



APPENDIX A

Reference Documents and Review Commentary

Mt. Polley DSR - Report Reference Database

Report Name	Date	Author	Reference	Summary Comments
Report on Geotechnical Investigations and Design of Open Pits and Waste Dumps	12-Jun-96	Knight Piésold	1628/1	Baseline geological data for surficial deposits No real discussion as to potential, or lack thereof, for preshearing or other concerns in the firm to stiff glaciolacustrine materials that would underlie portions of the tailings embankment
Operation, Maintenance & Surveillance Manual for Stage 1A Embankment	11-Mar-97	Knight Piésold	1627/1	Sound and detailed OMS for a facility initial year Pending EPP noted as being developed within first year of operation Noted from the outset of operations that TMF was also to serve as a water management/collection facility for other mine impacted areas
Manual on Sampling & Handling Guidelines for Determination of Groundwater Quality	8-May-97	Knight Piésold	1625/5	Summary of procedures including QA/QC protocols No inclusion of monitoring locations, plan maps etc.
Tailings Storage and Ancillary Features May 1, 1997 Site Inspection	3-Jun-97	Knight Piésold	1627/4	More of a point form document versus a standard DSI style (adopted later by Knight Piésold) Three main concerns noted: 1. spring at corner of sedimentation pond 2. unsuitable fill (snow and ice) being placed in dam and needed removal 3. outlets to Chimney Drain need to be located and exposed to allow monitoring
Updated Design Report	6-Jun-97	Knight Piésold	1627/2	A very comprehensive document The use of a single undrained strength (10 kPa) for post liquefied strength of the tailings was perhaps overly conservative for the bulk of the deposit (but would not have changed design or construction so potentially a moot point) Water balance used a probabilistic approach - and this was readily compared to a deterministic evaluation - thorough
Report on Stage 1A/1B Construction	14-Aug-97	Knight Piésold	10162/7-5	Good summary report on activities Complements the design reports for start of construction (Stages 1A and 1B which started in May 1996 and completed March 1997) Piezometric responses during construction did not indicate any foundation induced concerns Sub horizontal fissures noted in the stiff foundation till.....preshears?
Stage 2A Tailings Facility Construction Selection Excerpts from Reference Information	6-Nov-97	Knight Piésold	10162/9-2	
Operation, Maintenance & Surveillance Manual	24-Nov-97	Knight Piésold	10162/7-3	Thorough OMS Some hand written comments in OMS.....change process?
Report on On-Going Construction Requirements	2-Dec-97	Knight Piésold	10162/9-3	Intention of report stated to support permit application(s) Dam design is essentially an upstream raise termed "modified centreline" as the ultimate crest, while moving upstream, overlies very little, if any, beached tailings due to the width of the raised section - the design also includes internal drainage with two levels of outlet (base of Chimney Drain and a Foundation Drain) Instrumentation is placed within "Monitoring Planes" - initial instrumentation levels in terms of piezometers appeared appropriate but a potential lack of lacustrine deformation potential monitoring in place (lack of inclinometers) based upon that original potential failure mechanism Has the DBE been updated with the (pending) revisions to the NBCC? Initial hazard classification for the facility was "LOW" for operations reverting to "HIGH" upon closure No discussion as to whether the foundation stiff glaciolacustrine materials have been pre-sheared Confusing as on some figures, e.g. 5.8 to 5.10, Zone 9 is alternatively Zone C, Chimm
1998 Annual Inspection Report	26-Jun-98	Knight Piésold	10162/9-5	Thorough DSI (equivalent) - completed by P.Eng.
Evaluation of Cycloned Tailings for Embankment Construction	2-Nov-98	Knight Piésold	10162/11-1	It was concluded at the time that Mount Polley tailings were amenable to cycloned sand production though uncertainty to the splits to achieve embankment construction was noted The conclusion that the tailings would act as a "crack stopper" if there was deformation is moot given the embankment is not using cycloned sand but the comment is not agreed upon

Report Name	Date	Author	Reference	Summary Comments
Stage 3 TSF Selected Excerpts from Reference Information	20-Apr-99	Knight Piésold	11162/13-6	Document used to assist dam raise contractor(s) It was envisioned at the time of this document that compacted cycloned sand (CS) would be used for dam shell construction
Report on 1998 Construction & Annual Inspection	16-Jun-99	Knight Piésold	11162/10-1	Similar and as thorough as the other annual reports for the TSF This report covered the construction of the Stage 2A/2B embankment raises Loss of some piezometers noted This inspection was completed by a P.Eng.
Evaluation of Cycloned Tailings for Embankment Construction	16-Jun-99	Knight Piésold	11162/11-1	At the time this report was issued, it was planned to use cycloned sand from the overall tailings stream to achieve downstream shell construction
Report on Cycloned Sand Construction of Stage 3 & On-Going Stages of TSF - Volumes 1 & 2	13-Dec-99	Knight Piésold	11162/12-2	At the time this report was issued, it was planned to use cycloned sand from the overall tailings stream to achieve downstream shell construction Though not the focus of this document, noted that foundation "conservative" effective friction angle of 26 degrees chosen from triaxial tests...for overconsolidated glaciolacustrine, direct shear is a better indicator of strength IF there are any presheared entities State parameter and shear wave velocity results from the SCPTu in-situ testing both point to large quantities of the tailings being contractant under shear - this was not discussed in the accompanying report though trigger issues were (but not static triggers)
Tender Documents for Construction of Stage 3 TSF	14-Apr-00	Knight Piésold	11162/13-2	Thorough tender package that was consistent with the facility's design - only point (made elsewhere) is potential concern with overcompaction of till core
Addendum to Report on Cycloned Sand Construction of Stage 3 & On-Going Stages of TSF	11-May-00	Knight Piésold	11162/13-4	A report to reflect the (then) planned changes to operations and construction of dam raises that reflected the commitment to use of cycloned sand in the dam shell. The report (Section 3) includes a series of responses to concerns raised by BC Ministry of Mines (via Mr. Chuck Brawner) - the original report of concerns was appended to the 11 May report
Contract Documents for Construction of Stage 3 TSF	8-Jun-00	Knight Piésold	11162/13-2	Thorough in terms of earthworks and ancillary instruction No mention of overcompaction potential
Site Inspection Manual for Stage 3 Construction Main & South Embankments	23-Jun-00	Knight Piésold	11162/13-7	Excellent concept document Specific concern is lack of overcompaction commentary Not in agreement with 90% compliance goal as depending upon item being measured, that 10% outliers can create a fatal flaw - would prefer to see, from a Dam Safety perspective, prescriptive performance or method specifications that expectation of 100% compliance and any noted exceptions are evaluated for potential concern in terms of potential failure modes Site filing system noted (CHECK THIS)
Report on 1999 Construction	30-Aug-00	Knight Piésold	11162/13-5	Covers the Stage 2C construction to embankment elevation 941 metres Thorough documentation - no noted concerns related to constructed condition versus design expectation
Report on 2000 & 2001 Annual Inspection	16-Oct-00	Knight Piésold	11162/14-2	Thorough per the other DSI equivalent reports
Report on 1999 Annual Inspection	16-Oct-00	Knight Piésold	11162/13-9	Inspection completed in April 2000 to cover 1999 operations - perhaps out of synch with Provincial Guidelines (?) DSI apparently carried out by E.I.T. - though undersigned by senior consultant and designer of record, for tailings dams E.I.T. is typically not a sufficient level of experience to undertake an annual DSI Report is thorough per similar documents for the Mount Polley TSF
Operation, Maintenance & Surveillance Manual for Stage 3 Embankment	26-Oct-00	Knight Piésold	11162/13-3	A first rate OMS manual Is there an annual update (roles and responsibilities) as the OMS should be a "living" document (?) Unclear as to some of the summary information on some of the instruments (piezometers) - inoperative versus operative clear but some are not provided any indication either way
Report on 2000 & 2001 Annual Inspection	3-Oct-01	Knight Piésold	11162/14-2	Covers the period March 2000 to April 2001 - again appears a bit out of synch with Provincial Guidelines per document 13-9 (typically annual inspections are due 31 March of the calendrical year following the annual inspection period - though not seemingly as issue as nothing in files about concern from BC Mines Inspectorate) No visual concerns or abnormal behaviour with piezometric monitoring were noted It appears that no inclinometers were operational that period as no mention in report



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Report on Stage 3 Construction - Permit M200	19-Oct-01	Knight Piésold	11182/14-3	Excellent as-built construction report (thorough) Compaction of till core appears potentially excessive - up to 105% reported with no mention in text about cracking concerns and/or potential errors due to rock corrections - specifications should typically include a maximum placed density when potentially brittle core materials are used
Report on: 2002 Annual Inspection	30-Apr-03	Knight Piésold	VA101-00001/3-1	Noted that TSF was categorized as "HIGH" hazard classification meaning MDE was to be 50% MCE and impoundment needed to store PMP - it was classified as "LOW" in 1997 Further noted that last "third party" review was by Chuck Brawner in 1999 (where is this document?) and a formal DSR would occur in 2006 Noted that piezometer data consistent with design expectations but that only one inclinometer was "alive" Thorough DSI documentation
Design of the Tailings Storage Facility to Ultimate Elevation	14-Mar-05	Knight Piésold	VA101-001/08-01	The most recent design document in terms of overall facility plans The stability assessment for upstream stability and/or downstream liquefied tailings evaluation are not necessarily correct (but may be moot) The reasons for the downstream toe berm at closure are not well described The foundation description does not address potential preshears in the overconsolidated fine-grained tills/lacustrine materials The location of the overflow closure spillway needs to be defined Use of pond as polishing entity upon closure or will all other runoff sources be rerouted?
Report on Stage 3C Construction	23-Sep-05	Knight Piésold	VA101-1/5-2	Good summary report on activities Some Zone S values below 95% but the larger issue may be the number of results well over 100% (up to 108%)
Stage 5 Design of the Tailings Storage Facility	12-Jun-06	Knight Piésold	VA101-01/12-1	A bit more "concise" than previous raise design documents Little explanation for stability analyses that include some inconsistent (but perhaps moot) results No discussion about plans for samples procured from foundation tills No discussion about closure berm (where is such discussion/rationalization...is it insurance as the drainage system degrades?)