

APPENDIX E

AGENCY PERMIT LEVEL - ISSUES TRACKING SUMMARY - REVIEW OF THE ADDITIONAL INFORMATION REPORT AND ADDENDUM REPORT

Appendix E - Agency Permit Issues Tracking Summary					
# ID	Issues Raised	Submitted by	Proponent Response	Review Status	Permit Agency
EPD Environmental Quality Section Comments on the Information Requirements for permitting the Wolverine Mine					
1	Sediment discharge limits: Refer to my comments below for page 3.14-23 with regard to WCC's proposed sediment pond discharge criteria for suspended solids and turbidity. See also page 10.4-35. The proposed discharge levels are too high.	B. Carmichael	WCC: WCC is committing to best practices in sediment prevention and erosion control, and will provide a contingency flocculent system on the major settling pond. We expect that an approach similar to that developed for permitting of the Dillon Mine (i.e dependent on background levels) could be applied, to be installed prior to construction for Wolverine. PITEAU has suggested a discussion of an allowance for dilution in W14 flows for SP18 and SP14, as these are small flows and will mix with W14 immediately after they pass beneath the rail embankment. Follow-up item for discussion at permitting.	Details at Permitting	MWLAP
2	Mine site water diversion/recycle: In our next technical meeting, I request that WCC present a detailed assessment of their plans for mine site water diversion and recycle. WCC should make full use of water recycling and diversion options. To do so may benefit mass balance predictions by reducing contaminant loads to Perry Creek and the Wolverine River. See comments for pages 3.5-25/26/37 and 3.8-1.	B. Carmichael	Cochrane - As discussed in item #11, some water from sedimentation ponds can be recycled back to the plant. However due to limited storage in the plant, we have to recycle some of the water into the tailing dam for seasonal flow that occurs in the sediment ponds. There may be an opportunity to pump sediment pond water into an elevated tank for loading into the "Water Boy" truck that is used for haulage road dust control. The logistics of this must be worked out.	Details at Permitting	MWLAP

			(cont'd) - PITEAU-Dust control water, which represents the largest water demand for the project, will utilize water diverted from SP12 and pit inflows. Tailings seepage, and some seepage from SP12, will be intercepted for process make-up water. However, during droughts, groundwater wells will be necessary to augment or totally replace the supply available from these sources. A water balance developed for SP12 (to accompany the water licence application), indicates this source could be managed to sustain dust control demand through an eighteen day drought period. However, if seepage losses from SP12 are high, it may be necessary to operate the pond at a lower stage, which could reduce the length of the drought period that could be bridged by this source.		
3	Source water in contact with ARD/PML: WCC has limited its source water volume (and hence its contaminant load) only to that water in contact with ARD/PML. Is this appropriate? See comments for pages 3.14-7 and 10.4-17/33.	B. Carmichael	LORAX: PAG/PML materials are considered to be all rock sources which are either moved (waste rock) or exposes (pit), as well as process plant products (tailings, CCR and coal stockpiles). The only wastes not included within the PAG/PML category are excavated or exposed overburden and soils (diversion ditches, soil stockpiles, roads). Within the context of impacts associated with releases of nitrogen compounds, sulphate, selenium and metals, the use of PAG/PML contact waters is appropriate. From a TSS perspective, predictions of TSS are based on site-flows, and not on "contact" flows. Within this framework, it is assumed that the sedimentation ponds and erosion control measures will result in discharges which meet TSS and turbidity objectives. PITEAU/ALAN - attn.: The assessment was based on source concentrations derived from the site test work, field leach tests and QOC data.	Response Satisfactory	MWLAP

			<p>These concentrations were at source, not overall diluted mine site concentrations. It was therefore necessary to split out the non PAG/PML source waters from the other waters in the water balance, so that dilution numbers would be meaningful. If entire site flows were used, a dilution number would have to be applied to the source concentrations to reflect dilution with other site waters, prior to discharge to the receiving waters.</p>		
4	<p>Dissolved metals modelling versus total metals water quality objectives: A potential information gap exists due to the use of dissolved metals for modelling and total metals for objectives. See comments for page 3.14-15/23 and 12.8-55.</p>	B. Carmichael	<p>LORAX: This is a good point, although there is some support for the use of dissolved metals in this case. First, the data available for input into the metal prediction model were predominantly dissolved values. They were used as they are representative of the region, and as well, the large number of values permitted a fairly robust statistical assessment. Second, metals leached from wasterock will be predominantly in a dissolved form. Third, since all wasterock runoff will be managed through sedimentation ponds, it is likely that the particulate metal load will be minimized. Fourth, the use of the "mean" metal concentrations in the predicted range for contact flows imparts a level of conservatism into the predictions, as the mean values include extreme values and outliers. As per ongoing discussions, the water quality objectives are being established. Several options are possible - either leave the predictions as is and assume the conservative nature of the predictions will take into account the effects of total:dissolved ratios, or, develop metal-specific total:dissolved ratios and predictions based on estimates of totals. The total:dissolved ratio for receiving waters will not necessarily reflect the total:dissolved ratio in sedimentation pond effluents.</p>	<p>Details at Permitting</p>	<p>MWLAP</p>

5	3.4-12: The sump is designed for recycle, but no mention is made that wash water will actually be recycled. I agree that cleaned water can go to tailings (or recycled directly). Where will the oil/grease from the separator be directed? I assume that the oil/grease residue will be recycled to that industry. Clarification item.	B. Carmichael	COCHRANE Response. The oil/grease section of the oil water separator is designed to be cleaned by suction truck. This task will be sub-contacted to a qualified company with the capability of handling and disposing/recycling of such material.	Response Satisfactory	MWLAP
6	3.4-14 3.5-28: More detail and diagrams for fuel management are requested. Fuel management methods are not clear from the description provided. A diagram might be useful here. All fuel hydrocarbons must be stored in a bermed, impermeably lined area that provides 110% containment for the total volume of stored materials. This containment must extend under the fuelling area(s) such that fuelling spills will be directed back to the main containment area and/or so that contaminated soils can be completely reclaimed. These conditions also apply to fuel stored at the explosives storage site (3.5-37) and EB pit. Clarification item.	B. Carmichael	WCC is finalizing a fuel management plan which will be submitted during the permitting process. WCC will comply with the fuel handling criteria outlined in the Provincial Fire Services Act (1996) and regulations, including the BC Fire Code (1998) . In addition, the plan will comply with the Fuel Storage Guidelines outlined on the MWLAP web site, in various documents for industry, including "A Field Guide to Fuel Handling, Transportation and Storage" (MWLAP 2002). In addition, where it relates to spills or waste originating from fuel handling activities, WCC will comply with the Waste Management Act, including the Special Waste Regulation, and the Spill Reporting Regulation.	Details at Permitting	MWLAP
7	3.5-12 3.5-42: What are our concerns with regard to stop valves on the tailings line, given that all of line is behind the BCR line? The same question applies to tailings line directional berming. Are these required? Clarification ..	B. Carmichael	COCHRANE -The tailings line has to be designed to drain or it will freeze in the winter months. Directional Berming slopes the line for drainage. We also want to minimize valving.	Response Satisfactory	MWLAP
8	3.5-18: Flocculants – WCC must manage for aquatic life chronic toxicity and not assume that potable water flocculent toxicity (to protect human health) will be sufficient. What are the comparable human to aquatic life toxicities? Clarification item.	B. Carmichael	PITEAU attn:: Rainbow trout toxicity testing is being conducted to support the use of the selected flocculants. Tests are being performed on synthesized pond decant and on the raw chemicals. This information will be included with the Mine Permit Application.	Details at Permitting	MWLAP

9	3.5-25/26/37: Plant makeup and fire protection waters should be recycled from sediment ponds as much as possible, not taken from wells. WCC must maximise diversion and recycle so as to minimise discharge (particularly to Perry Creek). Commitment item.	B. Carmichael	Cochrane - Sediment ponds in close proximity to the tailings pond can be pumped to the pond and hence the water recycled back to the preparation plant process water system. Sediment pond water is seasonal flow. Using the surge capacity within the pond will allow for greater storage capacity. PITEAU / ath: Plantsite water will come mostly from the tailings seepage interception system and wells. Due to proximity, the tailings seepage interception seepage will also intercept SP12 seepage, so this source will be a component of the overall process water supply. Dust control water represents the largest water demand for the project. First priority sources for this water will be water diverted from either SP12 or the Pit Sump (which reports to SP6). The Plantsite Ponds could also be a source of supply, when they contain water during the dust control period. During an extreme drought, when the ponds and sump may be near dry, wells would be a last resort for dust control water.	Details at Permitting	MWLAP
10	3.5-38: More detail is requested for the explosives storage site pond. Is discharge to SP2 acceptable? What is the possible pond water quality? Should contents be directed to tailings pond or be recycled? Clarification item.	B. Carmichael	WCC: Final design for the explosives storage site will be the responsibility of a third party contractor. WCC will work with the contractor to ensure that acceptable water quality standards are met. Acceptability of discharge to SP2 will be evaluated at permitting, and alternatives presented as necessary. Standard best management procedures practices for facilities of this type will be adopted.	Details at Permitting	MWLAP

11	<p>3.8-1: In lieu of a detailed review of the complicated construction phase water management plan, WCC is requested at both Perry and EB mine sites to: 1) maximise diversion of clean water; 2) treat diverted "clean water" as necessary using "channel seasoning", stilling basins, ponds, swales, etc to meet approved discharge criteria; 3) meet BC turbidity and total suspended solids (TSS) guidelines for protection of aquatic life at the point of mixing in Wolverine downstream of each specific discharge. Sites are to be determined. If the Wolverine River floodplain habitat (egg adjacent to SP18 pond) is found in future to be utilised by fish, BC guidelines may apply to specific tributary streams; 4) maximise water recycle for process, fire protection, dust suppression, etc.</p>	B. Carmichael	<p>PITEAU attn:: Designs are being developed to divert clean water around the areas, and to minimize erosion along the diversions channels. Designs for the initial diversions will be included in the Water Licence Application submission. Implementation plans include channel seasoning, vegetation, some armouring and slope protection, check dams, etc., but it must be realized that some erosion will occur in the initial commissioning period. Initial performance will be monitored, and areas that are determined to present a chronic risk will be remedied.</p>	Details at Permitting	MWLAP
12	<p>3.8-8: SP12 is expected to decant at most times. Ground water flow is 12 L/s. WCC should consider using a swale and/or recycling as necessary to meet WQO in Wolverine. A commitment is required that WCC will direct the discharge to a swale (or other treatment) if necessary (if site specific WQOs are exceeded) and provided that selenium management is not compromised. By what date would a management plan be required? Commitment item.</p>	B. Carmichael	<p>PITEAU/ALAN attn:: Details of the management plan will be presented at permitting. SP12 will decant to a channel that routes through a nominal 1 ha temporal wetland in a remnant oxbow. A low gabion weir may also be constructed across the outlet from this area, to impound a low head during significant storm events. This would be removed if selenium becomes an issue, but the site would be well seasoned and sediment control would be well established by this time.</p>	Response satisfactory.	MWLAP
13	<p>3.8-6: Note that SP14 will discharge for half the year. What is the aquatic life value of the local floodplain? Will require a site specific WQO site on Wolverine for turbidity and TSS. Discussion required as to where water quality objective sites will be located (one site downstream of the entire operation for all parameters or specific sites related to suspended solids and turbidity below each specific discharge).</p>	B. Carmichael	<p>Air photo interpretation and ground surveys indicate the only significant zone of wetland habitat down gradient of SP14 is Oxbow-3, situated 500 m ENE. A baseline program for this Oxbow, as well as other potentially impacted wetland areas, has been developed in conjunction with EPD. Sediment sampling was completed in August 2004 while benthos/periphyton is scheduled for September. Agreed that discussion is required as to where water quality objectives sites will be located.</p>	Details at Permitting	MWLAP

14	<p>Given the seasonal discharges from most mine site sediment ponds, WCC is requested to confirm that tributary habitat assessments did include the lower reach of each mine site stream. This is important, as with some of these pond discharges the initial receiving streams might be considered as part of an effluent polishing system (i.e. water qualities at sediment pond discharge may not need to meet objectives). The exact locations where discharge criteria for sediments will apply need to be determined.</p>	B. Carmichael	<p>PITEAU (Reviewed by David Morantz) - Both SP14 and SP18 will discharge directly to the floodplain in areas that are not aquatic habitat. W14 water will also discharge in the same general area, and will dilute these flows. Under high runoff conditions, some of these flows will route over the floodplain directly to the Wolverine River, near the site of the old Canfor bridge crossing. Some of these flows will also route through the oxbow lake located to the north of the Canfor Road. To the best of my (A. Holmes) knowledge, the aquatic habit value of this oxbow lake has not yet been assessed, but an assessment would not be involved, and could likely be conducted in an expeditious manner. SP12 will discharge to the existing BC Rail ditch, and then route through a temporal wetland area in a remnant oxbow, and finally through a last ditch segment to the Wolverine River.</p>	Response Satisfactory.	MWLAP
			<p>CONT. This second oxbow is largely a grassy area, hence does not provide aquatic habitat and limits habitat values upstream. The last segment of the BC Rail ditch drainage course may have some temporal habitat values when the Wolverine River is high and the water level in this ditch is high (> 0.6m depth), but this ditch will contain very limited water under low flow conditions and will likely freeze in the winter. SP12 water will therefore not impact any significant, year round aquatic habitat upstream of the Wolverine River. SP6 will discharge into a constructed channel that will route through a temporally ponded area by the BC Rail embankment, and then via a constructed channel to the River. There are no habitat values that require assessment along this pathway.</p>		

15	3:40: Details are requested on the construction phase sewage treatment and spray irrigation plan. These are pre-construction requirements. Clarification item.	B. Carmichael	<p>COCHRANE response. The construction camp is equipped with a sewage treatment plant with sufficient capacity to treat camp sewage at the maximum occupancy expected. Sludge from the treatment plant is collected and disposed by a qualified subcontractor in this business. Treated effluent is collected in a lagoon. The lagoon has sufficient capacity for treated effluent storage over the winter months when spray irrigation is not practical. In the spring, summer and autumn the effluent will be "shock treated" with liquid chlorine and pumped to a distribution area west of the camp site. The distribution spray system, distributes the treated effluent under the trees and over a specified area of vegetation and ground. Prior to camp construction, detailed design of the lagoon and treated effluent spray system and disposal area will be in accordance with industry practice regulatory guidelines. The camp will be operational for a 14 month period and the spray irrigation will occur over two (spring, summer and autumn) periods.</p>	Details at Permitting	MWLAP
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16	<p>3.14-15/23: If these metal predictions are being used for receiving water monitoring, they should be redone using the total fraction, which better compares to existing water quality guidelines. Note that Appendix M uses total fractions for the development of objectives. Is WCC willing to accept commitments based on totals when their modelling is based on dissolved fractions? Commitment item.</p>	B. Carmichael	<p>LORAX: This is a good point, although there is some support for the use of dissolved metals in this case. First, the data available for input into the metal prediction model were predominantly dissolved values. They were used as they are representative of the region, and as well, the large number of values permitted a fairly robust statistical assessment. Second, metals leached from wasterock will be predominantly in a dissolved form. Third, since all wasterock runoff will be managed through sedimentation ponds, it is likely that the particulate metal load will be minimized. Fourth, the use of the "mean" metal concentrations in the predicted range for contact flows imparts a level of conservatism into the predictions, as the mean values include extreme values and outliers.</p>	Finalize at Permitting	MWLAP
			<p>Discussions on water quality objectives are ongoing, and objectives will be established in conjunction with permitting. Several options are possible - either leave the predictions as is and assume the conservative nature of the predictions will take into account the effects of total:dissolved ratios, or, develop metal-specific total:dissolved ratios and re-run the predictions based on estimates of totals. The total:dissolved ratio for receiving waters will not necessary reflect the total:dissolved ratio in sedimentation pond effluents.</p>		

17	<p>3.14-23: the proposed TSS and turbidity discharge limits for sediment ponds are not acceptable, in that they make full use of the calculated assimilative capacity of the Wolverine River and appear to under-utilize best available control technology. My preference here would be for the construction and operating permits to identify a firm discharge limit (50 mg/L and perhaps a turbidity limit), plus the requirement to meet water quality objectives for turbidity and TSS at established sites in the receiving stream. The various scenarios of wet/dry mine and watershed conditions, </> 50 mg/L effluent, and WQO being met/not met in combination with non-compliance of discharge versus non-compliance of discharge and pollution should allow sufficient flexibility in permit management. Again, the actual point of discharge needs to be confirmed for each sediment pond (sediment pond outlet versus discharge to aquatic life habitat). Consideration of a turbidity discharge limit might include WCC proposals on page 3.14-23. Commitment item.</p>	B. Carmichael	<p>WCC: WCC is committing to best practices in sediment prevention and erosion control, and will provide a contingency flocculent system on the major settling pond. WCC expect that an approach similar to that developed for permitting of the Dillon Mine (i.e dependent on background levels) could be applied, to be installed prior to construction for Wolverine. PITEAU has suggested a discussion of an allowance for dilution in W14 flows for SP18 and SP14, as these are small flows and will mix with W14 immediately after they pass beneath the rail embankment. Follow-up item for discussion at permitting,</p>	Details at Permitting	MWLAP
18	<p>3.16-12: Sewage from construction is proposed to be trickle irrigated over vegetation above the CCR dump site. The proposed location appears to be an acceptable distance from watercourses, but WCC needs to ensure no channelling of flow and/or discharge to surface waters. Clarification item.</p>	B. Carmichael	<p>COCHRANE response. As discussed in item #21, the irrigation system detailed design will be in accordance with standard practices and regulatory guidelines as they apply to the local topography. The design will take into account the proper flow rate to minimize potential channelling and routine inspection supervised by WCC's qualified environmentalist, will assure the system operates within the design specifications and regulatory guidelines.</p>	Details at Permitting	MWLAP

19	10.2-13: WCC makes frequent reference to the use of water, sediment, periphyton and benthos as a means of identifying potential impacts to aquatic resources in Perry Ck and Wolverine R, particularly with regard to selenium impacts. A suitable aquatic baseline must be attained prior to construction. As per Chapter 4.	B. Carmichael	WCC: WCC has committed to acquire a suitable baseline data set prior to construction. A comprehensive sediment survey was completed in August 2004, and periphyton/benthos programs are being conducted in September 2004. These programs have been designed with input from EPD. WCC will review results of these programs with EPD after certification, at which time decisions will be made on what, if any, additional aquatic baseline work is warranted. If needed, further work can be conducted in September 2005.	Response Satisfactory	MWLAP
20	10.4-9: WCC is requested to explain why fine grain settling tests are providing better than expected results. Clarification item.	B. Carmichael	PITEAU The tests were performed on minus 2mm fractions of the samples, at an initial concentration of 1000 mg/L. The minus 10 micron proportion of the initial TSS would be about 200 to 300 mg/L, so clearly some of this material did sediment in the laboratory. Settling rates would be slightly slower in a pond subject to currents, wind, etc., and sediment loading to the pond, which would dictate effluent quality, would likely be considerably higher than 1000 mg/L. For this reason, flocculants are proposed on the SP12 Pond which will service the largest stripping area during construction.	Response Satisfactory	MWLAP
21	10.4-35: These turbidity and TSS requested discharge values are putting much onus on the receiving environment to deal with sediments. They appear to be back calculations from the water quality objective. As per page 3.14-23. Commitment item.	B. Carmichael	PITEAU ath: These were suggested discharge limits, and were based on back-calculating from receiving water objectives. WCC is in discussion with MWLAP with respect to construction effluent permit discharge limits for the Dillon Mine, and we anticipate that similar approaches may be applied to Wolverine.	Details at permitting	MWLAP

22	10.4-43 and Appendix M: A review of proposed water quality objectives. For the Wolverine River, subject to a more detailed review, the proposed objectives are reasonable, except for TSS (set too high), turbidity (lacking), chlorophyll (lacking), nitrate (lacking, but should be 40 mg/L). Note that the chronic and acute ammonia objectives will be set on a time specific temperature and pH basis.	B. Carmichael	WCC is committed to revised water quality objectives for TSS, turbidity, chlorophyll, nitrate and ammonia in conjunction with permitting.	Details at Permitting	MWLAP
23	Appendix M for Perry Creek: Subject to a more detailed review, the proposed objectives are reasonable, except for TSS (set too high), turbidity (lacking), chlorophyll (lacking), nitrate (lacking, but should be 40 mg/L). Note that the chronic and acute ammonia objectives will be set on a time specific temperature and pH basis.	B. Carmichael	WCC is committed to revised water quality objectives for TSS, turbidity, chlorophyll, nitrate and ammonia in conjunction with permitting.	Details at Permitting	MWLAP
24	10.5-8: Composite benthos, sediment, etc samples should be measured regularly in the wetlands through mine life, regardless of whether the water column exceeds 2 ug/L. Commitment item.	B. Carmichael	LORAX: WCC is committed to measuring composite benthos, sediment on an appropriate schedule in the wetlands through mine life. Monitoring of selenium in water is proposed as the early indicator; monitoring of other parameters in the wetlands should not be required on a frequent basis if water Se levels do not exceed 2ug/L. WCC expects to revisit the frequency of sampling during permitting.	Details at Permitting	MWLAP
25	10.5-11: Regarding till and glaciofluvial sediments, I note that "areas from which topsoil has been stripped will have a high erosion potential" and that eroded till sediments will generate a higher component of very fine particles that will be difficult to settle. Pit and north/south dump areas have a high erosion potential. The east dump has a moderate erosion potential.	B. Carmichael	PITEAU ath: That is correct. A higher priority will be placed on managing sediment sources in the pit and north/south dump areas than in the East Dump area. The Construction Effluent Approval Technical Assessment Report will reflect these differences.	Details at Permitting	MWLAP

26	10.5-13: Has the use of peat windrows to encapsulate silt stockpiles been proven technology? Clarification item.	B. Carmichael	Ath PITEAU: Compost has been used by the Connecticut DOT and is reported to be as effective as wood mulch for controlling soil erosion from soil stockpiles. Peat would be similar. Peat windrows as a downgradient filter would also be applicable. WCC: The Company is using a mulching machine at the Dillon Mine, and, if it is as successful as expected, we will be adding this to our proposed range of methods for use in erosion prevention and sediment control, to be outlined in the Construction Effluent Approval Technical Assessment Report.	Details at Permitting	MWLAP
27	10.5-16: The expectation of “high risk of runoff erosion in the spring” is telling. Would this be improved by a spring construction start? If so, this should be considered, or does the current construction schedule direct most ground disturbance to occur during next summer’s low risk period? Clarification item.	B. Carmichael	WCC: The exact timing of various construction activities will be dependent on the timing of approvals of the EA Certificate and various permits and approval required prior to construction. Delays from the proposed October/November construction start will result in shifts in the overall schedule due to constraints, including weather. WCC will be targeting site development as soon as practical, and some activities will be ongoing during the spring when erosion risk is higher. WCC are committed to employing erosion prevention and sediment control (EP&SC) measures as required to provide for water quality protection during construction activity. The proposed use of a mulching machine is expected to contribute to stabilizing potentially erodible surfaces. EP & SC measures will be outlined for approval as part of the Technical Assessment report for the Construction Effluent Permit.	Details at Permitting	MWLAP
28	10.5-16: Have all borrow areas been mapped out for our review? EPD requests notification of borrow locations. Clarification item.	B. Carmichael	Some borrow will be taken from within the future CCR Dump area. Test holes to define additional borrow areas are tentatively scheduled for mid-Oct.	Details at Permitting	MWLAP

29	10.9-25: Construction phase monitoring will be a blend of daily (turbidity), weekly (TSS, turbidity and flow), monthly (general ions, metals) and quarterly (hydrocarbon) sampling. High frequency suspended solids monitoring will carry through construction and into operation until such time as sediments are shown to be effectively managed. Reporting frequency will be identified in the construction approval.	B. Carmichael	Requirement acknowledged. No response required	Response Satisfactory	MWLAP
30	12.8-5: Does WCC have mapping for the small alpine pond near the EB pit and its related ditching? Clarification item.	B. Carmichael	PITEAU - Plans at this point are conceptual and are as shown on Figure 3.8-5. Detailed mapping and planning will occur at the Permitting stage for the EB area mine.	Details at Permitting for EB	MWLAP
31	12.8-5: Regarding the 16.8 ha of Perry east dump that will ground discharge to Perry Creek, the placement of monitoring wells downhill from the east dump does not lessen the potential for impact, and will support the assumption of negligible input only after the impact source is in place. Wells do not reduce the potential for impact (unless they are interception wells). So, the assumption that impacts to Perry Creek are only relevant after Year 6 may not be well based. The water quality implications of this east dump input to Perry Creek should be modelled now (at least in addition to the EP loads). Also, during which year of operation are the monitoring wells to be installed? Clarification item.	B. Carmichael	PITEAU ath: Monitoring wells will be constructed during the first year of mining in the Perry Creek Open Pit. Adequate data will be available by Year 6 to calibrate and validate a model of the loading along this pathway. As the groundwater flow quantity is estimated to be 0.5 L/s, this pathway would not be an issue unless it were augmented by other loadings from the EB Pit area. Total loadings to Perry Creek, and management of these impacts, will be addressed during Permitting for the EB Pit.	Details at Permitting for EB	MWLAP

32	12.8-9: Yes, the residual impact assessment is primarily based on an assumption of full mixing. Some consideration should be given to the point "prior to complete mixing". Do we accept the idea of a diffuser into the Wolverine River? The discharge locations appear to be at SP4 and SP12? Clarification item.	B. Carmichael	PITEAU - ath: The discharge point for the SP12 Settling Pond decant flow channel is where the existing BCR ditch from the SP12 area meets the Wolverine River at the southern boundary of the Ranch. The discharge point for the SP6 Settling Pond decant flow channel is a point just upstream of where the W4 channel meets the Wolverine River. If water quality dictates that settling pond water be conveyed directly to the Wolverine River, the conveyance pipe from SP6 will have a diffuser at the end to distribute the flow over at least a 5m width. A diffuser could also be added to the end of the SP12 pipe, if necessary.		MWLAP
33	12.8-23: As per figure 12.8.2-2, highest nitrate concentrations generated from QOC are recorded during March. WCC collected Mesa slide selenium data in October. Consider whether Se will correlate with nitrate and if so, what concentrations might be expected from the Mast/Mesa system in March. Mesa slide must be sampled March 2005 (likely by QOC). Clarification item.	B. Carmichael	LORAX: There are no data for Mesa Creek in March. Such sampling could be done by the Quintette Operating Corporation or MWLAP to assess the possible maximum of selenium concentrations in this drainage. It is agreed that modelling maxima of 80 ppb would almost certainly cover the possible range in Mesa Creek.	Response Satisfactory	MWLAP
34	12.8-64: TSS and turbidity source controls must be acted upon starting with initial construction. We need to determine more appropriate TSS and turbidity water quality objectives than what are listed here. The excessive erosion of colloidal materials and very turbid conditions identified here must be managed from the start of construction by using source controls for erosion reduction and flocculants for settling. These activities should not be conditional. Anticipate these problems initially and plan accordingly. Commitment item.	B. Carmichael	PITEAU ath: Settling ponds and runoff collection systems are in place prior to major surface disturbance in the Plantsite and mine areas. The construction plan will identify erosion control as a priority, and an erosion prevention and sediment control plan is being developed as part of the Technical Assessment Report for the Construction Effluent Permit.	Details at Permitting	MWLAP
35	12.8-65: MWLAP is to be provided with flocculent test results, both success and toxicity. Clarification item.	B. Carmichael	PITEAU -- These tests are in progress, and a memorandum on this will be provided in conjunction with the Construction Effluent Permit application - Technical Assessment Report.	Details at Permitting	MWLAP

36	12.8-65 Ponds may not have been designed up to receiving water guidelines, unless we agree with the proposed guidelines. Clarification item.	B. Carmichael	PITEAU The ponds are all large enough to comply with normal design guidelines. They are drawn down by up to 1.2m between storm events, so would only start to decant at the end of the 1:10 year 10 hour design storm. A flocculation system will also be in place on SP12, and could be added to the other ponds in short time frame, if necessary. The ponds are sized to meet a 50 mg/L TSS criterion for the design storm.	Response Satisfactory	MWLAP
37	Flocculent Toxicity - Request for additional information on flocculents and flocculent toxicity	John Clark	PITEAU: Additional information on flocculents will be provided as part of the Mine Permitting submission. The two flocculent tests designed to simulate settling pond decant used site water (from W6) and sediments from test pits samples. Tests to determine the toxicity of unreacted flocculent will use the filtered laboratory water normally used for rainbow trout 96 hour LC50 tests.	Details at Permitting	MWLAP
38	From #3.3 in J. Clark Letter. Confirmation of the ARD sampling to day would be corroborated by sampling/testing as the waste are produced. It is expected that MEM will provide a sampling program in their permitting. In addition, the MWLAP effluent permitting sampling requirements should provide data that addresses the metals releases during production. Will the MEM permit require a suitable continuation of relevant parameter sampling for post closure to determine at what point the wastes are not producing acid/metals/sulphate/etc.	John Clark	B. MATTSON - LORAX: MEM has requested that the material placed in the waste dumps be sampled to determine the spatial distribution of PAG and NAG material in the dump and evaluate the effectiveness of the blending management plan. The details of additional drainage sampling will be evaluated during permitting.	Response Satisfactory. Details at Permitting	MWLAP

39	<p>From #4 in J. Clark Letter. The Se and SO₄ are assumed to originate from either the coal and/or the associated removal of waste rock, etc. Similarly for SO₄, except some sulphate is expected from sulphides oxidation. Nitrate is expected primarily from blasting compounds. It is not recommended that Se, SO₄ and Nitrate be incorporated in the effluent permit as permitted discharge levels, but they will be part of the sampling program. The impact of these parameters should be covered by an impact assessment biologist in the Technical Assessment Report in support of the Approval/Permit Applications.</p>	John Clark	<p>A. MARTIN - LORAX: A risk-based approach to potential impacts to valued ecosystem components is presented in Section 12 of the Additional Information Report. This level of information is expected to satisfy permitting requirements.</p>	Response Satisfactory	MWLAP
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AGENCY: METAL LEACHING / ACID ROCK DRAINAGE					
1	EB Pit ARD Prediction - Refine and update mitigation plans for Se and ARD management based on experience gained at Perry Creek. - Permitting	Kim Bellefontaine	Mitigation and management plans will be refined during the permitting of EB Pit	Details at Permitting	MEM
2	EB Pit ARD Prediction - Develop detailed dump design and waste sequencing to support minimization/management of ML/ARD. - permitting	Kim Bellefontaine	Waste sequencing and detailed dump design will be re-evaluated during permitting of EB Pit	Details at Permitting	MEM
3	Waste Rock - The outlines for operational monitoring programs for ML/ARD management have been provided for many aspects of waste handling in the report. Refinements to these based on on-going test work and mitigation planning will be required at the permitting phase. [WCC should] continue to refine ML/ARD predictions for the Wolverine conglomerate and potentially the lower portion of FSs-E2 (i.e. establish site specific NPR criteria) to confirm the need for special handling requirements. The performance of the fine fraction is key to this assessment. - Permitting	Kim Bellefontaine	LORAX: Humidity cell testing is ongoing for samples of the Wolverine conglomerate and the lower portion of the FSs-E2 unit. The results of this test work will help to establish site specific NPR criteria.	Details at Permitting	MEM
4	MEM requested clarification regarding the future of the J-3 parting. MEM noted that the J-3 parting is not specifically mentioned in the Addendum with regard to materials handling. The possibility of a specific waste dump for this material was considered by WCC but determined to be more problematic than blending and dispersal.	Kim Bellefontaine	WCC - The parting will be mined by itself but wastes will be mixed with other waste streams to allow good dispersion. Some 12 to 15 million cubic meters of total waste rock will be handled every year. The significance of the J-3 Parting is its potential for ARD (some drill holes have relatively high sulphur, others do not. WCC clarified that this material will be dispersed in the dumps.	Details at Permitting	
5	Waste Rock - Investigate opportunities to minimize Se leaching from the North and West dumps through dump design. - Permitting	Kim Bellefontaine	WCC - Opportunity to place units that contain sandstone and/or siltstone in the base of the North and West dumps(to minimize Se leaching) will be investigated @ permitting.	Details at Permitting	MEM

6	Waste Rock - Develop detailed mine waste sequencing and waste placement plans for all dumps including scheduling, placement methods, geochemical characteristics, operational management strategies, and operational and confirmation monitoring methods. It is expected that this will form part of the EMS manual for the site. - Permitting	Kim Bellefontaine	WCC - Mine waste sequencing and waste placement plans that identify management strategies and confirmation monitoring will be prepared during permitting of the Perry Creek pit.	Details at Permitting	MEM
7	Waste Rock - Develop methods for achieving quick turnaround times on analytical work that is required for making waste management handling decisions and eliminating the need for double handling. - Permitting	Kim Bellefontaine	WCC - This will be addressed in permitting. It is likely that an onsite laboratory will be established that will be capable of obtaining rapid results for key tests for waste segregation.	Details at Permitting	MEM
8	Waste Rock - Maintain a material inventory of waste materials at the site that includes composition, mass, volume, storage area, history and timing of placement and geochemical characteristics. - Permitting	Kim Bellefontaine	A Waste dump construction inventory will be maintained during operation that will be based on mine movement records and waste rock grab samples from the depositional face.	Details at Permitting	MEM
9	Waste Rock - Develop operation monitoring programs to guide ML/ARD management and confirm effectiveness of mitigation strategies. - Permitting	Kim Bellefontaine	Operational monitoring of ARD characteristics will include blast hole sampling of the Wolverine Conglomerate as stated in the Additional Information Report and conformational monitoring of depositional face of waste rock dump.	Details at Permitting	MEM
10	CCR - MEM considers that although there is significant uncertainty with CCR characteristics, the conceptual mitigation strategies appear reasonable. Additional information is required to ensure CCR materials are adequately characterized and placed. [WCC should] continue with refining the assessment of ML/ARD characteristics of CCR products through permitting and operational phases. - Permitting	Kim Bellefontaine	CCR samples will be tested in humidity cell to assess the ARD/ML characteristics. WCC will continue operational monitoring of the tailings and CCR (a general plan for the monitoring was included in the Additional Information Report). Details of monitoring and management will be outlined during permitting and operations.	Details at Permitting	MEM

11	CCR - [WCC should] assume CCR and tailings components of G-seam (Perry Creek) and B-seam (EB pit) near seam materials are PAG until information is available on their geochemical characteristics. - Permitting	Kim Bellefontaine	Lorax/WCC - Perry Creek Pit - G-Seam is relatively clean compared to other seams, resulting in smaller quantities of coal reject produced from in-seam dilution. The kinetic testing reported to date is not representative of G-Seam; it is a larger sample that includes material from the hanging wall that lies outside the material that would be expected to comprise out of seam CCR. Out of seam dilution samples from G-seam have been submitted for static testing and the leaching characteristics of G - Seam CCR is being evaluated in a composite humidity cell sample that includes all upper seams. This composite sample represents a waste product that will be produced during operation of the mine. EB Pit - B Seam samples will be evaluated further during the permitting phase of the EB Pit.	Details at Permitting	MEM
12	CCR - [WCC should] provide detailed CCR waste assessment and handling methods. This should form part of the EMS manual for the site. - Permitting	Kim Bellefontaine	WCC- The basis for the CCR waste assessment and handling methods was outlined in the Additional Information Report. A more detailed procedures manual will be prepared during permitting and will be part of the EMS for the Perry Creek Pit.	Details at Permitting	MEM
13	CCR - [WCC should] develop methods for achieving quick turnaround times on analytical work that is required for making waste management handling decisions and eliminating the need for double handling. - Permitting	Kim Bellefontaine	WCC - Methods will be established to ensure test results are available for waste segregation decisions.	Details at Permitting	MEM
14	CCR - [WCC should conduct] operational monitoring to confirm geochemical characteristics and confirm waste handling program. - Permitting	Kim Bellefontaine	WCC - A commitment for monitoring CCR during operations was outlined in the Additional Information Report.	Details at Permitting	MEM

15	Tailings - Although some tailings from individual seams are predicted to have NPR <2, WCC predicts that the tailings will not become ARD generating because tailings will be a well-blended waste product. Out of seam dilution is mixed with the raw coal and raw coal from the upper seams (or J seams) are mixed together as they are processed. As well, the tailings are thoroughly mixed during processing and transport. MEM concurs with this assessment. See CCR discussion above for Se management. [WCC should conduct] operational monitoring to confirm geochemical characteristics including differing chemistry due to segregation of tailings during deposition. - Permitting	Kim Bellefontaine	WCC - A commitment for monitoring tailings during operations was outlined in the Additional Information Report.	Details at Permitting	MEM
16	Dryer Ash - Limited volumes of dryer ash will be generated. The materials are not expected to be PAG and are slated for disposal within the CCR pile. MEM concurs with this assessment. [Wrn should conduct] operational monitoring to confirm geochemical characteristics. - Permitting	Kim Bellefontaine	WCC - A commitment for monitoring dryer ash during operations was outlined in the Additional Information Report.	Details at Permitting	MEM
17	Small pit ponds will remain at the end of mining in both the Perry Creek and EB pits. Their chemistry will be influenced by geochemical characteristics of pit surfaces and backfilled waste as well as groundwater quality. Calcareous footwall materials will likely be the dominant control and final drainage is predicted to be alkaline. Elevated Se concentrations in pit ponds is potentially an issue. WCC has stated that backfilling these ponds with waste to ensure the waters are not accessible to waterfowl is a potential contingency option at closure. During operations, [WCC should] predict the quality of water in the pit ponds at closure to determine the need for mitigation. - Permitting	Kim Bellefontaine	WCC - WCC has committed to ongoing refinements of drainage water quality predictions during operations.	Details at Permitting	MEM

Min. Energy and Mines - Environmental Quality Section Comments on Information Requirements for permitting Wolverine Mine					
GEOTECHNICAL					
	Technical Issue: Adequacy of Information				
1	It is considered that the geotechnical information presented in the Additional Information Report is sufficient for the level of detail required for the Environmental Assessment. Additional site investigation, foundation information and final design studies are required prior to the <i>Mines Act</i> permit application.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	WCC is currently undertaking additional studies to obtain more site investigation, foundation information and final design studies. The results of these will be incorporated into the Mines Act permit application.	Details at Permitting	MEM
	Technical Issue: Stability of major mine structures				
2	Stability evaluations indicate that the major mine structures (tailings storage facility, coarse coal reject pile and waste dumps) at the Perry Creek mine site can be constructed to meet acceptable stability criteria. Additional foundation investigation and stability evaluation is required for the EB Pit waste dumps, however, no major stability concerns are expected.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	WCC will undertake additional foundation investigation and stability evaluations for the EB Pit waste dump areas to confirm that there are no major stability concerns. The development of the EB Pit will be delayed for 5 years, which will allow sufficient time for the necessary studies to be completed prior t permitting at EB.	Details at Permitting	MEM
3	A formal risk assessment has been undertaken to identify potential major failure modes, assess associated risks and develop risk reduction strategies. The design of mitigation measures and/or contingency plans and the development of instrumentation and monitoring plans will be required.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	WCC will undertake the design of mitigation measures and contingency plans, and will develop instrumentation and monitoring plans.	Details at Permitting	MEM

	Technical Issue: Tailings Impoundment and Dam Stability				
	<u>Tailings Impoundment and Dam</u>				
4	Construction of a tailings dam, 12 metres high and about 1.3 km in length, is proposed on the Wolverine valley flood plain to store about 2.2 million cubic metres of tailings. The dam will be constructed in stages by downstream construction and comprise a starter dam of local borrow material followed by upper lifts of coarse coal rejects with a downstream dam slope of 3H:1V. Tailings will be spigotted from the upstream crest to form a beach and keep water away from the dam section. Geotechnical investigations, involving drill holes and test pits, have revealed weak foundation soil materials that may be susceptible to liquefaction. The tailings impoundment is classified as a high failure consequence.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	WCC has noted the concern about weak foundation soil materials that may be susceptible to liquefaction, and that the tailings impoundment is classified as a high failure consequence. Management plans for Issues raised will be handled at the permitting level based on additional field programs that have now been completed.	Details at Permitting	MEM
	<i>Permitting Requirements:</i>				
5	Further geotechnical investigation is required to ensure that a long-term stable design is developed.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	WCC - WCC is undertaking further geotechnical studies to ensure the development of a long-term stable design.	Details at Permitting	MEM
6	Determine if the clay and silt is varved.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	WCC - This information will be provided at permitting.	Details at Permitting	MEM

7	Update soil strength profile of the foundation soils.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	WCC - This information will be provided at permitting.	Details at Permitting	MEM
8	Update pore pressure profile under the dam site.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	WCC - This information will be provided at permitting.	Details at Permitting	MEM
9	Determine consolidation characteristics of the clays and silts and calculate potential foundation settlement and differential settlement. Design for differential settlement.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	WCC - This information will be provided at permitting.	Details at Permitting	MEM
10	Investigate the extent and characteristics of the muskeg and requirements for removal.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	WCC - This information will be provided at permitting.	Details at Permitting	MEM

11	Fully assess liquefaction potential of the foundations, the effect on dam stability and provide mitigation plans as required. The potential effects of ground vibration caused by loaded coal trains on the adjacent rail line should be adequately assessed.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will fully assess the liquefaction potential of the foundations, and the effect on dam stability. Mitigation plans will be provided as required. In conjunction with the liquefaction assessment, the potential effects of ground vibration caused by loaded coal trains on the adjacent rail line will be assessed.	Details at Permitting	MEM
12	Confirm the stability safety factors during construction and long term.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will confirm the stability safety factors during construction and over the long term.	Details at Permitting	MEM
13	Prepare detailed dam design with stage cross-section design drawings.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will prepare detailed dam design with stage cross-section design drawings.	Details at Permitting	MEM
14	Prepare quality control and quality assurance specifications for dam construction and associated surface water and seepage water management structures.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will prepare quality control and quality assurance specifications for dam construction and associated surface water and seepage water management structures.	Details at Permitting	MEM

15	Develop inspection and maintenance program for water diversion works.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will prepare an inspection and maintenance program for water diversion works.	Details at Permitting	MEM
16	Develop field monitoring instrumentation program and prepare an Operation, Maintenance and Surveillance manual.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, A field monitoring instrumentation program will be developed, and an Operation, Maintenance and Surveillance Manual will be prepared.	Details at Permitting	MEM
17	Develop an Emergency Preparedness Plan.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will develop an Emergency Preparedness Plan	Details at Permitting	MEM
18	Prepare closure design concept.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will develop a closure design concept.	Details at Permitting	MEM

	Technical Issue: Coarse Coal Reject Pile and Integrity of Water Diversion Structures				
	<u>Coarse Coal Reject Pile</u>				
19	A 35 metre high coarse coal reject (CCR) pile with an overall slope of 2H:1V is proposed to be constructed on the valley slope near the plantsite. The toe of the CCR pile has been located to avoid deep lacustrine clay in the valley floor foundation. The integrity of water diversion structures located above the dump is important for dump stability.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	WCC recognizes that the integrity of water diversion structures located above the dump is important for dump stability. Issues raised will be handled at the permitting level.	Details at Permitting	MEM
20	· Prepare detailed design.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will prepare a final detailed design for the Coarse Coal Reject Pile.	Details at Permitting	MEM
21	· Develop field monitoring instrumentation program	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will develop a field monitoring instrumentation program for the Coarse Coal Reject Pile.	Details at Permitting	MEM
22	· Develop inspection and maintenance program for water diversion works.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will develop an inspection and maintenance program for the water diversion works.	Details at Permitting	MEM

23	<ul style="list-style-type: none"> Prepare dump construction procedures including quality control and quality assurance requirements. 	<p>Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.</p>	<p>At the permitting level, WCC will prepare construction procedures including quality control and quality assurance requirements for the Coarse Coal Reject Pile.</p>	<p>Details at Permitting</p>	<p>MEM</p>
24	<ul style="list-style-type: none"> Determine the potential for combustion of the carbonaceous material to be stored in the reject pile and the possible effects on dump performance. 	<p>Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.</p>	<p>At the permitting level, WCC will determine the potential for combustion of the carbonaceous material to be stored in the Coarse Coal Reject pile and the possible effects on dump performance.</p>	<p>Details at Permitting</p>	<p>MEM</p>
25	<ul style="list-style-type: none"> Prepare closure design concept. 	<p>Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.</p>	<p>At the permitting level, WCC will prepare a closure design concept for the Coarse Coal Reject Pile.</p>	<p>Details at Permitting</p>	<p>MEM</p>

	Technical Issue: Integrity of Perry Creek Pit Waste Rock Dumps				
	<u>Perry Creek Pit Waste Rock Dumps</u>				
26	Three major dumps are proposed to store the waste rock from the Perry Creek pit. An assessment of deep-seated stability, shallow stability and rock rollout has been carried out for the waste dumps. The South Dump is proposed to be 200 metres high with an overall slope of 2H:1V and is classified as high failure consequence due to the proximity of the main coal haul road and tailings storage facility below the dump toe. The design for this waste dump will incorporate 20 metre high lift construction with an outer shell zone of select coarse material and rollout protection berms on each bench. The North Dump will be located above the Perry Creek pit and downslope risks associated with potential failure and run-outs have been considered for this potentially high failure consequence dump during operation. The East Dump is classified as low failure consequence.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	WCC recognizes there are varying amount of downslope risks associated with the potential failure of the dumps during operation. WCC will address these issues at the permitting level, incorporating management plans appropriate to level G risk.	Details at Permitting	MEM
	<i>Permitting Requirements:</i>				
27	· Prepare dump construction and stability monitoring procedures for all waste dumps.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will prepare dump construction and stability monitoring procedures for all waste dumps.	Details at Permitting	MEM
28	· Develop procedure for worker safety in pit below active north dump.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will prepare a procedure for worker safety in the pit below the active north dump.	Details at Permitting	MEM

29	· Develop highwall dewatering requirements below the north dump.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will prepare highwall dewatering requirements for the area below the north dump	Details at Permitting	MEM
30	· Determine zone of "no access" below the east dump toe.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will implement a zone of "no access" below the east dump toe.	Details at Permitting	MEM
31	· Prepare closure design concepts.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will prepare closure design concepts for the Perry Creek Waste Rock Dumps.	Details at Permitting	MEM

	Technical Issue: Integrity of EB Pit Waste Rock Dumps				
	<u>EB Pit Waste Rock Dumps</u>				
32	Based on an initial review of foundation conditions for the EB pit waste dumps, the design consultant has determined that there are likely to be no major stability concerns. Further site investigation, evaluation of the foundation conditions and stability analysis is required. The proposed West Dump and East Dump are classified as high failure consequence due to the proximity of a pipeline ROW and access road below the dump locations. It is understood that permitting for the EB pit is to be deferred until year 5 of the Wolverine Mine project, allowing sufficient time for additional geotechnical studies to be undertaken.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	WCC recognizes that the proposed West and East Dump are classified as high failure consequence for various reasons. The development of the EB Pit will be deferred until Year 5, allowing ample time for additional geotechnical studies to be undertaken. WCC intends to address issues related to the EB Pit Waste Rock Dumps at the permitting level.	Details at Permitting	MEM
	<i>Permitting Requirements:</i>				
33	· Complete additional site investigation, design studies and stability analyses.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will complete additional site investigation, design studies and stability analyses.	Details at Permitting	MEM
34	· Prepare final designs.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will prepare final designs for the EB Pit Waste Rock Dumps.	Details at Permitting	MEM

35	Prepare pre-mine drainage ditching plans.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will prepare pre-mine drainage ditching plans for the EB Pit Waste Rock Dumps.	Details at Permitting	MEM
36	Develop dump construction and stability monitoring procedures.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will develop construction and stability monitoring procedures for the EB Pit Waste Rock Dumps.	Details at Permitting	MEM
37	Prepare closure design concepts.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will prepare closure design concepts for the EB Pit Waste Rock Dumps.	Details at Permitting	MEM
	Technical Issue: Pit wall design and slope geometry at Perry Creek and EB Pit				MEM
	Perry Creek and EB Pit				
38	Preliminary pit wall designs for the Perry Creek open pit and the EB open pit are based on one borehole at each site and surface geology outcrop mapping. Pit wall design and slope geometry will be developed based on slope mapping and structural geology interpretation during the operating stages of pit development.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	WCC intends to address issues raised by the Perry Creek and EB Pit at the permitting level.	Details at Permitting	MEM

	<i>Permitting Requirements:</i>				
39	· Prepare pit wall designs.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will prepare pit wall designs for the Perry Creek. The EB Pit will be delayed for 5 years, however, at such time as is required, WCC will prepare pit wall designs for the EB Pit.	Details at Permitting	MEM
40	· Develop monitoring and inspection program for pit wall stability.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	At the permitting level, WCC will develop a monitoring and inspection program for pit wall stability.	Details at Permitting	MEM
	General: geotechnical evaluations				
41	The results of the geotechnical evaluations for the proposed major structures (tailings storage facility, coarse coal reject pile and waste rock dumps) presented in the Additional Information Report are considered acceptable for the Environmental Assessment of the Wolverine Coal Project. Additional studies are required to prepare final designs to be submitted with the <i>Mines Act</i> permit application.	Chris Carr, P.Eng., Senior Geotechnical Engineer, Ministry of Energy and Mines, letter Aug 5/04.	WCC has initiated the additional studies required to prepare the final designs to be submitted with the <i>Mines Act</i> Permit Application.	Details at Permitting	MEM

LWBC - WATER MANAGEMENT & LAND TENURE					
	Technical Issue: Debris Flow Hazard				
1	<p>Terrain mapping identified a debris flow hazard within the W14 and W18 watersheds. Information provided to date has not satisfactorily addressed this hazard. The debris flow hazard in the W14 watershed is of particular concern as the mine's plant site is potentially within the debris flow run-out zone, and thus represents a risk to life and infrastructure. The planned mitigation and monitoring procedures within the W14 watershed may not be sufficient to address this hazard. The planned debris gate at the entrance of the W14 culvert will not likely be sufficient to halt or dissipate a debris flow. LWBC recommends that the geomorphic hazards within watersheds W14, W18 and W22 be assessed and mitigated. This issue could be addressed by the Ministry of Energy and Mines as part of their Mines Act permitting.</p>	<p>LWBC - Brendan Miller, P.Geo. Land and Water Licenced Officer - letter Aug 9/04.</p>	<p>WCC is addressing the assessment & mitigation of geomorphic hazards within the W14, W18, and W22 watersheds as part of the permitting process. Field studies are scheduled for fall 2004.</p>	<p>Details at Permitting</p>	<p>LWBC</p>
	General: Land Act Tenure				
2	<p>A Land Act tenure is to be sought for all infrastructure located beyond WCC, Mines Act tenures. The appropriate Land Act tenure in this instance is a lease. To acquire a Land Act tenure, an application and associated application fee is to be forwarded to LWBC's Fort St John Regional Office. A Land Act tenure application review usually involves referring the application to concerned agencies and First Nations for their comments. As this project is being reviewed under the Environmental Assessment Act, referral may not be necessary.</p>	<p>LWBC - Brendan Miller, P.Geo. Land and Water Licenced Officer - letter Aug 9/04.</p>	<p>WCC - A lease application for the plantsite is proposed near the end of September.</p>	<p>Details at Permitting</p>	<p>LWBC</p>

	Technical Issue: Sedimentation Ponds				LWBC
3	A separate Water Act licence is required for the sedimentation ponds at the Perry Creek pit and the sedimentation ponds at the EB pit (2 licences). To acquire the licences, applications and associated application fees are to be forwarded to LWBC's Fort St John Regional Office.	LWBC - Brendan Miller, P.Geo. Land and Water Licenced Officer - letter Aug 9/04.	WCC will apply for a water license for each of Perry Creek pit in the fall of 2004, with application for EB deferred for several years.	Details at Permitting	LWBC
4	All works are to be designed and reviewed by a Professional Engineer registered in BC. A Professional Engineer is to supervise construction of the works.	LWBC - Brendan Miller, P.Geo. Land and Water Licenced Officer - letter Aug 9/04.	All works will be designed and reviewed by a P.Eng registered in BC. A P.Eng will supervise construction.	Resolved	LWBC
5	Conceptual engineering plans are to be provided to LWBC prior to being given leave to construct. Final, as-built drawings are to be submitted following construction. All works are to be constructed in accordance with Provincial regulations and to the satisfaction of the Regional Water Manager.	LWBC - Brendan Miller, P.Geo. Land and Water Licenced Officer - letter Aug 9/04.	Conceptual engineering plans will be provided to LWBC prior to construction being permitted. As-built drawings will be submitted following construction. All works will be constructed in accordance with Provincial regulations and to the satisfaction of the Regional Water Manager.	Details at Permitting	LWBC
6	The proponent is to ensure that they have acquired agreement from any agency, corporation or individual, prior to issuance of the licences, if the sedimentation ponds encroach upon any privately held or Crown tenured land."	LWBC - Brendan Miller, P.Geo. Land and Water Licenced Officer - letter Aug 9/04.	WCC Acknowledged - WCC is working on agreements with those who hold land which may be encroached upon by the sedimentation ponds	Details at Permitting	LWBC

7	A boom may need to be incorporated into the sedimentation ponds' design, to reduce the potential of outlet plugging, if required by LWBC's Dam Safety Officer.	LWBC - Brendan Miller, P.Geo. Land and Water Licenced Officer - letter Aug 9/04.	WCC's consultants will consult with LWBC on dam safety aspects of dam design.	Details at Permitting	LWBC
8	The LWBC Dam Safety Officer has indicated that the methodology used in assessing the risk associated with a dam breach is not clear. Please contact Rob Piccini (250 565-6441) to address this issue during the permitting stage.	LWBC - Brendan Miller, P.Geo. Land and Water Licenced Officer - letter Aug 9/04.	During the permitting stage, WCC will contact the LWBC Dam Safety Officer to ensure that all concerns are addressed.	Details at Permitting	LWBC
Technical Issue: Culvert for W14 Stream					LWBC
9	A Water Act approval is required for the culvert for the W14 stream. To acquire the approval, an application and associated application fee is to be forwarded to LWBC's Fort St John Regional Office. The culvert is to be designed and reviewed by a Professional Engineer registered in BC. A Professional Engineer is to supervise construction of the works.	LWBC - Brendan Miller, P.Geo. Land and Water Licenced Officer - letter Aug 9/04.	WCC will initiate the application for a Water Act approval for the culvert for the W14 stream in the fall of 2004. Fees will be forwarded to LWBC's regional office when the application is made. The culvert will be designed and reviewed by a P.Eng registered in BC A P.Eng will supervise construction of the works.	Details at Permitting	LWBC
Technical Issue: Diversion Ditches					LWBC
10	A Water Act approval is required for the diversion ditches at the Perry Creek pit and a second approval is required for the diversion ditches at the EB pit (2 approvals). All works are to be designed and reviewed by a Professional Engineer registered in BC. A Professional Engineer is to supervise construction of the works.	LWBC - Brendan Miller, P.Geo. Land and Water Licenced Officer - letter Aug 9/04.	WCC will apply for the Water Act Approvals for the diversion ditches as indicated. All works will be designed and reviewed by a P.Eng registered in BC. A P.Eng will supervise construction.	Details at Permitting	LWBC

MWLAP - WILDLIFE					
1	Ongoing monitoring study of Caribou including participation from all industries.	Pierre Johnstone MWLAP Aug 11/04.	WCC - WCC would be willing to contribute to efforts related to caribou studies and management planning, in the context of an overall strategy led by government for cumulative effects management, and commensurate with our level of impact on key factors affecting the population. WCC notes that the EB area is the key area of concern for this project, and WCC will not be developing this area for about eight years. In the meantime, other industrial users (Oil and Gas) are active in the area.	Response Satisfactory. Commitment to contribute to caribou studies	MWLAP
2	EB Pit may be in migration corridor for caribou	Pierre Johnstone, MWLAP Aug 9/04.	WCC - Available data have been reviewed by the wildlife working group. No major migratory route has been confirmed, but available data are not definitive. WCC is willing to contribute to studies needed to confirm movement through EB area in the context of the studies mentioned in #10 above.	Response Satisfactory. Commitment to contribute to caribou studies	MWLAP

MWLAP - AIR QUALITY					
1	Should the receptors include a few around the fence line of the farm (assuming the residents will not be staying in their house)?	MWLAP	RWDI - Receptors were located in the areas where the residents are most likely to be. It is more likely for the residents to be in or around the out-buildings than to be at the property line. To assess all positions on the farm would have required using gridded receptors covering the farm area, and that was beyond the scope of a screening level assessment. However, in subsequent runs for the coal dryer RWDI has considered a receptor at the SW corner of the Terry Ranch property.	Response Satisfactory	MWLAP
2	RWDI stated that the exit velocity may be lower 15 m/s for the dryer. How will that change compare to using the 30 m/s exit velocity?	MWLAP	RWDI - The 15 m/s exit velocity does result in higher predicted concentrations. Model runs for Case1 and Case 2 indicate that though predicted concentrations from revised coal dryer emissions are greater, they are still below ambient guidelines. RWDI will provide additional results for the coal dryer that consider a receptor on the closest property line and the latest information available on the selected coal dryer.	Details at Permitting	MWLAP
3	Modelling does not consider furnace Bypass, stack sampling data from Bullmoose, and latest coal dryer design changes in exhaust flow parameters.	MWLAP	RWDI - RWDI will model the coal dryer with additional information collected from Cochrane Engineering (Designer of Coal Dryer), Bullmoose stack sampling data (acquired from MWLAP) and Furnace Bypass information (acquired from Bullmoose operational experience).	Details at Permitting	MWLAP
4	Continuous monitoring plan is required if the Terry Ranch will be occupied during the life of the Wolverine Mine.	MWLAP	WCC - WCC is committed to continuous monitoring of air quality at the ranch. During permitting RWDI will prepare a continuous monitoring plan that will address the requirements of the MWLAP and in line with the agreement and understanding between WCC and the owners of the Terry Ranch.	Details at Permitting	MWLAP

5	Worst-case concentrations of fugitive dust particulate are calculated for blasting emissions at one location in the Perry Creek Pit closest to the Terry Ranch. It is not clear what the effect will be of blasting occurring at distances further away from the Terry Ranch that may have a higher frequency of impacts due to frequencies of winds.	MWLAP	RWDI will conduct a sensitivity analysis to consider the impact of blasting fugitive dust emissions at other locations in the south Pit on the Terry Ranch.	Details at Permitting	MWLAP
	Abbreviations				
	CCR - Coarse Coal Rejects				
	Cochrane - Cochrane Engineering				
	EMS - Environmental Management System				
	Lorax - Lorax Environmental Services Ltd.				
	LWBC - Land and Water British Columbia Inc.				
	MEM - Ministry of Energy and Mines				
	ML/ARD - Metal Leaching / Acid Rock Drainage				
	MWLAP - Ministry of Water, Land and Air Protection				
	NAG - Non Acid Generating				
	NPR - Net Potential Ratio				
	PAG - Potential Acid Generating				
	Piteau - Piteau Associates Engineering Ltd.				
	PML - Potential Metal Leaching				
	QOC - Quintette Mine				
	RWDI - RWDI West Inc.				
	WCC - Western Canadian Coal Corp.				