

WASTE ROCK AND ORE STOCKPILE MANAGEMENT

1. PURPOSE AND OBJECTIVES

This Global Standard sets the minimum requirements for the management of waste rock and ore stockpiles to minimize adverse environmental and human health impacts promote beneficial post-mining land uses and reduce post mining closure and reclamation liability.

2. REQUIREMENTS

2.1 Planning and Design

- 2.1.1 Sites shall determine baseline conditions prior to siting and design of Waste Rock and Ore Stockpiles. Baseline conditions shall be determined through qualified technical studies that address geographic and temporal variations. These studies will include, at a minimum, land use, surface and ground water hydrology, geochemistry, climate, flora, fauna, cultural resources, geology, seismicity, and soils.
- 2.1.2 Sites shall develop a Waste Rock and Ore Stockpile Management Plan (WRAOSMP) or equivalent to restrict the release of pollutants to surface runoff, toe seepage and infiltration into groundwater. This Plan shall include:
- Reference to applicable regulatory and legal requirements
 - Design parameters to minimize the generation and/or release of pollutants which could adversely impact the environment
 - Inventory, description, characterization, and management methods for waste rock and ore stockpiles
 - Inspection and monitoring procedures
 - Responsibilities defined for on-site personnel
 - Risk assessments as applicable
- 2.1.3 Sites shall design waste rock and ore stockpiles in accordance with the Closure & Reclamation plan.
- 2.1.4 Sites shall develop geochemical characterization, hydrologic modeling, and material management plans (or equivalent) to govern characterization and management of rock placed in stockpiles. The characterization plan will be designed to represent to the extent practical discrete lithologic units, geochemical variability and, spatial distribution of the ore and waste.
- 2.1.5 Waste rock will be physically and geochemically characterized prior to design. Acid generating potential will be determined using acid-base accounting methodology that is consistent with international standards and acceptable to regulatory requirements.
- 2.1.6 Waste rock disposal facilities with the potential to generate low quality run off or seepage shall ensure that operational design of retention basins are sufficient to contain the runoff resulting from a 1: 25 year 24 hour storm event or other risk-based design event using Site specific data that is protective of the environment.
- 2.1.7 Water treatment shall be implemented as required to meet the Site water management criteria at the point of discharge.
- 2.1.8 Sites will engineer and construct permanent surface water run on diversion structures sized to convey flow from the 1:100 year 24 hour storm event or other risk-based design storm event using Site specific data. Designs must be consistent with regulatory, legal, and social requirements.
- 2.1.9 Potentially Acid Generating (PAG) material used for construction purposes outside of the waste rock disposal facilities shall be managed such that adequate protection of the environment and compliance with relevant regulatory, legal and social requirements is achieved.

WASTE ROCK AND ORE STOCKPILE MANAGEMENT

- 2.1.10 Waste rock disposal and related drainage facilities will be designed and constructed to accommodate permit/license, regulatory, legal, and social requirements.
- 2.1.11 Waste rock and ore stockpiles will be designed to be geotechnically stable considering both static and pseudo-static conditions. Waste rock and ore stockpile geotechnical stability and design shall achieve a minimum factor of safety during operations of 1.3 static and 1.0 seismic loading or other risk-based design using Site specific data. Facilities shall be closed to maintain a minimum factor of safety of 1.5 static.
- 2.1.12 Incorporation of solid waste disposal and or contaminated soil management facilities within waste rock facility footprints will be based on a risk assessment and in accordance with regulatory, legal, and social requirements. Specific facility design criteria shall be prescribed within the Waste Management plan (or equivalent).
- 2.1.13 Sites with facilities (e.g. dumps, stockpiles, diversions channels, etc.) located in areas that are socially or environmentally sensitive and which pose potential for catastrophic consequence in the event of a failure shall conduct a risk based assessment of the numeric design criteria in this standard to ensure adequate levels of protection.
- 2.1.14 Risk-based designs must be reviewed and approved by the Corporate Global Practice Lead – Environmental and Corporate Senior Director Geotech and Hydrology.

2.2 Implementation and Management

- 2.2.1 Sites shall implement and maintain the WRAOSMP or equivalent which will be reviewed annually and updated as required by changes in mine plans or at least every three (3) years.
- 2.2.2 Waste rock disposal facilities will be operated and closed in accordance with permit/license, regulatory, legal and social requirements. Reclamation of these areas will be in accordance with the Closure and Reclamation plan.
- 2.2.3 The WRAOSMP or equivalent Site practices shall include appropriate methods to track waste and ore to its destinations. The Site shall implement methods that identify rock in a manner appropriate to ensure routing to the destination which achieves consistent results aligned to regulatory, legal, and social or other requirements. These practices must include adequate record keeping to determine the location, volume, and geochemical profile of the waste rock storage facilities and ore stockpiles.
- 2.2.4 Waste rock and ore stockpile facilities will be managed throughout operations and closure to restrict the release of pollutants including surface runoff, toe seepage and groundwater infiltration thereby protecting against adverse effects on the environment.
- 2.2.5 Waste rock and ore stockpiles will be operated and closed as per design requirements to be geotechnically and erosionally stable.
- 2.2.6 Waste rock disposal facilities and ore stockpiles will be closed and reclaimed considering physical and geochemical characteristics of the waste rock in accordance with the WRAOSMP or equivalent to meet the objectives as detailed in the Closure and Reclamation plan for the Site.

2.3 Performance Monitoring

- 2.3.1 Sites shall reconcile waste rock and ore stockpile performance with the WRAOSMP or equivalent no less than annually throughout the operational life.
- 2.3.2 Geotechnical monitoring of waste rock and ore stockpiles will be completed as per the monitoring plan to verify the facility is being constructed and operated in accordance with design.
- 2.3.3 Waste rock disposal facilities will be inspected following periods of significant rainfall, as determined by the Site and documented in the WRAOSMP or equivalent. The inspection will document any issues of ponding on top of the waste rock disposal facility or seepage from the toe. In addition, the diversion structures and sediment control structures shall be inspected to verify they are functioning as designed. Facilities will be inspected following any significant seismic event.
- 2.3.4 Monitoring of surface runoff, toe seepage and groundwater wells around waste rock disposal facilities will be conducted routinely in accordance with the monitoring scheduled identified in the WRAOSMP or equivalent.
- 2.3.5 Concurrent reclamation will be monitored on an annual basis per the Closure and Reclamation Standard.