

## Information Request 8

Information Request 8	8-1
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## Responses to Information Request 8

Response to Information Request 8a	8-3
Response to Information Request 8b	8-5
Response to Information Request 8c	8-6
Response to Information Request 8d	8-7
Response to Information Request 8e	8-8
Response to Information Request 8f	8-9
Response to Information Request 8g	8-10

## **IR 8 – Acid Rock Drainage / Metal Leaching Prediction**

### **References:**

EIS Guidelines, Section 2.7.2.1  
EIS, Section 2.7

### **Rationale:**

The EIS (p. 539-541) states that:

#### *Waste Rock:*

- "...potential for ARD typically varies over the scale of tens of metres with local zones of smaller scale variation between PAG and non-PAG rock. This indicates that waste management by segregation of PAG and non-PAG rock is a practical approach for the Project, and that operational monitoring will be important for appropriate waste classification."
- "The delay to onset of ARD [will be] decades to centuries before the majority of the PAG rock transitions from neutral to acidic weathering conditions. Since Taseko plans to flood PAG rock within 2 years of placement, it is expected that pH neutral weathering conditions will be maintained within the PAG waste rock."

#### *Tailings:*

- "Tailings characterization showed that a single bulk tailings product is expected to be non-PAG, and that tailings seepage [from the TSF] will be pH neutral."

#### *Pit Water:*

- "Pit water will remain pH neutral indefinitely, and pit water chemistry will be dominated by surface inflow from Fish Lake, by discharge of collected TSF seepage, and by seepage from the non-PAG waste rock storage facility. Loadings from the pit high wall are predicted to be lower than cumulative loadings from these other sources."

### **Information Requested:**

With respect to the ML/ARD Prediction and Prevention Plan referred in the EIS, the Panel requests that Taseko provide the following information:

#### *Waste Rock:*

- a. How will the identification and segregation of PAG and non-PAG waste rock be carried out within the pit (pre- and post-blasting)?
- b. What operational testing and monitoring programs will be implemented to ensure accurate, on-going segregation of PAG and non-PAG waste rock?

- c. Should ARD/ML predictions prove to be inaccurate and acid runoff is generated from the non-PAG waste rock pile; how will this unanticipated ARD be addressed?

*Tailings:*

- d. What operational testing and monitoring programs will be implemented to ensure that ARD/ML predictions for materials in the TSF are accurate (i.e., that they will be non-acid generating)?
- e. Should ARD/ML predictions prove to be inaccurate and acidic seepage is generated from the TSF; how will this unanticipated effect be addressed?

*Pit Water:*

- f. Upon closure, what testing and monitoring programs will be implemented to ensure that ARD/ML predictions for pit water are accurate?
- g. Should ARD/ML predictions prove to be inaccurate and acidic discharge is generated; how will this unanticipated effect be addressed?

**Information Request #8a**

How will the identification and segregation of PAG and non-PAG waste rock be carried out within the pit (pre- and post-blasting)?

**Response Summary**

PAG and non-PAG waste rock will be managed in a similar manner as grade control procedures for segregating ore and waste. Pre-blast, operational monitoring of ABA parameters will be carried out on blast hole cuttings, with results incorporated into the mine's material handling plan. PAG and non-PAG waste rock polygons will be delineated using mine planning software, and results will be transferred to mine staff who will identify PAG and non-PAG limits in the blasted area after each blast. Appropriate technology will be utilized to allow shovel operators to determine what material classification is being mined. Shovel operators will then direct trucks to appropriate locations depending on the material (ore, PAG, non-PAG, overburden).

**Discussion**

A Metal Leach/Acid Rock Drainage Prediction and Prevention Plan (ML/ARD/PPP) will be submitted to the BC Ministry of Energy, Mines and Natural Gas as part of the Mines Act Permit Application.

The basis for material classification prediction at Prosperity for mine planning purposes is expected to be a three dimensional model based on exploration and blast hole sampling. Assay data will be referenced back to drill hole locations and the information stored in a drill hole database. Acid/Base Accounting (ABA) data will be managed using the same systems as for ore and waste determination. Geostatistical analysis of the drill hole results will be undertaken to continuously update the three dimensional model.

The basis and methodology for predicting PAG/NAG on a bench scale operational level for purposes of waste management is discussed in the following sections.

**PAG/NAG Delineation and Segregation**

1. Blast hole cuttings will be collected from surveyed drill holes.
2. These cuttings will be tested onsite for parameters specific to each waste rock type with regards to its PAG/NAG nature.
3. Rock types will be identified based on this information and communicated to shovel operators and supervisors.
4. Shovel operators will indicate the type of material loaded to the haul truck driver.

5. Material will be delivered to the appropriate location with monitoring to ensure that the materials are appropriately placed.

### **Blast Hole Sampling Frequency and Analysis**

For waste rock blasts where large contiguous zones of PAG waste are present, a single composite per blast would be prepared and analyzed for acid-base accounting. These analyses would be performed to confirm the PAG nature of the waste in these zones, and to ensure that there is a geochemical inventory of the PAG material.

For waste rock blasts in zones that are modelled as NAG or are considered to be uncertain, it is currently planned that every fifth blast hole will be analyzed for sulphide sulphur (for AP calculation) and Modified NP to generate a (NP-10)/ AP value.

Once a consistent set of test results is revealed through operations experience, and personnel become familiar with the data, the frequency may be modified to a test program that continues to update the block model appropriately and adequately characterizes waste.

### **Reporting and Confirmatory Sampling**

Sampling to confirm the efficiency and reliability of the materials handling and management procedures set out under this plan will be carried out on a routine basis. Samples will be analyzed for Modified NP and AP.

A geochemical inventory of NAG and PAG waste rock will be generated. Geochemical characteristics will be determined in the pit prior to waste excavation, and from confirmation sampling from active dump crests in the case of NAG waste. GPS based computerized tracking systems will be utilized to track and report waste rock placement performance.

**Information Request #8b**

What operational testing and monitoring programs will be implemented to ensure accurate, on-going segregation of PAG and non-PAG waste rock?

**Response Summary**

In-pit monitoring of appropriate ABA parameters will be carried out to allow segregation of PAG and non-PAG waste rock. To verify that the in-pit monitoring program and the subsequent dispatching by pit operations is functioning as intended, auditing of management systems and confirmatory sampling will be carried out on a regular basis. It is anticipated that this confirmatory monitoring would be carried out through composite sampling along active non-PAG dump crests to determine if PAG materials is being deposited in the facility. There are no plans for confirmatory sampling of material placed in the PAG disposal facility because inclusion of non-PAG rock is not a concern.

**Information Request #8c**

Should ARD/ML predictions prove to be inaccurate and acid runoff is generated from the non-PAG waste rock pile; how will this unanticipated ARD be addressed?

**Response Summary**

A Metal Leach/Acid Rock Drainage Prediction and Prevention Plan (ML/ARD/PPP) will be submitted to the BC Ministry of Energy, Mines and Natural Gas as part of the Mines Act Permit Application. Specific procedures regarding the mitigation of unanticipated acid runoff will be included in that document.

**Discussion**

Acid runoff is not expected from the non-PAG waste pile. Should acid runoff be identified, investigations will be carried out to identify the source and the scale of the acid generating material. If the scale of the source is determined to be relatively small, the acid-generating material will be excavated and disposed in a location that will provide saturated storage over the long term. If the scale of the source is large or unidentifiable, Taseko will evaluate and select an appropriate option to avoid unacceptable impacts. As noted elsewhere, this commitment to undertake appropriate mitigation extends to implementing runoff/seepage capture and water treatment if that approach is required to avoid unacceptable impacts. Drainage from the non-PAG facility is fully contained within a subcatchment of the open pit, so these types of measures can be implemented, if needed.

**Information Request #8d**

What operational testing and monitoring programs will be implemented to ensure that ARD/ML predictions for materials in the TSF are accurate (i.e., that they will be non-acid generating)?

**Response Summary**

Monthly composite tailings samples will be subjected to monitoring of ABA parameters to define the ABA characteristics of the tailings over the mine life. In addition, samples will be taken from the crest of the active beach to the edge of the tailings pond to evaluate whether sulfide minerals are preferentially accumulating in the beaches. A Metal Leach/Acid Rock Drainage Prediction and Prevention Plan (ML/ARD/PPP) will be submitted to the BC Ministry of Energy, Mines and Natural Gas as part of the Mines Act Permit Application. Specific procedures regarding the operational testing and monitoring programs to ensure that ARD/ML predictions for materials in the TSF are accurate will be included in that document.



**Information Request #8e**

Should ARD/ML predictions prove to be inaccurate and acidic seepage is generated from the TSF; how will this unanticipated effect be addressed?

**Response Summary**

A Metal Leach/Acid Rock Drainage Prediction and Prevention Plan (ML/ARD/PPP) will be submitted to the BC Ministry of Energy, Mines and Natural Gas as part of the Mines Act Permit Application. Specific procedures regarding the mitigation of unanticipated acid runoff will be included in that document.

**Discussion**

Acid seepage is not expected from the TSF because the exposed tailings are non-PAG, monitoring will be performed as indicated in the response to IR8d, and process adjustments can be made (if required) to adjust sulphide content in the final tailings beach. In the very unlikely event that acid seepage is identified, Taseko will evaluate the nature of the issue and select an appropriate option to avoid unacceptable impacts. As noted elsewhere, this commitment to undertake appropriate mitigation extends to implementing seepage capture and water treatment if that approach is required to avoid unacceptable impacts.

**Information Request #8f**

Upon closure, what testing and monitoring programs will be implemented to ensure that ARD/ML predictions for pit water are accurate?

**Response Summary**

A Metal Leach/Acid Rock Drainage Prediction and Prevention Plan (ML/ARD/PPP) will be submitted to the BC Ministry of Energy, Mines and Natural Gas as part of the Mines Act Permit Application. Specific procedures regarding the testing and monitoring programs that will be implemented to ensure that ARD/ML predictions for pit water are accurate will be included in that document.

**Discussion**

Water quality predictions at the site will be verified in general through data collection during operations. This will include evaluating modelling assumptions. Revised predictions will be produced as appropriate and used to improve monitoring strategies. As soon as the open pit begins to fill, a program of pit monitoring will be implemented. In concept, monitoring would initially be limited to monitoring of water quality and rate of pit filling, with depth profiling of both water quality and in-situ parameters likely to be incorporated once sufficient depth of water is established. Results of pit monitoring, together with other operational monitoring results, will be used to calibrate the pit water quality prediction and track the evolution of the pit water chemistry against the pre-production predictions presented in the EIS and subsequently refined.

**Information Request #8g**

Should ARD/ML predictions prove to be inaccurate and acidic discharge is generated; how will this unanticipated effect be addressed?

**Response Summary**

Acid discharge is not expected from the open pit. As soon as the open pit begins to fill, a program of pit monitoring will be implemented. In concept, monitoring would initially be limited to monitoring of water quality and rate of pit filling, with depth profiling of both water quality and in-situ parameters likely to be incorporated once sufficient depth of water is established. Results of pit monitoring, together with other operational monitoring results, will be used to calibrate the pit water quality prediction and track the evolution of the pit water chemistry. Should acid water be identified in the pit during the filling period, Taseko will evaluate and undertake to implement appropriate mitigation as necessary to avoid unacceptable impacts once the pit discharges.