TABLE OF CONTENTS

Page

TABLE OF CONTENTS

Page

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

1.0 INTRODUCTION

1.1 Project Overview

Mount Polley Mine is a copper and gold mine owned by Imperial Metals Corporation and operated by Mount Polley Mining Corporation (MPMC). The site is located 56 km northeast of Williams Lake, British Columbia. Mount Polley mine production began in 1997 and operated until October 2001 when operations were suspended for economic reasons. In March 2005 the mine restarted production and has been in continuous operation to date. Currently it is estimated that the mill throughput is approximately 20,000 tpd. Tailings are deposited as slurry into the tailings storage facility (TSF). The TSF is comprised of one overall embankment that is approximately 4.2km in length. The embankment, based upon original separate embankments, is subdivided into 3 sections referred to as the Main Embankment, Perimeter Embankment and South Embankment. Heights vary along the embankment and are approximately 45m, 27, and 17m respectively, based upon the Main, Perimeter and South nomenclature. The design and construction monitoring of the TSF embankments to date has been completed under the direction of Knight Piésold Limited (KP). AMEC Earth and Environmental, a division AMEC Americas (AMEC) assumed the role of engineer of record for the TSF embankment as of 28 January 2011. The overall embankment has incorporated a staged expansion design utilizing a modified centerline construction methodology. The latest expansion was completed in August 2010, which entailed a 4 m embankment raise to a crest elevation of 958 m. The next expansion is planned for 2011 construction season.

1.2 Construction Schedule

The optimal construction season for placement of moisture-sensitive till core material at the Mount Polley Project site typically falls between May and September. The 2011 Stage 7 Embankment raise (2.5m to crest El. 960.5 m) is targeted for completion by the end of September 2011.

For the 2011 construction seasons MPMC will use a contractor to carry the majority of earthworks associated with the annual raise. Haulage of waste rock will be performed by MPMC equipment.

1.3 Construction Monitoring

The level of construction monitoring and QA/QC performed in previous years is to be continued, but MPMC will take a greater role and responsibility in this regard than has been previous practice. Specifically, MPMC would engage its own engineers, technicians, or summer student to provide full-time construction monitoring. That monitor would, working under the direct supervision of Mr. Ron Martel of MPMC, produce daily progress/technical reports for MPMC and for AMEC.

At the commencement of construction AMEC will provide approximately 10 days of full-time dayshift supervision during which AMEC will verify that proper construction methods are employed during dam construction, material specifications are adhered to and that the monitoring and testing requirements are understood by MPMC personnel, and are being satisfied. This time would also be used to make certain that daily technical/progress reports are being completed properly, site and AMEC home office responsibilities are thoroughly understood by all parties, and lines of communication between the site and AMEC office-based support are clearly established and functional.

Once AMEC is satisfied that the design intent is being met, and that MPMC's field inspector is fully trained and prepared to undertake the construction monitoring and reporting role with primarily remote support required by AMEC, we will reduce our monitoring presence to roughly monthly visits, though actual timing will vary somewhat with visits timed for relatively key construction activities, such as foundation preparation and approval, and till core trench approval. To be successful, this arrangement will require that MPMC's field inspector, devoted full-time to the dam construction project, to have good support and cooperation from senior Mt. Polley personnel, and from the Mt. Polley construction team, along with regular technical support as needed from AMEC project personnel.

Todd Martin, Senior Geotechnical Engineer and Daryl Dufault, Project Manager, will visit the site during construction activities. The objective of these senior personnel visits will be to view first-hand the construction, liaise in person with MPMC construction monitor and other project personnel, discuss any issues with construction or design, and get a "look ahead" so that any future upcoming issues can be proactively identified and resolved. These visits will also be used to ensure that a good working relationship is being maintained between AMEC and MPMC project personnel, which will be critical to providing AMEC the requisite confidence to provide as-built report sign off following the end of each stage of dam raising.

1.4 Purpose of Manual

AMEC has prepared this manual for use by on-site personnel and for AMEC's engineering support personnel, who will maintain close communication with the site throughout the construction season and carry out periodic site visits as required.

The objectives of this manual are as follows:

- Summarize the annual construction plans.
- Detail the technical specifications for the dam construction as presented in the design drawings.
- Outline the requirements for monitoring and reporting of the dam construction.
- Present the proposed performance monitoring procedures and design criteria.
- Clearly define the roles and responsibilities of both MPMC and AMEC personnel associated with the 2011 embankment construction activities.

2.0 STABILITY ANALYSES

2.1 General

Two-dimensional limit equilibrium stability analyses were carried out for the proposed 2011 raise using the computer code SLOPE/W (GeoStudio, 2007).

The factor of safety (FoS) for the modeled sections met the minimum design targeted FOS of 1.3 for short-term (during construction) steady state conditions. See Appendix A for a complete discussion of the stability analyses carried out for the proposed 2011 raise.

2.2 Material Parameters

The material strength parameters used in the stability analyses are as summarized in Table 2.1.

Table 2.1 Material Strength Parameters

Material	γ_b (Bulk Unit Weight) (kN/m^3)	ϕ' (Friction Angle) (degrees)	c' (Cohesion) (kPa)
Rockfill (Zone C)	22	Defined by Lep's (1970) shear normal function for average quality rockfill (Note 1)	0
Compacted Till Fill (Zone S)	22	35	0
Ablation Till	21	26	0
Glaciolacustrine/Glaciofluvial	20	24 (residual for glaciaolacustrine)	0
Glacial Till	21	33	0
Tailings	18	30 (drained) S_u/σ_v' = 0.1 (undrained)	0

Note 1. The shear normal function used for the rockfill accounts for the stress-level dependency of the normalized shear strength as expressed by the effective friction angle (ϕ') – see Figure 2.1.

2.3 Pore Pressure Assumptions

Where possible the current phreatic surfaces were derived from vibrating wire piezometer readings installed in the embankments or into the embankment foundation, as reported in Stage 6B construction report (KP, 2011). Where no piezometric pressure data was available the phreatic surface was estimated based on the dam design, and judgement based extrapolation of observed piezometric trends.

The phreatic surface for the 2011 expansion was estimated by increasing current phreatic surface on the upstream side of the core by 2.5 m, equivalent to the Stage 7 raise, while maintaining the phreatic surface downstream of the core.

The rockfill was assigned zero pore pressure except where located below the phreatic surface, below which pore pressures at any given point were taken as hydrostatic.

Artesian conditions are modeled in the main embankment to reflect the pore pressures observed in the glaciolacustrine/glaciofluvial unit in that area. Note that as stated in KP's Stage 6 Construction Report (KP, 2007) piezometric trigger level of 15m above ground reduces the FoS to 1.1. For Stage 7 expansion the same piezometric trigger level is adopted.

Part of the Stage 6 embankment expansion, KP performed a complete stability analysis (KP, 2007). To progress with the required Stage 7 expansion in 2011, AMEC updated only selective scenarios. A comparison of FOS for the worse case scenarios, between Stage 6 and Stage 7 embankment configurations, only a slight reduction in the FOS was observed. Thus, the Stage 7, 2.5 m expansion scheduled for 2011 can be considered negligible to the overall stability of the embankment. Similarly due to the negligible reduction in FoS, the seismic stability situation would remain unchanged relative to KP's 2007 analyses and the deformations would still be considered negligible.

3.0 CONSTRUCTION MONITORING AND TESTING REQUIREMENTS

3.1 Construction Activities

The 2011 construction of the TSF embankment will include the following activities:

- Foundation preparation abutment extensions to expose suitable foundation materials, including excavation of the cutoff trench.
- Development of glacial till borrow areas.
- Development of non-acid-generating (NAG) rock borrow areas (assumed to be mine rock).
- Development of the sand and gravel borrow area or production of sand and gravel from mine waste rock.
- Excavating, hauling, placing, and compacting acceptable structural fills and waste zones to raise the dam core and shell in accordance with design specifications.

The guidelines for quality control testing procedures outlined in this manual are to be observed during construction to satisfy and document that the dam is constructed in accordance with the design.

3.2 Monitoring and Testing

The general monitoring and testing requirements for construction of the 2011 construction of the TSF embankment correspond to the construction activities outlined in Section 3.1; these general requirements are:

- Review and confirm that the prepared foundation areas are acceptable for support of structural fills.
- Review and confirm that the borrow materials are acceptable for use as structural fill.
- Monitor and test (where required) the placement and compaction of accepted structural fill.
- Monitor dam performance by reading and recording instruments in the dam(s) and preparing cumulative change and time plots of the results.

Construction monitoring of activities such as placement of structural fills and foundation preparation will proceed on essentially a continuous basis. Schedules based on minimum test frequencies per unit volume of compacted structural fill, will be followed for the various field and laboratory tests, with additional tests to be performed as required to reassess out-of-compliance results or at the discretion of AMEC.

The results of the monitoring and testing program will be reported to the appropriate parties (MPMC, AMEC) as they are obtained.

3.3 Organization and Responsibilities

3.3.1 Overall

At the commencement of the 2011 construction season, AMEC will provide a dayshift supervisor for approximately a 10 day period (longer if required), during which AMEC will monitor the construction methodology, material testing procedures, instrumentation monitoring frequency, and daily technical/progress reporting to ensure that the design specifications are satisfied.

After AMEC is satisfied that the design specifications intent is being met, site and AMEC home office responsibilities are thoroughly understood by all parties, and that MPMC construction monitor is fully trained and capable to monitor and report on construction, MPMC will undertake day to day quality control for the construction. AMEC will continue to provide remote support though out the project, and conduct monthly site visits (actual timing of site visits will vary to coordinate with critical construction activities) to monitor ongoing progress on the embankment construction. To be successful, this arrangement will require that MPMC field inspector is devoted full-time to the dam construction project with support and cooperation of senior MPMC personnel, and from the MPMC construction team.

Figure 3.1 outlines the overall organizational structure for Stage 7 TSF embankment construction, while the responsibilities associated with the construction monitoring is summaries in Table 3.1.

3.3.2 MPMC Field Inspector

MPMC is to provide a full-time dayshift field inspector to monitor daily embankment expansion construction. MPMC field inspector is to have support and cooperation from the senior MPMC personnel, construction team

The responsibilities of MPMC field inspector will be as follows:

- Monitor and photograph daily construction activities related to TSF embankment.
- Prepare daily technical/activity reports. (See Appendix B).
- Measure and record instrumentation readings on a weekly basis.
- Document and conduct material testing as per specifications.
- Report any non-compliance issues observed to AMEC and MPMC.

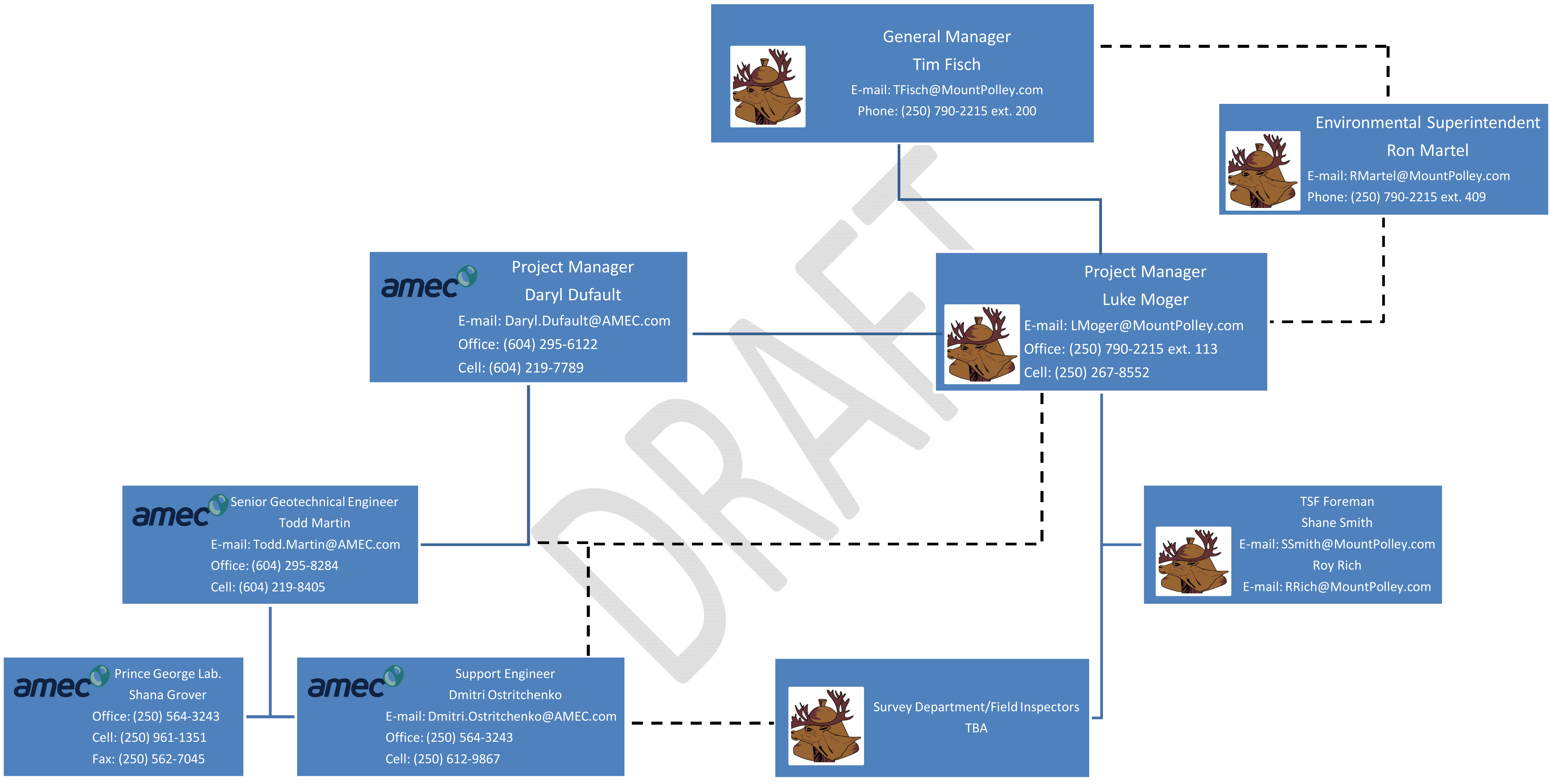

Figure 3.1 2011 Construction Organization Chart

Table 3.1 Construction Monitoring Tasks

No.	Tasks Description	Responsibility
1.0	**Foundation Preparation**	
1.1	Abutment Extensions: Review of exposed soil and or rock conditions and confirmation that suitable dense, undisturbed, native soil, or sound bedrock conditions are exposed for dam construction.	AMEC
1.2	Core Trench Construction: Review of exposed soil and or rock conditions, perform test pits as required to confirm the thickness of glacial till over bedrock along the core trench alignment. Review of core trench excavation and confirmation of proper excavation slopes. Direct rock excavation and cleaning work as deemed necessary.	AMEC
1.3	Approval: Review the provided photos of the foundation preparation and provide approval.	AMEC
2.0	**Review of Borrow Areas and Materials**	
2.1	Glacial Till Borrow Pit: • Review cut slopes. • Collect and prepare samples of borrow material for testing to assess both suitability of materials and to evaluate the Standard Proctor maximum dry density and optimum moisture content of the material. • Report test results to AMEC and MPMC's Project Manager as they are obtained.	MPMC
2.2	NAG Rock Source: • Review the selective borrowing / classification of material for the coarse NAG rockfill. • Visual verification of the material for conformance to the gradation specifications. • Report observation and test results to MPMC's Project Manager as they are obtained.	MPMC
2.3	NAG Rock Source: • Monitoring the selective borrowing/classification/processing of material for the fine NAG rock transition zone. • Sampling and testing the material for conformance to the gradation specifications. • Report observation and test results to AMEC and MPMC's Project Manager as they are obtained.	MPMC
2.4	NAG Crushing Operation: • Monitoring the filter sand and gravel crushing and decking operation. • Testing the material throughout for conformance to the gradation specifications. • Report observation and test results to AMEC and MPMC's Project Manager as they are obtained.	MPMC
2.5	Materials Approval: • Conduct quality assurance testing • Approve the materials to be used during construction of the embankment.	AMEC
3.0	**Review of Structural Fill Placement**	
3.1	Zone S: • Review and confirm that the location of zone interfaces are in their correct locations. • Confirm the width of the core zone is sufficient. • Test the placed and compacted Zone S structural fill for in-place density. • Collect samples for moisture content determinations and density (rock content) corrections. • Collect samples of fill for confirmation index testing. • Report observations and test results to AMEC and MPMC's Project Manager as they are obtained.	MPMC
3.2	Zone C: • Review and confirm that the NAG rock is in conformance to the gradation specifications. • Observe and confirm the compaction specification is followed.	MPMC
3.3	Zone T: • Review and confirm that the NAG transition zone rock is in conformance to the gradation specifications. • Observe and confirm the compaction specification is followed. • Report observations and test results to AMEC and MPMC's Project Manager as they are obtained.	MPMC
3.4	Zone F: • Review and confirm that the zone interfaces are in their correct locations. • Confirm the width of the filter zone is sufficient. • Review and confirm that the crushed fine filter material is in conformance to the gradation specifications. • Confirm via hand-excavated test pits that segregation of filter sand and gravel is not occurring. • Report observations and test results to AMEC and MPMC's Project Manager as they are obtained.	MPMC
3.5	Zone U: • Review and confirm that the zone interface is in the correct location. • Collect soil samples for gradation analysis. • Monitor material reworking to ensure proper distribution within the cell. • Report observations and test results to AMEC and MPMC's Project Manager as they are obtained.	MPMC
4.0	**Dam Performance Monitoring**	
4.1	Coordinate weekly readings of vibrating wire piezometers, slope inclinometers during the construction, enter the data into a spreadsheet and submit the recorded data to AMEC for analysis. Also prepare summary table of R_u values for till fill piezometers. Check piezometer levels against threshold levels, and immediately report any values approaching these levels.	MPMC
4.2	Review submitted weekly readings, prepare associate graphs and analyze the collected data.	AMEC
4.3	Report monitoring results to AMEC and MPMC's Project Manager as they are obtained.	AMEC
5.0	**Construction Monitoring**	
5.1	Meeting daily with MPMC's TSF Foreman and Project Manager to review the construction program, concerns, upcoming work, and other relevant issues.	MPMC
5.2	Meeting monthly with the MPMC Field Inspector, Project Manager and TSF Foreman	MPMC/AMEC
5.3	Directing the survey personnel to address the survey requirements, results, etc.	MPMC
5.4	Addressing any concerns or out-of-compliance situations observed and recorded during construction.	MPMC/AMEC
6.0	**Record Keeping**	
6.1	Maintain daily construction site photographic record of construction activities.	MPMC
6.2	Completing daily construction reports, and delivering a copy to MPMC's Mine Superintendent, and by email to AMEC's Support Engineer.	MPMC
6.3	Completing monthly construction reports, with copies to MPMC's Project Manager and AMEC's Project Manager and Senior Geotechnical Engineer.	AMEC

3.3.3 AMEC Support Engineer

The AMEC Support Engineer will provide full-time construction monitoring at the commencement of the Stage 7 construction. After confidence in the MPMC Field Inspector is achieved, the AMEC Support Engineer will provide remote assistance by reviewing daily reports and instrumentation results as required. The AMEC Support Engineer will also perform monthly site visits (actual frequency to be determined by site performance) to verify construction methods and specifications are being adhered to.

The responsibilities of AMEC Support Engineer are as follows:

- Provide remote assistance to MPMC Field Inspector.
- Review daily construction reports, communicate and document any concerns arising from the review to AMEC Project Manager and/or Senior Geotechnical Engineer.
- Review and interpretation of instrumentation reading plots, and communication of any concerns to AMEC Project Manager and/or Senior Geotechnical Engineer.
- Carry out monthly site visits to monitor construction progress and perform quality assurance testing.
- Prepare monthly progress reports summarizing construction activities, test results, and milestone achievements.
- Prepare site As-built/Annual Review Report.

3.3.4 AMEC Project Manager

AMEC's Project Manager will have overall responsibility for AMEC's role with upcoming and future dam raising projects. He will review all monthly construction progress reports. He will liaise with the AMEC Senior Geotechnical Engineer, MPMC Senior Mine Engineer and Project Manager, to review any problems that may arise.

The AMEC Project Manager will liaise with the AMEC Support Engineer, MPMC Field Inspector and the Project Manager, and will make site visits as deemed necessary during construction. The exact timing and duration of the site visits will be determined in consultation with MPMC's Project Manager so that critical aspects of the construction can be viewed during these visits.

The responsibilities of AMEC's Project Manager will be as follows:

- Review weekly construction reports prepared by the site Field Engineer, and document and communicate any concerns arising from these reviews to MPMC's Project Manager and AMEC's Senior Geotechnical Engineer.
- Review instrumentation interpretations and communication of any concerns to MPMC's Project Manager and the AMEC Senior Geotechnical Engineer.
- Review monthly progress reports prepared by the AMEC support Engineer document and communicate any concerns arising from these reviews to MPMC's Project Manager and AMEC's Senior Geotechnical Engineer.
- Carry out periodic site visits as appropriate during the construction season, timed to coincide

with particularly critical aspects of the construction.

- Identification, review, and approval (in writing) of any design changes determined to be required by AMEC and/or the MPMC's Project Manager.

3.3.5 AMEC Senior Geotechnical Engineer

AMEC's Senior Geotechnical Engineer will serve as the engineer of record for the Mount Polley TSF embankment. He will review weekly construction and instrumentation reports as required and review the As-built/Annual Review reports. AMEC's Senior Geotechnical Engineer will also conduct a site visit early in the construction season become familiar with the site.

3.3.6 AMEC Soils Laboratory – Prince George

Confirmatory geotechnical index testing of borrow soils and filter material will be carried out in AMEC's Prince George office soils laboratory. AMEC's laboratory technician, based in Prince George, will be responsible for carrying out the required testing and reporting of results to the AMEC Support Engineer.

3.3.7 Soils Testing – Mount Polley Site

The Mount Polley site will have the capabilities to carry of sieve analysis for grain size determination of all granular materials as per the ASTM Standards presented in Appendix C. All test results are to be submitted to AMEC Support Engineer for review and approval.

3.3.8 MPMC Project Manager

MPMC's Project Manager shall assume overall responsibility for MPMC's construction management and MPMC's supervision, monitoring, and for quality control testing activities when AMEC is not on site. This person shall ensure that the design specifications and the QA/QC requirements as outlined in this manual are adhered to. In the absence of the MPMC Project Manager, the TSF Foreman shall assume this role.

MPMC's Project Manager shall liaise with AMEC's Support Engineer, and AMEC's Project Manager, to discuss construction progress, any problems encountered and their resolution, and the timing of site visits by AMEC personnel to view the construction.

3.3.9 MPMC Environmental Superintendent

The MPMC Environmental Superintendent will address any concerns raised by the Field Inspector/Support Engineer including, but not limited to, the following:

- placement of material unacceptable as dam fill.
- unacceptable construction procedures (excessive lift thickness, inadequate compaction, inadequate foundation preparation, etc.).
- non-compliance issues identified by the AMEC Support Engineer and MPMC Field Inspector that are not immediately rectified by the construction forces, be they those of the contractors

or MPMC.

3.3.10 MPMC Survey Crew

Survey control for the dam construction will be provided by MPMC. The MPMC surveyors will be responsible for the following tasks:

- Locating the centerline and cutoff trenches for the Dam as identified on the appropriate AMEC construction drawings.
- Establishing and maintaining upstream and downstream slope stakes as requested during dam construction.
- Locating the upstream and downstream toes of the slopes in the field, based on the identified centerline locations.
- Providing location and elevation data as required to field staff.
- Collecting data required for the as-built drawings, including a complete survey of the cutoff trench, dam crest, and dam toe as constructed.

The Field Inspector will record survey data as provided for compacted density test locations, etc. in the daily construction reports.

4.0 MATERIALS TESTING AND CONSTRUCTION INSPECTION

4.1 General

The detailed technical requirements for the 2011 raise of the TSF Embankment are shown in attached drawing 560.2011.01 through 560.2011.06. The technical requirements for the construction are indicated on attached drawing and are restated in Sections 4.3 through 4.6.

4.2 Estimated Fill Volumes

Table 4.1 below summarizes the estimated material quantities for Stage 7 expansion.

Table 4.1 Stage 7 Expansion (El. 960.5) Estimated Fill

SECTION	ESTIMATED FILL VOLUMES (m^3)				
	Zone C	Zone T	Zone F	Zone S	Zone U
Main Embankment	55,000	6,000	6,000	21,000	73,000
Perimeter Embankment	87,000	9,000	9,000	33,000	138,000
South Embankment	47,000	5,000	5,000	18,000	74,000
Total	**189,000**	**20,000**	**20,000**	**72,000**	**285,000**

Notes:
1. Volumes are estimated from drawings 560.2011.02 through 560.2011.06, and are rounded up to the nearest 1000 m^3.
2. No settlement allowance has been considered.
3. Quantities are based on neat construction lines; with no contingency or allowance for overbuild.

4.3 Foundation Preparation, Inspection, and Approval

4.3.1 General

Foundation preparation for the 2011 dam construction along the abutment extensions are to be completed to the following specifications:

- All topsoil, organic material, soft or loose soils, and other deleterious materials are to be removed from the foundation area.
- The exposed abutment foundation subgrade will consist of dense to very dense glacial till, or bedrock.
- The abutment subgrade shall be proof-rolled with a smooth drum compactor.

Foundation preparation for the abutment cutoff trench extensions will be completed to the following specifications and in accordance with Detail 1 on drawing 560.2011.03 in Appendix C.

- The cutoff trench shall extend a minimum of 0.5 m into the undisturbed glacial till, where the glacial till is in excess of 1 m thick.

- Where less than 1 m thickness of glacial till exists, the cutoff trench shall extend to sound bedrock with removal of weathered or fractured bedrock completed to the approval of the AMEC Support Engineer. Additional specifications related to bedrock encountered in the cutoff trench are provided in Section 4.3.4 below.
- The thickness of glacial till at the cutoff trench is to be confirmed by performing test pits at locations along the cutoff trench alignment selected by the AMEC Support Engineer.
- The cutoff trench shall be constructed with a minimum 2 m width at its base. Where bedrock is encountered, the AMEC Support Engineer may direct that overburden be removed for the full 5 m width of the Zone S core.
- The cutoff trench shall have side slopes of 1H:1V or flatter. Steeper slopes may be accepted in bedrock at the discretion of the AMEC Support Engineer.
- Surface runoff water or groundwater shall not be permitted to collect in the cutoff trench.

Prior to placement and compaction of structural fill in the cutoff trench excavation, the Field Inspector will send photos to the AMEC Support Engineer for approval. The Field Inspector will verify that the cutoff trench is founded in the minimum specified depth of glacial till (and will conduct or oversee soil probing as required), or that the cutoff trench is founded on sound bedrock. Cutoff trench excavation inspections will be performed as required, and inspection dates and results will be tracked by the Field Inspector on copies of the construction drawings or by station number. MPMC surveyors will provide a survey pick-up of the cutoff trenches and maintain a project database for use in the as-built documentation.

4.3.2 Tie-In to Existing Till Embankment

The 2011 raise of the core zones of the embankment will involve placement of structural fill on the existing dam crests. On the existing dam crests, removal of the crest running surface (by grading it off the upstream edge of the dam crest) may be required, followed by removal and/or drying and re-compaction of any loose, over-wet zones within the till fill.

4.3.3 Foundation Preparation

The dam foundation areas for the 2011 will be drained (where required) and will be stripped of all organic material, loose or soft soils, and all other deleterious materials. These unacceptable materials will be wasted in an approved manner, in an approved location as designated by MPMC personnel. Salvageable topsoil and organic material that could be used for reclamation will be stockpiled in appropriate locations for future use, as directed by MPMC's Project Manager.

Suitable dense subgrade for Zone S will be exposed for dam construction, then proof-rolled and scarified (if deemed necessary by the Support Engineer) prior to placement of structural fill. The exposed subgrade is to be protected from moisture softening due to surface water runoff or excessive precipitation.

The cutoff trench location will be identified in the field by surveyors, and the design vertical (depth) extent of the cutoff in native soil or weathered bedrock verified by test pits or soil probes that extend below the minimum specified trench depth (see Detail 1, drawing 560.2011.03). The cutoff trench excavation will be protected from moisture softening due to surface water inflow or excessive precipitation. Water seeping into the cutoff trench excavation will be removed by pumping, and will not be permitted to collect and remain in the excavation.

Prior to placement and compaction of structural fill in the cutoff trench excavation, the Field Inspector will send photos of the prepared foundation to the AMEC Support Engineer for approval. Inspections will occur as foundation areas are completed and the approval will be documented as part of the daily construction reports. Field copies (11X17" size) of the construction drawings and a photographic record will be maintained to identify foundation areas that have been inspected and approved, clearly indicating their date of inspection. Areas not approved for placement of structural fill by the AMEC Support Engineer are not to be covered with fill under any circumstances.

The Support Engineer will report on the approved or unacceptable foundation areas to MPMC's Field Inspector, Project Manager and TSF Foreman. The Field Inspector will record the location and state of any unacceptable prepared foundation areas in the daily construction report. The contractor will be required to perform the appropriate work to the satisfaction of the AMEC Support Engineer.

4.3.4 Special Considerations for Bedrock Exposed in Till Cutoff Trench

If bedrock is encountered in the dam foundation cutoff trench, special considerations exist and special bedrock treatment measures may be required. Guidelines and procedures for dealing with bedrock exposed in the cutoff trenches are as follows:

Weathered or fractured bedrock is defined as bedrock that can be readily excavated by a dozer or a hoe excavator equipped with a digging bucket and that, based on visual assessment, is highly pervious to groundwater flow due to the presence of fractures/joints/faults. Sound (competent) bedrock, is defined as bedrock that can be excavated only with significant difficulty (or not at all) by a hoe excavator equipped with a digging bucket. When excavating in bedrock, frequent communication with AMEC Senior Geotechnical Engineer, and transmission of photographs should be carried out.

If shear/fault zones are encountered within the bedrock exposed in the core to abutment contacts, the following information should be collected and passed on to AMEC's Senior Geotechnical Engineer:

- Photographs of the shear zone from a variety of vantage points, both close-ups and photos giving an overall perspective.
- Orientation (strike & dip) of the feature and its orientation relative to that of the core zone (i.e. does it provide a potential upstream-downstream seepage pathway?).
- Thickness and continuity.
- Infilling (clayey gouge, granular material). The infilling material should be sampled and sent to the AMEC Prince George soils laboratory for grain size and Atterberg limits testing.

AMEC's Senior Geotechnical Engineer, upon analysis of the information provided, will determine what (if any) special treatment is required for the shear/fault zone. Such treatment may include hand excavation a few centimeters into the shear zone, followed by placement of bentonite powder in advance of till placement.

Once sound bedrock is encountered, the surface should be cleaned of loose materials using a hoe excavator equipped with a narrow cleaning bucket, following by pressure washing using either air or water. Where the slope of the cleaned and approved sound bedrock surface, along the axis of the dam (i.e. up the abutment), is flatter than 1H:1V, then Zone S structural fill placement may proceed. Good compaction of the Zone S fill against the bedrock surface is required. If the undulations in the bedrock surface along the bottom of the trench are such that this cannot be achieved using dozers and the compactor, then such undulations (i.e. rock protrusions) should be removed if possible. If this is not possible, then compaction of thin till lifts with a walk-behind or plate-tamping compactor, or with tamping with a hoe bucket, will be required, to fill in the undulations. Once this is done, then normal spreading and compaction procedures can be undertaken.

Where the slope of the sound bedrock surface is steeper (overall) than 1H:1V, but flatter than 0.5H:1V, then the AMEC design office should be consulted for a decision on the need for any further treatment measures. Photographs of the bedrock surface should be sent to the design office. If the roughness of the rock surface is such that it is judged that effective compaction of till fill against the bedrock on the base of the trench cannot be achieved, then additional (small scale) bedrock excavation (removal of protrusions) should be attempted to attain a surface against which it is judged till fill can be effectively compacted. If this measure is unsuccessful, then one of the following additional measures will be required:

(a) Additional (large scale) bedrock excavation should be undertaken to achieve a maximum 1H:1V overall slope for the bedrock surface. This can be achieved by mechanical means (dozers, hoe excavators), or by small scale, controlled drilling and blasting.

(b) Dental concrete or shotcrete application will be required to fill in the undulations in the bedrock surface, and yield a maximum slope of 0.5H:1V, against which till fill can be effectively compacted.

Where the bedrock surface is steeper than 0.5H:1V, the same two measures outlined above will apply.

Where dental concrete is required against steep bedrock faces, it will likely be necessary to use formwork. Dental concrete, if used, will conform to the following specifications:

- 28 day strength – minimum 25 MPa if flyash included in mix, otherwise minimum 30 MPa.
- Water to cement ratio: 045:1 by mass.
- Air entrainment: to provide for 5% to 7% air entrainment.
- Cement to flyash ratio (if flyash used): 4:1 by mass, which would allow overall water:cement:flyash ratio of 0.45:0.8:0.2.

The dental concrete need not be of high strength. It does need to be sufficiently fluid that it will fill in irregularities in the bedrock surface to a reasonable extent. Addition of flyash to the mix would achieve that objective, as well as save on cement costs.

Should shotcrete be selected, then MPMC will prepare a mix design for review and approval by AMEC.

Prior to placement and compaction of structural fill in the cutoff trench excavation, the Field Inspector will send photos to the AMEC Support Engineer for approval. Core trench excavation inspections will be performed as required, and the Field Inspector will track inspection dates and results on copies of the construction drawings or by station number. MPMC surveyors will provide a survey pick-up of the core trench excavations and maintain a project database for use in the as-built documentation.

4.4 Borrow Materials Site Development and Operation

AMEC understands that various borrow pits will be required for the 2011 construction seasons. All proposed borrow pits are subjected to laboratory testing and approval by AMEC's Support Engineer and Project Manager. During the TSF embankment construction detailed documentation will be maintained to ensure the source of the material being placed is known and material testing requirements are satisfied.

Topsoil and other overburden judged to be unsuitable as structural fill will be stripped from the borrow pit and hauled to an acceptable waste dump.

The borrow material site(s) shall be developed such that groundwater inflow and precipitation runoff are directed in a controlled manner to a designated sump area (or areas) of the site, and then removed as required. External surface water runoff shall be prevented from flowing into the borrow materials area by construction of diversion ditches or small dykes as required.

The performance of the cut slopes in borrow areas will be inspected and recorded as required by the MPMC Field Inspector for documentation within the construction reports. AMEC Support Engineer may request modifications to the excavation plan, including flattening of the slopes and water control measures, based on the observed performance of the cut slopes.

4.5 Material Specifications, Material Testing, Inspection, and Approval

The approved structural fill to be used for embankment construction is to meet the specifications shown on drawing 560.2011.03. Additional comments pertaining to each of the zones are provided below.

4.5.1 Zone S (Core) – Glacial Till

The glacial till borrow materials approved for construction are to be well graded, organic-free mineral soils, having moisture contents near their optimum for compaction and conforming to the specified gradation envelope provided on Drawing 560.2011.03. The optimum moisture content range of the borrow soils is to be determined by Standard Proctor moisture-density relationship testing. A general guideline for allowable moisture contents for the Zone S structural fill is ±1% of the optimum moisture content as determined by the Standard Proctor test.

Routine on-site laboratory testing of borrow soil includes determinations of natural moisture content and material gradations. These determinations are used to correct the in-situ field density values obtained with the nuclear densometer or Moisture + Density Indicator (MDI) gauge. It is understood the MPMC Field Engineer will use the MDI gauge and the AMEC Support Engineer will use a nuclear densometer. Off site testing is to be carried out in AMEC's Prince George office soils laboratory, includes confirmatory gradation, specific gravity, Atterberg limits, and Standard Proctor moisture-density relationships. Borrow material approved by the AMEC Support Engineer, based on the results of the above testing and other factors, may be used as structural fill for construction of the TSF embankment.

The proposed till borrow soils are to be visually inspected for consistency on a daily basis and test (1) per 10,000 m^3 is to be collected and tested the following ASTM standard tests: D698-07 (Standard Proctor determination), D422-07 (gradation test), D4318-10 (Atterberg Limits), D2216-10 (moisture determination) ; with a confirmatory duplicate off site gradational test (1) per 20,000 m^3. Testing frequency may gradually be reduced at the discretion of AMEC's Support Engineer if consistency in test values is established.

The approved Zone S structural fill is to be spread in 0.3 m loose lift thicknesses spread with a dozer and then compacted by a 10 ton vibratory smooth drum compactor. A minimum of 95% of the Standard Proctor maximum dry density is to be achieved.

The field QA/QC personnel will perform in-situ determinations of structural fill compacted density and moisture content utilizing the nuclear densometer (ND) method (ASTM D6938-10) or with the MDI gauge (ASTM D6780). Periodic samples will be collected for laboratory rock and moisture content determinations as required to make corrections to the ND density calculation. In the event that a test result indicates that the fill did not achieve the specified density, subsequent fill placement will be suspended in the test area until additional compaction effort has been applied and positive test results are obtained.

The in-situ MDI gauge testing of the till fill is specified at a minimum frequency of one (1) test per 150 m per lift of compacted Zone S fill. Test site locations will be identified by three dimensions: elevation, chainage along setting out line (S.O.L) and perpendicular distance upstream or downstream of S.O.L. or crest. Test site elevations will be based on the elevations shown on the slope stakes maintained by the MPMC surveyors, or otherwise determined by the QA/QC personnel. The field density testing schedule is intended to provide sufficient construction inspection of the compacted fill within the dam while permitting the QA/QC personnel enough time to assess the field density values, complete the associated soils testing, and fulfill other monitoring/inspection duties on site.

A sample of placed Zone S material should be taken from the dam for grain size determination (1) per 10, 000 m^3 of material placed This sampling and testing should be offset from the grain size testing of the borrow material. A sample is to be sent to Prince George for grain size testing every 20,000 m^3.

4.5.2 Zone F (Filter) – Manufactured Sand and Gravel

The sand and gravel filter material is to be well graded, organic-free mineral soil, falling within the gradation envelope shown on drawing 560.2011.03. Preliminary grain size testing of stockpiled material is to be carried out on site in order to establish the suitability of the material prior to its use as fill in the dam. Manufactured sand and gravel is assumed to be crushed on site utilizing NAG.

Prior to mass production of the manufactured filter product, routine testing of produced material is to be carried out to ensure the material is within specification. The tests program should determine if the manufacturing process is consistent and the produced material is within the gradational specification. During mass production of the manufactured sand and gravel on site testing of this material, will consist of a gradational test (1) per 5,000 m^3; with a confirmatory duplicate off site gradational test (1) per 10,000 m^3.

Zone F material is to be placed in maximum lift thicknesses of 0.6 m. Care will be taken during handling and placement of the material to minimize segregation. A sample of placed Zone F material should be taken from the dam for grain size determination (1) per 5, 000 m^3 of material placed. This sampling and testing should be offset from the grain size testing of the stockpile material. A sample is to be sent to Prince George for grain size testing every 10,000 m^3. Zone F is to be compacted utilizing previously established compaction pattern of a minimum of four passes with a 10 ton vibratory smooth drum. Visual inspection after compaction will be carried out and approved by the MPMC Field Inspector.

4.5.3 Zone T (Transition) – Fine NAG Rock Transition

Fine, NAG rock transition material shall be confirmed to be NAG by MPMC, and shall fall within the gradation limits indicated on drawing 560.2011.03. On site testing of this material includes visual determination of upper and lower bound grain sizes, suitability of rock hardness, and a gradational test (1) per 5,000 m^3. Off site testing of this material, will consist of a gradational test (1) per 10,000 m^3. Special care shall be taken during sampling to ensure that representative samples are obtained. Photographs of this material when exposed in the excavated filter trenches are to be taken frequently, as the best means of assessing the ability of Zone T to serve as a filter for Zone F is through visual means.

The fine NAG rock transition zone serves as filter protection for the adjacent Zone F filter sand and gravel which in turn serves as filter protection for the Zone S core. The importance of conformance with gradation specifications for both of these filter zones cannot be over emphasized.

Prior to placement of Zone T material adjacent to the Zone C Rock Shell, the Zone C/Zone T interface is to be inspected for openwork areas created by concentrations of larger size rocks. Removal of openwork areas will be carried out prior to placement of Zone T.

Zone T material is to be placed in maximum lift thicknesses of 0.6 m. Care will be taken during handling and placement of the material to minimize segregation. Zone T is to be compacted utilizing previously established compaction pattern of a minimum of four passes with a 10 ton vibratory smooth drum. Visual inspection after compaction will be carried out and approved by the MPMC Field Inspector.

4.5.4 Zone C (General Rockfill) – Coarse NAG Rock Shell

Coarse NAG rockfill shall be confirmed to be NAG by MPMC prior to being used as fill on the dam. QA/QC personnel are to visually confirm that particles no larger than 1 m are used as structural fill. Larger sizes are to be dozed away from the contact with Zone T.

The rockfill shell (Zone C) will be constructed using approved coarse NAG rockfill, placed in lift thicknesses of 2 m or less. The Zone C lifts will be compacted by uniform routing of haul trucks and spreading equipment. Some degree of compaction of Zone C is required nearer Zone T as excessive settlement of the rockfill could disrupt the continuity of the overlying transition and fine filter materials (Zones T and F respectively). If Zone C material contains appreciable quantities of fines, and the compacted lift surfaces assume a ‘pavement’ type appearance that might impede vertical drainage, then these lift surfaces may require scarification prior to placement of a subsequent lift.

4.5.5 Zone U (Upstream Fill) –Select Fill

The selected upstream fill (Zone U) will be constructed using cells of total tailings. The cells are constructed by confining the discharged tailings with berms. The confining berms are to have culverts, to allow for the water and fine materials to escape into the TSF. The coarse tailings sand that settles out into the cells are to be constantly reworked with the help of a dozer to ensure proper distribution within the cells, provide compaction and to expedite the excess water drainage. This construction method has been used and proved effective in previous TSF embankment raises.

4.6 Criteria for Suspension of Work

The till borrow material is highly sensitive to moisture in terms of its compaction characteristics and workability. Consequently, during periods of wet weather, construction of the core zone will be suspended. Adequate slopes will be maintained on till fill surfaces, and they will be sealed with a smooth drum vibratory roller, to promote surface water runoff and prevent excessive softening of compacted fill. Moisture-softened lifts must be removed or scarified, dried to an acceptable moisture content and re-compacted.

Embankment construction work will stop for the season when freezing weather prevents acceptable fill placement and compaction.

5.0 TEST PROCEDURES

5.1 Scheduled Tests

The following tests, as described by the American Society for Testing and Materials (ASTM), will be used for quality control of materials and earthworks during the 2011 construction.

ASTM STANDARD PRACTICE	DESIGNATION
Particle Size Analysis of Soils (Gradation test)	D422-07
Water (Moisture) Content of Soil and Rock	D2216-10
Liquid Limit, Plastic Limit, and Plasticity Index of Soils	D4318-10
Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))	D698-07
Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)	D6938-10
Correction of Unit Weight and Water Content for Soils Containing Oversize Particles	D4718-07
Standard Test Method for Water Content and Density of Soil in Place by Time Domain Reflectometry	D6780-05

Laboratory and field procedures for each test are provided in the corresponding ASTM Standard Practice document. Copies of those standards for the tests to be performed on site are provided in Appendix C of this manual. Moistures and density tests will be conducted by the Field Inspectors and Engineers on site. Replicate samples of those tests carried out on site will be forwarded to the AMEC Prince George laboratory for confirmation testing, typically at a rate of one confirmation test per fifteen field tests. Limits and proctor tests will be carried out in the AMEC Prince George soils laboratory.

The tests outlined above will be carried out initially at the minimum frequencies indicated on drawing 560.2011.03. As trends and consistency in the test results develop, AMEC's Support Engineer may reduce testing frequencies where deemed appropriate.

5.2 Additional/Supplemental Tests

Determinations of specific gravity (ASTM D854-10) for the approved glacial till and borrow soils may be required if significant material changes are observed. These tests will be conducted at the AMEC Prince George laboratory, following the Standard Practice noted below. Typically, two or three specific gravity determinations would be required for each soil type.

5.3 Sample Collection Procedures

Samples to be transported to the AMEC Prince George laboratory for field laboratory verification testing will be sealed to minimize soil moisture losses, and shipped in an expedient manner.

The shipping address of the Prince George lab is:

Atten: Shana Grover or Dmitri Ostritchenko
AMEC Earth and Environmental
3456 Opie Crescent
Prince George, BC
V2N 2P9

The Field Inspector shall include transmittals with the samples outlining the tests to be carried out for each respective sample. These transmittals will be faxed to AMEC Prince George Laboratory (250-562-7045) and emailed to AMEC's Support Engineer in advance of the shipment. The Prince George laboratory will ensure that the label information attached to each sample is incorporated onto the corresponding test sheets, and that copies of the test sheets and results are forwarded to the Field Inspectors and the AMEC Support Engineer as the tests are completed.

Samples collected by the Field Inspectors for the scheduled tests during the 2011 construction will be identified by a detailed labeling scheme, the following is an example:

SAMPLE LABEL	
Project name :	Mt. Polley Mines Project
Construction :	Stage 7 Raise – 2011
Material :	*Glacial Till (Zone S)*
Source :	*Main Embankment*
Location :	*Elev. 960, 1 m d/s of CL, sta 21+00*
Date :	*06/20/11*
Sample Number :	*06/20/11-(initials)1*
Sample Destination:	AMEC Prince George laboratory
Test Type(s):	*Standard Proctor, Gradation*

Sample locations, material descriptions, and other relevant notes will be recorded by the Field Inspectors. The sample label information, accompanying field notes, and test results will be included in the construction reports as part of the permanent record of the 2011 construction program.

Samples will be collected and preserved in a manner consistent with their scheduled tests, such as the placing and sealing of samples for natural moisture content determinations in plastic bags.

6.0 REPORTING

6.1 Construction Documentation

The Field Inspector will document the monitoring and testing program for Stage 7 Embankment raise construction by means of daily construction reports, field and laboratory test sheets, weekly progress reports, survey reports as provided, and notes from relevant on-site meetings, discussions, and decisions. Other documents, such as borrow area excavation diagrams, or dam construction progress maps, may be included with the construction records. A photographic record will also be maintained on site. Select photographs will be captioned, dated, and included in the final as-built report.

6.2 Daily Construction Reports and Test Records

Borrow pit development, dam construction, site conditions, weather, and other related field activities will be documented each day on daily construction reports. Field copies of drawings 560.2011.2 (letter size) will be annotated with sample and/or test locations, notes, etc. on an as-required basis. Each annotated drawing will be attached to its corresponding daily construction report. Records of all samples collected and test results will be maintained by the Field Inspectors on standard laboratory test forms. Copies of each days dam performance monitoring data are to be kept with the daily reports as they are generated. A sample copy of a daily report is provided in Appendix B.

The Field Inspector has the responsibility for the preparation of the reports. The daily reports will be submitted, by noon of the following day, to MPMC's Mine Superintendent and emailed to AMEC's Support Engineer.

6.3 Monthly Progress Reports

Monthly progress reports will be prepared by the AMEC Support Engineer, for those periods when active construction is onging, documenting the construction activities, equipment in use, construction supervision and quality control testing activities, borrow area development, and conformance of quality control test results with the design specifications. The monthly progress report shall include copies of all instrumentation and survey monument data, plan and sections showing the areas of construction and progress to date and a brief discussion on these enclosures and milestones of the past months activities. These reports will be issued to MPMC's Project Manager, AMEC's Project Manager and Senior Geotechnical Engineer, the appropriate Ministry representative, and the Mount Polley Mines Corporation office in Vancouver.

6.4 As-Built Report/Annual Review

AMEC will prepare a report summarizing the construction methodology followed and documenting the as-built dam conditions for the 2011 construction season. This as-built report for 2011 will be combined with the 2011 annual review report. The report will be confirmation that the dam was raised in conformance with design intent, and will serve as a guide for construction of TSF embankment in subsequent years.

The as-built report will also outline any modifications made in the field to the initial methods of foundation preparation; borrow soils excavation, hauling, placement, and compaction; or other relevant work. Documentation of any such refinements made during construction will be of benefit for subsequent dam raising. The as-built report will also include recommendations pertinent to the construction and QA/QC monitoring of future dam construction.

MPMC will mark-up the construction drawings based on as-built surveys of the raised dam. These marked-up drawings will be used by AMEC to produce CADD as-built drawings for the report.

7.0 INSTRUMENTATION & MONITORING

7.1 General

As part of the 2011 construction program AMEC will conduct a full review of the instrumentation currently functional for the TSF embankment. Recommendations for replacement or additional instruments will be presented in a separate report.

7.2 Inclinometers

Five inclinometers have been installed in the main embankment to measure the potential displacement in the glaciolacustrine unit that underlies the embankment. One of the inclinometers has sustained damage (SI01-01), while another (SI01-02) is showing slight deviations (less than 3mm). The need for additional inclinometers will be assessed during the 2011 construction period.

7.3 Vibrating Wire Piezometer

The vibrating wire piezometers are required for monitoring changes in pore pressure during construction and dam foundation pore pressure changes over time. As the dam height increases, undrained response of the compacted till fill to load addition results in near immediate increases in pore pressure. The data obtained provides the pore pressure parameters that are used for limit equilibrium stability analyses. This information will continue to be required for monitoring the short and long term performance of the structure and for design optimization of future raises.

During active construction the piezometers are to be read weekly and the data reduced and plotted such that a minimum amount of time lapses between the recording of the data and the inclusion of the charts in the monthly report. Based on dam performance the reading frequency may be increased or decreased at the sole discretion of the AMEC Senior Geotechnical Engineer. The piezometer readings shall be plotted in terms of equivalent hydraulic head in elevation units. All plots shall be prepared at the same scale to facilitate comparison. The Field Inspector shall indicate on these plots when construction activities have taken place within 100 m of S.O.L chainage from the piezometers. This is required so that changes in piezometric pressures and measured displacements can be correlated with construction activities.

8.0 CLOSURE NOTE

This report has been prepared for the exclusive use of Mount Polley Mining 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 engineering geology and geotechnical engineering practices. No other warranty, expressed or implied, is made.

If you have any questions about the content of this manual, please do not hesitate to call.

Respectfully submitted,

AMEC Earth & Environmental Limited

Per
Dmitri Ostritchenko EIT
Geotechnical Engineer

Reviewed by:

Per
Daryl Dufault, P.Eng.
Project Manager

Per
Davies, Michael P., P.Eng.
Vice-President, Mining

Per
Todd E. Martin, P.Eng., P.Geo.
Senior Geotechnical Engineer

REFERENCES

AMEC (2006). “Dam Safety Review Mt. Polley Mine - Tailings Storage Facility” December.

CDA (2007). “Dam Safety Guidelines”

GeoStudio, 2007 (Version 7.17, Build 4921). Geo-Slope International, Ltd. Calgary, Alberta, Canada.

KP (2005). “Mount Polley Mine – Design of the Tailings Storage Facility to Ultimate Elevation”, June 18.

KP (2007). “Mount Polley Mine – Stage 6 Design of the Tailings Storage Facility”, June 18.

KP (2011). “Mount Polley Mine – Tailings Storage Facility Report on Stage 6B Construction”, January 25.

KP (2011). “Mount Polley Mine – Tailings Storage Facility Report on 2010 Annual Inspection”, January 25.

Leps, T.M., 1970. “Review of Shearing Strength of Rockfill”. ASCE Journal of the Soil Mech. and Found. Eng. Div., SM4. July 1970. pp. 1159-1170.

AMEC Earth & Environmental Limited
2227 Douglas Road, Burnaby, BC
Canada V5C 5A9
Tel +1 (604) 294-3811
Fax +1 (604) 294-4664
www.amec.com

MOUNT POLLEY MINES

TAILINGS STORGA FACILITY – STAGE 7
2011 CONSTRUCTION MONITORING MANUAL

Submitted to:

MOUNT POLLEY MINING CORPORATION
Vancouver, BC

Submitted by:

AMEC Earth & Environmental Limited
Prince George & Burnaby, BC

15 April 2011

VM00560

APPENDIX A - Stability Analysis

APPENDIX B - Sample Daily Construction Report

APPENDIX C - ASTM Test Standards