were realized from the western lobe of East Pit, primarily from hornfelsed volcanic and volcaniclastic rocks. The eastern lobe of East Pit is occupied by the granodiorite of the East Zone Stock. The East Zone Stock was more highly mineralized than the Main Zone Stock, but still contributed less metal than the enclosing hornfels.

Gypsum and anhydrite are ubiquitous at Huckleberry as late stage fracture fillings in all rock types. Dissolution by meteoric and ground waters has removed the sulphates in the weathered portion of the deposits. The resulting loss of cementation in the fractures contributes to a lack of cohesion and poor rock mechanical characteristics in the weathered zone.

8.0 DEPOSIT TYPE

Porphyry copper-molybdenum deposits such as Huckleberry are characterized by the dissemination of relatively low concentrations of metals through large volumes of rock. Because of this, and the relatively homogenous nature of the mineralization, porphyry copper deposits have proven to be particularly amenable to extraction by bulk mining techniques. On a global scale, these deposits satisfy demand for a large portion of the world’s copper, and contribute to the supply of gold, silver and molybdenum.

The Tahtsa Reach Deposits (Huckleberry and Whiting Creek) are associated with calc-alkaline magmatic rocks. They were formed in the roots of Cretaceous plutons emplaced into oceanic island arcs as these arcs accreted to ancestral North America. Erosion has removed a considerable thickness of the arc volcanics, exposing a conglomerate at what appears to be the base of the volcanic pile, and the roots of the mineral deposits.

One of the characteristics of a porphyry copper –molybdenum deposit is the development of concentric shells of mineralization and alteration. The Huckleberry Main Zone deposit exhibits well-developed zoning, with halos of sulphides, alteration assemblages and metals centered on the Cretaceous Main Zone Stock. Although molybdenum commonly accompanies copper in the Main Zone, there are clearly episodes of molybdenum mineralization unrelated to the copper events in the Main Zone Extension. Some of the highest molybdenum grades are reported from the Footwall Fault of the MZX, often in rocks with insufficient copper to ship as ore. In addition, a circular distribution of molybdenum (the Sayeed Circle) is also apparent in the blast hole assays, indicates a source of mineralization centred below the MZX. There is also some evidence in blast holes of molybdenum concentrated on the faulted margins of the Tertiary dykes.

In particular, the iron and copper sulphide minerals which accompany these deposits respond to certain geophysical techniques. By inducing electrical currents into the surrounding rocks, and accurately measuring the decay of these currents, an image may be generated of the sulphide distribution around the deposit. These surveys have been and will continue to be used to guide exploration. Sulphide concentrations in the Huckleberry deposit are sufficient enough that the deposit responds to electromagnetic geophysical surveys as well as induced polarization.

9.0 EXPLORATION

Exploration on HML site has been carried out on three fronts:

1. Aerial and surface geophysics
2. Soils and rock chip sampling
3. Diamond drill holes

In 2008 Geoscience BC conducted an aerial geophysical survey by launching the QUEST-West Project in June 2008. The project aimed to identify mineral potential in the province of British Columbia. The aerial survey covered an area well over 40,000 square kilometres from Vanderhoof and Fort St. James to Terrace and Kitimat. The Regional Districts of Bulkley-Nechako and Kitimat-Stikine, Northern Development Initiative Trust and the BC Geological Survey (Ministry of Energy, Mines and Petroleum Resources) partnered with Geoscience BC on this project.

HML staff used this data to delineate some drilling targets in late 2008. The targets were successfully drilled in 2009. In addition to the BC Geoscience aerial survey, HML staff has successfully completed additional airborne surveys in 2007 as well as ground based IP surveys on select areas of the mine.

In 2009, targets indentified through airborne and surface geophysics were tested with soils and rock chip samples collected from target areas on a grid. Target areas with anomalous copper or molybdenum assays were then tested with diamond drill holes.

10.0 DRILLING

The following section covers drilling specific to the development of the MZO (Main Zone Optimization) Pit at the Huckleberry Mine. Historical diamond drilling was also used in resource estimation, and has been discussed above.

Table 10.1 Summary of drilling Huckleberry Deposit 2009-2010

Operator	Year	MZ Holes	Metres
Huckleberry MZS and MZO	2009	39	11,184
Huckleberry MZS and MZO	2010	23	4,378
Total MZO		**62**	**15,562**
Total 1962-2010 all pits		**619**	**104,999**

Of the 62 holes completed at Huckleberry in 2009 and 2010, four were exploratory holes outside the pit area.

10.1 Drilling

Subsurface testing was conducted using a skid mounted diamond drill with a hydraulically driven head which obtained HQ (63.5 mm) and NQ2 (50.6 mm) size rock core, with approximately 10 feet (3.05 m) metres cored in each run. Data obtained from the drill holes was utilized for resource evaluation.

In addition to conventional surface diamond drill holes (oriented at angles steeper than -45 degrees from the horizontal plane), in 2009 HML had employed a diamond drilling method whereby rock core was obtained from horizontal drill holes drilled to install de-pressurizing drain holes in the Main Zone Extension north pit wall. Although used in underground mines, horizontal coring techniques are not common in open pit settings, and provide structural and assay data which may be unavailable with conventional drilling. To accomplish this task, a surface diamond drill rig was modified modify to drill and core horizontal drain holes (drilled at an angle of +10 degrees from the horizontal).

Diamond drill core was logged and split for sampling on site. All HML sampling protocols were followed. Analyses from both conventional and horizontal holes were utilized in resource calculations. The horizontal holes were particularly useful in locating the major structures lying behind the pit highwall.

After completion of each diamond drill hole, HML engineering surveyed each hole at the collar using an accurate Trimble GPS unit commonly used in the mining industry. Northing, Easting and elevation of each hole was then recorded and entered into the drill hole database along with hole dip and azimuth.

Diamond drill holes drilled during the years 2009 and 2010 encompassed an approximate area equal to 420,000 square metres with average depth of holes equaling approximately 340 metres.

In summary, diamond drilling at Huckleberry in 2009 and 2010 served to fill gaps in the historical drill coverage, and to extend the limits of drill testing laterally at to depth. The gaps were present in the wedge or saddle of rock between the mined out Main Zone Pit and the MZX/MZS Pit; along the eastern margin of the Main Zone, and below the Main Zone. In particular, hole 09ST-F returned 0.38% copper and 0.01% molybdenum over 498 metres, which is the longest continuously cored intersection reported from the Huckleberry deposit. In combination with the historical diamond drilling and blasthole data, the 2009 and 2010 drilling was used to produce the resource model which served to generate the MZO Pit.

10.2 Core Logging

Core logging was carried out onsite at HML and included lithological logging of recovered core which included description of mineralogy and major geological features like dikes, faults (gouge rock), simple RQD calculations and core recovery calculations.

Logging of each hole was carried out in two distinct passes. In pass one, core recoveries and Rock Quality Designation (RQD) were determined.

Core recoveries were calculated using total length of rock core contained in box divided by the length of run, all multiplied by 100% to get percent recovery:

*Core Recover y = [(l core) /(length of run)]*100*

Where l core = length of core in core box

Generally speaking, core recoveries from the drill holes were in the order of 80-95 %.

Recoveries were markedly lower in sections of sericitic alteration (moist clay like) intervals. Recoveries were also recorded lower in faulted sections of the hole where ground up and gouged rock mass was encountered.

RQD calculations were performed using D.U. Deere's method where all pieces longer than 10 cm in length of intact and competent core were identified by technicians and then summed up. The sum of the length was then divided by the length of run all multiplied by 100 to calculate per-cent.

Formula used for RQD is as follows:

$$RQD = [(\sum l100mm) / (l \text{ of core run})]*100$$

Where: $\sum l100mm$ *= Sum of 100mm length portion of intact and solid core*

In the second pass lithological description of recovered core was recorded, which primarily included rock type, color, texture, mineralogy and where possible, description of major geological features such as intrusive dykes or faults (gouge rock). Pass two also included photographing the core for a visual record.

In the opinion of the authors, the accuracy and reliability of the results is suitable for the purposes of resource estimation. No drilling, sampling or recovery factors were encountered in the 2009 and 2010 holes that could materially affect the results.

10.3 Main Zone Optimization 2009-2010 drill hole locations

The 2009 and 2010 diamond drill hole locations used to support the mineral resource estimate was for the Main Zone Optimization are shown in Figure 10.1.

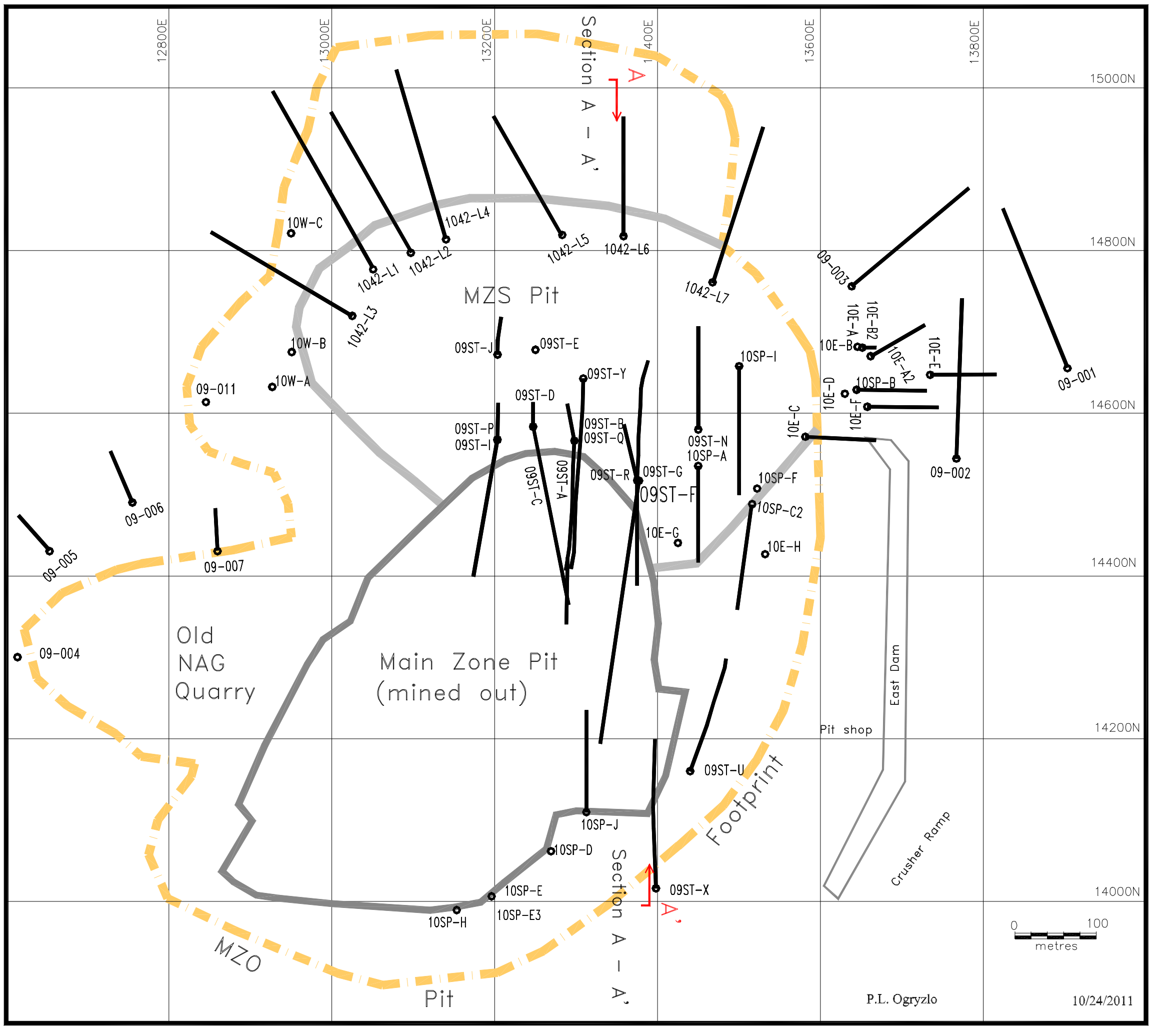


Figure 10.1 MZO drill locations 2009-2010.

A representative cross section has been created at 13350E in mine co-ordinates and is labeled Section A-A' on Figure 10.1. The resulting cross section in Figure 10.2 shows the relationship between the 2009 and 2010 diamond drilling and the block model. Historical diamond drill holes from 1962 – 2008 have also influenced the model, but are not plotted in order to identify only the holes discussed in this section.

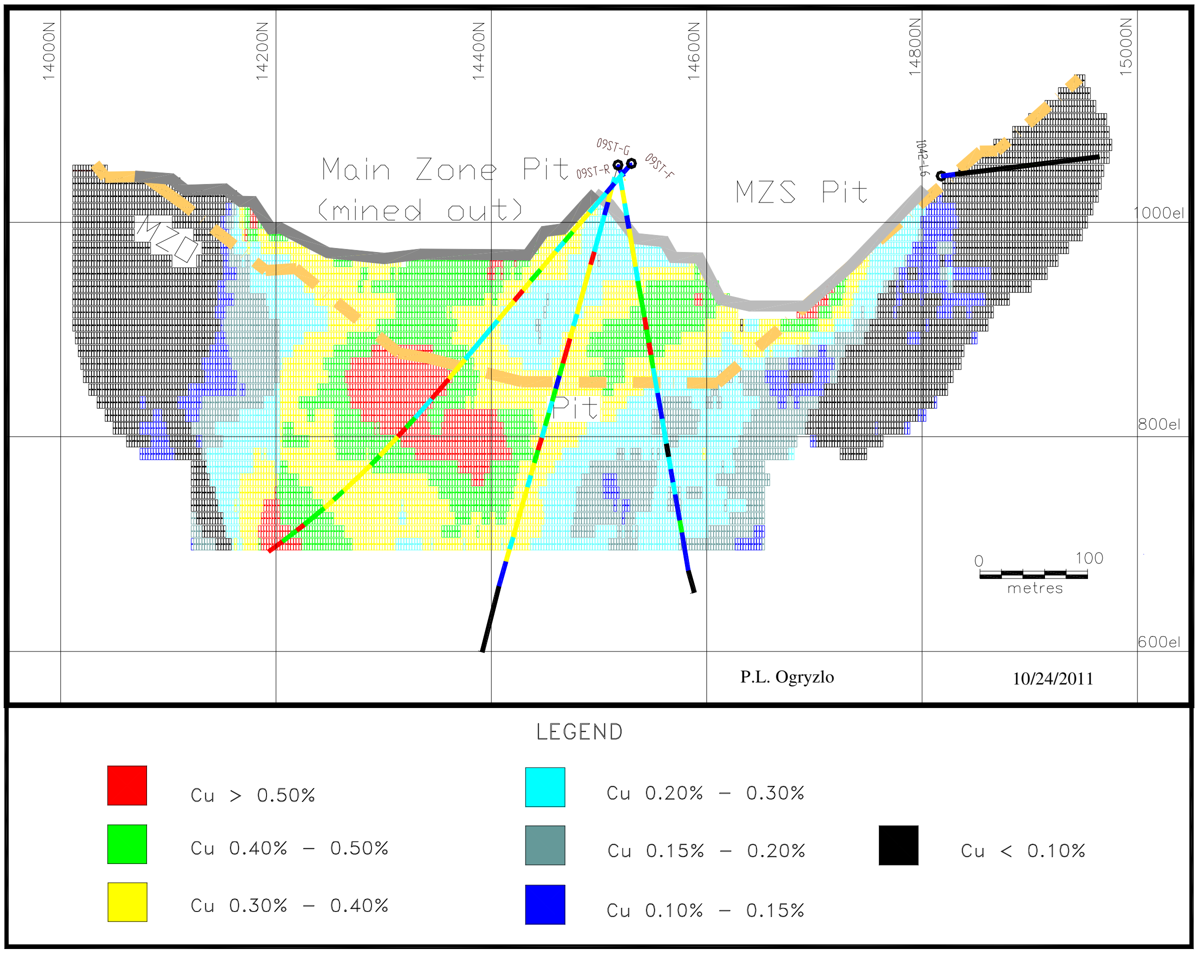


Figure 10.2 Cross Section A – A'.

11.0 SAMPLE PREPARATION, ANALYSIS AND SECURITY

For diamond drill programs undertaken since 2008, samples have been collected and transported to the laboratory under the supervision of Faisal Sayeed, Huckleberry Mine Geologist. Independent verification of sampling, sample security and quality assurance/quality control procedures from 2008-2011 is under the supervision of Peter Ogryzlo M.Sc., P. Geo., an independent Qualified Person.

For the 2004-2007 diamond drill programs, samples were collected and transported to the laboratory under the supervision of Peter L. Ogryzlo, M.Sc., P.Geo, a former employee of Huckleberry. Although much of this data relates to the MZX pit, which is largely mined out, some of the data remains relevant to the current study.

11.1 Diamond Drilling 2009-2010

After the diamond drill core was removed from the core barrel, it was boxed and transported to the core facility at the Huckleberry Mine. After logging, the core was sampled under professional supervision. The undisturbed core was first logged with a record made of lithology, mineralization, sulphide content and structure. Estimates were made of core recovery.

After geological and geotechnical logging, the core was split using a hydraulic core splitter. The approach was to send half of the core for analysis, and to retain the reject half. The first split was bagged with an identifying sample tag, and the other half was returned to the core tray for future reference. The bags were closed, and the bagged samples were taken to the onsite laboratory at the Huckleberry Mine. The split core was returned to the box, and is stored at the Huckleberry Mine Site. Sample widths varied slightly, but in general a 3.0 metre sample was processed. Minimum sample weight was approximately 3 kilograms with the average weight of sample submitted for analysis approximately 7.5 kilograms. Core recovery was good, and provided sufficient sample for analysis. Notations were made where broken ground conditions were encountered, or where core was ground or missing.

Two of the authors of this report (P.L. Ogryzlo and F. Sayeed) have examined the drill core. The sampling was done under the supervision of the latter. There are no indications in the drilling logs of any factors other than those discussed above that may have affected sample quality or that may have resulted in sample biases.

11.2 Sample Preparation

Sample preparation and analysis were performed in the Huckleberry laboratory under the supervision of G. McCullough, Chief Assayer at the Huckleberry Mine. The facility has been in operation since the mine opened in 1997. The laboratory is related to the reporting issuer, Imperial Metals Corporation through its interest in the Huckleberry Mine. The Huckleberry Mine laboratory is not a certified assay laboratory. As such, control on the quality of analysis is provided by submission of samples on a regular basis to ALS Minerals Laboratories of North Vancouver, British Columbia, a certified assay facility with an ISO9001:2008 certification. Further control was also provided by submission of sample from the diamond drill programs to ACME Analytical Laboratories of Vancouver, BC.

Reference materials, consisting of prepared standards, blanks and duplicates were inserted into the sample stream prior to delivery to the laboratory. Reference materials were also placed in the sample stream at the laboratory. Upon receipt at the sample preparation facility at the Huckleberry Mine samples were dried, crushed, split, pulverized and delivered to the laboratory.

11.3 Sample Analysis.

Analyses were performed for copper and molybdenum using an aqua regia digestion. The pulverized samples were split down to 2 grams. The 2 gram aliquots were attacked by an aqua regia (HCl – HNO3 – H20) digestion, and analyzed for copper and molybdenum using Atomic Absorption Spectrophotometry. In the laboratory, a suite of blanks, reference materials and duplicate samples were inserted into the sample stream. Approximately one in ten analyses represents some form of quality control check. The results reported were within the limits of instrumental and analytical accuracy. No corrective actions were taken. All coarse and fine sample reject material and all split diamond drill core is stored at the Huckleberry mine site for future reference. Prior to 2004 field duplicates were collected and analyzed from two separate samples from the same core interval. They were used to measure the reproducibility of sampling, which includes both laboratory variation and sample variation. Every 20th core sample was quartered, with the two quarters sent for analysis.

11.4 Sample security

All sample collection, processing and analysis were done at the Huckleberry Mine Site. Samples sent for analysis to an outside lab were transported by a bonded carrier. Split core, coarse sample rejects and pulverized sample rejects are stored at the Huckleberry Mine site for future reference. The Huckleberry Mine Site is not open to the general public, and as such may be considered secure.

It is the opinion of the authors that sample security is adequate for the purposes of the program, and that the Quality Assurance / Quality Control program is adequate to identify any issues relating to sample security.

11.5 Reliability of data

Huckleberry Mines Ltd. maintains an analytical laboratory to conduct routine ore control and process control analyses at the mine site. Sample preparation of ore control and of exploration drill samples is done in the sample bucking room on the mine site. Analysis is done by Atomic

Absorption Spectrophotometry after aqua regia digestion of the sample pulps. Analyses are reported for copper and molybdenum. The HML site laboratory was selected as the primary laboratory for its advantages in cost, in speed of reporting, in speed of responding to quality control queries, and convenience.

As the Huckleberry laboratory is not independent of the reporting issuer, confidence in the analytical results was established by the insertion of blanks, standards and duplicates into the sample stream. Confidence in the mine site laboratory was further established by sending duplicate samples from the program to the certified independent laboratory, ACME Analytical Laboratories (Vancouver) Ltd. who are certified to ISO9001:2008 standards.

A formal report has been prepared for quality assurance and quality control in reference to the data collected from the drilling. In the authors' opinion, the samples taken during the 2009 and 2010 drilling programs at the Huckleberry Mine adequately represent the metal content of the core.

All diamond drill and blasthole assay data collected between 1962 and 2011 from the Main Zone has been included in the Main Zone Optimization. For diamond drill data collected before 2004, the database has been proofread and checked for accuracy many times against the original logs and assay sheets, which are kept on file at the Huckleberry Mine. The database was constructed before the implementation of National Instrument 43-101 with its requirements for Quality Assurance and Quality Control. However, the database has been extensively tested by the collection of tens of thousands of blasthole assays in the Main Zone, East Zone and MZX pits. These have been reconciled against the production of millions of pounds of copper and molybdenum metal. As such, the data has undergone adequate review to be incorporated into the current study. In general, no additions or deletions are made to the historical database to maintain its integrity. One correction to the historical data was made during the course of modeling in 2010. A typographical error was noted in molybdenum reported from diamond drill hole 73-41 dating from 1973, which was corrected.

In the opinion of the authors, the procedures for sample preparation, analysis, security, and Quality Assurance / Quality Control provide adequate analytical data for the purposes of mineral resource estimation.

12.0 DATA VERIFICATION

A series of analytical standards was prepared by the metallurgical department at HML under the supervision of Jennifer Parry, Senior Metallurgist for Huckleberry Mines. The standards were prepared from crushed rejects of diamond drill core. Standard deviations and sample acceptance limits were established by repeated analysis of the standards. Standard reference materials were also obtained from CANMET as standard HV-2. This is a well established standard with known limits of assay variance. Although HV-2 was not used for routine QAQC in 2011, it has been used in setting the HML standards.

Analytical standards were inserted into the assay stream at random intervals, with at least one standard per drill hole. Silica sand was used as an analytical blank. At least one blank was inserted randomly into the sample stream for each hole. The purpose of the blank was to check for cross-contamination in the sample preparation process and instrumental zero alignment in the assay lab.

Two types of duplicate analysis were employed. The first type involves the collection of a duplicate sample of split diamond drill core in the core shack. The purpose of the coarse duplicate is to establish sample variance through the sample preparation and analysis process. The second type of duplicate uses the sample pulp, or pulverized reject portion of the sample which is sent to the external laboratory. The purpose of this duplicate is to compare HML analytical results with the external laboratory. These duplicates do not provide an assessment of variance at the sample preparation stage.

Analytical pass / fail limits were established in 2004 for the diamond drill program on the Northwest (MZX) deposit and have remained unchanged.

The pass/fail criterion for the standards is the mean value +/- ≤2 x standard deviations. Any standards falling outside this level fail. Conditional acceptance is given to standards falling within +/- ≤3x standard deviations from the accepted value. The only condition that may trigger conditional acceptance is where the sample sequence is of a grade well below any possibility that it may be included as mill feed, and where acceptance will not materially affect the grades or tonnages that are reported.

The pass/fail criterion for blanks is ≤3 times the detection limit. Any blanks falling outside this level fail.

The pass/fail criterion for the coarse duplicates is ±20% relative percent pair difference, expressed as:

$$\frac{A - B}{0.5*(A+B)} < 0.2$$

Any duplicates falling outside this level fail, subject to review of the concentration of metals present. Where duplicate analyses are acceptable, the average value is reported in the drill log.

Should quality analysis indicate an analytical failure, the data is first examined for clerical errors. If no clerical errors are evident, a request is made for re-analysis of the sample pulp. A minimum of five samples before and five samples after the failed analysis are re-submitted. If the rerun variances are within limits, the data for all the rerun samples is accepted.

If the second run fails, the coarse reject is re-submitted if it is available. A fresh analytical standard may be inserted into the sample rerun. The failed sample is similarly bracketed with a minimum of five samples before and five samples after. If the rerun lies within sample variance limits, the data is accepted and replaces the original data. If the rerun fails, the entire remaining core in the box is submitted for the interval in question. This requires cleaning the boxes with a brush and spoon to collect all fines and rubble. If the interval is correctly bracketed with ten samples, approximately twenty-five metres of split core is submitted. A fresh standard and blank may be inserted into the sample stream. Because of the jostling the core may have experienced as it is put into and retrieved from storage, individual assays may not be comparable with the original assays.

If the resubmitted reject core passes the variance screens, the results are accepted and entered into the log.

If all QC procedures fail, all pulps may be sent to an external laboratory. If results from the external laboratory fall outside acceptance limits, consideration is given to re-drilling the hole. Only one hole has been re-drilled since exploration resumed in 2004. In this case, the core was contaminated with a copper bearing pipe joint lubricant. Diamond drill hole 10SP-D in the 2010 program was similarly contaminated. The core was cleaned, and no measurable affect was noted.

Whenever a Quality Analysis failure is identified, a notation to that effect is made in the header of the diamond drill log, with a listing of the samples required for re-analysis. The log is not released for resource estimation or public dissemination until all notations are removed or answered.

Data entry is done by the Huckleberry Mine staff, and is proofread at several stages by the project geologist, the mine geologist, and the independent qualified person. Data entry into the software used to model the ore reserves was done by the independent qualified person. Prior to processing the data, all drill sample databases are run through a validation procedure to trap errors in the database. The principal source of error is clerical in matching hole survey data, principally hole depth, to sample interval data. All errors are corrected at this point.

The authors are of the opinion that the analytical and Quality Control / Quality Analysis procedures adequately represent the data, and that the data collected in the 2009 and 2010 diamond drill programs at Huckleberry are reliable for inclusion in the sample database. The revised database is adequate for the purpose of generating mineral resource and mineral reserve estimates suitable for economic evaluation of the Main Zone Optimization at the Huckleberry Mine.

13.0 MINERAL PROCESSING AND METALURGICAL TESTING

Metallurgical testing for the Main Zone Optimization was completed on 12 holes drilled in 2009. Bond Work Index, SAG Power Index, Crusher Index, and rougher flotation testing was done. Results from the testing were compared to the operation's historical metallurgical database.

13.1 Nature and Extent of the Testing and Analytical Procedures

13.1.1 Bond Work Index Testing

Forty-two composites were created from twelve of the 2009 drill holes in order to perform the Bond Work Index tests (BWI). Each drill hole was divided into equal length composites and then the waste rock - ore grading less than 0.2% Cu (w/w) was removed to create a composite of ore grade drill core on which the BWI testing was done. BWI values can be used to predict ball mill throughput given the F80, P80 and ball mill power draw. The BWI averaged 15.9 kWhr/tonne with a standard deviation of 1.7 kWhr/tonne for these 42 composites. Using a combined ball mill power draw of 7720 kW (actual data from January to May 2010), a F80 of 4 mm and a P80 of 0.185 mm the average throughput (at 93% availability) would be 18,800 dry tonnes per operating day (dtpod) or 842 dtpoh. The actual average will depend on the weighting given to different drill holes in the mine plan as the BWI ranged from 13.1 to 20.6 kWhr/tonne. The results of the BWI testing can be seen below in table 13.1.

Table 13.1 Bond Work index results from 2009 Drilling Campaign

	Composite IDs	BWI (kWh/tonne)	Predicted TPOH (Ball Mill-Limited)	Length of drill core represented (m)
A	STA-1	15.8	847	60
	STA-2	14.3	935	60
	STA-3	13.1	1020	60
	STA-4	13.7	978	57
B	STB-1	15.9	841	51
	STB-2	15.3	874	54
C	STC-1	15.0	892	69
	STC-2	17.5	764	51
	STC-3	15.7	852	69
	STC-4	14.0	956	33
D	STD-1	16.7	801	54
	STD-2	17.1	782	48
	STD-3	14.4	930	48
E	STE-1	19.8	676	69
	STE-2	16.9	792	69
	STE-3	17.9	747	66
F	STF-1	20.1	666	66
	STF-2	20.6	649	66
	STF-3	14.4	929	66
	STF-4	15.4	869	66
	STF-5	15.6	858	66
	STF-6	13.6	984	66
	STF-7	13.8	969	63
H	STH-1	17.5	764	69
	STH-2	17.2	778	66
	STH-3	16.7	801	66
	STH-4	15.9	841	66
I	STI-1	14.5	925	60
	STI-2	14.6	918	57
	STI-3	15.1	887	63
J	STJ-1	18.2	736	54
	STJ-2	16.1	831	54
P	STP-1	15.7	853	51
	STP-2	15.1	888	51
	STP-3	15.6	858	48
Q	STQ-1	15.4	869	66
	STQ-2	14.9	898	66
	STQ-3	14.6	916	63
R	STR-1	17.3	773	54
	STR-2	15.3	875	60
	STR-3	14.9	898	54
	STR-4	14.7	910	66
Weighted Average		*15.9*	*842*	
Average		*15.8*	*844*	
Std Deviation		*1.7*		

13.1.2 SAG Power Index (SPI) and Crusher Index (CI) Testing

Based upon the ore hardness information gathered from the BWI testing, six split core composites were prepared and sent to SGS Lakefield for SAG Power Index (SPI) and Crusher

Index (CI) testing. The samples chosen for these tests adequately characterizes the range of hardness expected with the new mine plan. The CI is used to predict the ore SAG feed distribution and is part of the sample preparation procedure. SPI is a measurement of ore hardness with respect to SAG milling. The SPI ranged from 114 to 173 minutes and averaged 139.8 minutes for the six composites. These results can be seen in Table 13.2.

Table 13.2 SAG Power Index SPI and Crusher Index Tests

Composite	BWI (kWhr/tonne)	CI	SPI (min.)
STB-2	15.3	14	136
STF-2	20.6	20	143
STJ-1	18.2	10	173
STA-3	13.1	8	133
STH-3	16.7	11	140
STQ-2	14.9	12	114

Six composites encompassing the range of BWI values sent to SGS for CI and SPI tests.

All samples were defined as “hard” compared to other mines that have submitted samples to SGS Lakefield. Figure 13.1 compares the MZO SPI values for the six HML samples to the SGS database.

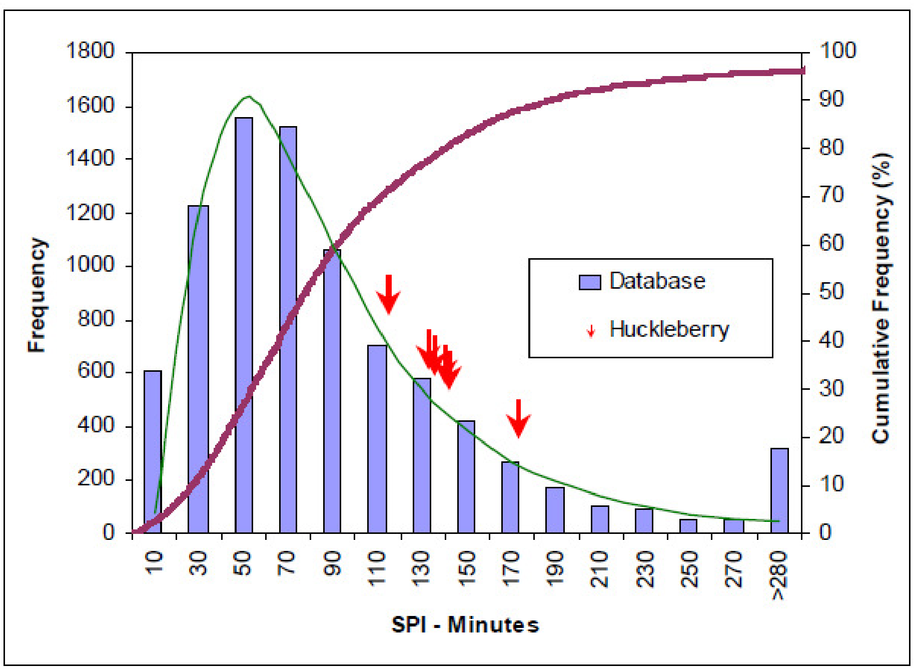


Figure 13.1 MZO SPI values compared to SGS Database

The average SAG power draw from January to May 2010 (6276 kW) was used for the calculations. Average throughput based upon SPI would be 17,300 tonnes per day (at 93% availability) or 745 dtpoh. Table 13.3 summarizes the results on SPI testing and expected throughput.

Table 13.3 Throughput based upon empirical data and SAG Power index results.

			6276 kW (May 2010 YTD Actual)	
Composite	***Crusher Index***	***SPI (min.)***	***Throughput (tpoh)***	***Throughput (tpd at 93% availability)***
STB-2	14	136	781	17421
STF-2	20	143	769	17156
STJ-1	10	173	724	16150
STA-3	8	133	785	17526
STH-3	11	140	773	17250
STQ-2	12	114	823	18367

13.1.3 Standard Rougher Flotation Tests

In addition to the BWI tests, each composite sample was used as feed for bench scale rougher flotation tests. The composites were crushed to 99.9% -12 mesh (1.41 mm) and split into 1224 g charges. Each composite was ground for two different time periods (20 and 30 minutes) then screened to determine the grind time required to achieve a target feed size of 54% -200mesh. The reagent dosages for the laboratory flotation test are based upon the existing reagent scheme in the processing plant. The flotation test tailings were screened and the size fractions assayed. The procedure in Table 13.4 was used.

Table 13.4. Rougher Flotation Test Procedure – air flow constant at 4L/min

Stage	Time (min)	PAX (g/t)	X7002 (g/t)	Fuel Oil (g/t)	Lime (g)
Grinding	*Varied*	*3*		*16*	*0.25*
Cond 1	*1*				*To pH 10.00 ±0.05*
Cond 2	*2*		*6*		
Float 1	*1*				
Float 2	*1*				
Cond 3	*2*	*2*	*6*		*To pH 10.00 ±0.05*
Float 3	*1*				
Float 4	*1*				
Cond 4	*2*	*2*	*6*		*To pH 10.00 ±0.05*
Float 5	*1.5*				
Float 6	*1.5*				
Tailings					

Table 13.5 summarizes the head grade, laboratory metal recoveries and predicted mill copper recovery for each standard flotation test. The sample head grades were calculated from the flotation test concentrates and tailings. They are not based on the assays of the individual samples in the composites.

Table 13.5 Standard Rougher Flotation Test Head Grades and Recoveries

Test ID	Calculated Feed			Lab Rougher Recovery			Predicted Cu Rougher Recovery (%)	Length of drill core represented (m)
	% Cu	% Mo	% Fe	Cu	Mo	Fe		
STA-1	0.524	0.019	4.710	97	94	24	95.0	60
STA-2	0.387	0.019	3.798	94	94	25	92.0	60
STA-3	0.299	0.013	5.010	93	93	18	89.5	60
STA-4	0.487	0.016	4.369	95	84	24	92.8	57
STB-1	0.243	0.012	5.612	93	88	20	90.6	51
STB-2	0.402	0.018	8.866	93	89	15	89.8	54
STC-1	0.317	0.015	4.187	93	88	24	89.7	69
STC-2	0.490	0.014	3.917	95	90	30	92.7	51
STC-3	0.437	0.021	4.116	95	90	26	92.1	69
STC-4	0.542	0.017	5.759	93	88	19	90.2	33
STD-1	0.416	0.008	6.189	96	80	22	93.7	54
STD-2	0.444	0.020	6.121	94	90	21	91.5	48
STD-3	0.306	0.010	5.255	93	84	23	90.1	48
STE-1	0.314	0.007	4.722	96	90	25	94.6	69
STE-2	0.541	0.012	7.439	96	94	24	93.5	69
STE-3	0.413	0.018	7.839	96	95	20	93.5	66
STF-1	0.330	0.007	3.586	94	97	25	91.1	66
STF-2	0.402	0.005	4.085	95	88	24	92.9	66
STF-3	0.267	0.008	4.460	93	39	23	90.5	66
STF-4	0.386	0.010	4.332	93	81	33	89.3	66
STF-5	0.341	0.009	4.864	93	81	23	90.2	66
STF-6	0.369	0.012	3.923	95	93	23	92.6	66
STF-7	0.527	0.013	4.636	96	93	31	93.1	63
STH-1	0.349	0.006	4.246	96	87	26	93.1	69
STH-2	0.482	0.005	6.378	97	88	22	94.9	66
STH-3	0.273	0.005	5.402	95	87	23	92.9	66
STH-4	0.307	0.015	6.842	95	95	22	92.1	66
STI-1	0.246	0.013	5.483	92	88	18	89.1	60
STI-2	0.375	0.014	4.565	90	81	28	86.1	57
STI_3	0.411	0.019	4.524	93	83	27	90.1	63
STJ-1	0.457	0.007	5.626	97	84	26	95.0	54
STJ-2	0.711	0.034	8.239	95	96	21	92.2	54
STP-1	0.387	0.006	6.069	97	87	20	95.0	51
STP-2	0.453	0.017	6.974	96	93	20	94.3	51
STP-3	0.322	0.014	5.470	96	92	23	94.0	48
STQ-1	0.376	0.022	4.019	93	87	29	89.7	66
STQ-2	0.478	0.025	4.986	95	92	27	92.5	66
STQ-3	0.361	0.022	5.118	94	91	18	90.7	63
STR-1	0.190	0.007	3.237	94	84	20	90.9	54
STR-2	0.415	0.008	5.321	96	85	23	94.4	60
STR-3	0.411	0.015	6.040	94	90	21	91.9	54
STR-4	0.358	0.010	5.729	94	83	19	90.5	66
AVERAGE	**0.394**	**0.013**	**5.287**	**95**	**88**	**23**	**91.9**	
WEIGHTED AVERAGE	**0.392**	**0.013**	**5.245**	**95**	**87**	**23**	**91.9**	

Bulk rougher copper recoveries on the processing of MZO are expected to range from 86.1 to 95.0% and average 91.9% while bulk rougher molybdenum recoveries are expected to average 88% based upon the information gathered from the forty-two laboratory flotation tests.

13.2 Assumptions or predictions for recovery estimates

Four minutes of laboratory flotation time is equivalent to the mill rougher cell residence time. However, the bench scale flotation time is 7 minutes; therefore the recovery after 4 minutes of testing was used to estimate mill rougher recoveries for copper. The average predicted rougher copper recovery was 91.9%. Assuming a 99% cleaner recovery (January-May 2010 Actual), the predicted average overall bulk copper recovery would be 91.0%.

Average molybdenum recovery is expected to be higher than in the Main Zone Extension based on the higher expected head grade (0.013% compared to 0.006%), and the higher molybdenum recoveries previously achieved in the Main Zone Pit which was 62% (December 1999 to March 2002)

13.3 Relationship between test sample, mineralization styles and the mineral deposit

The drill-holes and samples included in this test program were from twelve drill holes completed in 2009. Although the holes were not drilled to spatially characterize the Main Zone Optimization deposit, to the extent known these test samples are representative of the various types and styles of mineralization of the mineral deposit as a whole. Forty-two crusher reject composites were prepared using the crusher rejects from the twelve drill holes. The composites represent 2511 m of drill core and all were above the expected copper cut cutoff grade of 0.20%.

Table 13.6 Drill hole composites used for testing

Hole ID	Composite	Depth Range	Hole ID	Composite	Depth Range
09ST-A	STA-1	78m - 141m	09ST-H	STH-1	27m - 96m
	STA-2	141m - 201m		STH-2	96m - 162m
	STA-3	201m - 264m		STH-3	162m - 246m
	STA-4	264m - 324m		STH-4	246m - 312m
09ST-B	STB-1	120m - 189m	09ST-I	STI-1	3m - 87m
	STB-2	189m - 246m		STI-2	87m - 144m
09ST-C	STC-1	54m - 123m		STI-3	144m - 207m
	STC-2	123m - 195m	09ST-J	STJ-1	3m - 63m
	STC-3	195m - 264m		STJ-2	63m - 126m
	STC-4	264m - 297m	09ST-P	STP-1	9m - 60m
09ST-D	STD-1	0 - 54m		STP-2	60m - 111m
	STD-2	54m - 102m		STP-3	111m - 159m
	STD-3	102m - 150m	09ST-Q	STQ-1	63m - 144m
09ST-E	STE-1	9m - 81m		STQ-2	144m - 219m
	STE-2	81m - 153m		STQ-3	219m - 294m
	STE-3	153m - 219m	09ST-R	STR-1	24m - 81m
09ST-F	STF-1	36m - 102m		STR-2	81m - 147m
	STF-2	102m - 168m		STR-3	147m - 204m
	STF-3	168m - 234m		STR-4	204m - 348m
	STF-4	234m - 303m			
	STF-5	303m - 369m			
	STF-6	369m - 435m			
	STF-7	435m - 498m			

13.4 Processing factors or deleterious elements that could have a significant effect on potential economic extraction

Cleaner flotation tests and trace element analyses were performed on four composites: STA-4, STE-3, STF-3 and STH-1. The tailings size distributions averaged 84.3% -325 mesh which is consistent with the existing milling operation. The final copper concentrate is expected to have minute levels of arsenic, bismuth, lead, mercury, antimony and zinc; all less than the level of contaminants found in the current Main Zone Extension copper concentrate. These deleterious elements will not have a significant effect on potential economic extraction as no secondary processing is required for removal or treatment. The results can be seen below in Table 13.7.

Table 13.7 Cleaner flotation test results

	Final Recovery (%)						Cumulative Grade (ppm)					
	As	Bi	Hg	Pb	Sb	Zn	As	Bi	Hg	Pb	Sb	Zn
STA-4	94	95	73	84	78	40	87	35	0.05	41	1	108
STE-3	61	90	28	71	55	47	23	58	0.02	14	1	106
STF-3	47	89	51	83	67	55	4	21	0.02	27	1	83
STH-1	72	87	65	76	68	50	19	22	0.04	19	1	71
MZO Average	*69*	*90*	*54*	*79*	*67*	*48*	*33*	*34*	*0.03*	*25*	*1*	*92*
Main Zone Extension Average	*84*	*88*	*67*	*91*	*95*	*82*	*124*	*42*	*0.06*	*367*	*43*	*480*
Saddle Zone Average	*68*	*89*	*60*	*84*	*83*	*65*	*15*	*9*	*0.03*	*18*	*8*	*153*

Trace element analyses on four drill hole composites and averages of the four drill holes compared to MZE and SZ averages.

14.0 MINERAL RESOURCE ESTIMATES

Mineral resource estimates for open pits commonly supply a "block model" of the resource to the engineering staff of the mine for ore reserve estimation and daily production. The Huckleberry staff has accumulated 14 years experience with resource modeling, ore production and reconciliation of the resource and ore control models.

A block model is a three dimension matrix of metal concentrations. The metal concentrations in each block are estimated from the sample results, either from diamond drill intercepts, blast hole assays or both. The estimation techniques require the calculation of a weighted average of the surrounding assay points into the centre of each block in the model. The steps in producing a block model are the selection of an accurate database of assays, averaging the assays into suitable composites for grade estimation, determining the best technique for averaging the metal grades, and running the calculation. Although the mathematical tools for estimating the block grades are sophisticated, they are dependent upon the natural variations of metal concentrations in the rock. In this estimation used to evaluate the Main Zone Optimization, the geological model that best reflects these natural variations has been accorded importance equal to the mathematical manipulations of the data. The geological model has been subjected to external independent review with the estimation of a model solely based on the mathematical distribution of the grades.

The GEMCOM version 6.3.1 series of programs was chosen for database management, geological modeling, generation of block models and volumetric calculations.

14.1 Sample Databases

Huckleberry has an exploration and operating history extending over the past fifty years. All exploration and operating analytical data was included within the current study. The principal components of the data include listings of analytical data, hole locations, hole orientations and lithological notations.

1. Drillhole_D or DHD. This is the historical diamond drill database with all drill holes from 1962 to 2001 compiled into a single database. The portion of the database up to 1995 was used for the original Huckleberry feasibility resource model. The database also formed part of the feasibility study for the Main Zone Expansion pit, which was commissioned in 2007. The database has been proofread and checked for accuracy many times against the original logs and assay sheets, which are kept on file at the Huckleberry Mine. The database was constructed before the implementation of National Instrument 43-101 with its requirements for Quality Assurance and Quality Control. However, the database has been extensively tested by the collection of tens of thousands of blasthole assays in the Main Zone, East Zone and MZX pits, and by the production of millions of pounds of copper and molybdenum metal. As such, the data has undergone adequate review to be incorporated into the current study. In general, no additions or deletions are made to this database to maintain its integrity. However, during the course of modeling in 2010, a typographical error was noted in molybdenum reported from diamond drill hole 73-41 dating from 1973, which was corrected.

2. MZX2006. This database includes all diamond drilling from 2004-2006 which was used in the generation of the MZX pit. The data has been verified with rigorous Quality Assurance and Quality Control analyses, checked and proofread. Original copies of the diamond drill logs and assay sheets are on file at the Huckleberry Mine. Additions or deletions are no longer made to this database to maintain its integrity.

3. RC2007. Where sample collection was inadequate using diamond drilling, reverse circulation was used to collect larger samples. Reverse circulation drilling was specifically located on the west side of the MZX pit. Although much of this material is

now mined out, the reverse circulation holes have some influence on the west central portion of the model used for the Main Zone Optimization.

4. MZSaddle. This database is comprised of drillholes that tested the ridge of rock between the Main Zone and MZX pits. It and all subsequent databases similarly are tested with Quality Assurance and Quality Control, and are not edited.

5. DH2009, MZ2009Deep and MZ2010. These databases are comprised of drillholes that tested the MZO targets that lay around and below the Main Zone and Main Zone extension pits. The MZ2009 database is not subject to editing, but corrections to the MZ2010 were made up to April 2011 as testing of the data was ongoing.

6. MZBlast_holes (MZBholesold). This is the database of all production samples collected from the Main Zone Pit. As primary data, best practice guidelines require that mine production data be incorporated into the Mineral Resource database. For the current study, an original dated copy of the database is kept on file at the mine. There is no editing of the original files, but for the purposes of this study all blastholes which did not have analytical data (trim or pre-shear holes) were filtered from the database.

7. MZXBholes. This is the open and operating database for the Huckleberry Mine. Data is continually being added and amended. A copy of the database from April 26, 2011 was used for this study.

14.2 Surfaces – Topographic and Excavation

Several upper surfaces were used in the resource model. Aerial topography from 2006 was used to generate a triangulated surface outside the current operating limits. At the close of mining in the Main Zone Pit, a status map was produced of the final working faces. This map was used to produce a triangulated surface (Triangular Irregular Network or TIN) of the Main Zone. This surface is stored as MZ STATUSc 020501 and became one of the upper surfaces used to limit grade estimation. A top of bedrock surface was constructed using these two surfaces, guided by the intersection of the bedrock surface in the diamond drill holes. As the Main Zone Pit is now filled with waste and tailings with large stockpiles placed upon these, the current map of the surface status was not used in producing a block model. Huckleberry engineering staff has instead produced a surface which does not include the stockpiles, as these are currently being drawn down to support operations.

The MZX pit is an active excavation, with a pushback of the northern highwall underway at the time of preparation of this report. Accordingly, the January 1, 2011 status map (MZX Status 110101) was used as the upper surface in this area to limit block estimation. The model rebuilt to this surface also assists HML engineering staff in reconciling current pit production with the new ore reserve model. Finally, the working design for the MZP (Pushback) pit shell (MZS NWPB 101007) was used for volume and tonnage calculations, as the mineralization within the pushback shell has already been incorporated into reserves.

14.3 Specific Gravity

Specific Gravity is the ratio of the mass of a unit volume of a substance to the mass of a unit volume of water at four degrees Celsius. Because metal concentrations are reported in weight per cent, the determination of specific gravity has a direct relationship with the number of pounds of metal predicted.

Previous studies had established a specific gravity of 2.69 for the Huckleberry deposit through several hundred measurements. This figure has been used for all resource, reserve and production calculations. Further measurements were taken during the 2004 and 2005 diamond drill programs, which reported a specific gravity of 2.77. The latter figure has not been used in resource calculations, but was used in a resource audit completed in October 2010 (Giroux, 2010). Engineering practice at the Huckleberry Mine has found that the specific gravity of 2.69 better represents operating experience.

14.4 Geological model

The dependence of copper and molybdenum distribution on host rock lithology was incorporated into the feasibility model produced by Raymond (1997) which became the first ORM (Ore Reserve Model). Different block estimation regimes were used in the Main Zone granodiorite and the surrounding volcanics. To reproduce the distribution of copper around the contact of the Main Zone Stock, Raymond adjusted the orientation of the search volumes. Raymond also incorporated different estimation techniques where there was evidence of changes in grade distribution.

As production advanced and the deposit was exposed, the differing grade distributions became evident as fault controlled blocks. Geological mapping was able to define these blocks, and the bounding surfaces were also intersected in diamond drill holes.

The goal of grade estimation is to represent as accurately as possible the amount of metal present in the ground. To accomplish this, it is necessary to develop mathematical relationships that reflect the physical, chemical and structural conditions that formed the deposit. One of the main characteristics of grade distribution in a porphyry copper deposit is radial symmetry. Copper is deposited in roughly concentric zones around the central stock. Grades along an arc equidistant from the centre of the deposit, although separated by hundreds of metres, may be highly correlated. In contrast, samples collected relatively close together along a line perpendicular to the contact of the host intrusion may show little, if any, relationship.

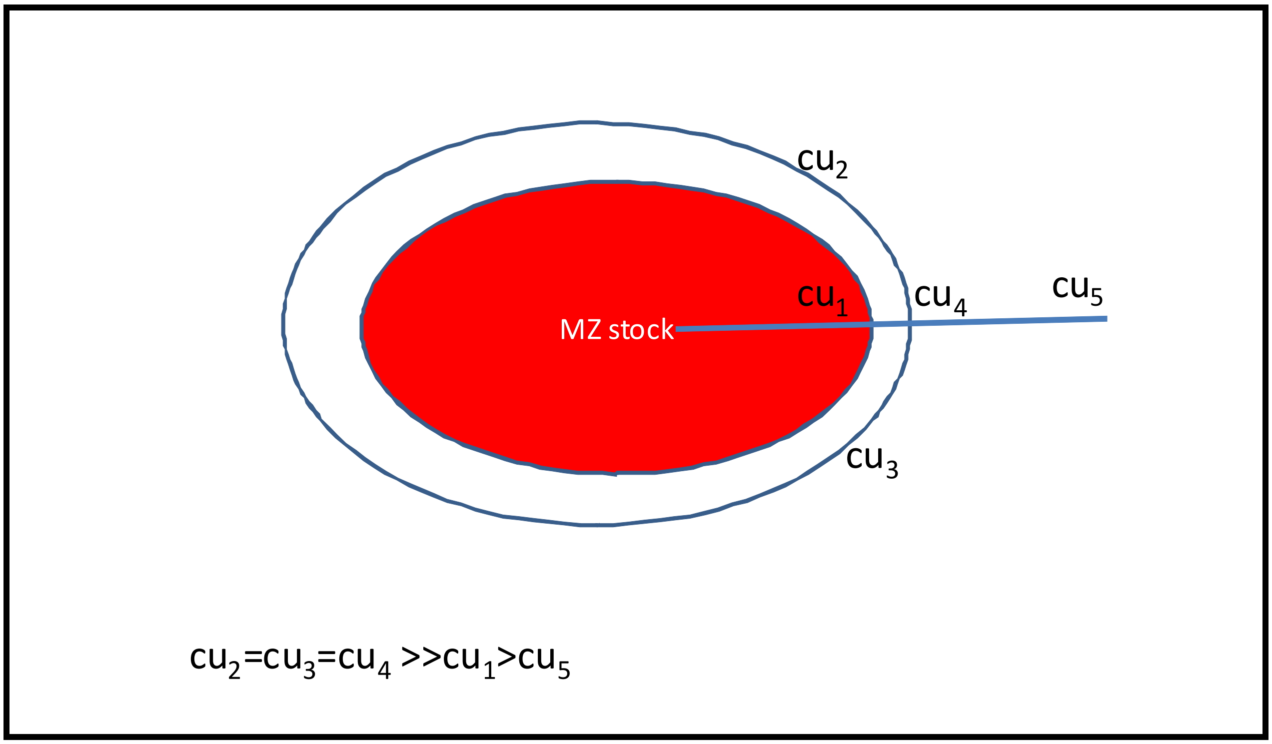


Figure 14.1 Porphyry Copper grade distribution.
Samples cu_2 cu_3 cu_4 may be close to equal in copper content, but may be an order of magnitude greater than cu_1 and cu_5.

14.4.1 Geological domains

In coding rock types, priority has been given to respecting the rock type identification and coding of the many geologists who have worked on the deposit over the past fifty years. The present study required simplification and synthesis of their work, but none of their historical observations were altered in the original logs or diamond drill databases.

The radial or tangential symmetry described above has been disrupted by structural adjustments and post mineral features. Mineralization in the Main Zone occurs within limits defined by these structures and lithologies. To establish geological controls for the mineralization, a geological framework with several geological domains was constructed. The geological domains so defined are the Main Zone Stock, the surrounding hornfelsed country rocks, and fault bounded structural blocks within the country rocks. Crosscutting all these rock types are post mineral dykes.

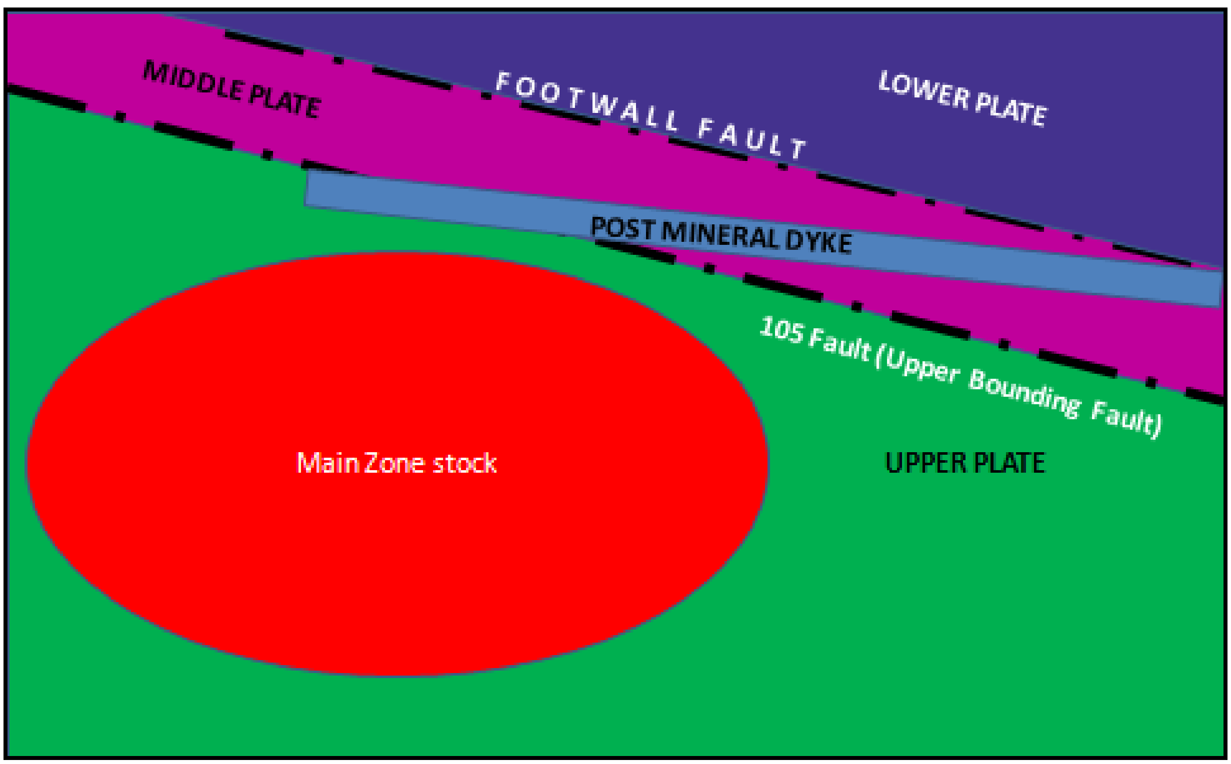


Figure 14.2 Schematic representation of geological domains, Huckleberry Main Zone.
Main Zone stock – granodiorite. Upper, Middle and Lower Plate rocks are fault bounded blocks of andesitic tuff thermally altered to biotite magnetite hornfels. The post mineral dykes are 1-10 metre wide tabular bodies of diabase.

The Footwall Fault truncates the MZX orebody to the north. The fault is visible in the north highwall of the MZX pit. The upper bounding fault is less well exposed, but is partly marked by post mineral dykes associated with the 105 Fault in its extension from the East Zone Pit. The slab of rock between the two faults dips to the south, and is termed the Middle Plate. Most of the ore in the MZX pit has been produced from the Middle Plate. Although all the rock in the Upper and Middle Plates have been thermally metamorphosed to a greater or lesser degree, the rocks of the Middle plate in particular have been pervasively baked to a hard black biotite magnetite hornfels.

The Upper Plate rocks consist of andesitic flows and lapilli tuffs that surround the Main Zone Stock. These country rocks have produced most of the copper extracted from the Main Zone Pit.

Copper mineralization overlaps the eastern contact of the Main Zone stock, but is displaced along the right lateral faults which bound the high grade mineralization in the Middle Plate (Figure 14.3). Mineralization is cut off abruptly at the Footwall Fault.

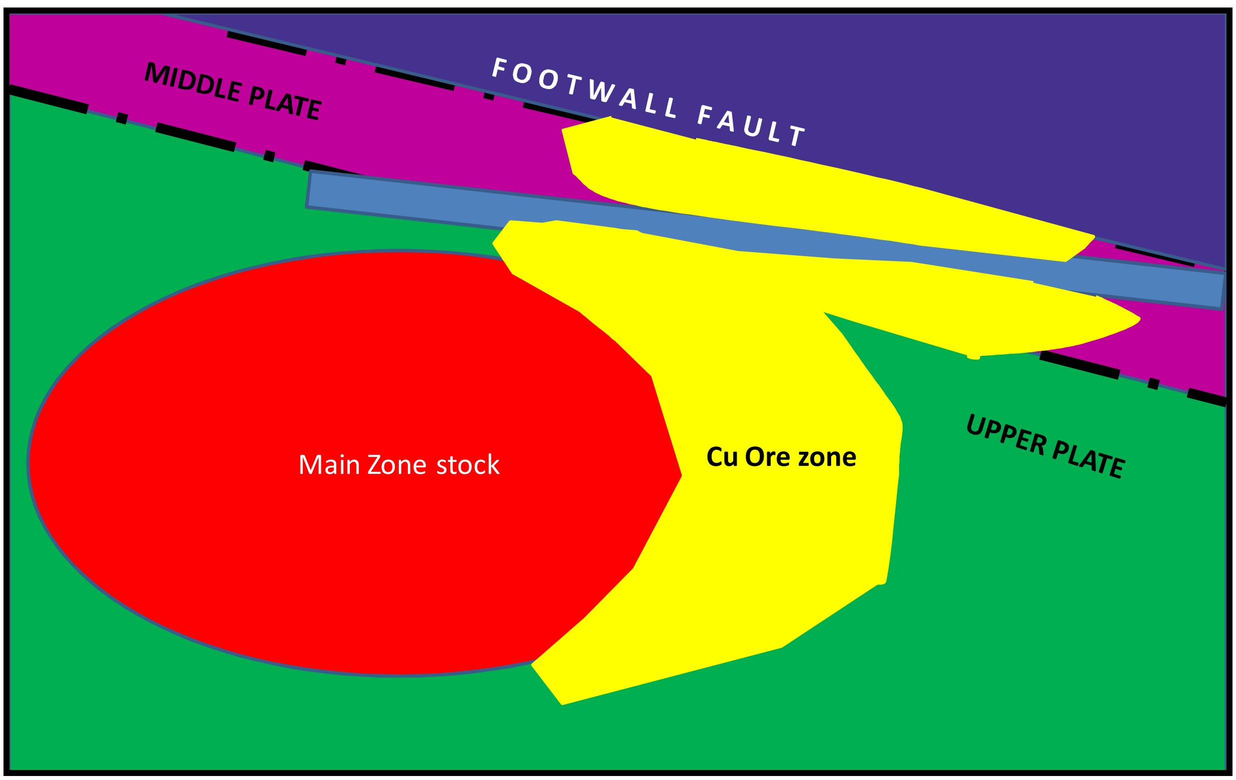


Figure 14.3 Schematic distribution of copper (in yellow) with geological domains – Main Zone

To reflect the various lithologies and structural boundaries, the geological domains were defined using by setting rock type codes for each domain (Figure 14.4). The rock type codes are used to prevent dilution of higher grade mineralization with post-mineral features. The best example of this is along the Footwall Fault. By establishing differing rock codes for the Middle and Lower Plate rocks, interpolation is restricted within each domain. Mineralization in the Middle Plate (ANTF224) is not diluted with un-mineralized rock from the Lower Plate (ANTF25).

Similarly, the post mineral dykes are isolated, and the adjacent ore grade material is not diluted with dyke assays. There is, of course, an operational component to this – dykes that are less than a bucket width (around 3 metres) are not isolated, and are averaged with the surrounding rock as operations would not be able to sort them.

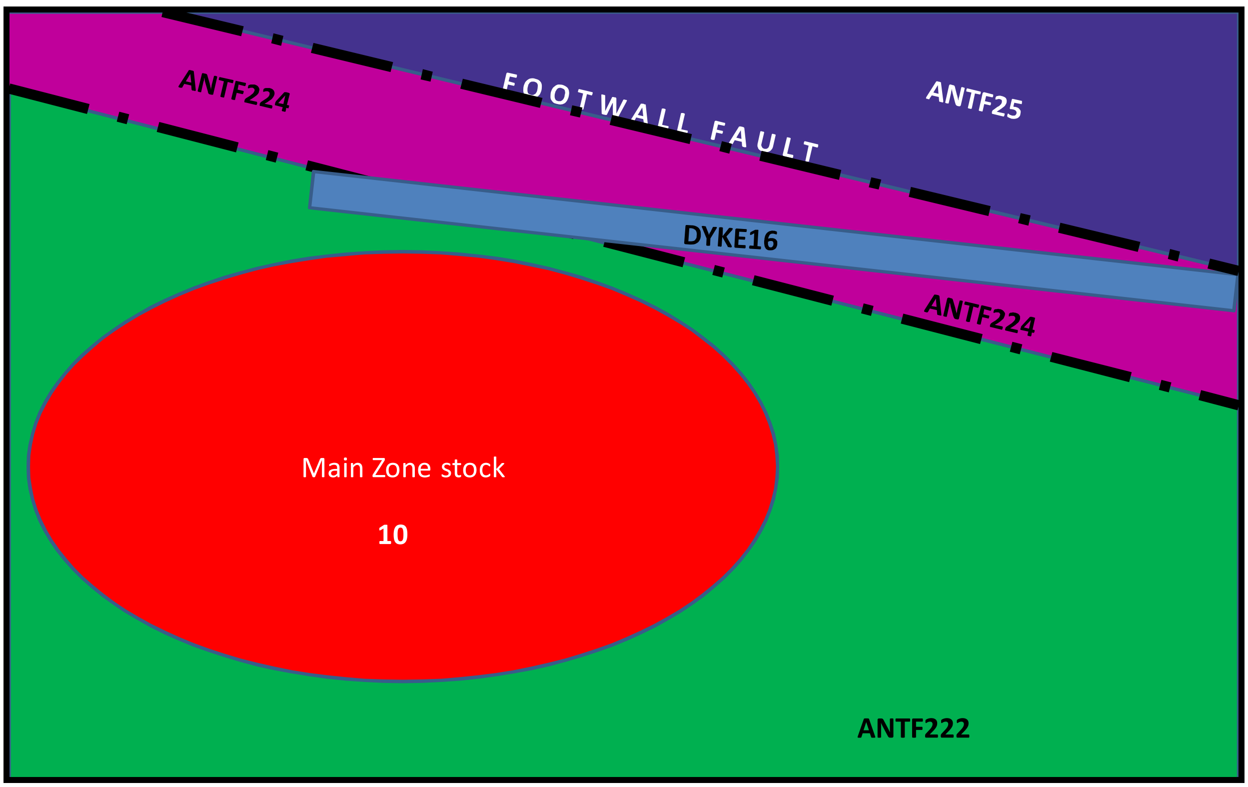


Figure 14.4 Schematic diagram of Geological Domains with rock type coding.

The geostatistical distribution of copper grades was studied for each rock type, and separate search volumes and kriging profiles were set. To accommodate the concentric distribution of copper along the contact of the Main Zone stock, ANTF222 was further subdivided into southern, central, and upper plate blocks (Figure 14.5).

Block estimation was done in two passes. Search volumes were constructed so that the first pass was used to estimate Measured and Indicated blocks. Block estimation was "tighter"; that is, first pass blocks are relatively closer to the relevant assay composites along the trace of the drill hole. The estimation error for each block is accordingly lower.

The second pass used larger search volumes and potentially more distant assays to complete the model with Indicated and Inferred blocks. Blast hole assays were included in the first pass. They were not included in the second pass to prevent the influence of the more sparsely distributed diamond drill composites from being overwhelmed by the more closely spaced blast holes.

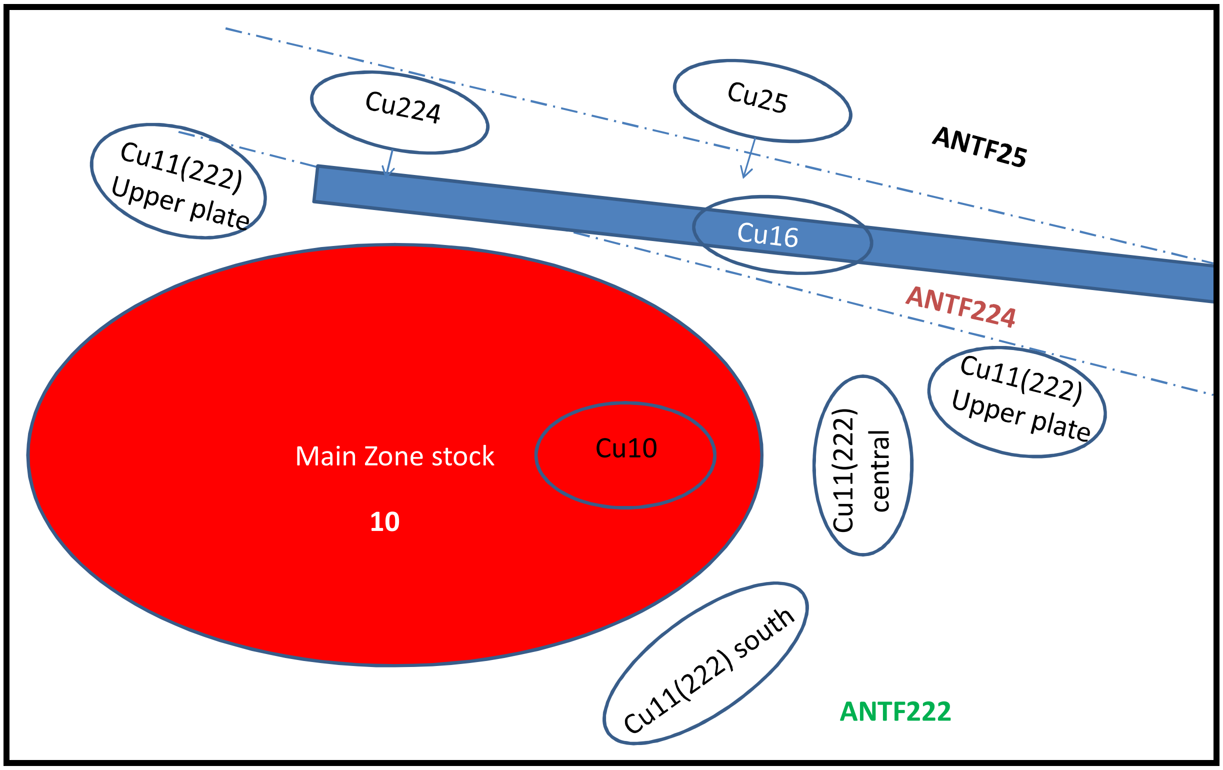


Figure 14.5 Kriging profiles and rock type coding.
Please note that the ellipses as shown are schematic.

The boundaries for Measured and Indicated blocks were arbitrarily set at 25 metres and 50 metres respectively. This corresponds to a kriging variance of approximately 0.16. Arbitrary distance was used rather than kriging variance. Variance was not comparable across domain boundaries, as the geostatistical distribution of grades was not identical between structural blocks. An attempt was made to achieve some consistency with the Measured and Indicated categories used in the 1997 Feasibility Study. This was done by comparing kriging variance with the distance to the nearest sample point in the 1997 study.

14.5 Outliers, or extreme grades

Cutting or capping of grades is a common practice used in resource estimation to reduce the influence of assays that fall outside the normal statistical distribution. The statistical frequency distributions of copper and molybdenum were studied. In the past, resource calculation for the MZX pit had placed cap of 1.2% on copper grades: all assays over 1.2% were replaced by 1.2% for the purposes of grade estimation. A cap of 0.06% (600 parts per million) was similarly placed on molybdenum, with all assays over 0.06% replaced with 0.06% for grade estimation. The same caps were used for mining operations. As mining progressed through the MZX pit, the outliers demonstrated no significant effect on grade calculations and were removed from both production blasthole grade calculations. Following on operational experience, grades were not capped for the APR2011 block model.

14.6 Compositing

Compositing is a simple mathematic manipulation whereby assays over a certain interval along the diamond drill hole are weight averaged into a value at a single point. Experience at Huckleberry has shown a 12 metre composite interval down hole to best represent the analytical data. The 12 metre interval is also easily compared to the 12 metre operating bench height, and the 12 metre interval sampled in the blast holes.

14.7 Model Geometry

A block model is a three dimension matrix of the amount of metal in the ground. This is achieved by estimating the metal concentrations using the natural spatial and statistical distributions of the metals in the deposit. To provide a model that was of the most service to mine operations, the dimension of each block in the model was set at 2.5 metres by 2.5 metres in plan, with a vertical dimension of 12 metres. This is the same block size used in the day-to-day operations of mine planning and ore control.

A block model origin was chosen for the Mineral Resource Model that would accommodate a larger pit shell than had been previously considered for the Main Zone. Studies on the Main Zone had demonstrated that very large pit geometries were possible if pit optimization was left unconstrained. The changes in block model dimensions over time are shown in Figure 14.6.

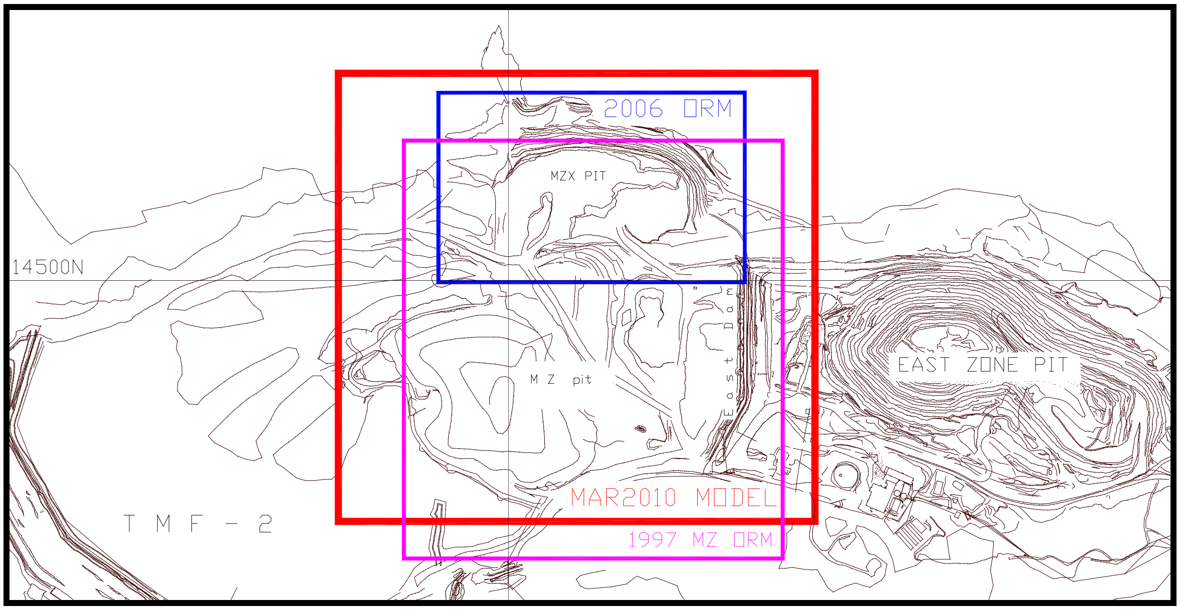


Figure 14.6 Block model geometry
Model limits shown for historical and operating block models. The APR2011 model limits are the same as the MAR2010 model limits.

14.8 Block model generation

Estimates of metal grades are written into the block model using the mathematical techniques of linear algebra. The estimations are essentially weighted averages of the composited sample points surrounding the blocks. Limits are placed on the maximum and minimum number of composites to be used, and on the maximum distance from a sample point to the block being estimated. The methods use geostatistical techniques which are commonly known as ordinary kriging.

The weighting factors are derived from the statistical distribution of the composite grades. The most important element in this method of averaging block estimates is that the sum of the weighting factors used in each block must equal one. By placing this restriction on block estimation, bias is removed from the estimate producing the Best Linear Unbiased Estimation. Details on search volumes, statistical distributions and sample restrictions are not included here but are referenced in a report on block estimation techniques (Ogryzlo, 2010).

14.9 Mineral Resource Estimate

A cut-off grade of 0.20% copper was used for the mineral resource estimate. This means that only blocks with a copper concentration of greater than 0.20% were counted. The 0.20% cut-off grade is consistent with current operating practice at the Huckleberry Mine. A specific gravity of 2.69 was used, which is also consistent with operating practice.

Table 14.1 Huckleberry Main Zone Deposit Resources at a 0.20% Cu cutoff

APR2011 HYBRID model January 1, 2011 status			
Class	**t x 10^6**	**Cu%**	**Mo%**
Measured	101.0	0.328	0.006
Indicated	79.7	0.299	0.005
M+I	**180.7**	**0.315**	**0.006**
Inferred	48.0	0.263	0.003

April 2011 HYBRID block model rebuilt to Jan 1, 2011 status surface
Lower surface block model limits

Classification of resources into Measured, Indicated and Inferred categories was done on the basis of the distance to the nearest sample point. Resources are classified as Measured if the blocks lie within 25 metres of a diamond drill hole. Resources are classified as Indicated if the blocks lie between 25 and 50 metres of a diamond drill hole. Blocks greater than 50 metres from a diamond drill hole are classified as inferred. Although the distances are arbitrary, they were derived from studying the block estimation variance.

Volumes are calculated using a procedure called "needling". Random arrays of "needles" are generated to penetrate blocks and intersect irregular surfaces such a topography or pit shells. A density of 2x2, or four needles per block was chosen. Because the process is random, small variations in subsequent tonnage estimates are possible.

14.10 Model Validation

As the model proceeds to block estimation, each run generates a summary report for each domain profile. The summary reports contain error listings and summary statistics. The first step in validation is to trap and remove any errors that may have arisen. The only errors identified were a few duplicate entries in the blasthole sample database, which were corrected in both the Ore Reserve and the Ore Control models. The composited data was checked for bias by means of a visual check was of the summary statistics, in particular the maximum, minimum and mean sample values and the population variance. These statistics are compared with the summary statistics used in preparation of the block estimation profiles. If no corrections or amendments are required, the block model is displayed on screen in plan and section. The estimated blocks are color coded as to copper or molybdenum content, and compared with the plotted data along the traces of the diamond drill holes. In areas where mining has progressed through the estimated blocks, the model is compare to the Ore Control Model. Past experience has shown the Ore Reserve Model to be modestly conservative when reconciled with the Ore Control Model.

Independent audits have been performed with each Ore Reserve Model produced since 2004. For the 2009 and 2010 drilling programs, a model audit was performed in October 2010 by G. Giroux, P. Eng. (Giroux, 2010). The audit was a work-in–progress model to verify that estimation techniques continued to be appropriate. The audit and the APR2011 Ore Reserve Model are not directly comparable, as diamond drill and blast hole data continued to be added up to April 2011, and some corrections were made to hole surveys. The resource estimate is provided here for comparison.

Table 14.2 Huckleberry Main Zone Deposit Resource Audit at a 0.20% Cu cutoff

APR2011 HYBRID model January 1, 2011 status			
Class	**t x 10^6**	**Cu%**	**Mo%**
Measured	155.8	0.321	0.007
Indicated	96.6	0.279	0.004
M+I	**252.5**	**0.305**	**0.006**
Inferred	12.1	0.264	0.002

April 2011 HYBRID block model rebuilt to Jan 1, 2011 status surface
Lower surface block model limits.

The higher tonnage reported in the audit results from the use of a higher specific gravity (2.77 vs 2.69), the use of an earlier surface which has been modified by mining advance (Aug2010 status vs JAN2011), and corrections and additions to the sample database used for the subsequent APR2011 model. Although a rigorous reconciliation was not performed, the differences reduce to approximately +1.6% on a contained copper metal basis when these factors are reconciled.

The differences in Measured and Indicated Resources between the APR2011 model and the OCT2010 audit arise from differing approaches taken to resource classification. The APR2011 Mineral Resource model uses distance to the nearest sample point to set limits on Measured and Indicated Resources, whereas the OCT2010 audit uses one quarter the semi-variogram range for

Measured, and one-half the semi-variogram range as the limit for Measured plus Indicated Resources. The ranges vary along the model axes. These differences are compared below in tabular form:

Table 14.3 Definition of Measured Plus Indicated Resources 0.20% Cu cut-off

Model	Giroux Oct 2010 Audit	Ogryzlo April 2011
Axis	Dist (m)	Dist (m)
X	150.0	50.0
Y	130.0	50.0
Z	60.0	50.0
Average	113.3	50.0

Prior to the construction of the APR2011 block model, the MZXorm2006 model was used to define ore reserves at Huckleberry. The geological controls used for the APR2011 model, suitably updated by highwall mapping and diamond drilling, are identical to those used for the MZXorm2006 model. Periodic reconciliations between the Ore Control Model (OCM), Ore Reserve Model (ORM) and mill performance are performed by Huckleberry engineering staff. The OCM receives a daily visual check against the ORM by production staff. A reconciliation report of variances between the OCM and ORM is prepared on a monthly basis. The criteria for acceptance of the Feasibility Study model was set by Raymond in the 1997at a variance +/- 10% nine years out of ten, and these acceptance limits have been adopted for current operations. The MZXorm2006 model has provided reconciliations within these limits since mining of the MZX deposit began in 2007. These reconciliations provide a validation of the APR2011 block model used in this study, as the data sets and geological framework have evolved from the earlier models.

14.11 Factors affecting Mineral Resource Estimates

A Mineral Resource estimate must possess a reasonable prospect for economic extraction. The APR2011 Mineral Resource Model provided the Huckleberry Mine with estimations of the copper and molybdenum contents of the host rocks. The only factors used in the estimate were the geology of the host rocks and the spatial and statistical distribution of the metal concentrations. However, to convert all or a portion of the Mineral Resource Model into an ore reserve, external factors such as engineering, permitting, legal, socio-economic and marketing factors must be considered.

1. Engineering factors. Portions of the block model may be affected by surface installations at Huckleberry. The Main Zone Pit is backfilled with waste and mine tailings. Engineering and geotechnical studies have been completed or are in progress at the time of preparation of this technical report to demonstrate practical means of removing the waste and tailings. Operating experience has been gained on the south highwall of the MZX Pit, which encroaches on the Main Zone backfill. The proposed MZO Pit is within the confines of the tailings management facility (TMF-2). Placement of pit highwalls has taken into account the surface installations of the containment. Although operations may be affected by weather, seismic and geotechnical factors beyond the control of Huckleberry Mines Ltd. or Imperial Metals Corporation, the mine staff has designed surface installations and operating procedures to address these factors.

2. Permitting and environmental factors. Current operations are conducted under Mines Regulation Act Permit M-203 dated May 20, 1997 and its subsequent amendments. Application for amendment to M-203 has been submitted. The optimization plan will require additional tailings storage. As the storage area known as TMF-3 was included in the original permit application for the Huckleberry Mine, no permitting hurdles are expected.

3. Legal and Mineral Title factors. The Huckleberry Mine operates on Mineral Lease 353594. The authors are not aware of any challenges to this title. An application for a Mineral Lease covering the proposed tailings storage area known as TMF-3 has been submitted. Legal surveys of the lease application has been completed and submitted. The Huckleberry Mine lies within an area in which First Nations Statements of Interest have been expressed by the Cheslatta Carrier Nation, the Wet'suwet'en Nation, and the Carrier Sekani Tribal Council. Other First Nations that may have aboriginal interests in some or all the area covered by tenures owned by Huckleberry Mines Ltd. are the Office of the Wet'suwet'en, the Nee-Tahi-Buhn Indian Band, and the Skin Tyee Nation. Canadian courts have provided decisions regarding First Nations' interest in land and the duty to

consult, but were silent on the nature or extent of the interest and also silent on the nature of duty to consult. Huckleberry has operated for approximately 14 years within these areas of First Nations interests.

4. Socio-economic and marketing factors. Conversion of the resources identified within the Huckleberry Main Zone Optimization into mineable reserves will be sensitive to metal prices, currency exchange rates and input costs. The metals produced at Huckleberry are subject to supply, demand, substitution and other economic factors beyond the control of Huckleberry Mine Ltd. or Imperial Metals Corporation. Input costs such as labour, fuel, electric power, supplies and services may be similarly influenced by factors beyond their control.

15.0 MINERAL RESERVE ESTIMATES

15.1 Introduction

Huckleberry Mines Limited (HML) developed feasibility level pit design options and production schedules for the Main Zone Optimization (MZO) project. The Mineral reserve estimate was completed under the instruction and supervision of Kent T. Christensen P. Eng., Manager of Mine Engineering, Huckleberry Mines Ltd., who has been designated as the Qualified Person for this purpose.

A mine plan for a pit design was produced that satisfies both the economic and physical restrictions limiting the exploitation to the recently identified deep MZ mineralization

The geological block model used for Pit design was from the September, 2010 version which included available assay data to that date. Ongoing model improvements as of April 2011, estimate mineral reserves for the MZO U_8 pit design as:

Table 15.1 Mineral Reserves - Huckleberry MZO Design

APR2011 block model (P. Ogryzlo) clipped to MZXP design @ Cutoff grade 0.20% Cu

	APR2011 Hybrid model		
Class	**t x 10^6**	**Cu%**	**Mo%**
Proven	30.7	0.352	0.009
Probable	9.0	0.311	0.009
P+P	**39.7**	**0.343**	**0.009**
Low grade 0.17-0.20	3.7	0.184	0.006

Gold and Silver are not from assay, and are predicted from regression of recovered amounts in concentrate sales during operating mine life and therefore not compliant with NI43-101. The regression results in an average gold grade of 0.018 grams per tonne and silver grade of 1.33 grams per tonne for the 39.7 million tonnes of proven and probable reserves. The lower grade material gold grade is 0.01 grams per tonne and silver of 0.72 grams per tonne of the 3.7 million tonnes shown above. The gold and silver revenue resulting from the regression amounts to approximately 6% of revenue discussed in section 19.

Table 15.2 shows the mineral reserve estimate obtained from the September 2010 block model of which the MZO U_8 pit design and scheduling were based upon. The 3.7 % discrepancy between the two models of percentage copper is within the accuracy of the model (+/- 10%, 90% of the time).

Table 15.2 Huckleberry Mine MZO U_8 Pit Design Scheduled Tonnage

Material	**Tonnes (000's)**	**Cu (%)**	**Mo (%)**
Ore (@0.20% Cu Cut-off)	39,675	0.339	0.008
Low Grade	3,908	0.185	0.005
Waste	14,458		
Overburden	808		
Rockfill	35,737		
Legacy Tailings	9,821		
Total	100,498		

15.2 Pit Optimization

15.2.1 Geological Block Model

HML utilized the geological block model file "SEP2010_BM.TXT", a Gems 6.2.3, Gemcom, software generated file from known geological information as of September 2010. The model was converted to use Mintec Minesight software for this project and consequently the model transfer required conversion of the data format. The model blocks are sized 2.5 m x 2.5 m horizontally and 12 m vertically. The model conversion was successful wherein total ore tonnes, waste tonnes and metal grades were all within 1% difference.

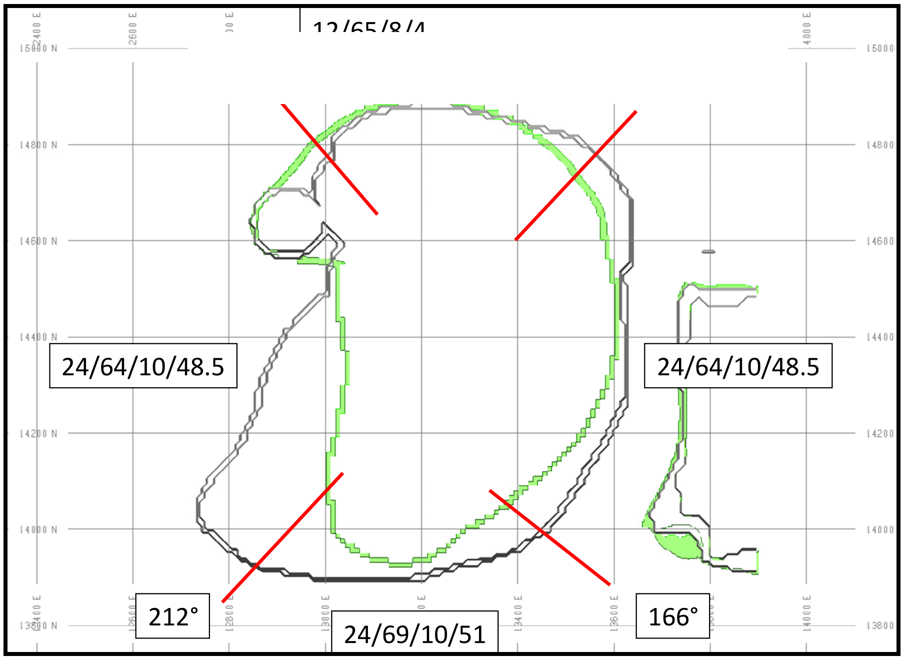
The block model (OMZ15.DAT) was modified to include items for recoverable copper, recoverable molybdenum, gold grades and silver grades. Huckleberry copper recovery is not linear and is dependent on the head grade whereas molybdenum recovery is only applicable to head grades above 0.008% Mo. Therefore, these aspects were incorporated into the model to improve the accuracy and also simplify further analysis. The block model did not incorporate gold and silver assay grades but instead accounted for their respective head grades and recoveries in budgeting and cash flow plans with empirical correlation factors. The correlation formulae used for gold and silver head grade estimation were subsequently used to place the calculated values into the Geological model on a block by block basis. The formulae used are shown in Table15.3.

Table 15.3 Formulas Incorporated in the Geological Block Model

Element	**Block Model Formulas**
Copper Recovery	% Rec Cu=-38.025*(Cu%)^2+45.573*(Cu%)-79.279
Gold Grade	Au gpt=0.0162*LN(Cu%)+0.047
Silver Grade	Ag gpt=1.5576*LN(Cu%)+3.6692

Values were incorporated in the block model to differentiate the geotechnical zones as identified by Golder Associates (Golder) so as to facilitate accounting for complex slopes in optimization process. The zones accounted for the in situ rock, overburden, backfilled waste and backfilled tailings. Golder provided the maximum inter-ramp wall angles by zone as shown in

Figure 15.1. Additionally, for the purposes of optimization, slope angles for internal rockfill and legacy tailings were assigned interramp angles of 37º and 3:1 (H:V) respectively.



* Angle parameters as per: Bench Height/Bench Face Angle/Catch-bench Width/Inter-ramp Angle. Grey Pit outline is HML PIT15 & Green Pit Shell is a preliminary Optimization

Figure 15.1 Geotechnical Parameter Zones Incorporated Into Block Model

15.2.2 Pit Optimization Input Parameters

Metal prices, mill performance characteristics, processing costs and all downstream costs were in unit rate formats or as conditional formulas (Table15.3). A summary of the basic inputs is shown in Table 15.4.

Table 15.4 Parameters for Lerchs-Grossman (LG) Check Runs

Cu Cut-Off Grade (Ore Designation)	%Cu	0.20
Mo Cut-Off Grade (Mo Processing)	%Mo	0.008
Cu Price	US$/lb	$2.70
Mo Price	US$/lb	$15.00
Au Price	US$/oz	$1,200
Ag Price	US$/oz	$20.00
Foreign Exchange	US$/CDN$	$0.90
Process Cu Recovery	% (Average)*	90.4
Process Mo Recovery	%	31%
Process Au Recovery	%	64.4%
Process Ag Recovery	%	54.7%
Mill Processing (incl G&A)-CDN$/ton	$	$8.34
Downstream Costs – CDN$/lb recoverable Cu	$CDN/lb Cu recovered	$0.54

Cu recoverable is variable and dependent on actual head grade.

Mine operating costs were calculated from empirical and budgetary information available from November 2010 Budget Plan. Table 15.5 summarizes the mining cost inputs for the pit optimizations. Haulage profiles for the MZO pit will vary significantly from the current operations therefore it was deemed necessary to account for the variations in haul costs. The mining costs were broken down to fixed costs and variable haulage costs. Haulage costs accounted for estimated haul profiles by material type and bench elevation increments.

Table 15.5 Optimization Mine Operating Costs

Description	Unit	Unit Cost
Ex-Pit Mining Cost Exclusive of Hauling (incl. D&B)	$/tonne mined	$1.10
Truck Haulage Operating Cost per Hour Worked	$/op hr	$250.55
Truck Haulage		
Fixed Surface Ore Haul	$/tonne mined	$0.35
Fixed Surface Waste Haul	$/tonne mined	$0.70
Incremental Haul (per 12 m bench)	$/tonne mined	$0.02
Drilling & Blasting Cost	$/tonne D&B	$0.29
Overburden	$/tonne moved	$1.52
Tails / Fill Excavation	$/tonne moved	$1.77

Aside from the typical pit optimization economic and geotechnical parameters, the Huckleberry MZO pit is limited to the maximum containment volume of the TMF3 and the pit shell lateral extents are limited by the East and South Saddle Dams. All waste, including tails, is to be deposited in the TMF3 which has a designed capacity in the order of 60 million m3. The total volume available for the MZO waste disposal could be increased by about one year of production through stockpiling approximately 6.0 million tonnes of ore and then sending the resultant tailings into the final MZO excavation.

15.2.3 Pit Optimization Lerchs-Grossman Sensitivity

A series of Lerchs Grossman (LG) optimizations utilizing Mintec MineSight® Economic Planner MS-EP software were run to determine the optimal ultimate pit configuration and to identify logical pit stages that would smooth production requirements over the life of the pit. In the optimization process the model was “reblocked” to 10 m x 10 m x 12 m to accelerate the process.

The base case ($2.70 copper) optimization run indicates that a design based on the ultimate shell would produce a volume that is significantly larger than the capacity of TMF3. The ultimate economic base case optimized shell also extends beyond the East and South Saddle dams. Various revenue scenarios were tested in a series of LG optimization runs. These optimizations required severely handicapping the revenue block values, resulting in economic ore remaining in pit walls and pit bottom. A series of LG runs were then performed wherein the stripping costs were incrementally increased.

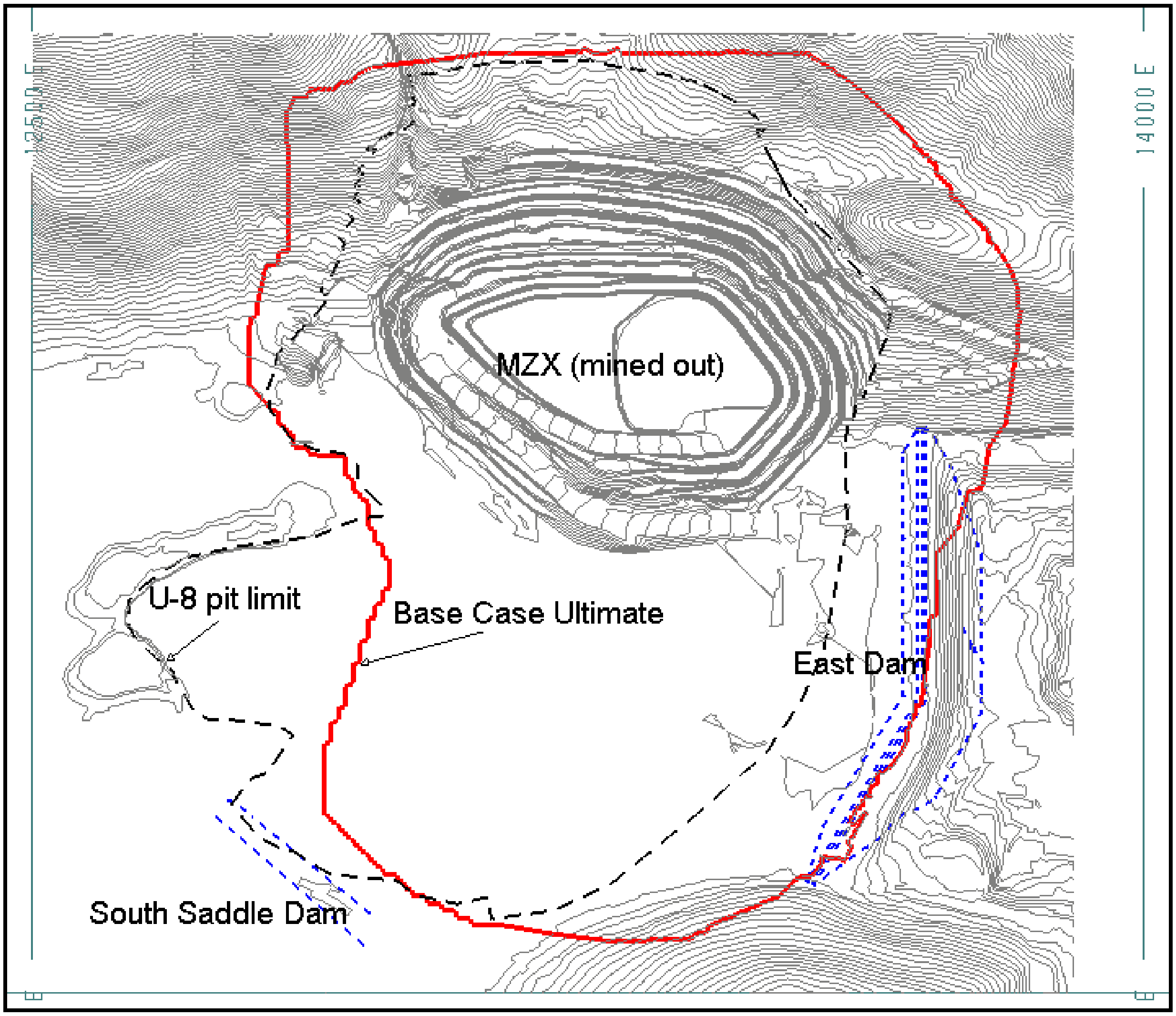


Figure 15.2 Base Case Ultimate and U-8 (MZO) optimized pit limits.

The result of inflating stripping costs indicates three logical and economic stages within the base case scenario, see Figure 15.3. The possible stage shells were identified at the following incremental ranges:

- 425% - 600% of base case stripping cost
- 405% - 415% of base case stripping cost
- 300% - 400% of base cast stripping cost.

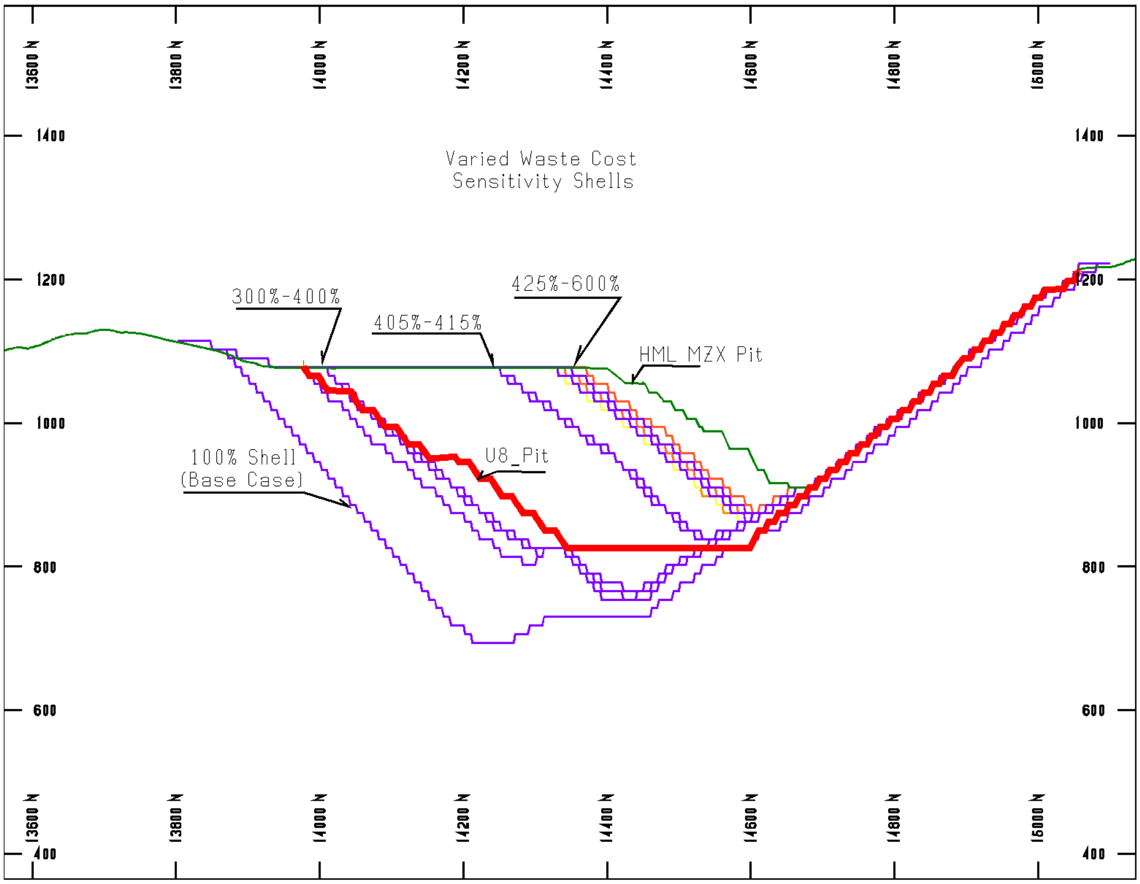


Figure 15.3 North-South Section of Incremental Stripping Cost Pit Optimization Shells

The preliminary stage (425% - 600%) is relatively robust and a design based on this range would logically augment the current MZX pushback design. However, the shell falls within the legacy tailings buffer zone recommended by Golder. This set-up is deemed an unsafe scenario because of the potential liquefaction issues from legacy tails and insufficient rockfill buttress between the tails and south wall of the shell. A smoothed design was unable to be produced that met the buttress parameters as identified by Golder Associates.

The predilection for the intermediate 405% - 415% shells is not as strong and a smoothed design based on this sized shell would invariably require a high wall with multiple benches of legacy tails. Therefore, a smoothed design based on the 405% - 415% shell is not practical.

The final range, (300% - 400%), of LG's became the target excavation sizes used in the ultimate pit smoothed design process. No single shell was determined to be the "ultimate" from which the smoothed pit could be derived. The fact that the overall swell factor of excavated material varies with the proportion of fill and in situ rock made the pit design process much more iterative. In essence, the zones targeted by the optimizations became the determinants of the pit outline as opposed to any specific shell outline. Available waste disposal volume turned out to be the limiting factor to pit size.

15.3 Factors that may materially affect the Mineral Reserve estimate.

The mineral reserve estimate contained in this report has been constrained by economic factors of commodity prices and production costs, but also the physical limitations of the capacity of the tailings management facility and the infrastructure of the present tailings management facility (East dam and South Saddle dam). A material increase in the mineral reserve estimate of the Main Zone Optimization Pit could be obtained if a study to determine the economics and design of both increasing storage capacity of tailings/waste and removing/replacing the East Dam and South Saddle Dam. Mine operating costs were calculated from empirical and budgetary information available from November 2010 and as such any significant increase in costs may affect the mineral reserve estimate.

The author is not aware of any other factors that would materially affect the mineral reserve estimate present in this report.

16.0 MINING METHODS

Huckleberry mine is a conventional truck/shovel open pit porphyry copper/molybdenum mine. Ore is processed through a SAG/ball mill circuit producing a copper concentrate and a molybdenum concentrate.

16.1 Previous Mine Development

The Huckleberry Mine began operation in September 1997, with initial mining in the East Zone Starter (EZS) Pit. Since initiation, mining has switched between the East Zone and the Main

Zone located 600 m to the west. Waste has been placed in a designated tailings facility (TMF-2) as well as backfilled into completed mine pits. Table 16.1 summarizes the active mining areas and waste disposal locations.

Table 16.1 History of Mining Operations at Huckleberry Mines Ltd.

Year	**Mining**	**Waste Disposal**[1]
1997	East Zone Starter (EZS) Pit	TMF-2
1999	Main Zone (MZ) Pit	TMF-2
2002	East Zone (EZ) Pit	TMF-2 and Main Zone (MZ Pit), backfill
2007 to present	Main Zone Extension (MZX) Pit	East Zone (EZ Pit), backfill

Notes: [1] disposal of Potentially Acid Generating (PAG) waste rock and tailings

TMF-2 was used for tailings and PAG waste rock disposal in the initial years of mine development. When mining reverted back to the East Zone in 2002, tailings and PAG waste rock were backfilled to the MZ Pit area. This area is contiguous with the TMF-2 impoundment, and is retained by three dams: the TMF-2 dam to the southwest, the East dam to the east (between the MZ Pit and the EZ Pit), and the Orica Saddle Dam to the south. The TMF-2 is essentially full to its design capacity.

In June 2007, a pit slope failure occurred in the north wall of the EZ Pit. A causeway of waste rock was then constructed across the pit to create a buttress and stabilize the slope. The East Pit Plug Dam (EPPD) was also built at the low point along the mined-out EZ Pit perimeter. Mining has continued back in the Main Zone with the Main Zone Extension (MZX) Pit, and tailings and waste rock waste have been backfilled to the EZ Pit impoundment.

16.2 Recent Mine Development

Currently, ore is being mined from the MZX Pit. In 2010, the mine plan was modified to incorporate a layback of the highwall of the MZX Pit. This will generate additional ore and waste rock, requiring increased storage within the EZ Pit impoundment. To develop this additional storage capacity, the EPPD must be raised above the current final design configuration of 1030 metres. It will be raised to a final crest elevation of 1040 m, which represents the maximum elevation wherein relatively minor infrastructure relocations will be required. All waste rock from the MZX Pit is considered to be PAG and will therefore be flooded at closure to mitigate the generation of ARD. Onset of ARD from non-submerged PAG waste rock is not expected for some decades.

16.3 Pit Design Basis

The MZO pit design must comply with a number of typical and atypical parameters. The special parameters include surface limits, volume caps, varied geotechnical considerations (legacy tailings) and road layout restrictions.

16.3.1 Wall Angles

Based on the Technical Memorandum "Main Zone Extension Pit Lay Back – Stability Assessment" dated December 23, 2010 by Golder Associates and the "Super Pit Bench Configurations" email correspondence from Golder Associates dated Dec 23, 2010, the following pit design wall angle parameters were applied and are summarized and displayed in

Figure 15.1. Removal of the legacy tailings is discussed in Section 16.3.5.

Table 16.2 Summary of Recommend Bench Designs

Rock Zone	**Bench Height**	**Bench Face Angle**	**Catch Bench Width**	**Inter-Ramp Angle**
North Wall	12 m	65^{o}	8 m	41.5^{o}
East Wall	24 m	64^{o}	10 m	48.5^{o}
South Wall	24 m	69^{o}	10 m	51^{o}
West Wall	24 m	64^{o}	10 m	48.5^{o}
Rock-Fill	24 m	37^{o}	0	37^{o}
Legacy Tailings*	-	-	-	-

* All Legacy Tailings are to be removed.

16.3.2 Ramp and Road Layouts

All haul roads and ramps are designed for two-way Cat 785 haul truck traffic. In the past, Huckleberry experienced significant failures on the north wall and therefore restricted haul roads to the east, west and south walls. Road and ramp design parameters are listed in Table 16.3.

Table 16.3 Road & Ramp Design

Road Width (including berm and ditch)	25 m
Maximum Grade	10%
Switchback Offset	8 m

16.3.3 TMF3 Volume Capacity

TMF3 has a capacity of 60 million m3. Furthermore, tailings produced from processing stockpiled ore can be directed to the completed MZO pit excavation. A stockpile in the order of 6 million tonnes is envisioned. Depending on the actual mining sequence there is also the opportunity to store an additional 4.5 million tonnes of ex-pit waste in the Pit U_8.

The total volume for any given smoothed design varied substantially because of the different material densities, Table 16.4 and the complex volume shape of previous excavations, rockfill and legacy tailings. Pit_U8 is a smoothed design that satisfies all the base parameters and will produce a total volume of waste within 5% of the TMF3 volume, see Table 16.5.

Table 16.4 Volume Calculation Factors

Swell Factor	(blasted rock)	1.3
Densities		
Rock-In situ	(tonnes / m3)	2.69
Ex-Mill Tails	(tonnes / m3)	1.35
Re-handled Legacy Tails	(tonnes / m3)	1.35
Re-handled Rockfill	(tonnes / m3)	2.0

Table 16.5 TMF3 & Pit_U8 Volume Comparison

TMF3 Design Volume				***(x1000 m 3)***	**60,000**
Potential Waste Storage Volumes					
Stockpile tailings to completed MZO Pit (*6.0 million tonnes*)				(x 1000 m^3)	7,800
In-Pit waste dumps *(4.5 million tonnes)*				(x 1000 m^3)	5,850
Total Potential Available Waste Storage Volume				(x 1000 m^3)	**73,650**
Excavated Pit Volume					
Pit_U8	Ore (expit)	Waste (expit)	Tails (rehandle)	Backfill (rehandle)	**Total**
Shell Reserve (x1000 tonnes)	*39,675*	*14,458*	*9,821*	*35,737*	*99,690*
Excavated Volume (x 1000 m^3)	29,389	6,987	7,275	17,869	**61,519**
Percent Differences		% Difference of Pit_U8 Vs. Storage Capacity			
Base Case (TMF3 only)		3%			
Increased Storage Capacity *(over current U8 vol)*		-20%			

16.3.4 South Saddle Dam and East Dam

Huckleberry Mine has constructed numerous dams in the past for water and/or tailings containment. The East Dam and the South Saddle dam potentially affect or restrict the MZO pit. (See Figure 16.1).

The block model was hardcoded so as to restrict the LG optimizations from expanding within 50m of the South Saddle Dam. As noted in Section 16.5.1, Golder recommended complete removal of the legacy tailings where it would otherwise be in the final wall. The location of the dam and the fact that legacy tailings have been placed within the south west lobe of the MZ pit, results in conflicting parameters for the optimization software to determine the MZO final pit shell. The final design was adjusted manually to remove all tailings placed east of the South Saddle Dam.

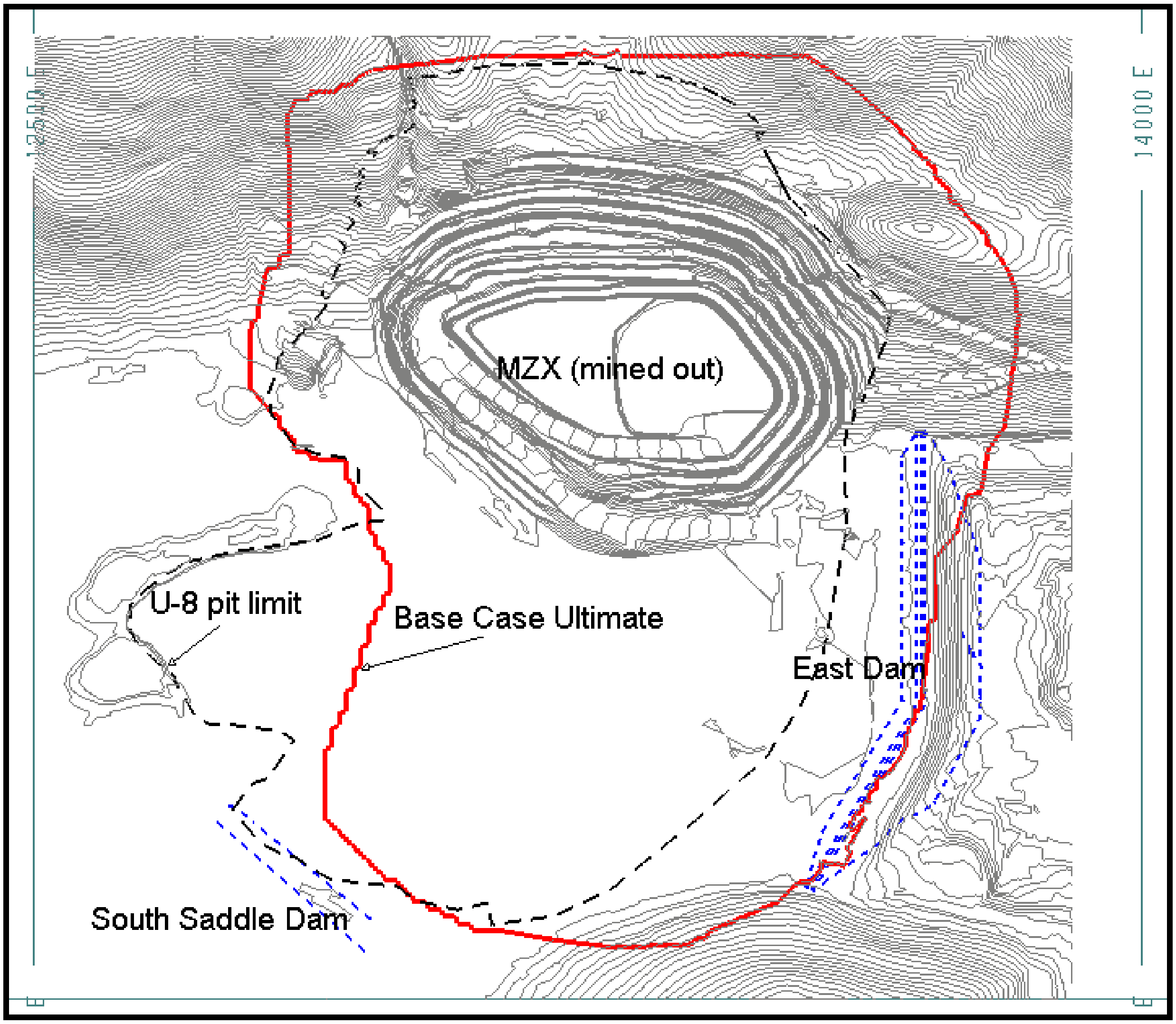


Figure 16.1 East Dam and the South Saddle Dam

Crests of future excavations were constrained to be a minimum of 30 m west of the East Dam. The smoothed U8 Pit crest is approximately 75 m to the west and therefore the design satisfies the recommended geotechnical buffer requirements for the East dam, as shown in Figure 16.2.

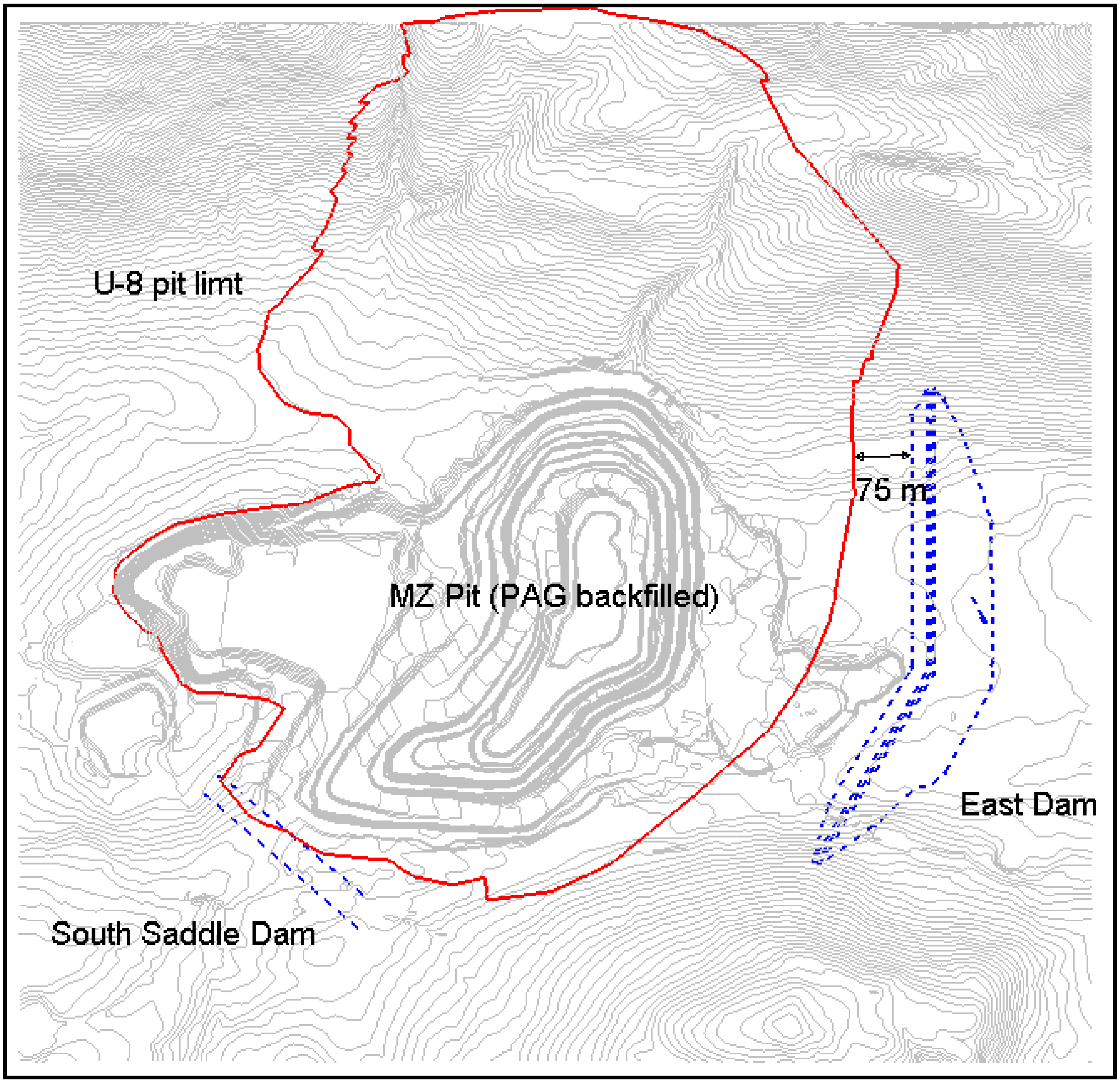


Figure 16.2 HML MZ Pit location (PAG backfilled)

16.3.5 Legacy Tailings

Golder identified the liquefaction of legacy tailings as a significant risk. Drilling in this area has provided a good concept of where the legacy tailings have been deposited within the excavated MZ pit, but it was not accurately surveyed during deposition. Any design dependent on the accurate location of pit walls accounting for sufficient buttress between final walls and legacy tailings will be questionable barring further test work. It is for these reasons ultimate designs incorporated complete removal of all legacy tailings.

Pit U_8 incorporates complete removal of all tailings including the volume located in the old NAG quarry west of the MZ pit. There may be opportunity to place a buttress to dam a significant volume of legacy tailings within the old NAG Quarry. In the order of 7.2 million m3 legacy tails are currently within the NAG quarry.

16.3.6 Mining of Backfilled Materials

The MZO Pit will encompass previous mining in the Main Zone area, including portions of the backfilled MZ Pit and all of the MZX Pit and MZX highwall layback. The feasibility of removing waste rock and tailings from the MZ Pit is discussed in the following sections. A summary of the supporting geotechnical investigations is provided along with a description of how the backfilled materials are distributed and how those waste volumes will be removed.

16.4 Geotechnical Investigations

A series of geotechnical investigations were conducted to characterize the waste rock and tailings in the backfilled MZ Pit (see Table 16.6).

Table 16.6 Investigations to Characterize Mine Waste Backfilled in Main Zone Pit

Year	Focus	Description
2007	Tailings characterization	9 boreholes drilled to depths of ~90 m (Symmetrix and mud-rotary drilling) Tailings samples from various depths for testing (unit weight, moisture content, specific gravity, grain size distribution, permeability)
2008	Hydrogeologic characterization	3 boreholes drilled in the north zone ranging to depths ranging from 101.5 to 127.1 m (dual-rotary Barber drilling) Included 2 monitoring wells and 1 pumping well All 3 boreholes encountered waste rock over their entire depths
Spring 2010	Distribution of	7 boreholes drilled to provide additional information to for

Year	Focus	Description
	waste rock and tailings	mine planning and to define the interface between tailings and waste rock in the MZ Pit Disturbed samples of tailings and crushed waste rock were collected during drilling Boreholes were logged and visual descriptions of the samples were obtained
Fall 2010	Density and strength of tailings	5 Cone Penetration Tests (CPTs) and 1 mud-rotary borehole Samples were obtained for laboratory testing

16.4.1 Distribution and Characterization of Waste Rock and Tailings in the Main Zone Pit

Based on the geotechnical investigations, the upper 20 m to 30 m of materials in the MZ Pit are waste rock. The waste rock is typically 0.15 to 2 m in size, with particles greater than 1 m in size estimated to comprise about 5% of the total waste rock by weight. Below about Elev. 1055 m, both waste rock and tailings are encountered, along with areas where waste rock and tailings are mixed, and some isolated areas of overburden materials (predominantly till).

A model was developed for the backfilled materials using the computer software SURPAC (version 6.1.3, by GEMCOM), which allows visualization and modeling using 3D graphics.

Tailings were found to be generally compact, with relatively high un-drained shear strength. The testing identified variability in the tailings (as expected), with lateral variability being greater than vertical variability (as expected). A summary of the geotechnical characteristics of the backfilled tailings is shown in Table 16.7

Table 16.7 Summary of Geotechnical Characteristics

Parameter	Typical values
USCS Soil Group	SM to CL/ML
Standard Penetration Test (SPT), N-value	13 to 25 with a single low value of 3
Cone resistance	5 to 20 MPa
Compactness	Compact with loose layers
Specific Gravity	2.7 to 2.8
Void ratio	Generally 0.7 to 1.1
Un-drained shear strength	~200 kPa
Friction angle	28 to 35 degrees

16.4.2 Removal Options for Backfilled Waste Material

A wide range of options was considered for removing the tailings, waste rock and other soils and materials from the MZ Pit as part of the development of the MZO Pit. Technologies which could be used to increase the viability of potential excavation options were also evaluated. It was concluded that waste rock materials can be excavated using conventional tracked excavators/shovels. The excavation of tailings is recognized as a challenge to the project and a significant effort was made to develop robust methods that can accommodate varying consistencies of the tailings that may be encountered.

Constraints considered in planning the removal of waste rock and tailings included the following:

- Start of materials removal in 2011 or early 2012;
- Waste and tailings must be removed at a sufficient rate to keep ahead of the open pit mining;
- Years 1 and 2 will require a higher rate of waste excavation than in subsequent years;
- Rock produced is potentially acid generating, and will ultimately need to be stored subaqueously;
- Water availability and discharge are not constraints; however, if discharge is required and high turbidity is generated during excavation, suspended solids would need to be removed prior to release; and
- Climate, with moderate annual precipitation (average ~1100 mm), cold winter temperatures (-20 to -30 degrees Celsius), and high winter snowfall (approximately 7 to 10 m).

Several options were judged to be impractical or excessively difficult and were eliminated from further consideration. The options selected for further evaluation and risk assessment were the following:

1. Conventional mining of tailings using tracked excavators and haul trucks
2. Creation of sumps for tailings to flow to the bottom and then excavate or pump tailings
3. Removal of tailings using a floating dredge or floating excavator.

16.4.2.1 Option 1 - Conventional Mining Using Tracked Excavators and Haul Trucks

The tailings surface is not expected to be routinely trafficable to heavy machinery and equipment, particularly where the tailings are disturbed or wet. As such, it may often be necessary to construct a working platform of waste rock on the surface of the tailings to enable access and excavation operations. The required thickness of the working platform will depend on the consistency of the tailings and the weight of the equipment.

In Option 1, excavators would excavate tailings to a depth which maintained a safe working bench height and would load the materials into haul trucks. Any working waste rock platform would be excavated in this process.

A schematic representation of the excavation sequence for Option 1 is presented in Figure 16.3.

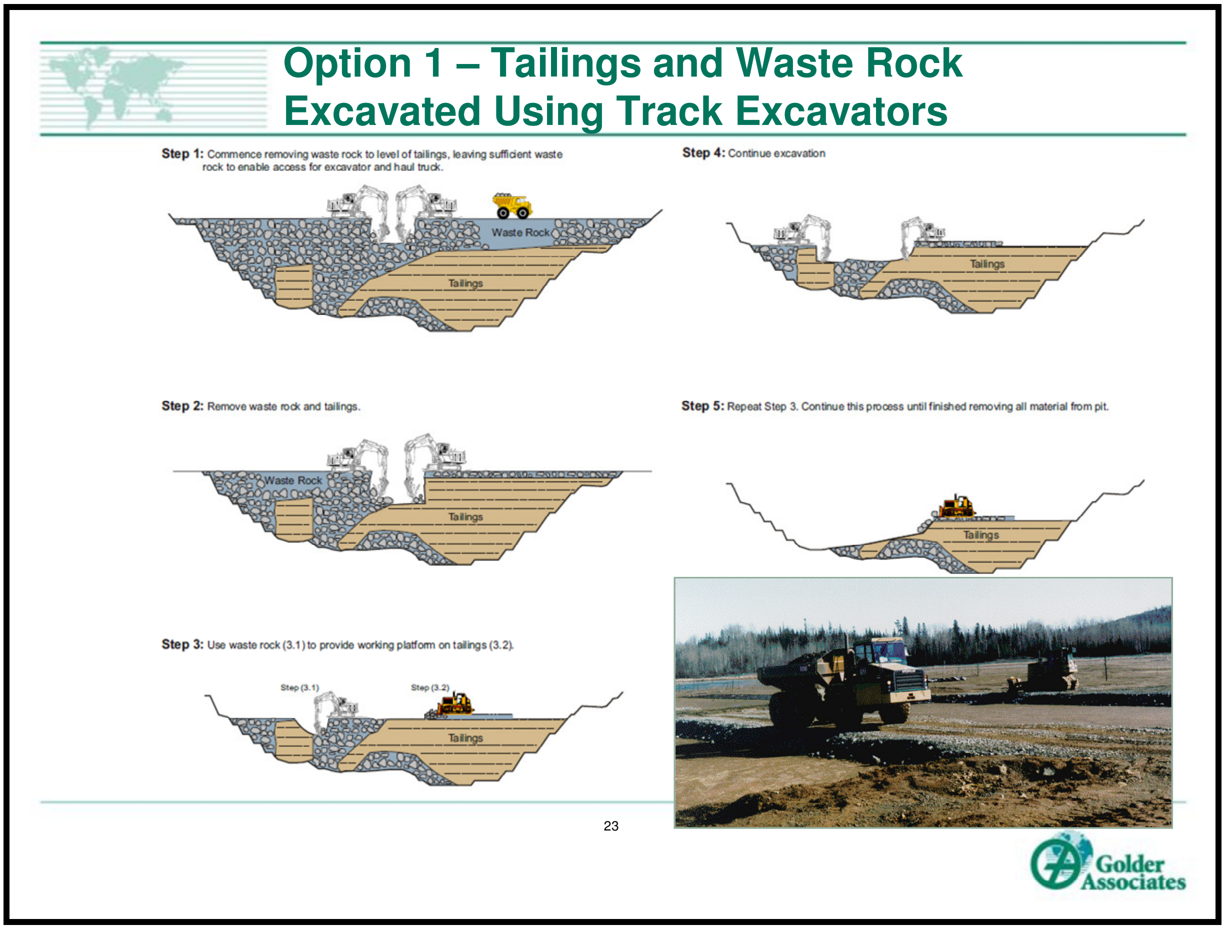


Figure 16.3 Tailings Removal Option 1.

16.4.2.2 Option 2 – Removal of Materials using Sumps

A sump (or sumps) could be excavated within the tailings, or within the waste rock adjacent to the tailings, at locations around the periphery of the MZ Pit. In Option 2, tailings would then be allowed to flow towards the sump or sumps in a controlled manner, and would then be loaded into haul trucks using tracked excavators or removal of the tailings from the sumps using pumps that can handle high solids content materials. This method could potentially be supplemented by the use of hydraulic cannons or monitors or by dozing to direct the tailings to the sump location.

16.4.2.3 Option 3 – Removal of Materials using a Floating Dredge

After removal of the upper waste rock (to about Elev. 1055 m), water could be added to the MZ Pit to enable the use of a cutter-suction dredge which could remove the tailings by pumping them out as a slurry.

After consideration of the three options, it was decided to proceed with the planning using option 1 since Huckleberry Mine has the necessary equipment and is typical of the truck/shovel method utilized presently.

16.5 Strategic Mine Scheduling Background

A schedule for life of mine (LOM) production starting first quarter 2011 following the completion of the MZX pit to the 970 bench was completed. Waste capacity of the East Pit and tailings storage was calculated from the HML 2011 budget production schedule.

Mine scheduling for the Life-of-Mine plan (LOM) utilized MineSight Strategic Planner (MSSP) software. MSSP analyzes bench pushback reserves, material destinations, and haulage parameters to provide a feasible life-of-mine schedule that maximizes net present value (NPV) and considers all operating constraints while meeting or exceeding project-specific objectives, period production goals, and quality targets.

The mine production schedule is summarized in Table 16.8.

16.5.1 Ore Production

For scheduling of the MZX and Pit_U8 scenario the development sequence was designed to release a minimum of 16,400 tpd during excavation of the MZX pit and 18,000 tpd from the MZO pit. HML predicts to increase mill throughputs with Main Zone Optimization ore as discussed in section 13. Stockpiling of ore in the later years of U8 production was also incorporated into the schedule to facilitate management of TMF3 volumes wherein the stockpiled ore tailings is expected to be redirected into the completed MZO pit. Bench advances were restricted to a maximum of two benches in any given period to avoid any ever forming a multiple bench high wall in legacy tailings. Haul truck requirements (hours) were kept to a maximum of 17 units as a method of smoothing total production over the life of the pits.

Table 16.8 Life of Mine Production Schedule

Huckleberry Mines Main Zone Optimization

PERIOD		11_Q1	11_Q2	11_Q3	11_Q4	12_Q1	12_Q2	12_Q3	12_Q4	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
MINE PRODUCTION																			
Total Tons Mined																			
Ex-Pit Ore	(tonnes x 1,000)	-	0.9	6.6	159.1	307.0	1,383.7	1,509.8	1,509.8	6,000.0	6,441.0	8,213.0	8,213.0	8,213.0	8,213.0	1,225.7	-	-	51,396
LG	(tonnes x 1,000)	-	0.8	14.6	91.8	99.6	711.6	456.4	206.8	860.3	1,717.0	1,673.3	889.8	534.1	571.4	46.8	-	-	7,874
Waste	(tonnes x 1,000)	1,237.9	1,929.0	1,976.9	1,775.3	1,171.8	1,304.9	791.2	237.9	2,138.9	4,832.9	1,374.6	171.9	89.6	84.9	2.1	-	-	19,119
Overburden	(tonnes x 1,000)	308.4	81.6	58.6	128.0	549.8	91.2	130.7	169.6	507.8	-	-	-	-	-	-	-	-	2,026
RockFill	(tonnes x 1,000)	-	-	-	-	190.4	224.2	4,171.3	4,835.8	13,841.4	7,870.6	3,382.4	1,555.1	150.8	-	-	-	-	36,222
Legacy Tailings	(tonnes x 1,000)	-	-	-	-	-	-	-	-	1,890.3	4,763.5	2,597.4	569.4	-	-	-	-	-	9,821
Total Mined	**(tonnes x 1,000)**	**1,546.3**	**2,012.3**	**2,056.7**	**2,154.1**	**2,318.5**	**3,715.6**	**7,059.4**	**6,959.8**	**25,238.7**	**25,624.9**	**17,240.7**	**11,399.2**	**8,987.5**	**8,869.3**	**1,274.6**	**-**	**-**	**126,458**
Strip Ratio	Waste/Ore	-	2,181.78	308.80	12.54	6.55	1.69	3.68	3.61	3.21	2.98	1.10	0.39	0.09	0.08	0.04	-	-	1.46
HG Stockpile Rehandle	(tonnes x 1,000)	968.6	1,492.5	1,503.2	1,350.7	1,186.4	109.7	-	-	-	-	-	-	-	-	5,344.3	1,225.8	-	13,181
LG Stockpile Rehandle	(tonnes x 1,000)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5,362.2	2,512.0	7,874
Total Stockpile Rehandle	**(tonnes x 1,000)**	**968.6**	**1,492.5**	**1,503.2**	**1,350.7**	**1,186.4**	**109.7**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**5,344.3**	**6,588.0**	**2,512.0**	**21,055**
MINERAL PROCESSING																			
Tons Milled	**(x 1,000)**	**968.6**	**1,493.4**	**1,509.8**	**1,509.8**	**1,493.4**	**1,493.4**	**1,508.8**	**1,508.8**	**5,986.0**	**6,441.0**	**6,588.0**	**6,570.0**	**6,570.0**	**6,570.0**	**6,570.0**	**6,588.0**	**2,512.0**	**65,881**
Tonnes per day milled		16,400	16,400	16,400	16,400	16,400	16,400	16,400	16,400	16,400	17,647	18,000	18,000	18,000	18,000	18,000	18,000	17,943	17,512
Feed Head Grade	%Cu	0.350	0.350	0.350	0.340	0.335	0.286	0.288	0.313	0.370	0.319	0.310	0.347	0.368	0.371	0.352	0.213	0.182	0.324
	%Mo	0.000	0.000	0.000	0.000	0.001	0.007	0.008	0.008	0.007	0.006	0.006	0.008	0.009	0.011	0.009	0.006	0.005	0.007
	Au (gpt)	0.023	0.023	0.023	0.023	0.024	0.026	0.027	0.028	0.030	0.028	0.028	0.029	0.030	0.030	0.029	0.021	0.019	0.027
	Ag (gpt)	1.323	1.323	1.323	1.345	1.385	1.630	1.681	1.807	2.030	1.815	1.796	1.963	2.041	2.058	1.980	1.192	1.015	1.760
Concentrator Recovery	- Cu (%)	90.6%	90.6%	90.6%	90.4%	90.3%	89.4%	89.4%	90.0%	90.8%	90.0%	89.9%	90.6%	90.9%	90.9%	90.6%	88.5%	87.6%	90.1%
	- Mo (%)	-	-	-	-	10.1%	20.4%	20.5%	20.7%	18.8%	16.3%	20.4%	22.6%	23.8%	26.2%	25.2%	18.7%	16.8%	19.2%
	- Au (%)	64.4%	64.4%	64.4%	64.4%	64.4%	64.4%	64.4%	64.4%	64.4%	64.4%	64.4%	64.4%	64.4%	64.4%	64.4%	64.4%	64.4%	64.4%
Metal Recovery (000's)	- Cu (lbs)	6,771	10,437	10,539	10,238	9,955	8,413	8,557	9,375	44,310	40,693	40,441	45,512	48,456	48,849	46,167	27,417	8,840	424,972
	- Mo (lbs)	-	-	-	-	3	45	51	55	176	128	184	253	310	407	344	154	47	2,156
	- Au (g)	14	22	22	23	23	25	26	27	116	115	117	124	127	128	124	90	31	1,154
	- Ag (g)	701	1,081	1,093	1,111	1,131	1,331	1,387	1,492	6,648	6,396	6,474	7,053	7,333	7,397	7,116	4,295	1,395	63,435

16.5.2 Possible Low Grade Stockpile

For strategic ore scheduling the current HML 0.20% Cu cut off grade was employed. Through preliminary analysis, the economic cut off grade at pit rim (zero mill head value) was estimated to be in the order of 0.15% Cu. Further evaluation indicates that if rehandle operating costs are incorporated, the economic cut-off grade is 0.17% Cu. Within the U8 pit design there is an estimated 5.8 million of 0.15% - 0.20% Cu low grade (LG) and 3.9 million of 0.17% - 0.20% Cu. The 0.17% Cu low grade cut off has been applied in both the planning and cash flow analysis of this report. There is the opportunity of storing LG in the old NAG quarry assuming the complete excavation of legacy tailings. If LG were stored within the old Nag quarry a decision to process it at the end of mine life can be made at that time, depending on the economics of the day. If it is not feasible to process then the material will be in a suitable permanent location (below maximum water elevation) and not require further handling. For the purposes of the mine scheduling included in this report, the LG has been considered waste and is assumed to be transported to TMF3 but is incorporated in the cash flow and is recovered at the end of mine life.

16.5.3 Stripping Production

All waste material was assumed to be transported to either the East Pit waste storage area or to TMF3. The mine waste movement and destination schedule is tabulated in
Table 16.9.

Table 16.9. Waste Movement and Destination Schedule

Material & Destination		Year									
		2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Waste (incl. rockfill)											
EPPD (EZ_Pit)	(tonnes x 1,000)	7,026	2,997	-	-	-	-	-	-	-	10,023
TMF3	(tonnes x 1,000)	-	11,405	18,731	19,184	9,028	3,186	775	656	49	63,013
Tailings											
EPPD (EZ_Pit)	(tonnes x 1,000)	5,482	2,469	-	-	-	-	-	-	-	7,951
TMF3	(tonnes x 1,000)	-	3,537	6,000	6,441	8,213	8,213	8,213	8,213	1,226	50,056
TOTAL											
EPPD (EZ_Pit)	(tonnes x 1,000)	12,508	5,466	-	-	-	-	-	-	-	17,974
TMF3	(tonnes x 1,000)	-	14,942	24,731	25,625	17,241	11,399	8,988	8,869	1,275	113,069

In the LOM plan featured in this report, a factor of 25% is added to the total haulage cycle times for specialized handling of legacy tailings but excluded dam construction, till core construction or NAG placement downstream of the dam Since these activities are assumed to be handled by contractors, costs for dam construction have been incorporated into capital expenses.

16.5.4 Scheduled Tonnages

This nine year strategic plan includes material from the MZX pushback pit (stage1), the U_8 pit (incremental stage2), and stockpiled material as estimated for the end of January 2011. The starting surface for scheduling was the projected as-built topographical surface for the end of January 2011 when the mining is halted in the current MZX pit. Table summarizes the pit tonnages forming the basis of the LOM plan.

Table 16.10 Life of Mine (LOM) Scheduled Tonnages

Pit name	Ore Kt	Waste Kt	Ovb Kt	Fill Kt	Tailings Kt	Total Kt
HML MZX (Stage 1)	11,721	12,536	1,217	485	-	25,959
U-8 (inc ultimate)	39,675	14,457	808	35,737	9,821	100,498
Stockpile (current)	6,611	-	-	-	-	6,611

16.5.5 Schedule Details and Highlights

To ensure the production is reasonable from an operational point of view the years 2011 and 2012 were scheduled quarterly with the remainder of the mine life being scheduled on an annual basis. The expected life of mine copper and expected molybdenum head grades are graphed in Figure 16.4.

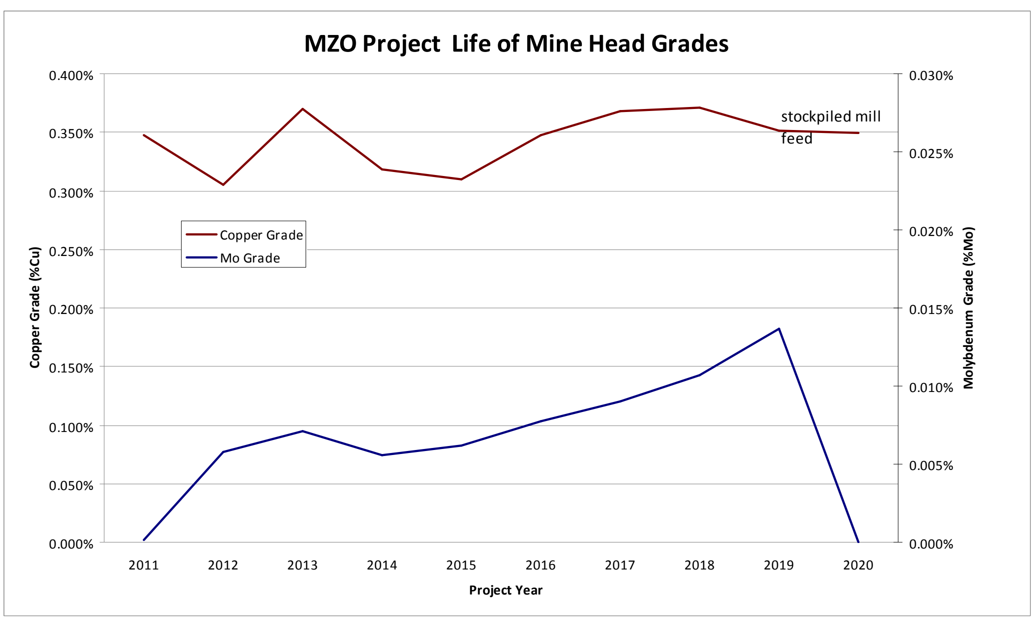


Figure 16.4 Huckleberry Project Life Mill Head Grades

16.6 Mining Fleet Requirements

Currently, the loading equipment is a combination of PH1900 & 2100 electric shovels, Komatsu PC2000 Excavators and Caterpillar 992 loaders. Currently HML has a fleet of five Cat 785 (120 tonne capacity) trucks and five Cat 777C (90 tonne capacity) trucks. The Cat 777C trucks are near the end of their respective useful lives with over 90,000 hrs accumulated on each unit. HML is contemplating their replacement in the near future. A list of current Major equipment is shown in Table 16.11.

Table 16.11 Current Mining Equipment

Equipment	Make and Model	Number
Cable Shovel	P & H 2100	1
Cable Shovel	P & H 1900	1
Excavator (backhoe)	Komatsu PC2000	2
Front End Loader	Caterpillar 992d	1
Haul Truck	Caterpillar 777C	5
Haul Truck	Caterpillar 785B	5
Blast Hole Drill	Bucyrus Erie 60R	2
Blast Hole Drill	Atlas Copco PV275	1

Detailed haulage profiles for the East Pit destinations were weight averaged to match the 2011 budget schedule for the purposes of this report. Detailed profiles for haulage to TMF3 were produced, based on the pit and dump centroids. Also assumed, for base case scenario analysis, was that no in-pit waste dumps were utilized although the distinct opportunity for this practice exists. There may be an opportunity to further optimize the mine schedules with regard to truck hour requirements through realigning in-pit haul routes during production and utilization of in-pit storage.

The projected haul truck requirement shows an increase in the fleet to 7 more Cat 785 (120 trucks) are needed from mid 2012 to 2016. Huckleberry has determined that 6 additional Cat 785 trucks will be obtained and the current fleet is will be maintainable until 2016, when the older units will be decommissioned. The seventh truck may be leased for the 3 year period of higher truck requirements. Cat 785 trucks were the preferred truck to be compatible with current loading equipment, Maintenance shop size and compatibility with parts and mechanical knowledge.

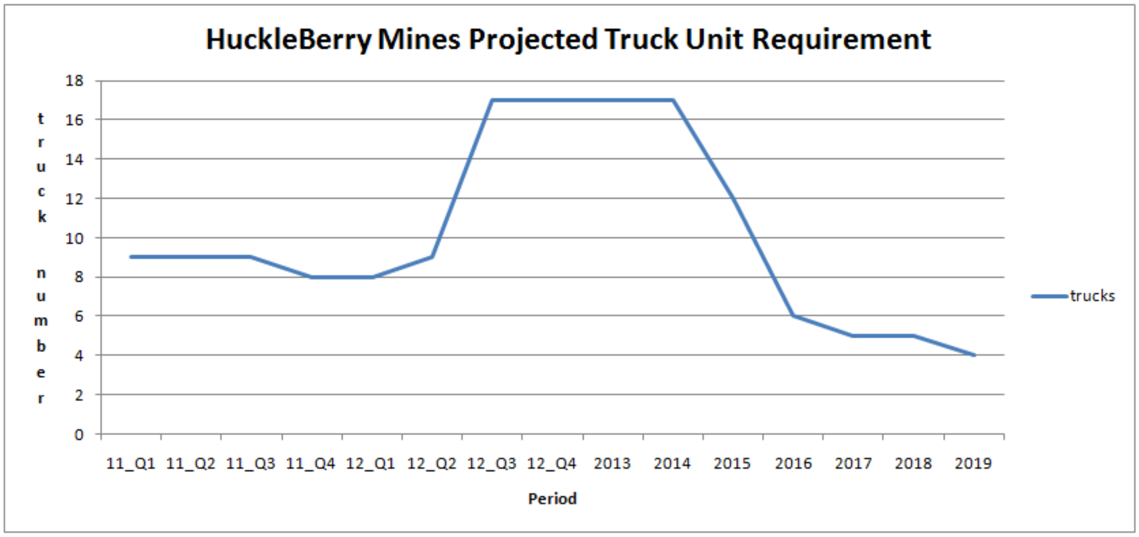


Figure 16.5 Truck Units Required

Production rates required for removal of the backfilled waste and tailing also exceeds present loading capacity at the mine. To achieve the production rates, an addition loading unit is required. The Komatsu PC3000 is an appropriate size match for the Cat 777/785 haul truck fleet. Its production rate corresponds to the increased production rate required in the mine schedule. The P&H 1900 shovel is from 1972 and while still operable, price and availability of parts do not lend the machine to be of reliable availability for longer term scheduling and is thus considered a "spare" shovel available for short periods of planned or unplanned maintenance of other loading equipment. Table 16.12 shows expected annual production rate for the loading equipment at the mine during the period of largest material movement.

Table 16.12 Loading equipment requirements and production rates in year 2016

Equipment	Expected Rate of production (tonnes per year)
P & H 2100	1,320,000
P & H 1900	0
Komatsu PC2000 (2X)	15,840,000
Komatsu PC3000 (new unit)	10,350,000
Caterpillar 992d	780,000
Total	28,290,000
Required	25,642,900

The current fleet of Blast hole drills consists of a 2009 Atlas Copco Pit Viper 275 and 2 nineteen seventies Bucyrus Erie 60Rs drilling 9 7/8" diameter blast holes up to 15 m depth. The main production drill is the PV275. While one BE 60R provides back up for the main production, the other is situated in the NAG quarry pit to provide broken NAG rock for the seasonal Tailings dam construction. Availability of parts for the older BE 60R is considered unreliable. A replacement drill is required to extend mine life with the proposed MZO. Figure 16.6 illustrates the tonnes mined per material type per year.

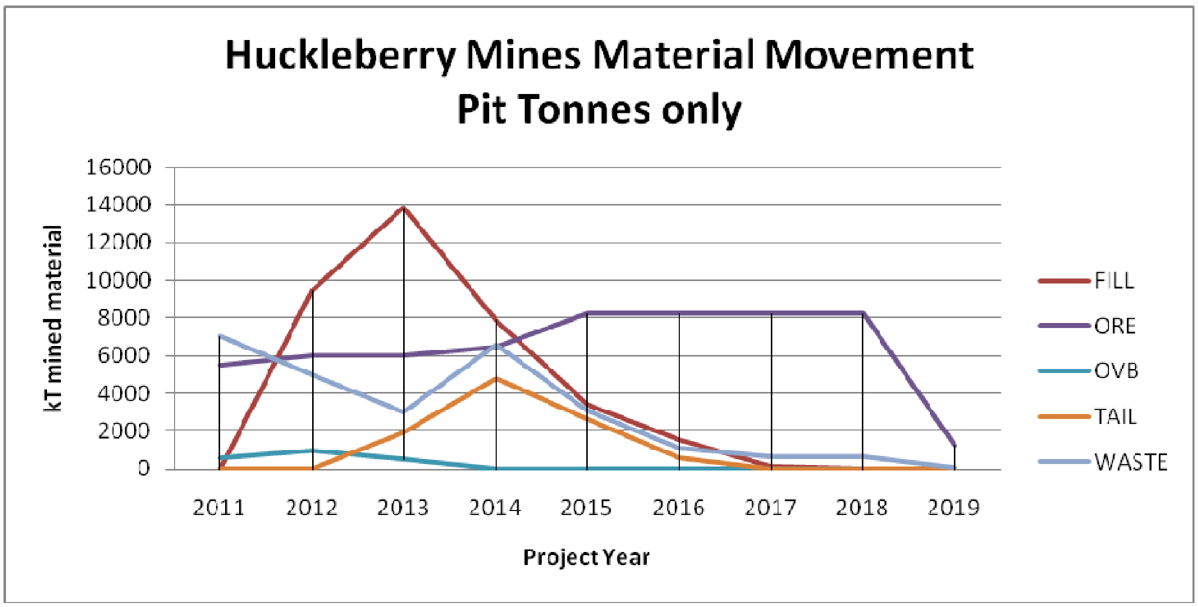


Figure 16.6 Material Mined Annually

17.0 RECOVERY METHODS

As per section 13.2, the predicted overall bulk copper recovery would be 91.0%, and based on historical plant results (2008 – 2010) the recovery of copper metal is expected to be 90.2% with a concentrate grade of 27.3%. The processing plant is maintained on a regular basis and there are no concerns with the processing plant, and with slight modifications for tailings management, will meet future processing requirements defined by the new production plan.

17.1. Flow sheet for the Huckleberry process plant

The flow sheet is given in Figure 17.1.

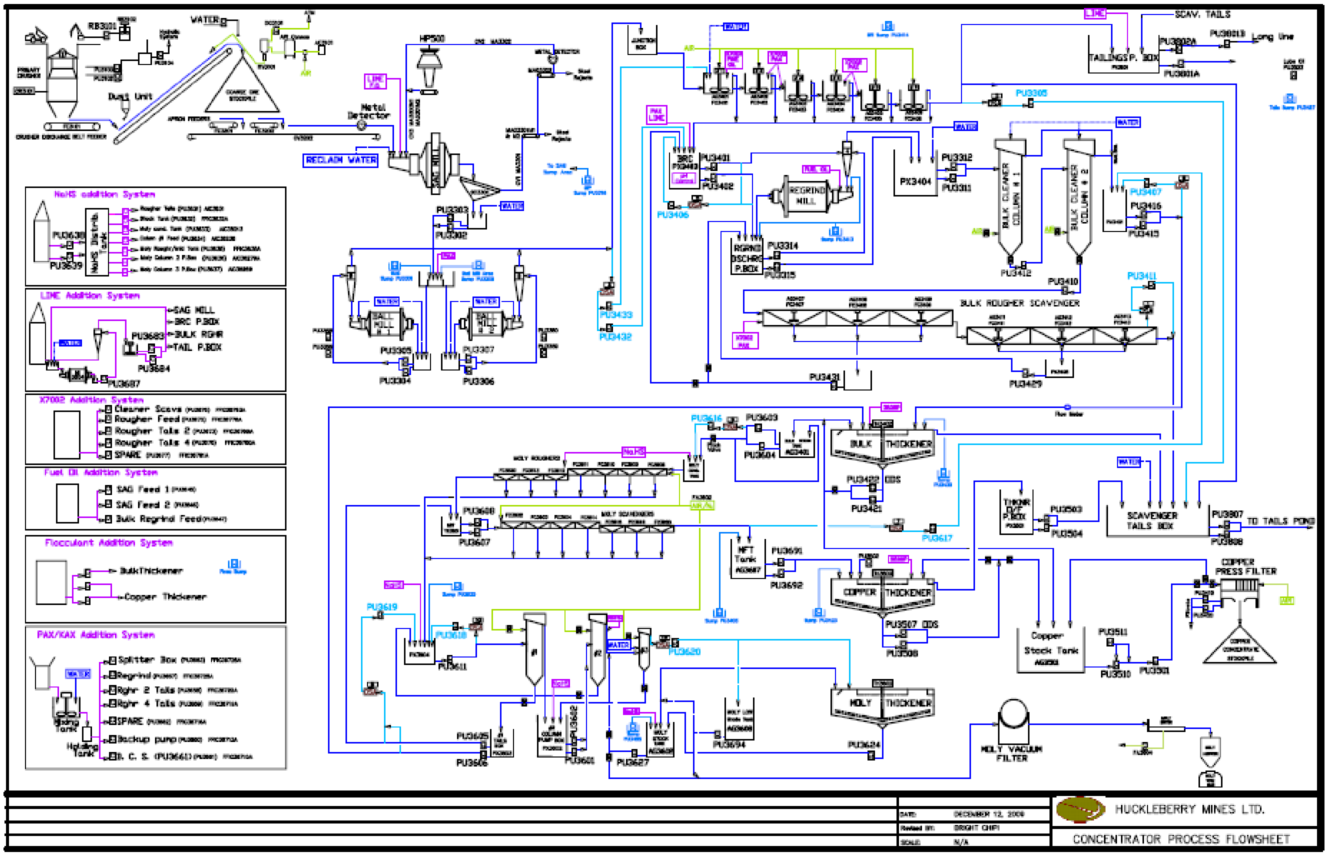


Figure 17.1 Process Plant Flow sheet

17.2 Plant design, equipment characteristics and specifications

17.2.1 Crushing Circuit:

Ore from the stockpile is fed to the SAG feed conveyor via two apron feeders. The grinding circuit integral equipment consists of a 32' x 13'8" Svedala SAG Mill (driven by two GE 5500 HP motors), a 20'x 8' Deister screen deck, a Metso HP500 pebble crusher, two 30' x 16' Svedala Ball Mills (each driven by one GE 5500 HP motor) and two clusters of six 26" technequip hydrocyclones. Cyclone overflow reports to the flotation circuit.

17.2.2 Flotation Circuit:

The flotation circuit integral equipment consists of six 100 m^3 Outotec tank cells (Rougher Circuit), two 10' diameter columns (Cleaner Circuit) & six 16 m^3 Outotec U-cells (Scavenger Cleaning Circuit).

17.2.3 Dewatering Circuit:

The dewatering circuit integral equipment consists of two thickeners (60' diameter), and an Ingersoll-Rand 40/24 Automatic Filter Press.

All equipment is in good shape and able to process up to 22,000 dmtpd depending on hardness of ore and mineralogy.

17.3 Current and projected requirements for energy, water and process materials

Based upon historical consumption rates for energy, HML will require 182,000,000 kwh of energy for 2011. Since there is no major electrical equipment change required for the new mine plan, power requirements are not expected to change.

2011 YTD average fresh water consumption is 784 m^3/day (including running the molybdenum recovery circuit). Based upon current consumption rates the mill will consume approximately 286,000 m^3 of water per annum. These figures represent fresh water requirements only and do not include process/reclaim water that is recycled on-site. The fresh water consumption is not expected to change with the new mine plan.

18.0 PROJECT INFRASTRUCTURE

18.1 Existing infrastructure

Access to the property is along 123 kilometres of gravel forest service roads and a private access road. The town of Houston is 307 kilometres west of Prince George, 400 kilometres east of Prince Rupert, served by Highway 16 and the Canadian National Railway.

Copper concentrates are transported by truck to the Port of Stewart, British Columbia and then by bulk carrier. The molybdenum concentrate is trucked to and sold in Vancouver.

Power is supplied via a 121 km long, 138 KV transmission line extending from the BC Hydro substation near Houston B.C. following the forest service road which accesses the mine site.

Major infrastructure at the mine site includes a concentrating mill, warehouse, administration offices and four-bay mobile fleet maintenance shop. A 275-man camp/kitchen complex accommodates the employees onsite. Minor infrastructure comprises of a fresh water intake barge on the Tahtsa Reach of the Nechako Reservoir, a potable water tank, a freshwater mill tank, a reclaim tank, waste water treatment facility and associated pipelines.

Tailings are transported to the tailings management facility (TMF) via slurry through 26 inch pipelines. Process water required for the mill is reclaimed from the TMF by a floating barge pump arrangement with fresh make-up water pumped from Rio-Tinto/Alcan Nechako Reservoir.

The Huckleberry Mine comprises three open pits: the Main Zone pit (MZP), the East Zone pit (EZP), and the Main Zone Expansion (MZX) pit, which is the only pit currently being mined. All Potential Acid Generating waste rock and tailings are placed within storage facilities comprised of 2 tailing management facilities. The MZP and EZP were mined-out at an earlier stage of the mine life. The MZP was subsequently backfilled with waste rock and tailings. The backfilled MZP area is contiguous with the TMF-2 impoundment, retained by three dams: the TMF-2 Dam to the southwest, the East Dam to the east (between the MZP and the EZP), and the Orica Saddle Dam to the south. These three dams are complete to their final configurations, and the TMF-2 impoundment is essentially full to its design capacity.

18.2 Tailing Management Facility - 3

The PAG waste and tailings from the MZO pit require a new tailings management facility. TMF-3 will represent the third tailings management facility constructed as part of the HML operation. It is scheduled to receive waste rock in 2012, and tailings starting in early 2013. It will provide for storage of all mine wastes projected through to the end of the MZO mine life in 2021. An overall site plan encompassing the entire HML operation, including the proposed TMF-3 development may be seen in Figure 18.1. The TMF-3 Dam will be a zoned earth fill, cyclone NAG sand and rockfill embankment constructed to a final crest elevation of 995 m. The east abutment of the dam will be approximately 600 m to the west of the northwest abutment of the TMF-2 Dam. The TMF-3 Dam will be approximately 2.5 km in length along the crest in its final configuration. The starter dam will be constructed to crest El. 945 metres.

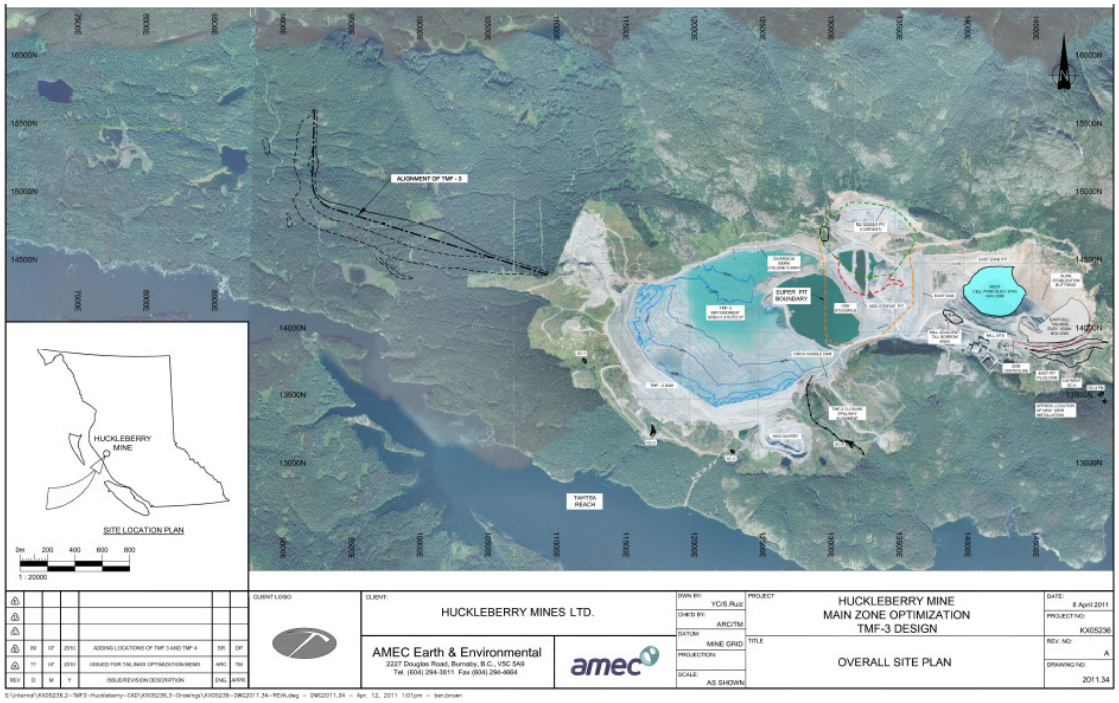


Figure 18.1 Site plan with TMF-3

A Saddle Dam will be required in an area of relatively low ground at the northeast end of the TMF-3 impoundment. The Saddle Dam will be constructed to crest El. 995 m.

To reduce the volume of runoff reporting to the TMF-3 impoundment during operation, a runoff diversion channel will be constructed along the east perimeter, as shown on Figure 18.2. The diversion channel will have a total length of about 2.15 km.

Runoff from the downstream shell of the TMF-3 Dam, along with seepage from the dam's toe, will be collected and contained in three collection ponds, designated SC6, SC7, and SC8 as shown on Drawing 2011.46. These ponds will be formed by small water-retaining dams, and will be connected by a road extending between the dams, which will likely also accommodate the power line (to service the pumps installed in the collection ponds) and water pipelines. Runoff and seepage collected in these ponds will be pumped into the TMF-3 impoundment, and, from there, reclaimed for the mill process.

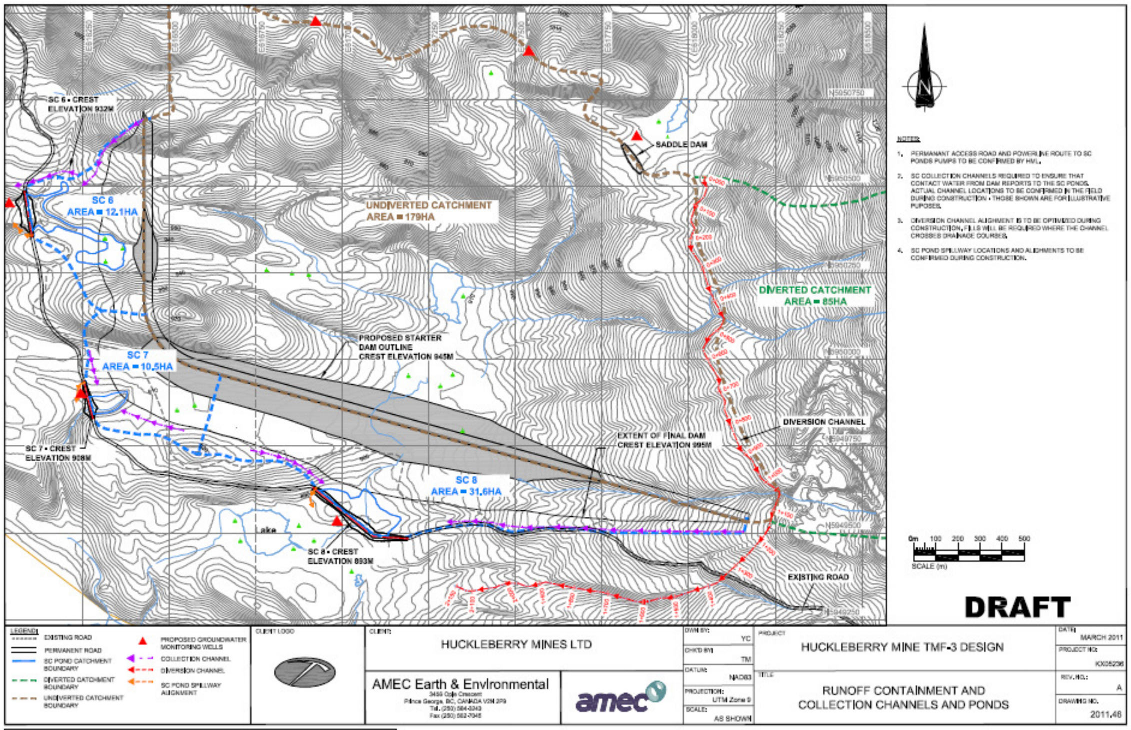


Figure 18.2 Runoff diversion for TMF-3

Per the current mine waste management plan, the total storage capacity required of the TMF-3 impoundment is projected to be as follows:

- Waste rock: 46.8 Mtonnes
- Mill tailings: 53.1 Mtonnes
- Re-handled tailings: 9.9 Mtonnes

The total tonnage of tailings includes NAG cycloned sand that will be used to construct a portion of the downstream shell of the TMF-3 Dam.

18.2.1 CDA Consequence Classification

The dams associated with the TMF-3 impoundment are designed in accordance with the 2007 Canadian Dam Association (CDA) guidelines.

A waste dump comprising mostly potentially acid generating (PAG) waste rock produced from MZO pit mining, and also including some re-handled (legacy) tailings mined from the backfilled Main Zone pit, will be constructed within the northern portion of the impoundment area. This waste dump will be separated from the TMF-3 Dam via the tailings deposit, which will be formed via discharge of tailings from various locations along the TMF-3 Dam crest. The waste rock (and re-handled tailings) dump will be constructed to a maximum elevation of 990 metres, to achieve full submergence upon closure. The TMF-3 impoundment will, during its operational phase, with annual dam raises, not have an open channel spillway. An open channel spillway will be constructed upon closure, at the east abutment of the dam,

The TMF-3 dams and impoundment will be closed and reclaimed to achieve a stable condition, with appropriate erosion control, surface reclamation, a closure water pond cover for PAG waste rock and tailings, and the closure spillway. The closure configuration has been incorporated into the design, an objective of which is to achieve a condition requiring the minimum amount of monitoring and maintenance over the long term.

Cycloned sand production parameters, for the NAG cycloned sand that will be used to construct a portion of the downstream shell of the TMF-3 Dam, are shown in Table 18.1. These parameters are derived from testing results of a 1998 study of producing cycloned sands for dam construction. The underflow sand suitable for dam construction will be placed in cells created on the waste dump platforms within the TMF-3 impoundment. The Cyclone plants will operate year round to produce the greatest amount of sand possible and will be re-handled to the TMF-3 via truck during seasonal construction period.

Table 18.1 Cycloned Sand Production Parameters

Rougher/cleaner tailings ratio	9:1	90% rougher, 10% cleaner
Annual rougher tailings production	90%	Percentage of total tailings feed
Sand fraction of the total tailings:	40%	
Cyclone underflow for construction	35%	of rougher tailings feed
Cyclone operating time:	10.5	Months
Cyclone effective operating time:	85%	Cyclone plant availability factor
% loss to decanted construction water	5%	Fines decanted into the tailings pond
Cycloned sand captured for dam fill	22%	Percent of annual tailings production

18.2.2 TMF-3 Development Schedule Milestones

Under the schedule as outlined above, the TMF-3 impoundment will begin receiving PAG waste rock in the 2nd quarter of 2012, with tailings discharge to commence in the 2nd quarter of 2013. To meet these milestones, the TMF-3 impoundment schedule will have to be along the following lines:

- Mines Act permit approval – End of 2011
- Logging– by end 2011.
- Permit approval for first NAG rockfill quarry – by end of 2011
- Clearing and initial preparatory work in borrow areas (till borrow, first NAG rock quarry) – Spring 2012
- Construction of temporary containment ponds for management of runoff from PAG waste dump placed in TMF-3 area prior to starter dam construction, along with access roads, pumping systems, power, pipelines, etc. to retain contact water within the site water management system – by end of 1st quarter, 2012. It is assumed that contact water (with PAG waste rock) cannot be discharged to the environment within the TMF-3 area.
- Construction of temporary sediment control ponds, and construction diversions, up-gradient of TMF-3 starter dam – by end of 1st quarter, 2012.
- Construction of downstream collection ponds SC6, SC7, and SC8, including dams and spillways, and use of these ponds for sediment control from TMF-3 starter dam construction – by end of 2nd quarter, 2012.
- Construction of TMF-3 starter dam (to at least crest El. 937 m), and runoff diversion channel – mid 4th quarter, 2012.
- Begin impounding water within the TMF-3 impoundment behind the starter dam – 4th quarter, 2012, or possibly earlier, provided the till borrow area is not flooded prior to starter dam completion.
- Install reclaim barge, power line, cycloned sand plant, reclaim water pipeline, tailings delivery pipelines, pumps within the SC ponds – by end of 1st quarter, 2013.

Overall, these schedule milestones are aggressive, particularly with respect to temporary water management facilities for management of contact water runoff prior to the starter dam being well advanced. To mitigate this risk, an alternative might be to stockpile PAG waste rock in the 2nd quarter of 2012, within the limits of the TMF-2 impoundment, for subsequent use by the earthworks contractor for construction of the upstream Zone 6 PAG rockfill shell of the starter dam.

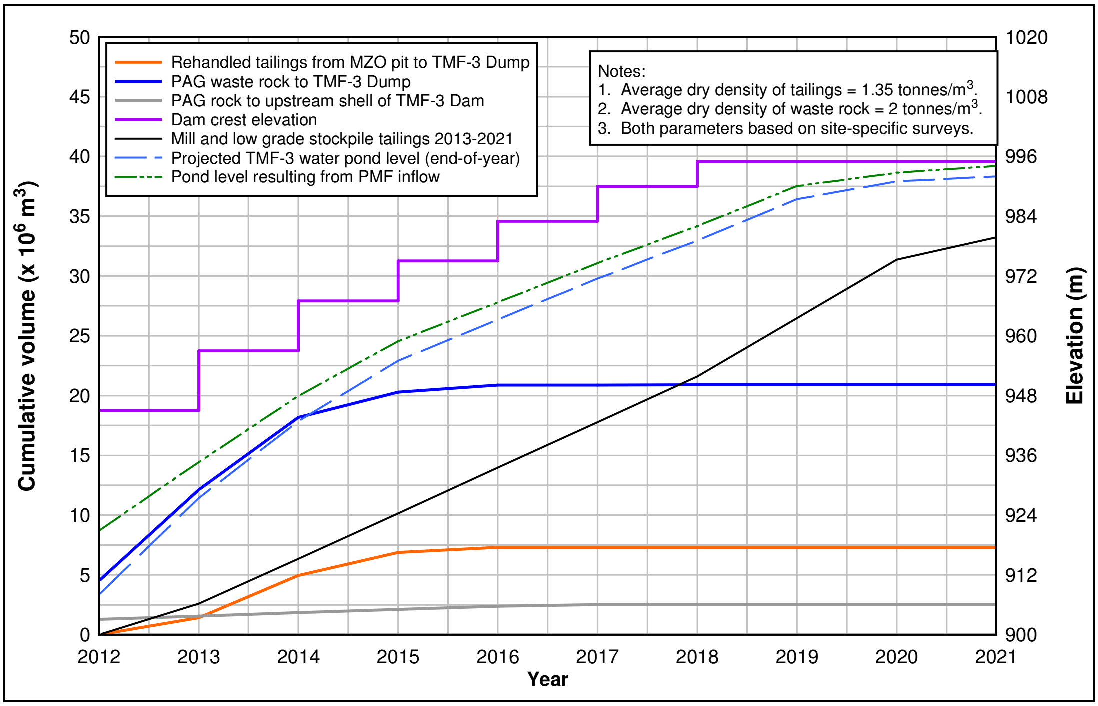


Figure 18.3 TMF-3 Filling and Dam Raising Schedule

18.2.3 Till Borrow

Till borrow is required for the construction of the starter dam, annual raising of the dam, seepage retention ponds, and a saddle dam at the northeast corner of the impoundment.

Basal till has been used for the construction of the existing dams and is planned for the construction of TMF-3 as well. The existing till borrow site is located immediately to the east of the TMF-3 impoundment area, and will be utilized for borrow as the facility is raised. For the initial phases of construction, including the starter dams and the initial dam raises, basal till will be borrowed from the broad gentle ridge that extends west from the current borrow site into the TMF-3 impoundment. Drawing 2011.38 shows the planned borrow site layouts and interpreted volumes of material available.

18.2.4 NAG Rock Quarries

NAG rock is required as a component of the construction of the downstream shell of both the starter dam as well as the larger footprint of the final dam. The NAG rock will be used in conjunction with cycloned sand for the purpose of providing an overall 2H:1V downstream slope. NAG rock will also be processed to form the sand and gravel filter material required for the TMF-3 Dam.

NAG rock quarry sites are planned within and above the northern slopes of the TMF-3 impoundment for a total in-place volume of 7.81 million m^3. It is envisioned that the NAG quarry sites within the impoundment area will be selectively mined in a sequence to provide NAG for the starter dam (prior to initial discharge) and NAG for the annual raising sequence of the dam. The completed quarry sites will expose the underlying bedrock and thus are planned for tailings discharge to reduce potential seepage volumes under the rising hydraulic head. To support the upper elevations of the dam raise sequence, the third of the NAG quarries will extend above (north of) the impoundment limits.

The locations of the proposed NAG quarries are shown on Figure 18.4. The quarries are shown as a typical arrangement only and final detailed quarry plans will be prepared based on existing site knowledge, operational needs, and regulatory requirements.

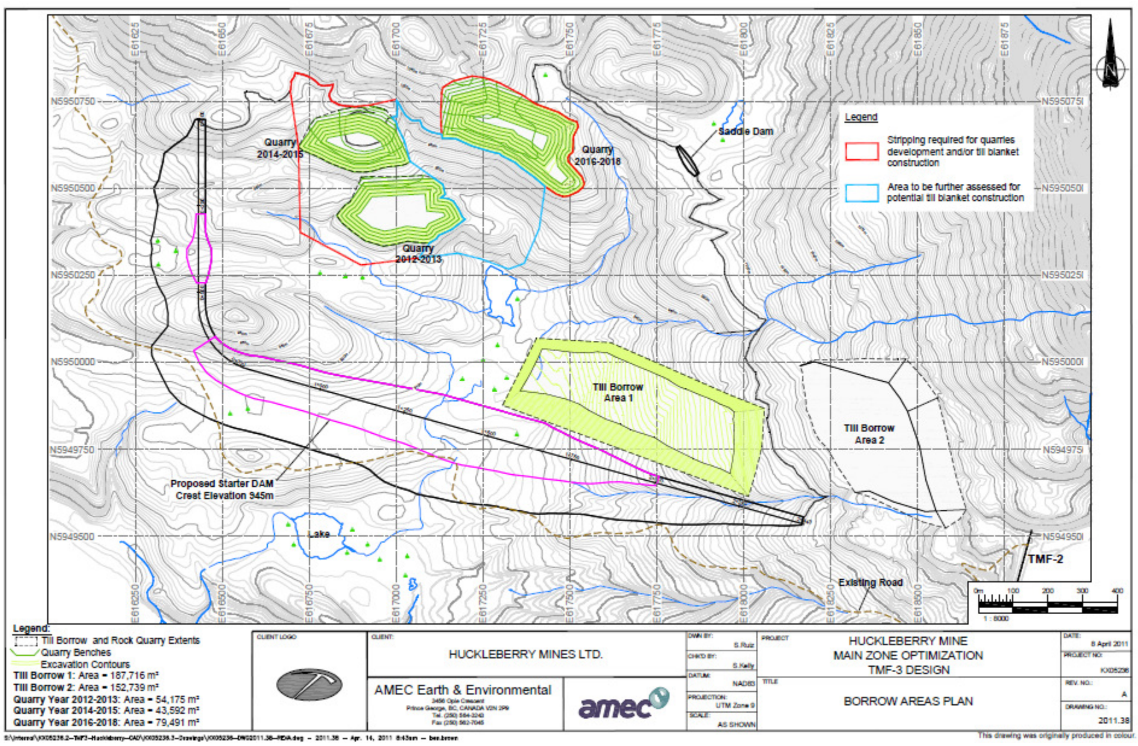


Figure 18.4 NAG rock quarries

18.3Other required infrastructure for the Main Zone Optimization Pit

- 2 new Pipelines to transport Tailings to the TMF-3 for the rougher (NAG) and cleaner/scavenger (PAG) portions.
- A pipeline and pumps to return water reclaimed from the TMF-3 back to the Mill will also be installed.
- A pipeline and pump system to return seepage reporting to the SC6, SC& and SC8 ponds for pumping back into the TMF-3 impound
- A Cyclone plant to produce NAG tails from the rougher circuit for segregation into size fractions suitable for dam construction will be placed on the east side of the TMF-3 impoundment.
- A power line to the TMF-3 from the Mill area for cyclone plant and pump operation

19.0 MARKET STUDIES AND CONTRACTS

19.1 Markets

Huckleberry is contractually obligated to sell 100% of its copper concentrate production jointly to Mitsubishi Materials Corporation, Dowa Metals & Mining Co., Ltd. and Furukawa Metals & Resources Co., Ltd. for the period to early, 2014. It is anticipated that all copper concentrate produced beyond 2014 resulting from the MZO Plan will also be sold to the three parties, based on expected extensions and amendments to the current contract. Huckleberry sells the copper concentrate based on current market prices for the copper, gold and silver at the time of sale. Smelting and refining costs are based on rates agreed upon at each contract renewal. Currently, the smelting and refining charges are based 50% on a fixed rate and 50% on a rate variable upon market copper prices at the time of sale.

Copper market prices used for the Base Case Scenario of US$3.14/lb for the years 2013 onwards is based on the average market copper price for the period January 1, 2006 through May 31, 2011. As current market copper prices are in excess of US$3.14/lb, the Base Case Scenario projects to gradually decrease copper prices between 2011 and 2013 by using a copper price of US$3.80/lb in 2011 and US$3.40/lb in 2012.

Foreign exchange rates (US dollar vs Canadian dollar) used in the Base Case Scenario of US$1.00 = CDN$1.08 for the years 2013 onwards is based on the average foreign exchange rate for the period January 1, 2006 through May 31, 2011. The Base Case Scenario projects to gradually adjust exchange rates to US$1.00 = CDN$1.08 by 2013. It assumes an exchange rate of par in 2011 and 2012.

19.2 Material Contracts

As Huckleberry has been in commercial operations since 1997, the Company has entered into contracts, as required to operate the mine and transport and sell the copper concentrate. The following lists the material contracts that the Company currently has outstanding:

1. Copper Concentrates Sales and Purchase Agreement – The contract sells all copper concentrate at market copper prices to a group of three companies (see section 19.1);

2. Transportation agreement with Oldendorff Carriers GMBH & Co. KG – the agreement outlines the transportation by ship of the copper concentrate from the Stewart, British Columbia port to Japan. The rates are within industry norms and the contract expires at the end of 2011;

3. Port storage and handling agreement with Stewart Bulk Terminals Ltd. – the agreement outlines the storage of the copper concentrate at the Stewart, British Columbia port and loading onto the ship. The rates are within industry norms and the contract expires at the end of 2015;

4. Trucking agreement with Arrow Mining Services Inc. – the agreement outlines the transportation by truck of the copper concentrate from the mine to the Stewart, British Columbia port. The rates are within industry norms and the contract expires in August, 2012;

5. Electricity agreement with British Columbia Hydro and Power Authority – the agreement outlines the provision of electricity to Huckleberry. The rates are within industry norms and the contract will be in force until terminated by either party, with six months notice.

6. Fuel supply agreement with Suncor Energy Inc. – the agreement outlines the supply of various types of fuel to Huckleberry. The rates are based on market prices at the time of purchase plus transportation costs. The contract will be in force until December 31, 2013.

7. Derivative instrument copper contracts with various brokers – the agreements with various brokers outline the purchase or sale of various quantities of copper at various fixed prices for periods to July, 2013. All contracts were based on market copper rates at the time of entering into the contract. All contract acquired prior to March 31, 2011 were reflected in the economic analysis.

8. Dam construction – in the years 2012 to 2014, Huckleberry has planned to engage a contractor to perform dam construction of the TMF-3 tailings facility. Currently the contract has not been put out to tender and there have been no significant discussions with potential contractors.

20.0 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

Environmental studies were undertaken in preparation of submitting an application to amend Huckleberry Mines Ltd. Mines Act Permit M-203 to include the Main Zone Optimization and TMF-3. This section is a summary of baseline environmental information for the Huckleberry Mine, with a focus, where appropriate, on the immediate TMF-3 area. The discussions are based on information from the original 1995 baseline studies and on more recent data collected to fill baseline gaps. The following topics are included:

- Hydrology;
- Fisheries and aquatic resources;
- Wildlife resources, with a focus on species at risk;
- Land description; and
- Archaeological resources.

20.1 Hydrology

20.1.1 Local Streamflows

A baseline flow monitoring program was undertaken from 1992 to 1996 to provide information for the original mine development application and environmental assessment (New Canamin, 1995), as well as for subsequent permit applications. Additional baseline streamflow monitoring was conducted in 2010, between May and November, to develop an improved understanding of the baseline conditions in the western half of the project area. Most of the small streams monitored in 2010 were dry or had very low flow between June and September.

The estimated mean annual runoff for the Huckleberry Mine area is 511 mm, based on the mean annual runoff for Whitesail Middle Creek adjusted for an assumed 10% difference in mean annual precipitation. The estimated mean annual basin runoff coefficient of 0.49 for the Huckleberry Mine area was derived from the mean annual runoff of 511 mm and mean annual precipitation of 1043 mm.

20.2 Water Quality

This section provides a summary of baseline surface and groundwater quality conditions within the project area.

20.2.1 Data Collection and Sources

Baseline water quality data for the Huckleberry Mine area was collected between 1993 and 1996 in support of HML's original Mine Development Certificate Application. The data collection program included water sampling at the following stations in the TMF-3 area and areas in the immediate vicinity:

- Creek 9 watershed: 1 surface water and 2 groundwater stations;
- Creek 8.5 watershed: 1 groundwater station (located in headwaters);
- Creek 8 watershed: 1 surface water station and 1 groundwater station (located in headwaters); and
- Tahtsa Reach: 1 surface water station

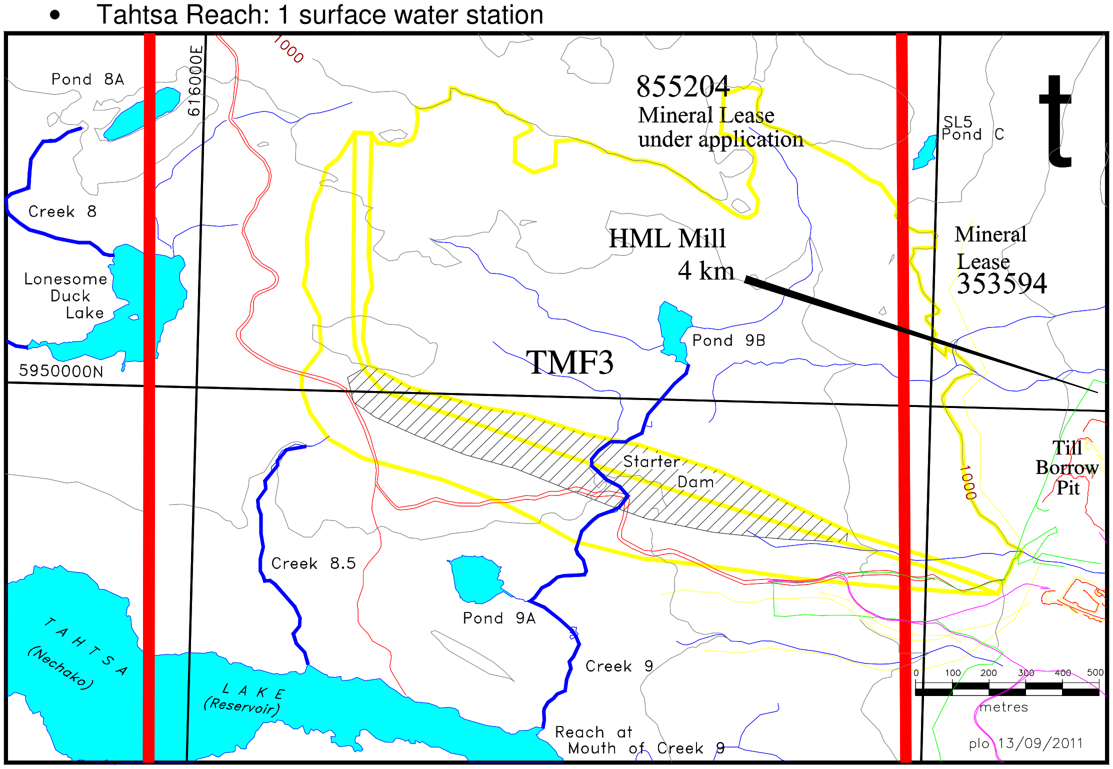


Figure 20.1 TMF3 with surface water data collection sources

The baseline water quality assessment is based on the historic data collected, with comparisons to BC Ministry of Environment (MOE 2006a and 2006 b) guidelines and working guidelines for the protection of aquatic life. In some cases, parameters could not be compared to water quality guidelines due to analytical detection limits being equal to, or slightly greater than, guidelines. Recent data collected during the 2010 Aquatic surveys are also discussed for comparative purposes.

20.2.2 Surface Water

Available data show that baseline surface waters had neutral pH, low conductivity, low hardness, low turbidity and generally low concentrations of metals. Beryllium, bismuth, boron, cadmium, cobalt, chromium, lead, molybdenum, nickel, silver, tin, thallium, tungsten and vanadium were undetectable in all surface water samples. Arsenic, mercury, selenium and uranium were commonly below detection limits. Surface water results were below BC MOE guidelines with the exception of the following, as recorded at least once during the monitoring period:

- pH: W8, W9
- Total Suspended Solids: W9
- Total cyanide: W8, Tahtsa Reach
- Total phosphorous: W8, Tahtsa Reach
- Dissolved aluminum: W9, Tahtsa Reach
- Copper (maximum): W8, Tahtsa Reach
- Copper (30-day average): W8, W9, Tahtsa Reach
- Iron (dissolved): W8, W9
- Iron (total): Tahtsa reach
- Zinc: W8, W9

Variability of baseline water quality, based on the four years of historic data, can be generalized as follows:

- Annual variability at W8 was minimal for most parameters.
- Annual variability at W9 was greater than at W8.
- Annual variability at Tahtsa Reach was minimal for most parameters, and comparable to the variability observed at W8.
- Seasonal variability at W8 was evident with many parameters at lowest concentration in the April/May period and higher during late winter and late summer.
- Seasonal variability at W9 was evident with many parameters at lowest concentration in the April/May period and higher during late summer and early fall.
- Seasonal variation at Tahtsa Reach was much less than observed at W8 and W9. Limited parameters exhibited seasonal variation.
- In broad terms, total phosphorous at W8, W9, and Tahtsa Reach exhibited similar seasonal variations with highest concentrations occurring during the summer and minimum concentrations occurring in the winter.

Water quality results from the 2010 aquatics survey indicate that waters in the TMF-3 area streams had neutral pH and generally low concentrations of metals. These recent results are similar to observations from the original baseline monitoring.

20.2.3 Ground Water

The groundwater monitoring results show that groundwater generally had neutral to slightly alkaline pH, high conductivity, and several slightly elevated metals concentrations. Concentrations of bismuth, cadmium, selenium, thallium, titanium and vanadium were less than detection levels in all groundwater samples. Chromium, cobalt, lead, mercury, silver and titanium concentrations were usually below detection levels.

Groundwater concentrations were generally below BC MOE surface water guidelines. While these guidelines are not intended to specifically apply to groundwater quality, this comparison was made to determine whether baseline groundwater chemistry could negatively affect local surface water quality. For the most part, concentrations were below the guidelines. Exceptions for each station are noted below.

- Total phosphorus: all sites
- Nitrite: Stations 94-213 and 94-215
- Arsenic: Station 94-215
- Copper (maximum): Stations 94-213, 94-214, and 94-215
- Copper (30-day average): Stations 94-213, 94-214, 94-215
- Total iron: Stations 94 -213 and 94-215
- Lead: Station 94-214
- Manganese: Station 94-214
- Nickel: Station 94-214
- Zinc: Station 94-214

There were also apparent exceedances related to aluminum and cadmium, due to changes in analytical detection limits.

20.3 Fisheries and Aquatic Resources

This section provides a summary of fisheries and aquatic resources studies conducted in 1993 and 1994 as part of the Huckleberry Mines Development Certificate Application and in 2010 in support of the MZO Project and this application for amendment to HML's Mines Act Permit M-203. The available information is summarized as follows:

20.3.1 Previous Studies

As part of the 1995 Huckleberry Mines Development Certificate Application, New Canamin Resources Ltd. conducted an aquatics assessment in the Huckleberry project area (New Canamin, 1995). The report indicated that the Huckleberry Project would cause no direct loss of fish habitat, although it did indicate that areas affected by mining and the TMF-2 facility (Creeks 2, 3, and 4) and by the planned TMF-3 facility (Creek 9) could be indirectly affected by mine development, mainly by the alteration of flows downstream of mine developments. These potential impacts led to the development of the Huckleberry Mine Fisheries Habitat Compensation Plan to offset any potential impacts and to ensure no net loss of fish habitat within the Huckleberry Mine area.

In the vicinity of the TMF-3 development area, baseline aquatic resource data were collected in 1993 and 1994 for Creeks 8 and 9, including Lonesome Duck Lake and Tahtsa Reach. Results of these surveys were incorporated into 2010 baseline data to provide an overall assessment of the aquatic habitat present in the planned TMF-3 development area.

20.3.2 Studies in 2010

Aquatic resource data was collected by Hatfield, between August and October 2010, from three main watersheds affected by TMF-3 (Figure 2.5-1). This included several small lakes which were examined to assess fish habitat and fish use. All study sites were located west of the current Huckleberry Mine site, between 1.5 and 3.0 km west of the TMF-2 tailings facility. Data collection focused on the following waterbodies:

- Creek 9 – Consists of approximately 1,600 m of riffle-pool stream and includes a large pond (Pond 9B) and a small lake (Pond 9A);
- Creek 8.5 – Consists of approximately 300 m of riffle-pool and ephemeral stream; and
- Upper Creek 8 – Consists of approximately 3,200 m of riffle-glide stream and includes four lakes including Lonesome Duck Lake; and
- SL5 Pond C (outlet to Sweeney Lake) – A small pond at the upper extent of the Sweeney Lake watershed.

Baseline surveys conducted during August, September and October 2010 followed accepted methods for conducting aquatic environmental assessments. Habitat survey methods followed those used in the original baseline study, updated to 2006 Resource Inventory Standards Committee (RISC) Standards for Conducting Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Follow-up Sampling Stream Standards (RISC 2006). The purpose of the follow-up sampling was to confirm watershed-wide fish distributions and habitat characteristics what were not sufficiently addressed in the initial 1993/1994 baseline assessment.

Historical benthic invertebrate baseline data were reviewed, and analyzed based on updated procedures presented in the current Environment Canada Metal Mining Guidance Document for Aquatic Environmental Effects Monitoring (Environment Canada 2002).

20.3.3 Description of Aquatic Resources

Overall, the aquatic habitat within the TMF-3 development area is of low to moderate quality, and generally comprises ephemeral streams or streams with extremely low flows during winter and summer months. Three creek systems occur in the study area: Creek 9, which will be substantially affected by the TMF-3; Creek 8, a tributary to Rhine Creek, which will be affected by the TMF-3 development only in its upper (ephemeral) reaches; and Creek 8.5, a small creek whose upper reach will be within the TMF-3 footprint.

Aquatic habitat, water quality, and fish distribution within the TMF-3 development area is summarized below.

20.3.3.1 Creek 9

Creek 9 is approximately 1,600 m in length running south from the west side of Huckleberry Mountain and draining into Tahtsa reach west of TMF-2. Habitat type and quality varied largely between reaches (Creek 9 was divided into five reaches and Pond 9A) and while overall the quality of habitat appeared moderate to high (based on channel morphology and substrate), extreme low flows and downstream fish barriers considerably reduced the quantity of available habitat. During the 2010 field assessments, some upper sections of Creek 9 were ephemeral and all feeder streams to Creek 9 were ephemeral or dry.

Natural fish passage barriers in Reach 1 (1.0 m and 4.9 m waterfall) and intermittent flows throughout Creek 9, have restricted fish (lake chub) presence to Reach 3 and Pond 9A.

In situ water quality was consistent throughout the Creek 9 watershed and was within provincial and federal guidelines for sustaining aquatic life. Creek 9 had relatively cool summer water temperatures, dissolved oxygen (DO) levels were measured 7.5 mg/L or higher, and pH was circum-neutral. Metal concentrations were below guideline levels except for total and dissolved aluminum, total and dissolved cadmium, total and dissolved copper and total and dissolved iron. All guideline exceedances, with the exception of cadmium, were within one order of magnitude of their applicable guideline.

20.3.3.2 Creek 9 Mouth (Tahtsa Reach)

In July 1994, a total of 28 fish were captured in 13 hours of gillnetting in Tahtsa Reach at the mouth of Creek 9. Species captured included rainbow trout, longnose sucker, northern pikeminnow and peamouth chub. Average age (determined from scale samples) varied little between species ranging from five years (rainbow trout) to four years (remaining species).

1994 water quality results indicate that water in Tahtsa Reach is soft, with low alkalinity, conductivity, TDS and TSS. pH was circum-neutral with low turbidity (<1 NTU) and nutrient concentrations (nitrite and nitrate, ammonia-nitrogen and phosphorus) near or below detection limits.

20.3.3.3 Creek 8.5

Creek 8.5 is a short (~300 m), partially ephemeral creek located west of Creek 9, which flows through the east side of a small wetland and drains into Tahtsa Reach approximately 660 m west of Creek 9.

No fish were captured in Creek 8.5 during the 2010 field survey. Minimal flow during summer months and intermittent flow in the upper reach significantly reduces the quantity of available fish habitat.

In situ and analytical water samples were collected in 2010 from the lower portion of Creek 8.5. Results were similar to Creek 9 with slightly lower temperatures and higher DO levels, likely due to recent rainfall. Physical variables, dissolved ions and major nutrients were also similar to Creek 9 and within provincial and federal guidelines. Metal concentrations analyzed in water samples were below guideline levels except for total and dissolved aluminum, cadmium and iron.

20.3.3.4 Creek 8

Creek 8 is 3,200 m in length, flowing west from three small lakes before draining into the lower reaches of Rhine Creek. The overlap area of TMF-3 and the Creek 8 watershed (including the sediment control pond) contains ephemeral streams in the upper edges of the watershed.

Habitat surveys found the majority of streams to be primarily ephemeral in their upper extents with poor substrates (boulders and detritus) and limited in stream or riparian vegetation. These ephemeral streams begin to channelize approximately 100 m upstream (east) of their confluence with Lonesome Duck Lake and had an average wetted width of 0.9 m and average depth of 0.25 m.

All of the Creek 8 watershed downstream of, and including Lonesome Duck Lake, is considered to contain fish habitat. Populations of rainbow trout, longnose sucker and small cyprinids (identified as red-sided shiners, but likely lake chub) were captured throughout the creek during 1993 baseline assessments.

Water quality data collected between 1993 and 1995 was generally of good quality throughout the year with near neutral pH, low conductivity, and hardness and TSS at or below detection limits. Nutrient and anion concentrations were low in all sampling seasons with nitrite and ammonia levels remaining below detection limits. With the exception of occasional exceedances of total iron and total aluminum, baseline concentrations of all metals were below CCME guidelines for the protection of aquatic life.

20.4 Wildlife Resources

A summary of the terrestrial biology investigations, particularly related to species at risk (SAR) that was conducted in support of the MZO Project and the application for amendment to HML's Mines Act Permit M-203.

A review of wildlife and vegetation information collected in 1993-1995 to support the original development application identified a number of gaps when compared to current information requirements. In general, the baseline studies conducted for the original project review and approvals were comprehensive for most wildlife species potentially occurring in the project area. The vegetation and ecosystems baseline studies were also comprehensive. The information gaps related primarily to the previous field surveys, and a lack of information documented for species at risk (SAR).

The original baseline surveys and effects assessment provided little information on plant and wildlife SAR potentially occurring in the project area (*i.e.,* those species listed provincially and/or federally under legislation or by federal-provincial accord under the federal *Species at Risk Act*). Given the limited information provided by the previous studies with regard to SAR, the potential for listed plant and wildlife species to occur in the project area was assessed.

20.4.1 Species at Risk Occurring in the Region

The project area is situated in the Nadina Forest District, in an area of low rocky hills and moderate relief west of Huckleberry Mountain and South of the Sweeny Lake lowland. The majority of the project area is in the Engelmann Spruce-Subalpine Fir moist cold (ESSFmc) bio-geoclimatic subzone while the lower portion is in the Sub-Boreal Spruce moist cold (Babine variant; SBSmc2) subzone.

The BC Conservation Data Centre (CDC) lists 16 federally and/or provincially designated SAR as occurring within the SBS and ESSF bio-geoclimatic zones of the Nadina Forest District (*i.e.,* those ranked by the BC CDC as Red or Blue-listed, as well as species listed as Endangered, Threatened or of Special Concern by the Committee on the Status of Endangered Wildlife in Canada [COSEWIC] established under Section 14 of the federal *Species at Risk Act* [SARA]). A focal list of 13 species (four mammals, four birds, one amphibian and four plants) was developed using a combination of occurrence data, range maps, and known species habitat requirements.

20.4.2 Species at Risk Field Assessment

Following identification of 13 SAR that may occur within the project area, Golder Associates conducted a wildlife and plant SAR field assessment from September 7 to 10, 2010. Ground transects (*n*=14) were completed to validate prior vegetation mapping conducted by Hallam Knight Piesold between 1992 and 1995 and to obtain information on potential wildlife activity. Transects were located in all habitat types, although habitats were generally sampled in proportion to their occurrence in the TMF-3 area. The most frequently sampled habitats were mid- to late-successional coniferous forest stands and wetland habitats. Vegetation plots (*n*=26) were completed to sample specific habitat characteristics in each vegetation community.

Human activities in the project area during the September 2010 field visit (especially forest clearing and road development) likely had a negative effect on the number of wildlife encounters and the amount of sign detected on transects. In addition, the field survey was conducted outside the breeding bird season (generally May 1 – July 31), thereby limiting detection of birds. Sign of moose (*Alces alces*), deer, and bear was common throughout the Project area. Of the 13 SAR that may occur in the project area, one species (western toad [*Anaxyrus boreas*]; federally listed as Special Concern) was observed during the field survey, while several nesting barn swallows (*Hirundo rustica*]; provincially Blue-listed) were observed at the Huckleberry Mine camp.

Field data collected from vegetation plots indicated that several habitat types of the project area are characterized by structural attributes important to additional wildlife SAR. Based on measured habitat conditions at the project site, known species habitat requirements, and a review of available occurrence information, caribou (*Rangifer tarandus*), wolverine (*Gulo gulo)*, fisher (*Martes pennanti)*, olive-sided flycatcher (*Contopus cooperi)*, American bittern (*Botaurus lentiginosus)* and common nighthawk (*Chordelies minor)* potentially occur within the project area. Of the four plant SAR that may occur in the Project area, (Black's sedge [*Carex backii*], Montana larkspur [*Delphinium bicolour*], purple oniongrass [*Melica spectabilis*], and alp lily [*Lloydia serotina* var. f*lava*]), none were observed during the field survey. HML has developed a Wildlife Mitigation and Monitoring Plan (WMMP) to ensure that effects from project development on wildlife and wildlife habitats are minimized.

20.5 Workplan

HML is committed to minimizing effects on wildlife and wildlife habitats, and has developed a Wildlife Mitigation and Monitoring Plan (WMMP) for the MZO Project and the mine as a whole

20.6 Terrestrial Environment

The potential effects of the TMF-3 project development on wildlife include both direct effects (*e.g.,* loss of vegetation, infrastructure development, mortality) and indirect effects (*e.g.,* habitat fragmentation, sensory disturbance, dispersal of invasive plants). The TMF-3 footprint is 184 ha, and project activities could potentially affect a number of terrestrial wildlife species during construction and operation, including 13 species at risk (SAR; Table 20.5.1). Wildlife with discrete movements and small home range size, limited dispersal capabilities, or other spatially-limiting factors are likely to be affected at a greater magnitude than wide-ranging species and habitat generalists. Potential project-related effects to SAR are described below.

20.6.1 Effects to Species at Risk

Of the 13 SAR that may occur in the TMF-3 area, one species (western toad [*Anaxyrus boreas*]; federally listed as Special Concern) was observed during the field survey, while several nesting barn swallows ([*Hirundo rustica*]; provincially Blue-listed) were observed at the Huckleberry Mine camp. The field survey was, however, conducted after the breeding bird season (generally May 1 – July 31), thereby limiting detection of birds. Furthermore, the lack of a snow layer limited the number of tracks observed, making it difficult to detect the activity and presence of terrestrial species in the project area.

Due to the limitations of the 2010 survey to detect wildlife species in the TMF-3 area, the assessment of potential project-related effects on wildlife species is based on existing species information for the central interior portion of the province, knowledge of habitat conditions in the project area, and information recorded during site surveys carried out in September 2010 to assess site specific habitat conditions. Each species is considered on a case-by-case basis, taking into account their specific habitat needs and the level and type of threats faced. The potential effects are summarized in Table 20.1.

Table 20.1 Potential Project-Related Effects to Species at Risk
Occurring in the Project Area

Common Name	Potential Effects
Mammals	
Caribou (Tweedsmuir Herd)	• Project-related effects to caribou are expected to be minimal given the lack of suitable habitat in the TMF-3 area.
Wolverine	• Effects on habitat for wolverines are anticipated to be minimal, given the small area of project footprint to be cleared relative to the large home range sizes of individual wolverines. • Effects on denning wolverines are not anticipated, given the lower elevation of the project setting. • Continued human presence and increased sensory disturbance may deter wolverines from foraging in otherwise suitable habitat, which can increase energetic costs to individuals and alter reproductive success, birth rates, and cub survival.

Common Name	Potential Effects
Fisher	• Effects on habitat for fishers are anticipated to be minimal, given the small area of project footprint to be cleared relative to the large home range sizes of individual fishers. • The loss of older trees and contiguous stretches of advanced forest structures are likely to have the most immediate impact on fisher. • Effects on denning fishers are not anticipated, given the present lack of suitable den trees in the area. • Continued human presence and increased sensory disturbance may deter fishers from foraging in otherwise suitable habitat, which can increase energetic costs to individuals and alter reproductive success, birth rates, and cub survival.
Grizzly bear	• Effects on habitat for grizzly bears are anticipated to be minimal, given the small area of project footprint to be cleared relative to the large home range sizes of individual bears and that specific wetland habitat affected by the TMF-3 development is not regionally unique. • Continued human presence and increased sensory disturbance may deter bears from foraging in otherwise suitable habitat, which can increase energetic costs to individuals and alter reproductive success, birth rates, and cub survival.
Birds	
Olive-sided flycatcher	• Project related effects to this species are expected to be minimal as the loss of wintering habitat in Central and South America is thought to be the most serious threat to this species. • The loss of tall, emergent standing snags and mature coniferous trees near forest openings, edges, riparian zones, and wetlands are likely to have the most immediate impact on olive-sided flycatchers by reducing the amount of suitable breeding, nesting, and foraging habitat. • Increased sensory disturbance (*i.e.,* noise and light) related to site preparation and clearing activities for the project may affect breeding olive-sided flycatcher behaviour and migration patterns.
Barn swallow	• Project-related effects to this species are expected to be minimal as changes in farming practices (*i.e.*, loss of suitable nesting sites) are thought to be the most serious threat to this species. • The loss of medium to large cavity bearing trees and snags associated with wetland habitats in the TMF-3 area may reduce the amount of suitable breeding, nesting, and foraging habitat available to barn swallows. • Increased sensory disturbance (*i.e.,* noise and light) related to site preparation and clearing in the project area may affect breeding barn swallow behaviour and migration patterns.
American bittern	• The loss of wetland habitat may result in a localized loss of suitable breeding, nesting, foraging, and migrating habitat for this species. However, project-related effects are expected to be minimal given that the overall small size of the TMF-3 footprint and that specific wetland habitat affected by project development is not regionally unique. • Increased sensory disturbance (*i.e.,* noise and light) related to site preparation and clearing in the project area may affect

Common Name	Potential Effects
	breeding American bittern behaviour and migration patterns.
Common nighthawk	• Project-related effects are expected to be minimal given the overall small size of the TMF-3 area. • Increased human presence in the area may attract avian predators (*i.e.,* crows and ravens) that prey on common nighthawk eggs and nestlings. • The loss of previously cleared or disturbed areas with little ground vegetation may reduce the amount of suitable common nighthawk breeding habitat in the TMF-3 area. • Increased sensory disturbance (*i.e.,* noise and light) related to site preparation and clearing in the project area may affect breeding common nighthawk behaviour and migration patterns. • Common nighthawks forage in low-light conditions at dawn and dusk, and the use of artificial light sources during construction activities may impact the foraging behaviour of this species.
Amphibians	
Western toad	• The loss of wetland habitat in the TMF-3 area will result in a localized loss of suitable breeding and rearing habitat available for this species. In addition, the loss of wetland habitat may affect movement of adults, particularly when migrating to traditional breeding grounds. However, project-related effects are expected to be minimal given that the overall small size of the TMF-3 footprint and that specific wetland habitat affected by the project is not regionally unique. • Wetland habitats down slope of the project area may be exposed to different drainage and water flow patterns resulting in changes to plant communities and ultimately affecting the viability of sites for breeding western toads and other amphibians.
Plants	
Back's sedge	Loss of habitat and species removal due to clearing and construction activities.
Montana larkspur	Loss of habitat and species removal due to clearing and construction activities.
Alp lily	Project-related effects to alp lily are expected to be minimal given the lack of suitable habitat in the project area.
Purple oniongrass	Loss of habitat and species removal due to clearing and construction activities.

20.7 Mitigation

20.7.1 General Wildlife Mitigation

Huckleberry Mines Ltd. has developed a Wildlife Mitigation and Management Plan (WMMP) for the Huckleberry Mine based on the principles of adaptive management. The purpose of the WMMP is to ensure that effects from the development of the TMF-3 on wildlife and wildlife habitats are minimized.

In general, the potential for impacts to SAR that may occur in the project area can be minimized by adhering to mitigation and best management practices for the protection of plant communities and wildlife.

The following mitigation will be implemented, where possible, during development of TMF-3:

- Clearing and construction activities will be scheduled outside the bird breeding period (generally May 1 to July 31). Should it be necessary to undertake clearing and construction activities during the breeding bird period, a breeding bird nest survey will be conducted by a qualified wildlife biologist to locate active nesting sites. In the event that an active bird nest is encountered, clearing and site preparation activities will be re-scheduled to avoid contravention of the Canada *Migratory Birds Convention Act* and the BC *Wildlife Act*, which protects birds and their nests when occupied.
- Clearing and construction activities will be scheduled outside the amphibian breeding, larval development, and juvenile migration period (generally April 1 to September 30). Should it be necessary to undertake clearing and construction activities during this period, activities will follow an approved amphibian mitigation plan to avoid contravention of the BC *Wildlife Act*. This plan will include a survey of potential amphibian breeding habitat, consideration of salvage of amphibians, and other specific measures to minimize impact to amphibian populations, specifically the federally listed western toad.

20.8 Known Environmental issues

Known environmental issues that may impact the ability to extract the mineral reserves:

- inability to manage water within the mine site and be able to discharge excess water to the environment. The ability to discharge water may be hampered by greater flow than anticipated for either the means to transport the water or greater than permit release rates, or contaminants levels greater than permitted to release to the environment.
- Delay in construction of the TMF-3 dam due to wildlife mitigation measures such as postponement of clearing of trees during specific bird breeding periods.

Environmental issues as above would not halt extraction of the mineral reserve, but only delay extraction for short periods.

20.9 Site Monitoring Plan

The site monitoring plan provides a detailed outline for the Huckleberry Mine Site. The plan is currently under development. It is being submitted as part of an Application for an Amendment to Mines Act Permit M-203, submitted by Huckleberry Mines Ltd. (HML), for the Main Zone Pit Optimization (MZO) Project. As part of the MZO Project, mining in the Main Zone area will be expanded with the MZO Pit and a new Tailings Management Facility (TMF-3) will be constructed and operated west of the existing

TMF-2 facility. This monitoring plan is intended to describe ongoing, revised, and new monitoring requirements and commitments for the Huckleberry Mine across various environmental disciplines.

Specific monitoring details, such as monitoring locations, parameters, and frequencies, are based on requirements as of May 2011, most of which are associated with HML's *Environmental Management Act* permit PE-14483 (issued by Ministry of Environment (MoE) and last amended May 6, 2008). It is anticipated that PE-14483, and potentially other permits and approvals, will be further amended as part of the MZO Project to reflect both changes associated with current operations and operational changes that will occur with mining of the MZO Pit and operation of TMF-3.

The information and tables in this document will be revised to incorporate the environmental monitoring requirements set out in the amended PE-14483 permit once that permit has been received. Conditions of other revised or new permits and approvals issued as part of the MZO Project will also be reflected in the monitoring plan, if applicable. The site monitoring plan will also be expanded with additional details (*e.g.,* sampling procedures, data management processes, and documentation requirements) for reference by HML staff, HML consultants, and external regulators and reviewers. Monitoring locations for programs described in Sections 2 to 7 are shown on Figure 1.

20.9.1 Climate Monitoring

The primary objective of climate monitoring at the Huckleberry Mine is to provide inputs for the following:

- calibration of site water balances;
- estimation of runoff and seepage around the site; and
- modeling of flows and water quality on the site and in the receiving environment.

Climate monitoring is also conducted as a condition of the 1995 Mine Development Certificate. The climate monitoring program at the Huckleberry Mine was initiated in 1992 and includes daily records of the following:

- maximum, minimum, and mean temperature (deg C)
- rainfall (mm)
- snowfall (cm) – rainfall equivalent is assumed to be 10% of the depth of snowfall in cm
- total precipitation (mm)
- wind velocity (m/s)

The HML climate station is currently located at the mine camp (53 40’34”N, 127 09’43”W). Prior to 2000 it was located in an area that is now under the centre of the TMF-2 impoundment.

A snow course survey (snowfall accumulation and density) was initiated in March 1994 and has been conducted two to three times per year since 2007 near the west abutment of TMF-2 and east of the East Saddle Dam. It is typically conducted in February, March and April.

Climate data are downloaded monthly and checked for completeness and errors. The database is updated and summaries are produced. The recorded climate data is used as input to the daily and monthly water balance simulations and, in conjunction with streamflow data, to estimate runoff and seepage volumes. The data are also used in reports that require a characterization of site conditions in terms of wet or dry characteristics (*e.g.,* the annual dam inspection reports).

20.9.2 Streamflow Monitoring

Flows at the Huckleberry Mine site are recorded, with the following primary objectives:

- to characterize runoff and seepage amounts from various sources; and
- to estimate loads associated with various water quality parameters.

Effluent discharge volumes are recorded quarterly and reported annually in accordance with MOE Discharge Permit PE-14483.

Flow monitoring locations for the Huckleberry Mine Project, as specified in MOE Discharge Permit PE-14483 (amended May 6, 2008), are outlined in Table 20.2. The monitoring locations reflect flows in the Main Zone, East Pit, and TMF-2 areas of the current mine development.

Table 20.2 Flow Monitoring Locations, Parameters and Frequency

Location Site	I.D.	Frequency
TMF-2	E226128	Daily
SC-2	E223764	
SC-3	E223765	Weekly
SC-4	E223766	
SC-5	E223797	
Discharge from Sewage Treatment Plant	N/A	Quarterly/Daily[a]

Notes: (a) Flow totalizer recorded daily during normal operations and for emergency bypass conditions. Flows are reported quarterly.

HML plans to expand the flow monitoring network to include a station on Creek 9 at Station H9. Flows at Station H9 were monitored in the historic baseline studies, and flows upstream of this location were monitored during the spring, summer, and fall of 2010 as part of recent investigations.

Collection ponds downstream of the TMF-3 embankment (SC-6, SC-7, and SC-8) are not included in the proposed flow monitoring program, as no discharges are anticipated from these structures. The collection ponds are intended to collect runoff and drainage from the TMF-3 downstream embankment and, in the closed system, water will be pumped back to the TMF-3 impoundment for recycle to the mill.

Permitted discharge volumes and rates for the Huckleberry Mine are summarized in Table 20.3. The flow monitoring program currently includes measurement of water level at weirs for SC-2, SC-3, SC-4, SC-5.

As part of the MZO Project, HML proposes to expand the flow monitoring program to include the following:

- continuous water level records at Station H9 on Creek 9; and
- manual water level flow measurements for calibration of weirs and stage-discharge curves, and at other Creek 9 locations coincident with water quality and/or aquatics monitoring.

Water levels are recorded on a continuous basis at SC-2, SC-3, SC-4, and SC-5. Continuous monitoring is also proposed for H-9. Manual flow measurements are conducted monthly to quarterly when the stations are serviced and data is downloaded.

Flow measurements are reported in conjunction with surface water quality parameters in accordance with MOE Discharge Permit PE-14483, as described in Section 20.9.3.

Table 20.3 PE-14483 Effluent Discharge Rates

Source	**Discharge Point(s)**	**Parameter /Measure**	**Permit Limits and Equivalents**			
			Stated in Permit	**Annual**	**Monthly**	**Daily**
Slurry Tailings from Ore Processing Facility	Tailings Management Facility or East Zone Pit (EZP)	Maximum Discharge Rate	48,600 m3/day	17.7 million m3	1.5 million m3	48,600 m3
TMF-2	Tahtsa Reach	Maximum Discharge Rate	5 million m3/year 20,000 m3/day	5 million m3	416,667 m3	20,000 m3
Tailings Impoundment	SC-2 / Creek 2	Mean Discharge Rate	85,000 m3/year	85,000 m3	7,083 m3	Not calculated
Seepage, and Tailings Dam Face and Minesight Runoff	SC-3 / Creek 3	Mean Discharge Rate	110,000 m3/year	110,000 m3	9,167 m3	Not calculated
Pit Water from EZP prior to tailings disposal; mill site, crusher pad and crushed ore stockpile runoff	SC-4 / Creek 4	Mean Discharge Rate	2 million m3/year	2 million m3	166,667 m3	Not calculated
Mine site runoff from in and around Main Zone Pit portion of Tailings Impoundment	SC-5 / Creek 5	Mean Discharge Rate	22,995 m3/year	22,995 m3	1,916 m3	Not calculated
Basal Till Borrow Pit Runoff	Creek 9	Maximum Discharge Rate	Indeterminate	N/A	N/A	Not calculated
Sewage Treatment Plant Discharge	Tailings Impoundment	Monthly Average Discharge Rate	63 m3/day	N/A	N/A	63 m3
Sewage Treatment Plant Emergency Bypass	Mill Creek	Monthly Average Discharge Rate	63 m3/day	N/A	N/A	63 m3

20.9.3 Surface Water Quality Monitoring

The objectives of the Huckleberry Mine surface water quality monitoring program are to document water quality in the receiving environment and to provide a basis from which potential effects on aquatic resources can be evaluated.

Surface water quality monitoring locations, parameters and frequencies for the existing Huckleberry Mine development, as specified in MOE Discharge Permit PE-14483 (amended May 6, 2008), are outlined in Table 20.4.

Sewage treatment plant monitoring locations, parameters and frequencies are outlined in Table 20.5.

In addition to the existing requirements specified in Permit PE-14483, as part of the MZO Project, HML proposes to monitor water quality in TMF-3 and at SC-6, SC-7, and SC-8. No discharges are anticipated from the runoff control ponds; however, the quality of runoff and seepage reporting to these ponds will be monitored. If water quality is demonstrated to be acceptable for release to the environment, HML plans to apply for permission to do so. If warranted, water quality monitoring locations may also be included in the lower Creek 9 watershed and/or in the Sweeney Lake watershed immediately downstream of the Saddle Dam.

Table 20.4 Surface Water Quality Monitoring Locations, Parameters and Limits

Discharge Location	Parameter	Permit Limit	Frequency
TMF-2 to Tahtsa Reach	Dissolved Copper	0.03 mg/L	
	Dissolved Iron	0.50 mg/L	
	Dissolved Zinc	0.05 mg/L	
	Total Suspended Solids	50.0 mg/L	
	pH	6.0 to 10.0 pH units	
	NO2	0.6 mg/L	
	Rainbow Trout 96 hr acute lethality; Single Concentration	50% Survival in 100% Concentration, Minimum	
	Dissolved Arsenic	0.02 mg/L(a)	
	Dissolved Cadmium	0.0005 mg/L(a)	
	Dissolved Lead	0.025 mg/L(a)	

Discharge Location	Parameter	Permit Limit	Frequency
	Dissolved Mercury	0.00005 mg/L(a)	
	Dissolved Molybdenum	0.4 mg/L(a)	
	Dissolved Selenium	0.005 mg/L(a)	
SC-2, SC-3, SC-4, SC-5	Dissolved Copper	0.05 mg/L	
	Dissolved Iron	1.0 mg/L	
	Dissolved Zinc	0.20 mg/L	
	Total Suspended Solids	50.0 mg/L	
	pH	6.0 to 10.0 pH units	
	Rainbow Trout 96 hr acute lethality; Single Concentration	50% Survival in 100% Concentration, Minimum	
SC-2, SC-3, SC-5	NO2	0.1 mg/L	
SC-4	NO2	0.25 mg/L	
Basal Till Borrow Pit and Diversion Ditches to Creek 9	Total Suspended Solids	50 mg/L	
Sewage Treatment Plant Emergency Bypass to Mill Creek	BOD5	45 mg/L	
	Total Suspended Solids	60 mg/L	
	Fecal Coliform	200 MPN / 100 ml	
SC-6, SC-7, SC-8	To be determined	Subject to PE-14483 amendment related to MZO Project	To be determined
TMF-3	To be determined	Subject to PE-14483 amendment related to MZO Project	To be determined
Lower Creek 9	To be determined	Subject to PE-14483 amendment related to MZO Project	To be determined
Sweeney Lake watershed	To be determined	Subject to PE-14483 amendment related to MZO Project	To be determined

(a) Not a specified permit limit. However, if analytical results exceed the specified concentration, the Regional Manager, Environmental Protection, must be notified within 30 days and additional sampling/monitoring may be required.

Table 20.5 Sewage Treatment Plant Discharge Locations, Parameters, and Sampling Frequency

Discharge	Location	Parameter(s)	Frequency
Sewage treatment plant to tailings impoundment	Point of discharge from the sewage treatment plant	TSS (mg/L) BOD5 (mg/L) Fecal Coliform (MPN)	Quarterly
Sewage Treatment Plant emergency bypass to Mill Creek	Point of discharge from the exfiltration pond	TSS (mg/L) BOD5 (mg/L) Fecal Coliform (MPN)	Within 12 Hours of the Bypass and Weekly Thereafter

20.9.4 Groundwater Quality Monitoring

Groundwater quality in the TMF-2 and East Zone Pit area is included in Huckleberry's current monitoring program. The program will be expanded to include groundwater quality monitoring in the TMF-3 area, and will be consistent with requirements associated with discharge permit PE-14483, the Aquatic Effects Monitoring Program, and the TMF-3 engineering Surveillance and Monitoring network. Requirements for this station, including location, will be evaluated based on predicted water quality within TMF-3 and discussions with MOE.

20.9.5 Aquatic Environment Monitoring

The aquatics monitoring program for the Huckleberry Mine is designed to meet requirements associated with the following:

- MOE discharge permit PE-14483
- Federal Environmental Effects Monitoring (EEM) requirements for mines under the Metal Mining Effluent Regulations.

20.9.6 Provincial Monitoring Program

The aquatic provincial monitoring program is conducted every year in early fall for benthic invertebrate community monitoring, and water quality and sediment quality sampling. Fish health and tissue chemistry sampling is conducted when requested by the MOE. An annual aquatic provincial monitoring report is submitted to provincial and federal agencies summarizing effluent flow and water quality in accordance with MOE Discharge Permit PE-14483, as well as results of aquatics sampling and monitoring programs undertaken in Tahtsa Reach.

20.9.7 Federal Monitoring Program

The federal Environmental Effects Monitoring (EEM) program for the Huckleberry Mine is required as part of the authorization to discharge effluent (Environment Canada 2002). The program focuses on environmental monitoring surveys to evaluate the effects of mine effluent on fish, fish habitat, and fisheries resources. This program was harmonized, where possible, with the mine's provincial EEM requirements during the last sampling period (Cycle Two) to maximize the amount of environmental information collected regarding potential aquatic environmental effects of mine discharges, while eliminating redundancy.

The federal monitoring program is conducted and reported on every three years, with field sampling conducted concurrently with the provincial sampling program in early fall.

20.10 Acid Rock Drainage and Metal Leaching

HML conducts regular testing to characterize Acid Rock Drainage and Metal Leaching (ARD/ML) potential of materials at its mine site. Monitoring is conducted for operational purposes and to meet requirements and conditions outlined in the following:

- Mines Act Permit M-203
- MOE Discharge Permit PE-14483
- the Mine Development Certificate.

Ongoing monitoring and testing of materials for ARD/ML will continue as part of the MZO Project. Conditions, parameters, and frequency of testing may be revised as part of revised permit and approval conditions.

20.10.1 ARD/ML Data

The following information is recorded, tabulated and submitted quarterly:

- Locations of Potentially Acid Generating (PAG) materials, including:
    - annual and total quantities of PAG material disposed of
    - elevation
    - date of placement
    - date of flooding
    - duration of exposure
    - PAG exposed at current elevations of TMF-2 and East Pit Plug Dams
    - PAG exposed at 24 months
    - PAG exposed at 5 years.
- Results of Pit Acid-Base Accounting (ABA) for each blasthole, including
    - bench
    - date
    - pH
    - sulfur percentage (S %)

- sulfate percentage
  - sulfide percentage
  - neutralization potential ratio (NRP)
  - acid generation potential (AP)
  - neutralizing potential (NP)
  - net neutralization potential (NNP)
  - total inorganic carbon (TIC)
  - calculated neutralizing potential (NP(calc))
  - tonnes in blast
  - total tonnes
  - number of blastholes
  - tonnes per sampled blasthole
  - site
  - geological description.
- averages, maximums, minimum, medians, standard deviations, and 95% confidence intervals of Pit Acid-Base Accounting (ABA) results.

The current MOE Permit PE-14483 specifies that runoff and seepage, from locations where potentially acid generating (PAG) material has been deposited or is exposed, be collected and monitored in accordance with the parameters and frequencies listed in Table 20.6. The permit currently lists the locations in Table 20.5; however, one of the sites (E228219) is no longer accessible and runoff from another (E228217) now reports to the EZ Pit and is no longer routed to a sediment control pond.

Table 20.6 MOE Permit PE-14483 Acid Rock Drainage Monitoring Requirements

Location Site	I.D. #	Parameter	Sampling Frequency
Crusher Pad and Crushed Ore Stockpile Runoff Combined	E228217	Al(diss), As(diss), Cd(diss), Cr(diss), Cu(diss), Fe(diss), Pb(diss), Zn(diss), Mo(diss), SO4, pH	Monthly
Concentrator Underdrains/Mill Site Drainage	E228219	Al(diss), As(diss), Cd(diss), Cr(diss), Cu(diss), Fe(diss), Pb(diss), Zn(diss), Mo(diss), SO4, pH	Monthly
East Zone Pit Water	E228086	Al(diss), As(diss), Cd(diss), Cr(diss), Cu(diss), Fe(diss), Pb(diss), Zn(diss), Mo(diss), SO4, pH	Monthly
Main Zone Extension Pit Water	E230579	Al(diss), As(diss), Cd(diss), Cr(diss), Cu(diss), Fe(diss), Pb(diss), Zn(diss), Mo(diss), SO4, pH	Monthly

Source: PE-14483, amended May 6, 2008.

Acid Rock Drainage (ARD) measurements are reported in conjunction with surface water quality parameters in accordance with MOE Discharge Permit PE-14483. Tables and graphs are submitted for the Water Quality reports, and tables and spreadsheets are also sent directly to the Ministry of Energy and Mines.

In addition, an annual ARD report is submitted to the Chief Inspector as a condition of Mines Act Permit M-203.

20.11 Land Description

20.11 Land Status and Use

20.11.1 Land Tenure

The TMF-3 development is located within Mineral Claim 855204 and Mineral Lease 353954 held by HML. Based on a review of land ownership and status mapping information on iMapBC, the MZO Project is not anticipated to affect any existing surface land tenures. There are no parcels of privately-owned land within an area bounded by Tahtsa Reach to the south, Rhine Creek to the west, Sweeney Creek to the north, and Whiting Creek to the east.

The following surface tenures are located near the project area, but are not anticipated to be affected by project activities (ILMB 2010):

- Map Reserve 55005 (File 0208548), consisting of 106.8 ha of un-surveyed Crown land and un-surveyed foreshore at the northeast corner of Sweeney Lake reserved for public recreation purposes
- Map Reserve 86923 (Files 6402632), consisting of 72.5 ha of un-surveyed Crown land and un-surveyed foreshore at the northwest corner of Sweeney Lake reserved for public recreation purposes
- License of Occupation 6403837 for light industrial purposes which covers 202 ha within the bed and foreshore of Tahtsa Reach
- License of Occupation 6405892 held by Huckleberry Mines Ltd. for sand and gravel quarrying at Whiting Creek approximately 5 km north of the project area. The Whiting Creek License of Occupation expires August 27, 2011.

The only surveyed parcels identified within the area bounded by Tahtsa Reach, Rhine Creek, Sweeney Creek, and Whiting Creek are the following comprising the Huckleberry Mineral Claim (ILMB 2010):

- District Lot 3230 Huckleberry 1 Mineral Claim, Range 4 Coast District (487.5 ha)
- District Lot 3231 Huckleberry 2 Mineral Claim, Range 4 Coast District (449.3 ha)
- District Lot 3232 Huckleberry 3 Mineral Claim, Range 4 Coast District (500 ha)
- District Lot 3233 Huckleberry 4 Mineral Claim, Range 4 Coast District (499.5 ha)
- District Lot 3235, Range 4 Coast District (35 ha).

The existing mine development area is situated on Crown land within Mineral Lease 353594 held by Huckleberry Mines, which encompasses District Lots 3230, 3231, 3232, 3233, and 3235. The proposed development TMF-3 area and supporting infrastructure will be situated on Crown land within the adjacent Mineral Claim 855204 (479 ha). A small portion is also situated within Mineral Lease. HML currently holds Claim 855204, and has submitted an application to BC Mineral Titles Branch to convert this tenure, along with Claim 855203, to lease status.

20.12 Social Environment

20.12.1 Land Use Considerations

Land uses within the proposed Project area are expected to be limited to potential for backcountry recreation, forestry, trapping, and guide-outfitting. HML is converting the TMF-3 mineral tenure area to lease for the purposes of the MZO Project.

Recreation activities in the vicinity of Huckleberry Mine are expected to mainly be limited to established recreation sites at Sweeney Lake and along Tahtsa Reach, although they may occasionally extend to the MZO Project area for hiking, wildlife viewing, and other transient activities. HML will communicate with land use stakeholders such as forest licensees, trappers, and guide-outfitters with interests in the area and notify them of upcoming project activities. HML will work with stakeholders to resolve any issues which may arise with respect to their interests in the Project area.

HML is currently undertaking consultation activities to better understand current First Nations land use in the TMF-3 area. To HML’s knowledge, and based on consultation information obtained to date, First Nations do not currently use the area specific to the TMF-3 development.

No Project-related effects on specific aspects of First Nations or non-First Nations land use are anticipated, and no specific mitigation requirements have been identified. Consultation with First Nations and land use stakeholders with respect to the MZO Project, and potential effects on land use interests, will continue prior to, during, and following construction, as required.

20.12.2 Forestry

The Huckleberry Mine area is located within Nadina Forest District and the Morice Timber Supply Area (TSA). The Timber Harvesting Land Base within the Morice TSA is dominated by lodgepole pine, while the two other major tree species are hybrid spruce and subalpine fir (MoFR 2008).

The two major licensees operating within the Morice TSA are West Fraser Mills and Canadian Forest Products (MoFR 2008). No timber licenses or Tree Farm Licenses are located within or adjacent to the project area (ILMB 2010).

20.12.3 Trapping

The Huckleberry Mine area is located within BC MOE Wildlife Management Unit (WMU) 6-4. The unit includes all of Tahtsa Lake, Tahtsa Reach and the north shore of Ootsa lake, and extends as far east as Francois Lake.

The Huckleberry Mine area is located entirely within trapline TR0604T045 (ILMB 2010). It includes the Sweeney Lake, Whiting Creek, and Rhine Creek watersheds, in addition to numerous smaller drainages entering the north shore of Tahtsa Reach and Tahtsa Lake.

Based on 1984-1992 records, marten was the most abundant fur-bearer within the TR0604T045 trapline area, accounting for 54% of fur harvest returns (MELP 1993a). Other commonly trapped species included beaver/castor, (16%), weasel (12%), and squirrel (7%). More recent data was requested of MOE but was not available for distribution.

20.12.4 Guide-Outfitting

The Huckleberry Mine area is located entirely within the guide-outfitting area registered to Gary Blackwell of Burns Lake, B.C on behalf of Wistaria Guiding (ILMB 2010). The guide outfitting permit allows moose, mountain goat, deer, black bear, and wolf to be harvested within the area. Other services offered by Wistaria Guiding include freshwater angling, saltwater angling, trail rides, photo safaris, wildlife viewing, and family wilderness vacations.

From 1984-1993, moose and black bear were the main species harvested within the territory, with 83 and 18, respectively, taken during the 10 year period (MELP 1993b). Deer and mountain goat were also being taken in certain years.

20.12.5 Recreation

Tahtsa Reach and Tahtsa Lake may have a moderate capability for outdoor recreation. Appropriate forms of recreation could include camping, sightseeing, sport fishing, wildlife viewing, boating and canoeing. The main limitation on recreational use is the distance from the nearest population centres at Houston, Smithers, and Burns Lake, and the presence of dead trees in the reach which can pose navigation hazards.

No provincial parks or ecological reserves are located within or adjacent to the project area. The BC Ministry of Tourism, Culture and the Arts (MoTCA) maintains recreation sites along the Morice Tahtsa Forest Service Road (FSR) near the project area at Sweeney Lake East, Sweeney Lake West and Tahtsa Reach (MoTCA 2010). The Tahtsa Reach site is located west of the proposed development area at Tahtsa Narrows. No facilities exist and recreational activities are limited to primitive camping and fishing. The Sweeney Lake East and Sweeney Lake West campgrounds each have toilets, picnic tables, and boat launches. The lake is a destination for campers, hunters, and sport fisherman from the Buckley Valley. Rainbow Trout is the main sport fish at Sweeney Lake. The Huckleberry Mine is on the opposite side of Huckleberry Mountain from Sweeney Lake, and no part of the proposed mine extension would be visible from Sweeney Lake. No mine-related facilities are proposed for the watershed that includes Sweeney Lake and Sweeney Creek.

According to the Morice Recreation Inventory, the proposed development area is located within an area of moderate significance and low sensitivity (ILMB 2010). The area is located adjacent to the existing Huckleberry Mine and does not include any landscape features that would form a natural focus for outdoor recreation or tourism such as navigable waterways, large lakes, or unusual scenic features. There is a limited potential for dispersed forms of recreation such as hiking, camping, wildlife viewing, and hunting. There are many alternative areas for these forms of recreation in the region.

20.13 Land Capability

Land capability classification mapping for the TMF-3 area according to the system outlined in "Land Capability Classification for Agriculture in British Columbia" was presented by Terra Silva Environmental Services Ltd. (1996).

The TMF-3 area falls into three capability classes – Class 5, Class 6, and Class 7, which are defined as follows:

- **Class 5:** Land has limitations that restrict its capability to produce perennial forage crops or other specially adapted crops.
- **Class 6:** Land is non-arable but is capable of producing native and/or uncultivated perennial forage crops.
- **Class 7:** Land has no capability for arable culture or sustained natural grazing.

The three capability subclasses serving as the dominant agricultural limitations with the TMF-3 area are:

- **Adverse Climate (C):** Thermal limitations to plant growth. Minimum temperatures near freezing and/or insufficient heat units during the growing season and/or extreme minimum temperatures during the winter season. Not improvable.
- **Topography (T):** Steepness or the pattern of slopes hinders the use of farm machinery, decreases uniformity of growth and maturity of crops, and/or increases the potential for water erosion. Not improvable.
- **Excess Water (W):** Excess free water, other than flooding, limits agricultural use and may be due to poor drainage, high water tables, seepage, and/or runoff from surrounding areas. Improvable by drainage; feasibility and level of improvement is assessed on a site-specific basis.

Climate is the primary agricultural limitation of the flat to moderately sloping portions of TMF-3. The high elevation coupled with a short growing season (attributable to snow accumulations of up to 3 m and a short frost-free period) limits the productivity of the area regardless of an abundance of arable soil, adequate moisture regime, and moderate topography. The "5C" designation reflects the significant limitations on the range of crops that can be cultivated within the area.

Topography is the primary agricultural limitation for considerable portions of TMF-3. The steep slopes found on the north side of TMF-3 have no potential for agriculture (Class 7T). The slightly more moderate slopes in the central and southern portions of TMF-3 have potential as rangeland (Class 6T).

Bogs located in TMF-3 are classified as $O6W^5$ – $O7W^5$. The dominant limitation is excess water which has accumulated in depressional areas. Most of these wetter sites are characterized by deep humic to mesic organic materials, with some gleyed mineral soils underlying these organic deposits and on the fringes of the wet areas. The water limitation can be corrected for these areas with adequate drainage but the Class 5 designation will remain due to climate limitations.

20.14 First Nations

HML is currently undertaking consultation activities to better understand current First Nations land use in the TMF-3 area. To HML's knowledge, and based on consultation information obtained to date, First Nations do not currently use the area specific to the TMF-3 development.

20.14.1 Archeological Assessment

An Archaeological Impact Assessment was conducted in early fall 2010 and summer of 2011. No archaeological materials were observed or recorded in any of the tests excavated during those field programs, and no additional archaeological studies were recommended for the areas that had been assessed.

Even a thorough investigation may fail to identify all archaeological materials that may be present. Subsurface conditions observed during development activity may differ from those on which the study is based. Therefore, if unanticipated archaeological materials or features (including but not limited to, stone artifacts, human remains, or unusual objects or features of a possible ceremonial nature) are encountered during construction and related activities, all work in the immediate area will cease, and the Cheslatta Carrier Nation, Nee-Tahi-Buhn Indian Band, Office of the Wet'suwet'en Hereditary Chiefs, Skin Tyee Nation and the Wet'suwet'en First Nation, Golder Associates, and the Archaeology Branch will be contacted so that an archaeological management plan can be developed and implemented

20.15 Authorizations Required for the Main Zone Optimization Project

The following authorizations will be required for the MZO Project:

- amendment to *Mines Act* permit M-203 (revised mine plan, including MZO Pit and TMF-3)
- amendment to *Environmental Management Act* permit PE-14483 (waste storage and effluent discharge permit)
- *Forest Act* Occupant License to Cut (clearing of the TMF-3 area)
- *Water Act* License for Land Improvement (small diversion around east side of TMF-3)

20.16 Mines Act Permit M-203

Mines Act Permit M-203 was issued by MEMPR for the Huckleberry Mine on February 14, 1996 prior to site preparation activities, and has been amended numerous times as operations have proceeded. Table 20.6 summarizes amendments made to Permit M-203. The proposed MZO Project requires an amendment to Mines Act Permit M-203 to approve the revised mine plan, including mining of the MZO Pit and construction and operation of TMF-3 which were previously approved in concept.

Table 20.7 Summary of Amendments to Permit M-203

Date	Scope of Amendment
February 14, 1996	Approving Work System and Reclamation Program
July 10, 1996	Approving Work System and Reclamation Program Amendment
August 19, 1996	Amendment to Reclamation Security
September 3, 1996	Approval to Construct TMF-2 Starter Dam
September 3, 1997	Approval to Construct TMF-2 Dam to Elevation 1036.6 m
September 3, 1997	Mine Plan Approval to End of Year 1 and Increase of Security
October 2, 1997	Amendment to Reclamation Security
July 31, 1998	1998 Construction, Revised Design for the East Section of TMF-2 Dam
November 13, 1998	Approval to Construct TMF-2 Dam to Elevation 1039.0 m Revisions to 1998 TMF-2 Dam Construction Design Sections
November 30, 1999	Approval to Construct the South Saddle Dam
May 10, 2000	Approving TMF-2 Cyclone Sand Dam
October 17, 2000	Approval to Construct Basal Till Borrow Dam
July 12, 2001	Approval to Raise TMF-2 Dam and South Saddle Dam and to Construct East Dam
February 15, 2002	Approving Work System and Reclamation Program
July 4, 2002	Increase in Reclamation Security
December 19, 2002	Increase in Reclamation Security
September 4, 2003	Approving NQ2 Quarry
January 21, 2004	Raise TMF-2 Dam to 1067 m
June 15, 2005	Raise TMF-2 Dam to 1075 m in 2006
October 11, 2005	Construction of East Saddle Dam
October 11, 2005	Raise TMF-2 and East Dam to 1073 m
February 22, 2006	TMF-2 and East Dam Raise to 1077 m
August 2, 2006	Discharge of Reclaim Water from TMF-2 to Tahtsa Reach
February 14, 2007	Mining of Main Zone Extension Pit
March 31, 2009	TMF-2, East and East Saddle Dams Raises to ~1080 m
April 2, 2009	East Pit Plug Dam Construction

20.17 Environmental Management Act Permit PE-14483

Environmental Management Act Permit PE-14483 was issued by the BC MOE, authorizing the discharge of effluent from the mill to the tailings impoundment; tailing impoundment seepage, pit water and mine site runoff to Tahtsa Reach. Under this permit, metal analysis is required on a monthly basis for all discharge points (weekly for metals at TMF-2) and monthly average and grab sample effluent limits for Total Suspended Solids (TSS) are specified. Water quality data collected in accordance with this permit are reported on a quarterly and annual basis to MOE. The permit also governs discharge of treated domestic sewage to the tailings impoundment.

The permit was first issued on January 28, 1998 and was most recently amended on November 23, 2009 (Table 20.7). An amendment to Environmental Management Act Permit PE-14483 is required to properly reflect both current and planned operational waste and water management across the site, including storage of waste and tailings, and discharge of excess water to Tahtsa Reach.

Table 20.8 Summary of Amendments to Permit PE-14483

Date	Scope of Amendment
January 28, 1998	Original Permit issued
July 27, 1998	Requirement to take flow and TSS measurements over a 48-hour duration following a rain event was removed
August 4, 2000	Authorized increase in mean annual mean discharge from SC-2, SC-3 and SC-4. Also increased NO_2 limits at SC-4 from -0.1 mg/L to 0.25 mg/L
May 24, 2001	Authorized to discharge accumulated rainfall runoff at the Basal Till Borrow Pit
September 11, 2001	Creek 9 monitoring requirements specified
July 15, 2006	Allowed for discharge of excess water from TMF-2 to Tahtsa Reach
May 6, 2008	Allowed disposal of tailings in East Pit
November 23, 2009	Acceptance of MW09-03 as a new groundwater monitoring location indicating parameters to be measured and required frequency of measurement

20.18 Forest Act – Occupant License to Cut

HML held a Licence to Cut and a Special Use Permit under the *Forest Act*. A new Occupant Licence to Cut (OLTC) will be required as part of the MZO Project to authorize clearing of the TMF-3 area prior to construction.

20.19 Water Act – Licence for Land Improvement

HML currently holds three *Water Act* licenses for the mine area, as listed in Table 20.8 A .separate water licence for land improvement will be required to intercept natural runoff from a small catchment along the west side of TMF-3 and divert it around the facility.

Table 20.9 Summary of Water Licences

Date	Reference	Scope of Water Licence
June 28, 1996	109935	diversion of water around the Huckleberry Reservoir
July 3, 1996	110027	diversion of creeks into the Huckleberry Reservoir to fill the reservoir
September 11, 1998	111372	diversion and use of water from Tahtsa Reach for industrial (camp) and mining purposes

20.20 Other Permits and Applicable Regulations

***Environmental Management Act* Permit PR-13943** authorizes discharge of refuse to ground in the current landfill facility and contaminants to air (regulated open burning of wood and associated products and auxiliary fuelled, forced air incinerator) subject to the permit conditions. The permit was issued on July 8, 1997 and was last amended on January 6, 2010. It is anticipated that construction of a landfill facility to appropriately dispose of discarded mine equipment tires will necessitate amendment of this permit prior to commencement of mine closure. No amendments to *Environmental Management Act* Permit PR-13943 are anticipated to be required for the MZO Project.

***Environmental Management Act* Permit PA-14800 –** authorizes air emissions from the mill subject to the permit conditions. The Permit was issued on November 25, 1997.

In addition to the *Environmental Management Act* permits discussed above, the **Hazardous Waste Regulation** and **Contaminated Sites Regulation** apply to the mine site.

The Huckleberry Mine is one of the BC mines to which the **Metal Mining Effluent Regulations (MMER)** apply. MMER requires weekly metals sampling and Environmental Effects Monitoring (EEM), including: fish health and tissue surveys; benthic invertebrate community surveys; water and sediment quality surveys; and effluent quality monitoring. The most recent results of these federal studies are reported in the Huckleberry Mines 2010 EEM Second Cycle Interpretive Report prepared by Hatfield Consultants (Hatfield, 2009).

20.21 First Nations, Public, and Agency Communication

20.21.1 First Nations Communication

In the context of this project, and to support the Crown's legal duty to consult, HML has been consulting with First Nations to assist in the identification of aboriginal interests that may be adversely impacted by the proposed activities and, where applicable, measures to avoid, minimize, or otherwise accommodate any such impacts. Golder has been providing First Nations consultation advisory and documentation support to HML since September 2010.

On August 5, 2010, HML was provided a list of First Nations that the Crown identified as potentially affected by the project, as follows:

- Nee Tahi Buhn Indian Band
- Skin Tyee Nation
- Wet'suwet'en First Nation
- Chelsatta Carrier Nation.

The following organizations were also identified by the Crown:

- Office of the Wet'suwet'en Hereditary Chiefs; and
- Carrier Sekani Tribal Council, of which Wet'suwet'en First Nation is a member.

On September 20, 2010, HML forwarded a project introduction letter and meeting request to the four First Nations identified above, as well as to the following First Nations:

- Moricetown Band
- Hagwilget Village Council
- Haisla First Nation

HML chose to include these additional First Nations to establish interest and protocol with respect to consultation on the project. Moricetown and Hagwilget were included based on their known association with the Office of the Wet'suwet'en Hereditary Chiefs and, in the case of Moricetown, HML's ongoing relationship with that community. Haisla have historically been included in consultation related to mine discharges into Tahtsa Reach and HML has generally kept them advised of mine activities.

The Office of the Wet'suwet'en Hereditary Chiefs was copied on the letters to the Moricetown Band and Hagwilget Village Council, as it was understood that these two First Nations were more closely linked to this organization than other Wet'suwet'en communities. For brevity, the Office of the Wet'suwet'en Hereditary Chiefs is nominally referred to in this section as a First Nation, even though it is recognized that it does not equate to an *Indian Act* band nor reflect an organization under the *Indian Act* system.

With respect to the Carrier Sekani Tribal Council, HML opted to send a letter only to its identified member, Wet'suwet'en First Nation, who indicated to HML that the Carrier Sekani Tribal Council defers to its members on project referrals.

A First Nations consultation work plan was provided to the Crown on January 18, 2011. The plan outlined HML's approach to First Nation consultation for the project design period during which the related *Mines Act* permit amendment would be prepared. The overall objective of the First Nations consultation program was to work toward providing reasonable opportunities for First Nations potentially affected by the project to meaningfully engage with HML in relation to the permit amendment for the MZO. Some potentially affected First Nations prefer to view their interaction with HML holistically and do not separate matters of consultation regarding the MZO Project from the broader ongoing relationship with the company. As such, communications with these First Nations have often included discussions that are only indirectly applicable to the current permit amendment application. HML activities were, however, intended to support the Crown's duty to consult with First Nations on any new adverse impacts that may occur as a result of that amendment. To this end, HML aimed to provide First Nations with the following:

- timely access to readily understandable project information;
- opportunities to identify how each community wished to be consulted in relation to the project; and
- opportunities to provide informed comment related to any new adverse impacts on aboriginal interests as a result of the proposed MZO activities.

These objectives have been pursued by phone, e-mail, and in-person communications with leadership and/or representatives of First Nations. To date, the Wet'suwet'en First Nation is the only community that has not indicated whether a meeting on the project with HML is desired. All other First Nations have indicated a clear desire to meet directly with HML. The following meetings have taken place:

- Cheslatta Carrier Nation, Cheslatta Carrier Nation Band Office, Burns Lake, January 20, 2011;
- Office of the Wet'suwet'en Hereditary Chiefs, Office of the Wet'suwet'en Boardroom, Smithers,
  March 8, 2011 (partial agenda only);
- Cheslatta Carrier Nation, HML Office Boardroom, Vancouver, March 23, 2011;
- Letter of Understanding (LOU) negotiation meetings with Cheslatta Carrier Nation representative(s),
  March 16, April 18, and 20, and May 17, 2011; and
- Informal meeting with Office of the Wet'suwet'en representative, Smithers, May 5, 2011.

All contact events to date, including transmission of draft baseline reports on behalf of the North West Mine Development Review Committee (NWMDRC), have been documented in logs maintained for each First Nation. Aboriginal interests or concerns identified in the course of consultation activities have been tracked.

To facilitate First Nations active participation in the review of the permit amendment by the NWMDRC, HML has taken the following steps to date:

- Signed a LOU with the Cheslatta Carrier Nation that includes capacity support for participation in the NWMDRC
- Reached agreement on capacity support for the Office of the Wet'suwet'en Hereditary Chiefs to participate in the NWMDRC
- Continued discussions with the Office of the Wet'suwet'en Hereditary Chiefs regarding the conclusion of a broader Communications and Engagement Agreement
- Reached agreement on capacity support for the Haisla Nation regarding review of initial baseline study reports, and ongoing communication related to participation in the NWMDRC.

HML continues to communicate with First Nations to arrange meetings, where desired; to identify whether and to what extent aboriginal interests may be adversely affected by the project; and, where necessary, to identify measures to avoid, minimize, or otherwise accommodate new adverse impacts to those interests. HML plans to continue these efforts and will keep the Crown informed of its activities.

20.21.2 Public Communication

Information about the MZO Project is available to the public and has been disseminated via a series of presentations and trade shows in the region. Activities have included the following:

- Presentation at the Nechako 2010 Business Forum, Regional District of Bulkley-Nechako on October 28, 2010
- Presentation to the Regional District of Bulkley Nechako Committee of the Whole, in Burns Lake on February 10, 2011
- Information booth at the Northwest Trade Expo, hosted by the Smithers and District Chamber of Commerce on April 29 and 20, 2011
- Information booth at the Houston Home and Recreational Show in Houston on May 13 and 14, 2011
- Luncheon presentation hosted by the Smithers Exploration Group and the Smithers and District Chamber of Commerce on May 16, 2011.

20.21.3 Agency Communication

HML has been working closely with Agency representatives in the preparation of this *Mines Act* permit amendment application. The MZO Project was first introduced to the NWMDRC on July 14, 2010 in Smithers, BC. HML made a presentation to the committee that provided an overview of the following (meeting minutes distributed August 12, 2010):

- history of the mine and contributions to the local economy;
- description of the resources and proposed mining;
- planned and ongoing site investigations;
- tailings management facility options;
- permitting requirements; and
- schedule.

Subsequent to the initial meeting, MEMPR issued a letter to the NWMDRC confirming that the original 1995 Mine Development Certificate Application for Huckleberry Mine included the TMF-3 facility in the associated environmental studies and mine plan. MEMPR also confirmed that the TMF-3 is, and always has been, a planned element of the Huckleberry Project. To construct and operate it requires an application from HML to amend Mines Act Permit M-203 (MEMPR 2010).

Two interagency meetings were scheduled with key reviewers and staff from various Ministries to provide an update on the project design and application status, and to discuss potential issues related to the amendment application. The meetings were held in Smithers on January 12, 2011 (draft meeting minutes circulated on March 17, 2011) and

March 15, 2011 (meeting minutes circulated May 18, 2011). A series of technical presentations was also presented to representatives of the MEM in Victoria on May 6th 2011.

HML continues to communicate with Agency representatives and will participate in additional technical discussions, as warranted, prior to submission of the completed *Mines Act* permit amendment application.

The following discussion related to mine closure and HML's conceptual reclamation plan was prepared by SRK (2011).

20.22 Conceptual Closure and Reclamation Plan

20.22.1 Closure Period

The expected post-closure land use for the Huckleberry Mine is forested land and wildlife habitat. This will be achieved through decommissioning of operations diversion structures, removal of site infrastructure not needed post closure, and re-vegetation of disturbed areas (including site access roads, dam slopes, and NAG sand tailings beach areas) using available stockpiles of overburden materials. It is currently anticipated that periodic dam safety inspections and long-term control of discharge water quality will be required during the closure and post closure periods. It should be noted that other possible uses of the site were discussed at the Huckleberry Mine Closure Workshop held in March 2009. One of them, use of the site and existing power line for wind power generation, remains under consideration. However, the economic viability of this option and its support amongst stakeholders has not yet been adequately investigated.

21.22.2 Overview of Mine Closure

Overviews of the closure and reclamation activities that will be required to transition the site to its expected post-closure condition are described as follows:

TMF-3

- Placement of an above water NPAG beach adjacent to the TMF-3 dam that will serve as a buffer between the maximum pond elevation within the impoundment and the dam embankment;
- Placement of overburden materials on the surfaces of the NPAG beach and downstream slope of TMF-3 based on available quantities of overburden materials. These surfaces will be subsequently vegetated;
- Construction of a closure spillway within the Creek 9 catchment to convey flow from the TMF-3 tailings impoundment to a discharge point at Tahtsa Reach. Work will involve

decommissioning of any portions of the planned diversion structures that are not incorporated into the TMF-3 spillway alignment; and
- Decommissioning of runoff collection ponds SC-6, SC-7, and SC-8.

Main Zone Optimization (MZO) Pit, TMF-2 and East Dam

- Allowing the Main Zone Optimization Pit to flood to the invert elevation of the closure spillway that will regulate water storage on the TMF-2 tailings impoundment. This will include re-submersion of tailings within TMF-2 that are beyond the limit of the proposed beach (~100m adjacent to the dam crest);
- Completion of any remaining placement of overburden material and re-vegetation of reclaimed surfaces on the NPAG sand beach and downstream slope of TMF-2 and the East Dam that is not completed during operations;
- Construction of a closure spillway within the Creek 5 catchment to convey flow from the TMF-2 tailings impoundment to a discharge point at Tahtsa Reach. Work will include decommissioning of any diversion structures up-gradient of the MZO pit limits; and
- Decommissioning of sediment collection ponds SC-1, SC-2, SC-3, and SC-5.

East Zone Pit, and East Pit Plug Dam (EPPD)

- Placement of an above water NPAG beach adjacent to the ultimate crest of the East Pit Plug dam;
- Use of a water cover over PAG materials placed within the limits of the East Zone pit;
- Placement of overburden materials on the surfaces of the NPAG beach and downstream slope of EPPD based on available quantities of overburden materials. These surfaces will be subsequently vegetated;
- Construction of a closure spillway that will be routed within the Creek 4 catchment to regulate the pond elevation within the East Zone pit; and
- Decommissioning of sediment collection ponds SC-4 and SC-4a.

Additionally, all site infrastructure will be demolished and all disturbed areas, including portions of existing haul roads, will be graded and covered with reclamation media that will subsequently be vegetated. Re-sloping and placement of reclamation media on the crest and beach of the TMF-2 dam has already commenced.

20.23 Post Closure Requirements

20.23.1 Post-Closure Period

The post-closure period will begin once the actions discussed in the closure period are complete (typically within 2 to 10 years after the start of the closure period based on the reclamation unit), and will continue over the long term. The major post-closure activities will be:

- Inspection and maintenance of geotechnical structures;
- Reclamation monitoring;
- Water quality and aquatic environmental effects monitoring;
- Water treatment, if needed at some point in the future; and
- Final closure of access and power corridors, when site access or on site power are no longer necessary.

20.23.2 Final Closure

Final closure of the site will be delayed until long-term water quality demonstrates the need for no further site presence, including no further water treatment.

Once the 7-km connector between the mine site and the forest service road system is no longer required, the width of the existing road will be reduced and reclaimed areas will be re-vegetated. The transmission line will also be decommissioned and the associated right of way reclaimed by backfilling and reseeding hydro-pole post holes.

20.24 Closure Cost Estimate- Preliminary

The preliminary estimate of closure and post closure costs is largely based on detailed closure costs included in the 2010 Closure Plan update (SRK 2010). The costs presented with this application utilize the same cost bases described in the 2010 Closure Plan update and have been applied to develop costs for the following reclamation units that were not included in the 2010 estimate of closure and post-closure costs:

- Reclamation of TMF-3 impoundment surfaces (including placement of overburden and subsequent vegetation of above water NPAG beaches adjacent to the TMF-3 dam crest, the TMF-3 dam crest, and portions of the downstream TMF-3 slope)
- Reclamation of the raised configuration of the East Pit Plug Dam
- Construction of the TMF-3 spillway

Closure of the Huckleberry Mine site is estimated to cost approximately $16.4 M (reported in 2011 $CDN). Equipment costs based in 2010 CDN$ were escalated by 5% to derive 2011 estimates, while labor costs associated with consulting services were escalated by 3% to develop 2011 estimates. Costs to complete closure and reclamation of tailings impoundments, demolition of site infrastructure, and reclamation of disturbed areas are shown on Table 20.9. During the post closure period annual costs are estimated to be approximately $146,000 between Year 3 and Year 29 post closure, and approximately $607,000 between Year 30 and Year 130 (reported in 2011 $CDN). These costs are summarized in Table 20.10. Based on the level of detail associated with the estimates a contingency of 20 percent has been applied as indicated on Tables 20.9 and 20.10.

Table 20.10 Summarized Estimate of Closure Costs (to year 2 post closure)

Task ID	Reclamation Area	Total Cost ($ 2011 CDN)
1	Tailings Dams	$2,499,000
2	Plant Site Structures	$3,296,000
3	Roads (NPAG Haul Road)	$133,000
4	Miscellaneous Access Roads	$342,000
5	Soil Stockpiles	$221,000
6	Linear	$80,000
7	Logged Areas	$306,000
8	Sediment Control Structures	$138,000
9	Solid Waste Disposal	$25,000
10	Engineering Consultants & Construction Management	$944,000
11	Disposal of PAG (from haul roads and Mill Area)	$2,206,000
12	NPAG Beach Construction (cost included in operation budget)	$0
13	Spillways	$1,402,000
14	Monitoring (initial closure)	$145,000
15	Onsite Admin Staff (costs included directly in appropriate reclamation area)	$0
16	Onsite Fixed Costs (costs included directly in appropriate reclamation area)	$0
17	Head Office Costs (costs included directly in appropriate reclamation area)	$0
22	Mill Shop Removal	$1,471,000
23	Contaminated Soil Remediation	$349,000
25	Sediment Control Structures (PAG removal)	$141,000
	Contingency (20%)	$2,739,000
	Total	$16,436,000

File Reference\\Van-svr0\projects\01_SITES\Huckleberry\1CH002.016_MineExpansion\2011_Huckleberry_Mine_Reclamation_and_Closure_18July2011.xlsx]Table 9a_2011 Closure Summary

Table 20.11 Summarized Estimate of Annual Post Closure Costs
(year 3 post closure and following)

Task ID	Reclamation Area	Timing/Duration Post Closure	Annual Cost ($ 2011 CDN)
Short Term Post Closure Monitoring			
14.4	Water Quality & Biological Monitoring	Y3 - Y20	$68,000
14.1 24.1	Geotechnical (includes instrumentation)	Y3 - Y13	$78,000
Long Term Monitoring			
24.6	Water Quality & Biological Monitoring	Y21 - Y30	$88,000
24.3 24.4	Geotechnical (includes instrumentation and inspection)	Y10 - Y129	$21,000
21.1	Water Treatment Plant Operation	Y30 - Y130	$612,000
	Avg. Annual Total Cost (Y3 - Y29)		**$146,000**
	Avg. Annual Total Cost (Y30 - Y129)		**$607,000**
	Large Lump Sum Capital Outlays in Post Closure Period:		
	Consultant Review & Reporting of Closure Measures (Y9)	$124,000	
	Water Treatment Plant Construction (Y 28-29)	$4,032,000	
	Site Abandonment (Y130):		
	Power line Removal	$1,023,000	
	Access Road (113 km-120 km)	$416,000	
	Water Treatment Plant Decommissioning	$1,260,000	
	Note: Labor costs have been inflated by 3% over 2010 estimated costs while equipment costs have been inflated by 5% over 2010 estimated costs. All costs include a contingency of 20%		
File Reference: \\Van-svr0\projects\01_SITES\Huckleberry\1CH002.016_MineExpansion\2011_Huckleberry_Mine_Reclamation_and_Closure_18July2011.xlsx]Table 10a_2011PC Summary			

Huckleberry Mines Ltd. estimates the total cost for all factors related to the closure, reclamation and monitoring of the Huckleberry Mine Site at $93.9 million in nominal 2011 dollars. This estimate has been subjected to independent review as outlined in section 21.1.3.

21.0 CAPITAL AND OPERATING COSTS

21.1 Capital Costs

21.1.1 Capital Cost Estimate Methodology

Capital costs have been estimated for the remaining life of the mine based on past Huckleberry experience, allowing for the MZO plan production requirements to the year 2021 and the need for replacement of certain existing equipment. Each department evaluated their capital requirements, assigning costs and timing requirements. The costs are estimated based on 2011 rates, with knowledge of past acquisitions and discussions with suppliers, as required.

This summary may include forward-looking statements as well as historical information. Forward-looking statements include, but are not limited to, the advancement of mineral exploration, development and operating programs. The words "potential," "anticipate," "forecast," "believe," "estimate," "expect," "may," "project," "plan" and similar expressions are intended to be among the statements that identify forward-looking statements. Although Imperial and Huckleberry believe that their expectations as reflected in any forward-looking statements, are reasonable, such statements involve risks and uncertainties and no assurance can be given that actual results will be consistent with these forward-looking statements

21.1.2 Capital Cost Estimate

The listing of capital costs is summarized as follows:

1. **Dam Construction**

The East Pit Plug dam will be built to a level of 1040 meters by the year 2012, requiring estimated costs of $13.9M, thereby increasing the waste and tailings that can be stored in the East Pit.

Commencing in 2012, the Company will construct the TMF-3 dam, which is anticipated to be completed by the year 2019 to an elevation of 995 metres. It is anticipated that the Company will contract out the dam construction for the years 2012 to 2014, as the Company will have insufficient equipment and manpower to perform the construction internally. Subsequent to 2014, the Company will require fewer resources devoted to mine operations and can therefore take over dam construction responsibilities internally. Total TMF-3 dam construction costs are estimated to cost $87.1M, which includes a 10% contingency.

2. **Mine Equipment**

The Company’s mine department has identified certain purchases of new mine equipment required in order to continue mining operations until 2021, including six new haul trucks, two dozers, one drill, two graders and one shovel. A seventh haul truck is budgeted to be rented for the short period for which it is required. The purchases are anticipated for the years 2012 through 2016, with an expected cost of $28.7M.

During the mine life, the mine equipment will require regular major installations, including replacement of engines, transmissions, undercarriages and other major equipment parts. These costs are capitalized at an estimated cost of $44.6M over the expected life of the assets.

Other mine equipment required for surveying, pit wall monitoring and pit dewatering total $2.6M and is expected to be incurred in years from 2011 to 2016.

3. Mill Equipment

The Mill Department has identified various mill equipment, primarily major repair replacements or upgrades required in order to maintain milling operations through the mine life. The majority of expenditures would be incurred from 2011 through 2016 with the significant capital expenditures including molybdenum circuit repairs, tailings pump and variable feed distributor replacement, on-stream analyzer replacement, ball mill pump boxes replacement, ball mill trunnion magnets and variable feed distributors for the cyclone feed pumps. Total cost would be approximately $7.3M.

4. Water Management

In managing water within the mine pit and the dam sites, the Company must:

- construct two ditches to divert fresh water around the mine site;
- develop three sediment control ponds to manage water release from the TMF-3 tailings facility;
- drill various deep wells for water release within the MZO mine pit; and
- purchase and maintain various pumps, piping and equipment required to remove water from the MZO mine pit during mining operations;

Total costs are estimated at $7.0M and will be incurred through the MZO mine operations time period.

5. **Cyclone Plant**

In preparing for the construction of the TMF-3 dam, the Company plans to acquire a cyclone plant and related piping, power line, transformer, building, booster station and pumps. The tailings will be piped from the mill to the cyclone plant near the TMF-3 dam location. The cyclone plant will then convert tailings from the mill into cyclone sand to be used in the construction of the TMF-3 dam. The total cost of the plant and related equipment is estimated at $5.8M. The plant is expected to be in operation in 2013, therefore the majority of the costs will be incurred in 2012.

6. Other

Miscellaneous other equipment required during the MZO mine life include:

- light vehicles including pick-up trucks, service trucks, ball dump trucks, crew buses and water and sand trucks;
- computer hardware and software upgrades, including server upgrades;
- various camp and kitchen upgrades including a new bunkhouse required to house the extra anticipated staffing levels;
- professional consultation and contracting work required for the MZO expansion application and review;
- ongoing exploration of the ore reserve in the MZO pit and the outlying areas; and
- other miscellaneous equipment and capital expenditures not specifically identified (estimated at $1.0M per year)

Total cost over the MZO mine life (including the general $1.0M per year for 10 years) is $21.1M.

21.1.3 Reclamation Cost Estimate

An independent review of costs related to reclamation and closure has been prepared by a third party engineering consultant. All reclamation costs incurred to the end of the MZO operational plan (the year 2021) were not discounted in the independent estimate. All reclamation costs incurred after the mine's closure were discounted back to the year 2021 based on a discount rate of 3.0%. Total costs were estimated at $93.7 million in nominal 2011 dollars, which produces a closure cost of $36.3 million with the application of the discount rates as noted above. The independent estimate agrees with the estimate prepared by Huckleberry Mines Ltd, in Section 20, with a variance of $815,000 in nominal 2011 dollars over the life of the project. The variance has been attributed to minor changes and refinements as the preparation of the two estimates were performed at different times during 2011.

During the MZO operational plan (to the year 2021), the Company will maintain and monitor all existing dam structures, ensuring compliance with all required environmental and mining related permits. As well, certain reclamation expenditures will be incurred (where possible) if the work can be performed during mining operations. Total costs are estimated at $3.5M.

In the three years subsequent to the closure of the mine, the Company will perform the following major activities:

- complete any work required to the tailings dam structures, including re-grading, re-sloping and replanting along the dam crests, beaches and downward slopes;
- demolish and remove all mine buildings and related structures;
- reclaim all deactivated roads and other related areas disturbed by the Company during mining operations;
- construct dam spillways and outflow channels;

Total estimated costs in the first three years subsequent to mine operations closure total $12.5M, discounted back to 2021.

For the years 2025 to 2038, the Company will monitor water quality and perform periodic site and dam inspections in order to ensure the structural integrity of the dam and that water quality maintains permitted levels. Estimated costs in these years total $1.0M, discounted back to 2021.

For the years subsequent to 2038, the Company will construct and operate a water treatment plant to treat water, where required to meet permit requirements. Total estimated costs subsequent to 2038 are $10.8M, discounted back to 2021.

The Company is required to pledge reclamation bonds as security against the reclamation work. All reclamation bonds requirements have been incorporated into the cash flow projections of the Company.

21.2 Operating Costs

21.2.1 Operating Cost Estimate Methodology

Operating costs have been developed based on historical cost data, adjusted for expected changes required for the implementation of the MZO plan. Costs were also adjusted for known or expected external economic factors. If historical cost data was not sufficient to determine certain sectors of the operating costs (i.e. new equipment, cyclone sand plant), further information was obtained from equipment suppliers. There was no general inflation increase calculated into the costs. Therefore, except as specifically noted in this section, all costs assume a constant 2011 dollar basis.

As the mine is already in the operational phase, working capital levels required to maintain operations have already been established. There is no expected change in working capital levels due to the MZO plan. Working capital levels can fluctuate based on security deposits pledged to counter-parties for anticipated future payments on outstanding derivative instruments. The fluctuations result from increases in projected copper prices on maturity of the derivative instruments, therefore increasing the payment required to the counter-parties on settlement.

21.2.1 Mine Operating Cost Estimate

In the MZO plan, the pit operations will mine ore, waste (not previously blasted), re-handled tailings and re-handled waste (previously blasted). Costs were based on the historical cost data adjusted for expected longer hauls of waste and re-handled tailings to the TMF-3 tailings facility, and recognizing the increased complexity of the re-handled tailings' composition. Annual equipment hours were calculated and then unit manpower, maintenance, operating and support costs required to operate the equipment for the specified equipment hours were applied.

In the calculation of the mine operating costs, an average projected diesel fuel price of US$0.88 per litre has been used, representing the average diesel fuel price paid by Huckleberry from 2006 to 2011.

Re-handled tailings will be mined during the years 2013 to 2016. Costs will include loading and hauling the tailings to the TMF-3 dam. The tailings will not require any blasting, however it is anticipated that both the load and haul factors will be lower than ore or waste due to the composition of the tailings. Therefore its cost per tonne is expected to be higher than re-handled waste by a budgeted amount of 24 per cent.

Ore will be mined through all years to 2019. Costs will include blasting, loading and hauling costs. For the years, 2019 through 2021, the Company will re-handle stockpiled ore to the mill. The re-handled ore will not require any blasting.

Waste that has not been previously blasted will be mined through the years to 2018. Costs will be consistent with the ore, as the waste will be required to be blasted, loaded and hauled. The main difference in cost will be the hauling distance, as the waste will be transported to TMF-3 for disposal, while the ore will be transported a shorter distance to the primary crusher for processing.

The re-handled waste within the MZO pit will have the lowest per unit cost as blasting costs will not be incurred and the waste will be easier to load and transport than re-handled tailings. Re-handled waste will be mined for the years 2011 through 2019.

Table 21.1 Unit mine operating costs per tonne mined by year
(excluding dam construction tonnes and costs)

Year	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Tonnes (‘000’s)	12,300	20,700	26,900	25,600	17,200	11,400
CDN$/tonne	$2.05	$1.50	$1.56	$1.72	$1.72	$1.73

Year	**2017**	**2018**	**2019**	**2020**	**2021**	**Total**
Tonnes (‘000’s)	9,000	8,900	6,600	6,600	2,500	147,700
CDN$/tonne	$2.51	$3.00	$1.80	$1.77	$2.03	$1.82

The calculation of tonnes mined and cost per tonne in Table 21.1 excludes the tonnes and cost of dam construction. Dam construction costs were calculated based on the average cost per tonne of all mining costs for the operation. The higher per tonnage costs in 2017 and 2018 is mainly driven by the increased uphill haulage distance as the trucks travel deeper into the MZO mine pit. By 2019, the mining operations have completed mining the MZO pit and are only transporting re-handled stockpiled ore for 2019 to 2021.

21.2.2 Mill and Other Operating Cost Estimates

Since the mill will be operated in a manner consistent with past history, mill operating costs have been mainly based on recent historical data. Adjustments have been made to reflect known costs savings from operational efficiencies obtained and anticipated future market prices for required supplies (mainly steel costs and reagent prices). As well, the costs reflect the impact of the projected increase in ore milled per day from the MZO pit.

Other operating costs include administration, environmental, human resources and plant support services. All costs were developed based on recent historical data, adjusted for expected market changes and operational changes due to the MZO plan.

Table 21.2 Mill and other operating costs per tonne milled by year

Year	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Tonnes ('000's)	5,900	6,000	6,000	6,400	6,600	6,600
CDN$/tonne	$8.22	$8.49	$8.97	$8.61	$8.55	$8.58

Year	2017	2018	2019	2020	2021	Total
Tonnes ('000's)	6,600	6,600	6,600	6,600	2,500	66,400
CDN$/tonne	$8.40	$8.41	$8.37	$8.14	$8.58	$8.48

21.2.3 Off-Site Concentrate Handling and Smelting Charges

Off-site concentrate handling costs include charges for trucking the concentrate to the Stewart port, port charges for concentrate storage and loading/unloading, ocean freight costs for transport to Japan and various miscellaneous charges including assay charges. Smelting charges include treatment and refining charges for the copper, gold and silver contained in the copper concentrate. Projected smelting charges have been calculated throughout the term of the MZO plan to be consistent with current contractual obligations.

Table 21.3 Average per unit off-site concentrate handling and smelting charges

Trucking, port and miscellaneous charges	Cdn$ per wmt	$78.00
Ocean freight	US$ per wmt	$61.00
Smelting charges	US$ per wmt	$169.00

22.0 ECONOMIC ANALYSIS

The Base Case cash flow incorporated the following assumptions:

- Copper price
  - 2011 – US$3.80/lb
  - 2012 – US$3.40/lb
  - 2013 – 2021 - US$3.14/lb
- Foreign exchange rate
  - 2011 – 2012 – US$1.00 = CDN$1.00
  - 2013 – 2021 – US$1.00 = CDN$1.08
- Gold price – US$1,300/oz
- Silver price – US$25/oz
- Molybdenum price – US$15/lb

- Includes actual results to March 31, 2011 and reflects the future impact of all derivative instruments outstanding as at March 31, 2011;
- Tax rates in accordance with current prescribed taxation rates;
- No changes in the corporate structure of Huckleberry Mines Ltd.;
- All funding requirements come from internal cash resources;
- No funds are issued to the shareholders in the form of dividends or other methods, except amounts earned by the shareholders over the normal course of operations for providing services to the Company;
- All reclamation bond requirements are funded through cash funds invested in interest bearing securities, pledged as security to the Provincial government.

All copper concentrate is sold to a group of three Japanese companies, all of which are also shareholders of the Company. The MZO plan assumes a continuation of the sales arrangement throughout the remainder of the mine life.

Working capital levels, including projected pledged reclamation bonds have been incorporated into the financial analysis when determining cash flow requirements. The cash flow levels required to maintain working capital have been estimated based on previous corporate financial data, accounting for an expected increase in supplies and inventories due to the MZO plan.

The MZO plan and its related cash flow integrates the completion of currently approved mining operations to 2014, with the development and operation of the MZO pit. The Company has budgeted continuous ongoing operations therefore there is no clearly defined start-up, development or investment period and related cash flow. As a result, an Internal Rate of Return calculation and Capital Expenditure Payback Period have not been prepared.

The Company is currently and will continue to be subject to the following income and other taxes unless changes occur in the statutory tax regulations or the company's operational status:

Federal income taxes	2011 – 16.5% on taxable income 2012 and onwards – 15.0% on taxable income
Provincial income taxes	2011 onwards – 10% on taxable income
BC mineral taxes	Total of: • 2.0% on net current proceeds from operations • 13.0% on cumulative net revenues less capital costs (if positive)

The Company has incorporated all existing and enacted statutory rates and rules in calculating taxes for the MZO Plan.

The following presents the expected cash flow from January 1, 2011 through the remaining life of the mine and completion of reclamation work (with the reclamation work performed subsequent to the end of the mine operations being discounted back to the year 2021 at a discount rate of 3%).

Table 22.1 Sensitivity Analysis ('000's)

For the sensitivity analysis in Table 22.1 the following assumptions have been made:

- Copper price
  - April-December, 2011 – US$3.80/lb
  - 2012 – US$3.40/lb
  - 2013 onwards - as noted in Table 22.1
- Foreign exchange
  - April-December, 2011 – US$1.00=CDN$1.00
  - 2010 -US$1.00=CDN1.00
  - 2013 onwards - as noted in Table 22.1

The assumption of the copper price for April-December, 2011 of US$3.80/lb is an approximation of the average actual copper price to the date of this report plus and assumption of US$3.40/lb for the remainder of the year. All other assumptions – as noted in the Base Case.

Copper Price (US$/lb)	**US$1.00=CDN$1.00**			**US$1.00=CDN$1.05**			**US$1.00=CDN$1.08**	
	Cash Inflow	NPV @ 8%		Cash Inflow	NPV @ 8%		Cash Inflow	NPV @ 8%
2.55	18,394	(4,375)		52,245	18,277		72,508	31,831
2.70	58,663	22,560		93,892	46,213		112,329	58,976
2.85	97,682	48,824		130,087	71,221		149,501	84,567
3.00	132,135	72,619		166,196	95,994		186,612	109,938
3.14	164,231	94,644		199,855	118,975		221,216	133,548
3.50	245,479	150,007		285,101	176,915		308,864	193,053

In Tables 22.1 and 22.2, Cash is defined as freehold cash that is not pledged as security (i.e. excludes reclamation bonds and security margin deposits).

Table 22.2 Base Case Statement of Cash Flows ('000's)

Year	2011	2012	2013	2014	2015	2016	2017
Net Revenues	169,494	128,384	147,134	128,348	128,563	165,537	166,128
Mine site Operational Costs	(74,127)	(83,177)	(96,135)	(99,450)	(85,964)	(77,806)	(78,085)
Transportation Costs	(11,386)	(9,267)	(10,943)	(9,575)	(10,331)	(13,283)	(13,283)
Derivative Gain/Loss & Other	19	(1,603)	3,812	2,177	2,785	(67)	666
Capital Expenditures	(17,062)	(67,394)	(20,266)	(22,569)	(24,359)	(23,957)	(15,529)
Reclamation Expenditures	(1,009)	(400)	(250)	(250)	(250)	(250)	(250)
Reclamation Deposit	(6,000)	(6,000)	(6,300)	(5,000)	-	-	-
Cash Flow Before Taxes	59,929	(39,457)	17,052	(6,319)	10,444	50,174	59,647
Taxes	(14,148)	(4,722)	(4,996)	(1,166)	(3,801)	(12,347)	(19,412)
Cash Flow After Taxes	45,781	(44,179)	12,056	(7,485)	6,643	37,827	40,235

Year	2018	2019	2020	2021	Thereafter	Total
Net Revenues	166,760	148,069	91,361	41,786	-	1,481,564
Mine site Operational Costs	(81,851)	(70,929)	(65,653)	(36,055)	-	(849,232)
Transportation Costs	(13,283)	(11,807)	(7,380)	(3,455)	-	(113,993)
Derivative Gain/Loss & Other	5,074	4,183	8,467	(1,356)	10,377	34,534
Capital Expenditures	(15,290)	(6,677)	(2,547)	3,435	-	(212,215)
Reclamation Expenditures	(250)	(250)	(250)	(250)	(32,682)	(36,341)
Reclamation Deposit	-	-	-	-	29,528	6,228
Cash Flow Before Taxes	61,160	62,589	23,998	4,105	7,223	310,545
Taxes	(20,749)	(20,974)	(6,243)	3,116	16,113	(89,329)
Cash Flow After Taxes	40,411	41,615	17,755	7,221	23,336	221,216

The above analysis may include forward-looking statements as well as historical information. Forward-looking statements include, but are not limited to, the advancement of mineral exploration, development and operating programs. The words "potential," "anticipate," "forecast," "believe," "estimate," "expect," "may," "project," "plan" and similar expressions are intended to be among the statements that identify forward-looking statements. Although Imperial and Huckleberry believe that their expectations as reflected in any forward-looking statements, are reasonable, such statements involve risks and uncertainties and no assurance can be given that actual results will be consistent with these forward-looking statements.

23.0 ADJACENT PROPERTIES

Huckleberry Mines Ltd. has mineral exploration rights over approximately 18,500 hectares contiguous to the mine site, including the area covered by Mineral Lease 353594. The company has performed work in the past in an attempt to define mineral resources within these holdings. Huckleberry also holds mineral exploration rights to the Whiting Creek molybdenum deposit, approximately eight kilometres south of the mine site. Limited testing by previous operators on the Ridge Zone has outlined a resource of 123.5 million tonnes at 0.062% Cu and 0.025% Mo (0.043 % MoS_2) (MINFILE 093E 112). Contained within this resource is a higher grade resource of 31.6 million tonnes at 0.06% copper and 0.112% MoS_2 (0.067% Mo); Cann and Smit (1995). **The above resource estimates were prepared prior to the implementation of National Instrument 43-101 Standards of Disclosure for Mineral Projects, and do not comply with that standard. A qualified person has not done sufficient work to classify the following historical estimates as current mineral resources of mineral reserves. Neither Huckleberry Mines Ltd. nor the reporting issuer, Imperial Metals Corporation, treat the above historical estimates as current mineral resources or mineral reserves.**

Exploration and diamond drilling in 2005 and 2008 expanded the known area of mineralization in the Ridge Zone, and also in the Creek Zone. Although no updated mineral resources estimate has been prepared, the Whiting Creek property has exploration potential and remains an asset to Huckleberry Mines Ltd.

24.0 OTHER RELEVANT DATA AND INFORMATION

There are no other data relevant to the Main Zone Optimization that have not already been discussed in this report

25.0 INTERPRETATION AND CONCLUSIONS

The Main Zone Optimization Pit is an expansion to the previously mined out and backfilled Main Zone Pit that would extend the operating life of the mine seven years from the current planned closure of 2014 until 2021. The mineral reserve estimate from the MZO is 39.7 Mt of ore containing 0.343 % copper using a 0.20 % Cu cutoff grade. The base case for the project is forecasted to require capital commitments over its life of

$212 million and is forecasted to generate after tax cash flows of $221 million over the life of the mine. The pit design is primarily limited by the tailings and waste storage volume available in a new tailings management facility, TMF-3, and is bounded by present tailings management structures of the East dam and South Saddle Dam. Based on the findings of this feasibility study, it is concluded that the project has robust economic viability, based on the Base Case assumptions.

The mineral resource as defined by forty years of exploration and production at the Huckleberry Mine has been used to produce the current mineral reserve. Because of the constraints placed by surface installations and tailing storage capacity, only a fraction of the mineral resources at the Huckleberry Mine have been used to define the current mineral reserves.

25.1 Risks and uncertainties

Factors that may affect the reliability of the mineral resource estimates contained in this report include, but are not limited to, natural variance in sampling and analyzing geological materials, and natural variances in manipulating the sample data to produce a resource estimate. Similar errors may also occur in surveying and in incorporating historical location surveys with more modern surveys. Location of samples may therefore be subject to variances similar in nature to those experienced by analytical results. The geostatistical methods employed are designed to quantify and minimize errors in estimation, but are not able to eliminate the natural statistical variance in the estimates.

Mineral reserve estimates must use assumptions regarding pit slopes, future metal prices, currency exchange rates, and future capital and operating input costs. The metals produced at Huckleberry are traded on open markets, and are subject to supply, demand, substitution and other economic factors beyond the control of Huckleberry Mine Ltd. or Imperial Metals Corporation. Input costs such as labour, fuel, electric power, supplies and services are similarly beyond their control. The sensitivity of the projected cash flows to variance in metal prices and costs has been addressed above in this report. Assumptions regarding open pit slopes rely on testing of non-homogenous geological materials. The operators of the Huckleberry Mine have demonstrated ongoing diligence in testing and measuring the geological materials which will form the projected pit slopes, but the in-homogenous nature of the material may nonetheless result in pit slope failures. These failures may require redesign of the excavation, with possible loss of mineable reserves.

In the opinion of the qualified persons preparing this report, the Main Zone Optimization presents an opportunity for the reporting issuer to extend the life of the Huckleberry Mine. The sampling, analytical data, resource estimation and reserve calculations have been subjected to several levels of technical and professional review. The estimates are robust. Huckleberry Mines Ltd. has proven experience in the extraction of mineralized reserves and in mine operation, and has the ability to manage and operate the Main Zone Optimization.

26.0 RECOMMENDATIONS

Based on the conclusions of the feasibility study, it is recommended that Huckleberry Mines Ltd proceed with the detailed engineering, procurement and commissioning to target waste stripping in the 2nd quarter of 2012. This recommendation is contingent upon receiving a timely and acceptable amendment to Mine Act Permit M-203.

A large mineral resource has been partially defined below and around the Main Zone Optimization Pit. Access to this resource is constrained by surface installations such as dams and tailings impoundments. Engineering studies should be undertaken to test the feasibility of accessing this mineral resource. Preparatory geophysical studies and diamond drill testing should be undertaken to identify higher grade areas that could support underground extraction methods that would not be limited by the surface constraints.

27.0 REFERENCES

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DATE AND SIGNATURE PAGE

This document, TECHNICAL REPORT ON THE HUCKLEBERRY AND HUCKLEBERRY PORPHYRY COPPER DEPOSITS OMINECA MINING DIVISION BRITISH COLUMBIA, CANADA has been prepared for Huckleberry Mines Ltd. and Imperial Metals Corporation by

Kent T. Christensen P.Eng

Dated at Huckleberry Mine, BC this 22 day of November, 2011

Kent T. Christensen P. Eng.

Signed

Peter L. Ogryzlo, M. Sc., P. Geo.

Dated at Huckleberry Mine, BC this 22 day of November 2011

Peter L. Ogryzlo, M.Sc., P.Geo. (BC.)

Signed

Gerald R. Connaughton P.Eng.

Dated at Huckleberry Mine, BC this 22 day of November, 2011

Gerald R. Connaughton, P. Eng. (BC.)

Signed

The effective date of the exploration data is September 1, 2011.

ILLUSTRATIONS

All illustrations are embedded in the document. The list of figures may be seen on page 3.

CERTIFICATES OF QUALIFICATIONS

Kent T. Christensen, P. Eng.
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1. I, Kent T. Christensen, P. Eng., am a Registered Professional Engineer and am currently employed as Manager of Mine Engineering and New Projects, with Huckleberry Mines Ltd., Km 121 Morice-Tahtsa FSR, PO Box 3000 in Houston, British Columbia, Canada.
2. I am a member in good standing of the Association of Professional Engineers and Geoscientists of the Province of British Columbia.
3. I am one of the contributing authors of the report dated November 22, 2011 entitled "Technical Report on the Main Zone Optimization Huckleberry Mine " to which this certificate applies.
4. I graduated from the University of Alberta with a Bachelor of Science in Mine Engineering in 1987 and have practiced in my profession continuously since 1987. My experience includes the following:
   a. 2003 - Present — Huckleberry Mines Ltd.; Manager of Engineering and New Projects with gradually increasing responsibility from Senior Mine Engineer to Chief Mine Engineer to present position.
   b. 2000 – 2003 — Bull Moose Operating Corporation; Senior Mine Engineer
   c. 1987-2000 — Quintette Operating Corporation; Engineer-in-Training and progressive roles in engineering of production, long range, and projects.
5. As a result of my professional qualifications and experience, I am a qualified person as defined in NI 43-101
6. I have been responsible for the Huckleberry Mines Ltd. Mine Engineering team since 2004 and have been responsible for, and over seen, all engineering activities related to the Huckleberry Mine and the Main Zone Optimization project. MY place of employment is located on the property site.
7. I am responsible for items 15 – 16, 18-22, and 24 – 26 within the technical report.
8. I am not independent of Imperial Metals Corporation, in that I am employed at Huckleberry Mines Ltd. which is 50% owned by Imperial Metals Corporation and managed as a separate entity.
9. I have read National Instrument 43-101, Form 43-101F1 and the companion Policy 43-101 CP and this report has been prepared in compliance with NI 43-101
10. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated at Houston, British Columbia, this 22 day of November, 2011.

Signature

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — K. T. CHRISTENSEN

Kent T. Christensen P .Eng

CERTIFICATE OF QUALIFICATIONS

Peter L. Ogryzlo M. Sc., P. Geo.
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I, **Peter L. Ogryzlo**, P. Geo, am a professional geoscientist, providing consulting services to the mining industry. I am co-author of the document TECHNICAL REPORT ON THE MAIN ZONE OPTIMIZATION HUCKLEBERRY MINE, OMINECA MINING DIVISION, BRITISH COLUMBIA, CANADA dated November 22nd, 2011.

I hold the degree of Bachelor of Science from McGill University and the degree of Master of Science in Geology from the University of Regina.

I am a Consulting Geologist with over 40 years professional experience in mineral exploration and mine production. I have over 20 years experience in the exploration, development, modeling, estimation, commissioning and mining of porphyry copper and porphyry copper-molybdenum deposits. My relevant experience includes resource modeling, ore reserve estimation, exploration drilling and geological supervision at the Noranda Minerals Bell Copper porphyry copper –gold mine and the Huckleberry copper-molybdenum mine. I have supervised exploration and drilling of the Morrison copper-gold porphyry deposit, the Whiting Creek copper-molybdenum deposit and the Poplar copper-molybdenum deposit. My career experience includes the supervision of approximately one million metres of diamond, reverse circulation, rotary, auger and sonic drilling.

I am a member of the Association of Professional Engineers and Geoscientists of British Columbia.

As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43-101.

The information contained in this report was obtained in part from reports provided by Imperial Metals Corporation and their subsidiary Huckleberry Mines Ltd. other public documents, and visits to the Property on multiple occasions, with the last visit on July 14, 2011. This information is to the best of my knowledge and experience correct. I was employed by Huckleberry Mines Ltd from 2004 to 2008 as Senior Mine Geologist, and have now retired from this position. I am responsible for sections 1-9,11,12,14 and 23 of this report.

As of the date of this certificate, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

I am independent of Huckleberry Mines Ltd. applying all of the tests of National Instrument 43-101.

I have read NI 43-101, the Companion Policy to NI 43-1-1 and Form 43-101F1. This report has been prepared in compliance with National Instrument 43-101 and Form 43-101F1.

Dated at Vancouver, BC this 22nd day of November, 2011.

PROFESSIONAL PROVINCE OF P. L. OGRYZLO BRITISH COLUMBIA GEOSCIENTIST

Peter L. Ogryzlo, M.Sc., P.Geo. (BC)

The effective date of the exploration data is September 1, 2011.

Certificate of Qualifications

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1. I, Gerald R. Connaughton, P.Eng., am a Registered Professional Engineer and am currently employed as Chief Metallurgist, with Huckleberry Mines Ltd., Km 121 Morice-Tahtsa FSR, PO Box 3000 in Houston, British Columbia, Canada.
2. I am a member in good standing of the Association of Professional Engineers and Geoscientists of the Province of British Columbia.
3. I am one of the contributing authors of the report dated November 22, 2011 entitled "Technical Report on the Main Zone Optimization Huckleberry Mine " to which this certificate applies.
4. I graduated from Queen's University with a Bachelor of Science in Engineering Chemistry in 2003 and have practiced in my profession continuously since 2004. My experience includes the following:
   a. 2008 - Present — Huckleberry Mines Ltd.; Chief Metallurgist with gradually increasing responsibility from Mill Metallurgist to Senior Metallurgist to present position.
   b. 2004 – 2008 — Vale Inco, Manitoba Division; Engineer-in-Training and progressive roles in engineering, supervising and mineral processing.
5. As a result of my professional qualifications and experience, I am a qualified person as defined in NI 43-101
6. I have been responsible for the Huckleberry Mines Ltd. Metallurgical Department since 2010 and am responsible for all metallurgical testing related to the Huckleberry Mine and the Main Zone Optimization project. My place of employment is located on the property site.
7. I am responsible for items 13 and 17 within the technical report.
8. I am not independent of Imperial Metals Corporation, in that I am employed at Huckleberry Mines Ltd. which is 50% owned by Imperial Metals Corporation and managed as a separate entity.
9. I have read National Instrument 43-101, Form 43-101F1 and the companion Policy 43-101 CP and this report has been prepared in compliance with NI 43-101
10. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated at Houston, British Columbia, this 22 day of November, 2011.

Signature

Gerald R. Connaughton P.Eng