Information Request 15

Responses to Information Request 15

IR 15 – Water Quality

References:

EIS, Table 2.9-1 (Table of Commitments)
EIS, Table 2.7.2.4B-38 (Summary of water quality effects assessment for Fish Lake)
EIS, Table 2.7.2.4B-40 (Summary of water quality effects assessment in adjacent streams and rivers)

Related Comments:

CEAR # 276 (BC Ministry of Mines, Energy, and Natural Gas)

Rationale:

The Proponent concludes that the water quality for Fish Lake, Fish Lake tributaries and adjacent lakes and streams could be adversely affected (p. 793-795). The Proponent proposed to implement monitoring during operations to confirm the original predictions of adverse effects, and to implement active water treatment, if required. It is unclear, given the explanation, how the Proponent arrived at a conclusion of 'no significance' (p. 793-795).

It is also unclear if the water treatment facility is an integral part of the design for mine site water management or if it will be built only "if necessary" as an adaptive management option (p. 1514).

Information Requested:

The Panel requests that Taseko:

a. Confirm its commitment to build a water treatment facility.

b. Discuss how Taseko will determine when such treatment would be required for the treatment of TSF effluent and pit water prior to discharge to the receiving environment would be required.

c. Provide clarification on the pH and chemical composition of the effluent and pit water that would need to be treated prior to discharge to the receiving environment from both the tailings impoundment area and from Pit Lake.

d. Provide a discussion on how Taseko determined 'no significance' based on the fact there will be adverse environmental effects on water quality prior to applied mitigation.

e. Discuss and evaluate the effectiveness of the proposed mitigation measures.

Information Request #15a

The Panel requests that Taseko:

Confirm its commitment to build a water treatment facility.

Response Summary

Taseko commits to construct a water treatment facility if and when monitoring results exceed pre-determined thresholds that will be defined such that sufficient time is available for construction of the facility in advance of any unacceptable impacts occurring.

Information Request #15b

Discuss how Taseko will determine when such treatment would be required for the treatment of TSF effluent and pit water prior to discharge to the receiving environment would be required.

Response Summary

Monitoring of TSF effluent will be carried out during operations. Surface discharge from the TSF is expected to be allowed to occur a decade after tailings deposition ceases, with the intervening period providing ample time to determine whether treatment is required. This period could be extended by continuing to route TSF water to the open pit instead of the lake. Similarly, discharge of pit water is expected to be allowed to occur 28 years after mining is complete and monitoring during the filling period will provide ample indication of whether water treatment will be necessary.

See response to IR 25g for clarification regarding water management and the timing of water storage and discharge from the TSF and the pit.

Information Request #15c

Provide clarification on the pH and chemical composition of the effluent and pit water that would need to be treated prior to discharge to the receiving environment from both the tailings impoundment area and from Pit Lake.

Response Summary

Taseko remains committed to treating water unsuitable for discharge however at this point in time it would be premature to state that a water treatment facility is needed. Continuous monitoring through the life of the mine and post closure will indicate if and when water treatment would be needed.

Both open pit water and TSF effluent are expected to display circumneutral pH values in the pH 7 to 8 range. The results of the water quality predictions for both the open pit and the TSF are shown in Appendix 2-7-2-1-I and these results provide the best available indication of the chemistry of water.

Information Request #15d

Provide a discussion on how Taseko determined "no significance" based on the fact there will be adverse environmental effects on water quality prior to applied mitigation.

Response Summary

Taseko is committed to implementing mitigation measures before there are any significant adverse environmental effects on water quality. If there are changes in water quality, these changes will be measurable and will gradually change over time. If mitigation is required it will be triggered through monitoring and measuring against predetermined levels included in an adaptive management plan. These trigger levels will be determined during the permitting process.

Discussion

A water quality model was utilized to predict the metals content of Fish Lake, Fish Lake tributaries, and other adjacent streams and rivers. This model uses results, assumptions and inputs from other studies to calculate the resulting water qualities in each of the relative water bodies. In order to be conservative, upper bound values for input parameters were used to force the model to derive the "worst case water quality scenarios" for each water body. In order to further build conservatism into the model, the worst case inputs are assumed to happen every day throughout the life of the project. If then, the worst case scenario does not exceed water quality guidelines, one can state with confidence that there will be no adverse effects.

In this case however, the worst case scenario did predict that some metal content levels in the receiving water bodies would increase above water quality guidelines over time. In reality, it would be rare that the highest metal concentrations, the worst flow rates, the maximum dust fall, etc., would occur at any time, let alone every day and all at the same time. It is for this reason that in the impact assessment tables (Tables 2.7.2.4B-38, 39 and 40) it is stated that the changes to water quality "**may**" result in adverse environmental effects.

If there are changes in water quality in the receiving waters these changes will gradually change over time. This is not only intuitive but is also predicted by the current modelling. Monitoring of all of the parameters of concern throughout the project timeline will allow Taseko to determine whether the modelled parameters are changing with time. Using this actual performance monitoring data, more accurate water quality modelling can be carried out. The predictions of future water quality will not only be more accurate (due to use of actual performance monitoring results) but will also be predicted with greater confidence. Using the actual performance monitoring data to inform water quality models will also allow Taseko to predict if and when water quality may exceed guidelines. If trends derived from these models show that guidelines are likely to be exceeded in the future, Taseko will implement appropriate mitigation in time to adjust the trend and remedy the situation. It is anticipated that adaptive

management plans (AMPs) that include monitoring locations, times and techniques as well as indication, warning, and action levels and finally proposed mitigation measures will be developed with Provincial Government during the mining permitting process. There are many technically sound and tested techniques for the treatment of water. Some techniques are better suited to certain conditions than others. To choose a treatment option and supply conceptual designs at this stage would be premature. Monitoring of water quality will identify what, if any, parameters need mitigation and at that point, treatment options will be determined.

Conclusion

By committing to the implementation of adaptive management plans, Taseko is ensuring that mitigation will take place before water bodies affected by the project experience any significant adverse environmental effects. Since there will be no significant adverse environmental effects on water quality prior to applied mitigation, the conclusion is that there will be no significant effects.

Information Request #15e

Discuss and evaluate the effectiveness of the proposed mitigation measures.

Response Summary

Water quality in the tailings storage facility (TSF) will be monitored through-out the operations and into the post operations phase of the project. Current modeling indicates that water treatment may be needed before discharging this water to the receiving environment. The modeling however, uses conservative assumptions and it is expected that the actual water quality will be better than the currently predicted qualities.

There are many technically sound and tested techniques for the treatment of water. Some techniques are better suited to certain conditions than others. To choose a treatment option and supply conceptual engineered designs at this stage would be premature. Monitoring of water quality will identify what, if any, parameters need mitigation and at that point, treatment options will be determined. There will be ample time to monitor the tailings lake water and the pit lake water before final decisions are made regarding what type of water treatment facility (if any) is needed.

Using the currently modeled water quality as a basis for a choosing a water treatment facility indicates that a reverse osmosis process with a mechanical evaporation of the residual brine would be applicable. This type of plant is typically able to remove 95% to 99% of most dissolved constituents and will be able to reduce the sulphates, copper, selenium and the cadmium concentrations that are currently projected to be elevated, to a level well below guidelines. Reverse osmosis and mechanical evaporation techniques are well understood, industrially proven technologies for treating water and are used extensively in a variety of applications around the world.

Taseko is committed to implementing effective mitigation measures, including implementing water treatment using reverse osmosis technology if necessary, to limit project impacts to acceptable levels. Taseko is confident in relying on the effectiveness of the suite of available mitigation strategies (including water treatment) to achieve the goal of avoiding unacceptable impacts.