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MOUNT POLLEY MINE
Tailings Storage Facility
2011 Construction

DRAFT As-Built Report and Annual Review

Submitted to:

Mount Polley Mining Corporation,
Likely, BC

Submitted by:

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SUMMARY

This report presents the annual review of the operation and performance of the Mount Polley Mine Corporation (MPMC) tailings storage facility (TSF) for 2011, together with the as-built report documenting the 2011 construction of the TSF embankment. This report has been prepared in accordance with the requirements of the British Columbia Ministry of Energy and Mines (MEM), including MEM's updated guidelines for Annual Reports, issued 14 February 2003. The following points give a general summary of the 2011 TSF activities and key developments.

1) Classification of the dam(s) in terms of Consequence of Failure (ref. Canadian Dam Association, Dam Safety Guidelines [2007]).

A formal dam safety review was conducted in 2006. (AMEC 2006). This review assigned a "LOW" hazard classification based on 1999 Canadian Dam Association (CDA 1999) guidelines. CDA updated their Dam Safety Guidelines rating in 2007 (CDA 2007) and under the new classification the TSF is classified under "Significant" category (see Classification System .

Table 1.1).

2) Change in Engineer of Record for the TSF

The design and construction monitoring of the TSF embankments from mine start up to early 2011 had been completed under the direction of Knight Piésold Limited (KP). AMEC Environment & Infrastructure, a division AMEC Americas (AMEC) assumed the role of engineer of record for the TSF embankment as of 28 January 2011.

3) Renumbering of embankment instrumentation

KP provided the historical raw instrumentation data collected from the impoundment instrumentation. The raw data was reprocessed, and working piezometers renamed to simplify data management. The revised naming convention for piezometers is presented on Drawing 2011AB.07. The piezometric data organized by planes is presented in Appendix C.

4) Embankment instrumentation summary

In 2011, a site investigation and instrumentation installation program was conducted. During the program additional vibratory wires and slope inclinometers were installed, Table 1.2, summarizes previously and newly installed vibrating wire (VW) installations.

Table 1.1 CDA (2007) Consequence Classification Scheme

Dam Class	Population at Risk [note 1]	Incremental Losses		
		[Note 2]	Environmental and Cultural Values	Infrastructure and Economics
Low	None	0	Minimal short-term loss No long-term loss	Low economic losses; area contains limited infrastructure or services
Significant	Temporary only	Unspecified	No significant loss or deterioration of fish or wildlife habitat Loss of marginal habitat only Restoration or compensation in kind highly possible	Losses to recreational facilities, seasonal workplaces, and infrequently used transportation routes
High	Permanent	10 or fewer	Significant loss or deterioration of *important* fish or wildlife habitat Restoration or compensation in kind highly possible	High economic losses affecting infrastructure, public transportation, and commercial facilities
Very High	Permanent	100 or fewer	Significant loss or deterioration of *critical* fish or wildlife habitat Restoration or compensation in kind possible but impractical	Very high economic losses affecting important infrastructure or services (e.g. highway, industrial facility, storage facilities for dangerous substances)
Extreme	Permanent	More than 100	Major loss of *critical* fish or wildlife habitat Restoration or compensation in kind impossible	Extreme losses affecting critical infrastructure or services (e.g. hospital, major industrial complex, major storage facilities for dangerous substances)

Note 1. Definitions for population at risk:

None – There is no identifiable population at risk, so there is no possibility of loss of life other than through unforeseeable misadventure.

Temporary – People are only temporarily in the dam-breach inundation zone (e.g. seasonal cottage use, passing through on transportation routes, participating in recreational activities).

Permanent – The population at risk is ordinarily located in the dam-breach inundation zone (e.g. as permanent residents); three consequence classes (high, very high, extreme) are proposed to allow for more detailed estimates of potential loss of life (to assist in decision-making if the appropriate analysis is carried out).

Note 2. Implications for loss of life:

Unspecified – The appropriate level of safety required at a dam where people are temporarily at risk depends on the number of people, the exposure time, the nature of their activity, and other conditions. A higher class could be appropriate, depending on the requirements. However, the design flood requirement, for example, might not be higher if the temporary population is not likely to be present during the flood season.

In general, in 2011 the piezometers indicated the following general trends for the TSF embankment:

- Pore pressures in foundation soils in around the TSF embankment were generally noted as stable with minor fluctuations, except for D1 were an upward trending piezometer is noted. Newly installed piezometers appear to have stabilized but insufficient data has been collected to show any trends at this point.
- Pore pressures in the till core are generally found to be stable, with a slightly increasing trend in response to the rising pond level. A14 piezometer shows a greater than typical pore pressure increase; however it appears that it has stabilized at the end of the year. This can be most likely explained by the vertical placement of the piezometer and the lack of an established fine grain beach at that section of the embankment.
- Pore pressures in filter and drains remained unchanged throughout the year.
- Pore pressures in the tailings and upstream fill generally experienced an upwards trend in response to the rising pond level. In addition, piezometers that were installed at a lower elevation experienced lower response relative to the piezometers near the pond elevation.

Table 1.2 Piezometer Summary

Embankment	Previously Installed		2011 Installed	Total (Functional)
	(Functional)	(Non-functional)		
Main	40	26	15	**55**
Perimeter	10	9	5	**15**
South	8	2	3	**11**
Total	**58**	**37**	**23**	**81**

As part of the 2011 site investigation three (3) additional inclinometers were also installed in around the embankment for a total of 7 functioning slope inclinometers as shown in Table 1.3. Newly installed slope inclinometers were not initialized until January 24th, 2012. The last 2011 record reading of site slope inclinometers was conducted on September 6, as such the inclinometer data collected in early 2012 has been included as part of this report, and is presented in Appendix C.

Table 1.3 Slope Inclinometer Summary

Embankment	Previously Installed		2011 Installed	Total (Functional)
	(Functional)	(Non-functional)		
Main	4	1	2	**6**
Perimeter	0	0	1	**1**
Total	**4**	**1**	**3**	**7**

5) Significant changes to dam stability and/or surface water control.

The limit equilibrium analyses, for the Stage 7 raise was conducted prior to commencement of the construction period, utilizing the provided cross sections from KP and material parameters established by KP with a minor change to the material properties of the Zone C. Through past experiences, AMEC believes that the rock fill material is best modeled utilizing Leps (1970) shear strength relationship. For the TSF and the grade of the rock fill with the construction practices being utilized an average quality relationship was used. Findings from the 2011 SI/Instrumentation program will be incorporated into an updated stability model; a report will be issued in mid-2012.

The runoff diversion ditch near Corner 4 at the southwest corner of the TSF was relocated approximately 30 m upslope to accommodate the 2011 extension of the embankment in that area. No other significant changes to the to the surface water control were implemented in 2011.

6) For major tailings impoundments, as described in Part 9.1.3 of the Health, Safety and Reclamation Code for Mines in British Columbia, all operating dams shall have a current Operations, Maintenance and Surveillance (OMS) Manual. The annual report shall indicate the latest revision date of the OMS Manual.

The OMS manual was last updated by MPMC in March 2010 requires an update in 2012.

7) Scheduled date for formal Dam Safety Review (ref. Canadian Dam Association, Dam Safety Guidelines).

A formal Dam Safety Review in planned to be conducted in 2016 or during detailed closure design, whichever is earliest.

8) Summary of 2011 construction.

AMEC was present on site for critical material placement. During this period AMEC verified that construction methods employed were consistent with design expectations during dam construction, material specifications were adhered to and that the monitoring and testing requirements were understood by MPMC personnel. This time was also used to verify that daily technical/progress reports were being completed properly, site and AMEC home office responsibilities were thoroughly understood by all parties, and lines of communication between the site and AMEC office-based support were clearly established and functional. Once AMEC was satisfied that the MPMC's field inspectors were fully trained and prepared to undertake the construction monitoring and reporting role with primarily remote support required by AMEC, AMEC reduced their monitoring presence to monthly visits. Actual timing varied somewhat to align with key construction activities such as foundation preparation and approval, and till core trench approval.

Stage 7 constructions involved raising the crest of the embankment to a minimum elevation of 960.1m began mid spring with placement of upstream fill (Zone U), and was completed by mid fall with placement of NAG rock (ZONE C). The majority of construction monitoring was conducted directly by MPMC field inspectors with submission of daily reports to AMEC during placement of critical materials Till Core (Zone S) and Filter (Zone F). Zone S and Zone F placement was conducted by Peterson Contracting Ltd (contractor). Zone U, Transition (Zone T) and rockfill (Zone C) was placed by MPMC directly. The abutment preparations were also conducted by MPMC. Please refer to Section 5.3 to a complete step by step methodology with regard to fill placement.

In general construction started at corner 4 and followed the embankment to corner 1. At which point due to the location of the secondary barge borrow pit the construction was carried out from corner 5 to corner 1. To meet the required freeboard o the TSF a 0.6 m thick layer was first constructed along the entire length.

Prior to placement of Zone S, AMEC inspected the Zone U to confirm that the bearing material is sufficient for the Zone S placement. Zone S placement was placed, and compacted in 0.3m loose lifts in approximately 1 km long sections while maintaining a minimum 5m width. Filter material was placed in approximately 1 km sections, and maintaining a minimum width of 1.8 m.

To accommodate the contractor MPMC followed up with the Zone T material shortly after the placement of Zone F was completed for the section. The width of the Zone T material was also maintained at a minimum of 1.8 m along the entire length of the embankment. In addition, accommodate timeframe and placement speed of the contractor, MPMC elected to utilize a manufactured product for Zone T material after the initial placement along the south embankment. In addition, to maximize production and provide a ramp for the contractor the transition material was placed with an additional thickness than lifted and reshaped prior to placement of Zone C.

Zone C placement mainly occurred in one lift at the end of the construction

9) Overall performance of the Tailings Management Facility

Observations and data obtained over the course of 2011 indicate that the tailings management facility continues to perform in a satisfactory manner.

1.0 INTRODUCTION

The Mount Polley Mine is located in central British Columbia, approximately 60 km northeast of Williams Lake. The main access route is via Likely Road. The turn to the Mine is located approximately 1.5 km east of Morehead Lake with the Mine located another 11 km to the southeast, along the Bootjack Lake Forest Service Road. The Mount Polley mine commenced production in June 13, 1997. Ore is crushed and processed by selective flotation to produce a copper-gold concentrate. The mill throughput rate is approximately 18,500 tonnes per day (approx. 6.8 million tonnes per year). Mill tailings are discharged as slurry into the Tailings Storage Facility (TSF) located on the south area of the Mine property.

Tailings slurry is conveyed from the Concentrator to the TSF via a tailings discharge pipeline. The tailings are deposited into the impoundment through moveable or fixed spigots on the embankment crest. A floating reclaim pump recycles process water from the supernatant pond in the TSF for use in the mill processing circuit. Sediment ponds and seepage collection ponds are designed to intercept runoff from the surface and seepage from the embankment respectively. Drains, instrumentation and monitoring wells are constructed in and around the TSF to assist in monitoring the performance of the facility.

Drawing 2011AB.01 presents a plan of the as-built condition of the Mount Polley Mine site. Figure 1.1 shows an aerial view of the site from 2011.

MPMC milled approximately 28 M tonnes of ore prior to entering into care and maintenance status for the period from October 2001 to February 2005.

The starter dam for the TSF embankment was constructed in 1996 to a crest elevation of 927.0m. AMEC understands that the starter dam was constructed out of a homogeneous compacted till fill. Discharge of the tailings into the impoundment commenced in the summer of 1997. The TSF embankment was raised in subsequent years as follows:

- To elevation 934.0 m in 1997.
- To elevation 936.0 m in 1998.
- To elevation 937.0 m in 1999.
- To elevation 941.0 m in 2000.
- To elevation 942.5 m in 2001.
- To elevation 944.0 m in 2004.
- To elevation 946.0 m in 2005.
- To elevation 949.0 m in 2006.
- To elevation 950.9 m in 2007.
- To elevation 951.9 m in 2008.
- To elevation 953.9 m in 2009.
- To elevation 958.0 m in 2010.
- To elevation 960.1 m in 2011.

In 2011 MPMC crews and equipment were responsible for the placement of Zone U, Zone T, and Zone C. Placement of Zone S and Zone F was performed by Peterson Contracting Ltd. (Peterson).

This report documents the construction monitoring, construction methods, and the results of the quality control testing performed during the 2011 construction of the Mount Polley TSF raise to approximately El. 960.1 m. This report also represents the 2011 annual review of the MPMC TSF.

Figure 1.1 Aerial View of Mine Site: 2011

2.0 OPERATION OF THE TAILINGS STORAGE FACILITY

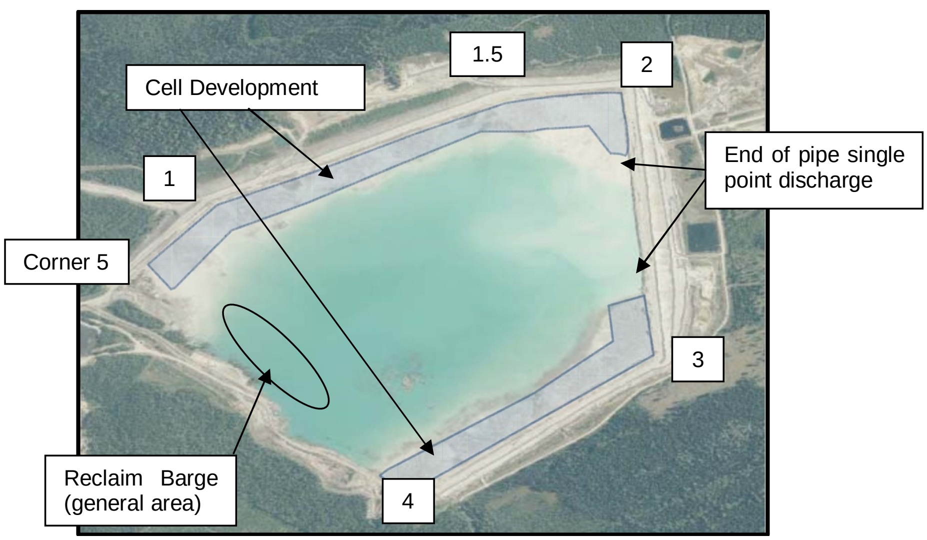
2.1 General

The Mount Polley TSF is comprised of one overall embankment that is approximately 4.2km in length. The embankment, based upon original separate embankments, is subdivided into three (3) sections; referred to as the Main Embankment, Perimeter Embankment and South Embankment. Heights vary along the embankment and are approximately 48 m, 30 m, and 20 m respectively (based upon the Main, Perimeter and South nomenclature). An as-built sections of the embankment is shown on Drawings 2011AB.03 through 2011AB.05.

2.2 Tailings Discharge and Beach Management

Tailings are transported from the mill to the impoundment via an approximately 7 km long HDPE pipeline. As shown in Figure 2.1 2011 cell construction was carried out from corner 5 advancing along the Perimeter embankment to the Main embankment to about Sta. 24+00. Insufficient tailings line pressure prevents cell construction along the central portion of the Main embankment and single point discharge is employed (approximately Sta. 24+00) to facilitate the beach development. Discharge from Sta. 24+00 was maintained for about 3 weeks after which discharge was relocated to corner 4 for the resumption of cell development. Cellular development was employed along the South embankment and around corner 1 where single point discharge was resumed. The pipeline design flow is 20,000 tpd at about 35% solids by dry weight.

Figure 2.1 Tailings Discharge Plan



2.3 Process Water Reclaim

The tailings pond supernatant is recycled to the mill for use as process water. It is transported via the reclaim pumping system, which consists of a barge, pipeline and booster pump station. The reclaim pipeline system returns water from the TSF to the mill for use in the mill process.

2.4 Operations, Maintenance and Surveillance Manual

The Operations, Maintenance and Surveillance Manual (OMS) was updated in 2010. Due to change in engineer of record, the addition of new instrumentation and an updated instrumentation surveillance and reporting plan the TSF management component of the OMS manual is to be updated in 2012 to reflect these changes.

2.5 Freeboard Requirements

The freeboard requirement for the TSF is 1.4 m to allow for the 72-hour PMP event, which corresponds to approximately 1.07 Mm^3 (resulting is a rise of pond level of 0.6 m) plus 0.8 m to allow for wave run-up. The water balance (managed directly by MPMC) projects that a small lift will be required this Spring to provide the necessary impoundment freeboard through the 2012 Freshet. MPMC holds the option of transferring excess pond water into the mined out Cariboo Pit if required to satisfy freeboard requirements until the full 2012 embankment raise is realized.

2.6 Seepage Collection Ponds

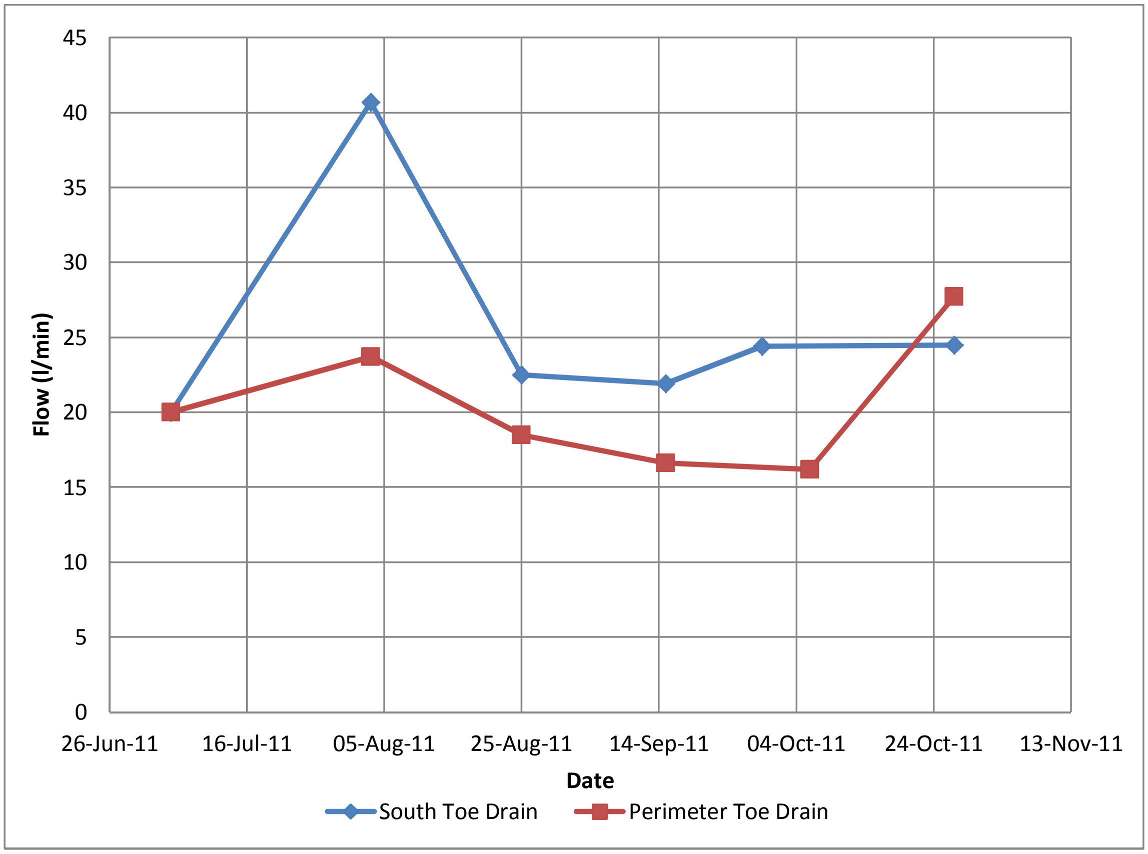
Seepage collection ponds are located downstream of each of the three embankments that create the TSF. The seepage collection ponds collect seepage from the embankments, embankment drain discharge as well as direct runoff from the embankment and reporting catchments. Records indicate that the ponds were excavated into low conductivity glacial till. The ponds were observed to be in good condition.

2.7 Drain Flow Data

Flows from the upstream toe drain and foundation drains of the Main embankment are measured at the sump located at the Main embankment seepage collection pond. Upstream toe drains from the Perimeter and South embankments discharge into ditches which carry the flow to their respective seepage collection ponds where it is measured at the end of pipe. Water from the upstream toe and foundation drains is recycled to the TSF.

Drain flows into the Main embankment require that the sediment control pond be pumped down to a low level to allow for safe entry into the sump. In 2011 Main embankment drain readings were not in compliance with the OMS manual requirements. MPMC is working to revise the monitoring system in an attempt to capture drain flow readings in compliance with the OMS requirements. Drain flows from the South and Perimeter embankments are read weekly as weather permits. The collected drain flow readings from 2011 are presented in Figure 2.2.

Figure 2.2 2011 Collected Toe Drain Flow Rates



3.0 2011 DAM DESIGN

The drawings appended to this report include design and as-built sections of the TSF embankment current as of the end of 2011. The drawings in plan view show the locations of the readout stations for the instrumentation (piezometers, inclinometers), and in section view show the relative placement of the instruments within the embankment and its foundation.

The 2011 Stage 7 TSF embankment raise design was to an elevation of 960.5 m. The design is presented on drawing 2011AB.03 and is as follows:

Upstream Fill (Zone U)

- Cell construction is to be utilized wherever possible;
- Reworking of the tailings is needed to ensure proper distribution within the cell;
- NAG/PAG rock fill can be utilized where the tailings placements is not possible.

Till Core (Zone S)

- Material is to be well graded and as specified in 2011AB.03;
- Minimum 5.0 m in width;
- Continuous full width overlap between the previous stage 6 and stage 7;
- Placed in maximum of 300 mm thick lifts;
- Compaction of minimum of 95%;
- Periodic sampling from the borrow pit and from the dam surface to verify suitability of the material;

Filter (Zone F)

- Material is to be free draining and as specified in 2011AB.03;
- Minimum 1.8 m in width;
- The transition between new and existing filter material is to be continues with a minimum of 1.0 m overlap;
- Placed in maximum of 600 mm thick lifts;
- Compacted by a 10 ton vibratory smooth drum;
- Periodic samples are to be collected for laboratory testing;

Transition (Zone T)

- Material is to be free draining and as specified in 2011AB.03;
- New material is to be placed in maximum of 600 mm thick lifts;
- Minimum 1.8 m in width;
- Compacted by uniform routing of haul trucks and spreading equipment.

Rock Fill (Zone C)

- Nominal maximum particle size of 1m;
- Pavement like surface between consecutive layers is to be scarified;

4.0 CONSTRUCTION MONITORING PROGRAM

Construction Monitoring during the 2011 construction season was mainly carried out by MPMC personnel. AMEC Support Engineer, reviewed daily construction records and perform regular site visits to monitoring the quality of construction and assess MPMC monitoring of the construction.

4.1 AMEC Support Engineer

AMEC's Support Engineer provided on site supervision during the following:

- Pre-construction Meeting: May 31 to June 1
- Construction Kick-off: June 13 to June 16, June 20 to June 24, June 27 to June 28
- July Site Visit: July 25 to July 28
- August Site Visit: August 19 to August 25

While on site the responsibilities of AMEC's Support Engineer were as follows:

- Monitor, train, and assist MPMC personnel with the requirement of construction monitoring;
- Monitor, sample, and requisition tests of the borrow areas, as required;
- Monitor and perform QA testing of compacted till core soils, as required;
- Review and approval of proposed borrow soils;
- Review and approval of transition and filter material, processed methodology and monitoring practices.
- Monitor and approval of the filter trench excavation and preparation;
- Monitor and approval of abutment preparation;
- Address any concerns or out-of-compliance situations observed and recorded during construction;
- Carrying out the quality control field and laboratory testing;
- Directing the MPMC personnel to address the survey requirements, results, etc.; and
- Meeting as required with MPMC to review the construction program.

While in the office the responsibilities of AMEC's Support Engineer were as follows:

- Review daily construction reports submitted by MPMC personnel;
- Review compaction results submitted by MPMC personnel;
- Plot and review instrumentation readings submitted by MPMC personnel;
- Address any concerns or out-of-compliance situations noted by MPMC personnel; and
- Coordinate with MPMC personnel and AMEC's Project Manager/Senior Engineer.

4.2 AMEC Senior Support

AMEC's Senior support Engineers visited site on the following dates:

- T. Martin: June 20/21
- D. Dufault: July 25/25

4.3 MPMC Field Inspector

MPMC Field Inspectors were responsible for the following:

- Monitoring and maintaining a photographic record of ongoing construction activities;
- Review borrow pit material to verify material consistency
- Delineate embankment zones with stakes (every 50 m).
- Perform QC compactor testing of placed Zone S material (as per material placement specifications);
- Collect material samples for QC laboratory testing;
- Conduct as-built surveys of various zones;
- Prepare and submit daily construction reports;
- Collect and submit instrumentation data; and
- Report and out-of-compliance situations to AMEC's Support Engineer

4.4 QA/QC Testing

A summary of the testing requirements is given in Table 4.1.

Table 4.1 Embankment Material Types and QA/QC Testing Requirements

Material Type	Construction Testing Requirements
Zone S – Till Core	Source Classification D422-07: 1 per 10,000 m^3 per source. In-Place Testing D6780-05: 1 per lift per 150 linear m or 1 per day per lift; D422-07: 1 per 10,000m^3 offset to source.
Zone F – Filter	Source Classification D422-07: 1 per 5,000 m^3 per source. In-Place Testing D422-07: 1 per 5,000 m^3 offset to source. Visual in-place inspection of compaction and zone dimension.
Zone T – Transition	Confirmation of waste rock inertness, as required. D422-07: 1 per 5,000m^3. Visual in-place inspection of material size, compaction, and zone dimension.
Zone C – Rockfill	Confirmation of waste rock inertness, as required. Visual in-place inspection of material size and placement.
Zone U – Upstream fill	Visual in-place inspection of material size and placement.

During the 2011 construction season, the testing frequencies as outlined above were generally maintained.

4.5 Instrumentation Monitoring

During 2011 construction period, MPMC personnel monitored the vibratory wire instrumentation along the embankments generally once every two weeks. Inclinometers were monitored during 2011 construction period generally every two weeks offset from vibratory wires.

For the period after the 2011 construction period through the end of 2011 the recommended instrumentation surveillance schedule was not maintained. Compliant monitoring frequency was re-established in January 2012.

5.0 2011 TSF STAGE 7 EMBANKMENT RAISE CONSTRUCTION OVERVIEW

5.1 General

Construction of the stage 7 entailed a raise of approximately 2.1m from approximate EL.958 m to EL. 960.1 m and core construction period took place between June 13 and September 21, 2011. This section provides a brief summary of the 2011 construction activities for the TSF. Drawings AB2011.03 through AB2011.06 show the plan view and as built section of the embankment in relation to the design. A selection of photographs showing various stages of the 2011 TSF construction are presented in Appendix D.

5.2 Abutment Preparation

To accommodate the 2011 embankment raise, the south and perimeter abutments were extended. Abutment preparation was conducted as follows:

- Bulk removal of overburden (including previously placed rock) were removed by MPMC personnel via excavator and dozer.
- Test pits were conducted to confirm that a minimum of 2 m of till was present beneath the embankment core. The test pits were located such that the existing soils found under the till core were not compromised. Bedrock was not encountered in any of the test pits.
- To accommodate a drainage trench detail implemented in past raises a ditch approximately 1.0 m in depth and 2.0 m in width was excavated along the perimeter and the south embankments. On the south embankment it was noted that a corrugated drainage pipe was present. The pipe was extended and placed at the base of the trench. No drainage pipe was noted on the perimeter embankment. The trench was than backfilled with filter material (Zone F).
- Prior to placement of the drainage blanket the exposed native abutment material was proof-rolled with a 10 ton vibratory smooth drum compactor.
- The drainage blanket was placed to the full extents of the embankment shell. The blanket consisted of 0.3 m thick lift of Zone F material overlayed by a 0.3 m thick of Zone T material.

5.3 Fill Placement

5.3.1 Zone U – Upstream Shell

The upstream shell was constructed utilizing cells, reworked with a dozer, and shaped with the aid of en excavator; the majority of this work was carried out without AMEC supervision. Where the tailings were unable to be utilized for shell construction waste NAG was utilized, as shown on Figure 2.1 this occurred along the central portion of the Main embankment between corner 2 and corner 3. The NAG was transported by haul truck and paced/shaped by excavator. Prior to 2011 Zone S placement AMEC's Support Engineer inspected the NAG to ensure that large boulders (diameter >1m) were not placed near the Zone U/Zone S interface.

5.3.2 Zone S – Till Core

During the 2011 construction season two (2) separate borrow pits were utilized. For the 2011 the main borrow source utilized was the perimeter borrow. This borrow pit is located downstream of the perimeter dam between Corner 1 and Corner 1.5. The second borrow utilized was near Corner 5. The second borrow source was only utilized for the small section between Corner 1 and Corner 5 of the embankment. The locations of the borrow pits are shown on Drawing 2011AB.02.

Prior to placement of the first lift of till core for the 2011 raise the existing Zone S/abutments were prepared by proof-rolling with a 10 ton vibratory smooth drum roller. Areas that were noted to be soft or affected by the frost were removed and replaced with approved Zone S material.

The placement of Zone S material was performed by contractor and generally was as follows:

- The top 0.1 m of the prepared surface was scarified with the aid of a dozer/grader.
- The surface was moisture conditioned as required to promote proper bonding of the till lifts.
- The till was placed in 0.3 m thick lifts via scrapers, and was spread with the aid of dozer/excavator/grader.
- Compaction was achieve by scrapper trafficking and a 10 ton smooth drum vibratory compactor
- The in-situ density and moisture content of the compacted fill were determined by performing MDI tests (ASTM D6780-05) by MPMC personnel. AMEC carried out additional QA testing with a nuclear densometer (ASTM D6938-10, ND). Where field test results indicated that the specified 95% Standard Proctor Maximum Dry Density (SPMDD) was not achieved, the area was re-compacted until satisfactory test results were achieved. Samples of till were also collected and periodically sent to AMEC's Prince George lab facility for geotechnical index testing. Additional discussion about the QC/QA tests performed and the results of these tests are provided in Section 5.5.
- On average every 2 to 3 lifts placed the downstream face of the till was trimmed and shaped by an excavator to maintain design lines. The extra width was required to ensure that the full design width of till was compacted.

5.3.3 Zone F – NAG Filter Rock

The material utilized for Zone F is crushed on site and was stockpiled around the embankment until required. Haul trucks are utilized to stock pile and transport the material to the TSF embankment. Refer to Drawing 2011.02 for stock pile locations used during the 2011 construction.

Prior to placement of Zone F material the previously placed filter material was exposed to ensure fresh filter material was exposed in advance of new filter placement. This was carried out by excavator as part of the trimming process for the core. The filter material was placed on the embankment by contractor in 0.6 m lifts. The material was transported by dump trucks and spread/shaped with the aid of excavator, grader, and a loader.

The placed Zone F material was compacted in conjunction with Zone T material, by 10 ton smooth drum compactor and scrapper trafficking.

5.3.4 Zone T – Transition NAG Rock

AMEC understands that historically the Zone T material was a finer gradation of Zone C material. To provide this finer gradation large boulder size rocks were manually sorted by an excavator. This process required experienced operators to sort the material; it was time consuming; and required constant supervision.. Initially manual sorting of material was utilized during the Stage 7 construction. However, during the initial placement of this material along the south embankment, it was noted that the required gradation and consistency of the material was not being achieved. Thus, to achieve the needed gradation and distribution MPMC suggested to utilized a manufactured crushed product that has a nominal particle size of <75mm. This particle gradation meets the specification and allowed to have consistency within the material. Samples of this material were collected and are presented in Appendix B.

Prior to placement of the Zone T material the interface between the different lifts was exposed or/and scarified to remove any pavement like surfaces. Zone T material was hauled by MPMC and placed by MPMC in 0.6 m to 1.2 m thick lifts with the aid of a loader and grader. Additional material was also placed to provide access ramps utilized by scrapers. These ramps enabled to scrapes to place additional till lifts. After the core and the filter material were constructed for the season, the previously placed transition ramp was reshaped to form the transition zone with the aid of an excavator. The compaction of the transition zone was conducted in conjunction with the Zone T material and routing of scrapers and haul trucks.

5.3.5 Zone C – Downstream Shell NAG Rock

Zone C material was placed by MPMC. Prior to placement, where pavement like grade was noted, the grade was scarified with the aid of grader/dozer. The NAG rock was transported from active mining areas to the embankment via haul truck and placed and spread by dozer.

5.4 Survey Control

Survey control requirements for the 2011 raise of the TSF included the following:

- Staking out the upstream and downstream of the Zone S; the stakes were generally placed every 50m along the entire length of the embankment.
- Maintaining the downstream crest stationing during embankment construction.
- Verification that a 5m width was maintained during construction.
- Establishing and verifying the Zone F/T transition line for placement of Zone T material.
- Varying that the minimum width of Zone F and Zone T are achieved by conducting spot checks.
- Survey pick-up of the locations of in-situ density tests.
- Collecting and storing data as required for the as-built record; and
- Providing location and elevation data as required by the AMEC Support Engineer.

5.5 Quality Control and Quality Assurance Testing

QA/QC testing of the fills used in the construction of the embankment involved mainly off-site testing. On-site testing was limited due to the availability of the on-site laboratory. The results of these rests are presented in Appendix A and B.

Prior to commencement of the 2011 construction season; MDI tests on the till were conducted as per (ASTM 6780-05). In addition, a proctor test was conducted to confirm the maximum density and optimal moisture content as per (ASTM D2216-10) of the glacial till.

A summary of the quantities of each different material type and the number and types of tests performed on the fills is provided in Table 5.1.

Table 5.1 TSF Summary of Material Quantities and Laboratory testing

Material Type	Source Of Material	Volume Placed (m^3)	QA/QC Tests Performed
Zone C – Downstream Shell NAG Rock	Springer Pit (ROM)*	209,500	Visual
Zone T – Transition NAG Rock	Springer Pit (Road Crush product)		31 gradations (MPMC – from stockpile) 4 Gradations (AMEC – from stock piles)
Zone F – NAG Filter Rock	Springer Pit (Filter Crush)	19,550	5 Gradations (MPMC As placed) 3 Gradations (AMEC – As placed) 5 Gradations (AMEC – from stock piles)
Zone S - Till Core	Perimeter and Barge Borrow Pits	54,300	5 Proctor 9 Gradation 7 Atterberg limits 43 ND field density (AMEC) 235 MDI field density(MPMC) 9 Laboratory Moisture tests
	Total Fill Volume Placed	**283,350**	

*Run of mine material (no processing required)

6.0 INSTRUMENTATION MONITORING

6.1 General

The design and construction monitoring of the TSF embankments from mine start-up to early 2011 had been completed under the direction of KP. AMEC assumed the role of engineer of record for the TSF embankment as of 28 January 2011. KP provided the historical raw instrumentation data collected from the impoundment instrumentation. The raw data was reprocessed, and working piezometers renamed to simplify data management. The revised naming convention for piezometers is presented on Drawings X through X. The piezometric data organized by planes is presented in Appendix C

6.2 New Instrumentation

In 2011, a site investigation program was conducted. During the site investigation additional vibrating wire piezometers and slope inclinometers were installed. Table 1.2 and Table 1.3 summarize the status of vibrating wire piezometers and inclinometers installed in the TSF.

6.3 Piezometers

In general, in 2011 the piezometers indicated the following general trends for the TSF embankment:

- Pore pressures in foundation soils in around the TSF embankment were generally noted as stable with minor fluctuations, except for D1 were an upward trending piezometer is noted. Newly installed piezometers appear to have stabilized but insufficient data has been collected to show any trends at this point.
- Pore pressures in the till core are generally found to be stable, with a slightly increasing trend in response to the rising pond level. A14 piezometer shows a greater than typical pore pressure increase; however it appears that it has stabilized at the end of the year. This can be most likely explained by the vertical placement of the piezometer and the lack of an established fine grain beach at that section of the embankment.
- Pore pressures in filter and drains remained unchanged throughout the year.
- Pore pressures in the tailings and upstream fill generally experienced an upwards trend in response to the rising pond level. In addition, piezometers that were installed at a lower elevation experienced lower response relative to the piezometers near the pond elevation.

6.4 Slope Inclinometers

In general, in 2011 the inclinometers indicated the following general trends for the TSF embankment:

- SI11-02 showed an approximately 5 mm displacement over the course of the entire year. During stage 7 construction, the rate of increase was minor, with the bulk of the movement (2.5mm) observed sometime after or near completion of construction period. Unfortunately regular readings were not conducted during that time and thus it is unclear what event triggered the displacement. The observed displacement is within the tolerable limits and thus does not present any immediate danger to the embankment.

- SI06-02 and SI06-03 also display a slight displacement. Overall since initialization of these slope inclinometers relative displacement of roughly 5 mm has been observed. However since the sensitively of the slope inclinometers is 10mm anything under that can be a result of instrumentation noise.
- No notable displacement has been noted on SI06-01, SI11-01, and SI11-02.
- SI11-04 is noted to have a compression displacement. This displacement sometimes occurs as a result of the installation process. It is suggested that the slope inclinometer be reinitialized when the compression displacement stabilizes.

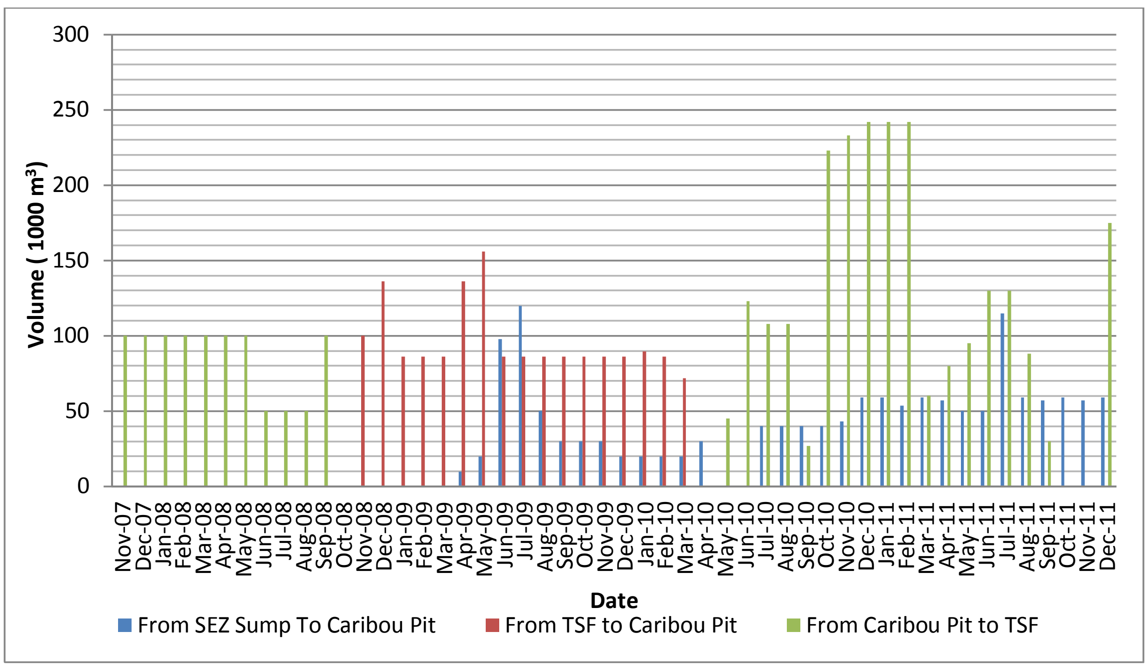
7.0 WATER MANAGEMENT

7.1 General

MPMC maintains the water balance for the impoundment and it has not been reviewed by AMEC. Integral component of any mine is the short and long term solid waste and water management. AMEC recommends that a review of the water balance be conducted during this upcoming year to confirm that the complex model is functioning as designed. The review of site water balance should include a stochastic analysis to evaluate the wet and dry precipitation conditions.

AMEC understands that currently the total inflow from precipitation and surface runoff exceeds losses from evaporation. Thus, MPMC mine site is operating under a water surplus condition, with the surplus being stored in the TSF, the Caribou Pit and North East Zone Pit. In addition, to control and maintain required water balance, MPMC transfers water as needed. The volumes transferred are shown in Figure *7.1*.

Figure 7.1 Water Transfer



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7.2 MPMC Site Water Management Plan

Site water management is illustrated on Figure 7.2 and is described below:

- Northeast Zone Pit water is pumped into the “Long Ditch”. Long Ditch also intercepts surface runoff along with flows via a buried pipeline from “Joe’s Creek” that collects water from dump runoff at the northern end of the site. The Southeast Rock Dump Site (SERDS) Ditch feeds into a pond (along with the open-flow Long Ditch). This water is conveyed via a buried pipe until just past the Bootjack Creek Bridge crossing (not identified on the map) where it then flows back into an open ditch and into the Perimeter Embankment Seepage Collection Pond. This water is collected and pumped into the TSF.

- The Anaerobic Biological Reactor (ABR) receives to drain flow, and discharges out to a pond and to the Main Seepage Pond, where it is pumped back into the TSF.
- The Mill Site Sump is bled into the tailings line to the TSF.
- The reclaim water line runs adjacent to the tailings line, and transfers water from the barge to the booster station (not labelled) and to the mill.
- No toe drains were shown, but as described in Section 2.7 all drains report to the seepage collection ponds before being pumped back into the TSF.

Figure 7.2 Site Water Management Schematic

8.0 CONCLUSIONS AND RECOMMENDATIONS

Conclusions drawn on the basis of this annual review and as-built report are as follows:

1. The TSF embankment was raised to a minimum crest elevation (till core) of 960.5 m in 2011.
2. The 2011 raise construction of the TSF embankment was carried out in conformance with design intent.
3. Monitoring of the TSF embankment via instrumentation and visual inspections indicated the following:
    a. Surveys of inclonometers within the downstream shell of the dam indicate that movements are minor and thus pose no immediate stability concerns.
    b. Foundation pore pressures have been stable.
    c. Pore pressures in the till fill of the dam have increased slightly due to the pore pressure increase of the tailings.....
    d. Measurement of flow rates from toe and embankment drains...
    e. The TSF embankment is performing in accordance with its design intent.

Recommendations made on the basis of this annual review and as-built report are as follows:

1. ....
2. In 2011...

9.0 REPORT CLOSURE

This report has been prepared for the exclusive use of Mount Polley Mine Corporation for specific application to the area within this report. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibility of such third parties. AMEC accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. It has been prepared in accordance with generally accepted geotechnical and tailings dam engineering practices. No other warranty, expressed or implied, is made.

Respectfully submitted,

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DRAWINGS

APPENDIX A

TILL COMPACTION TESTING AND RESULTS

APPENDIX B

SAND AND GRAVEL FILTER GRADATIONS

APPENDIX C

INSTRUMENTATION PLOTS

APPENDIX D

2011 CONSTRUCTION SEASON PHOTOS