Vedanta Tailing Management Facility (TMF) Standard

Purpose

This document defines Tailing Management Facility (TMF) performance standard, developed towards Investigation, planning, design, construction, and operations, closure and rehabilitation of the TMFs, for the Vedanta group of companies. It is applicable.to all the existing and future tailing facilities in mining operations and ash ponds in the coal-based power plants. (hereafter known as TMFs).

Tailing / Ash pond facility planning: Every facility will:

1. Select proposed TMF site (new or expansion) based on comprehensive Environmental, Social Impact Assessment (ESIA), economics, and public health and safety risk over life cycle of the tailing facility as per Good International Industry practices (GIIP) prescribed in **Annexure 1**.
2. Conduct dam break analysis based on advice of the designer/consultant to quantify the TMF related business risk in the case the TMF is located upstream, in proximity of community or sensitive environmental receptors.
3. Design TMF based on best available technology that will subject business to minimum environment, social, and economic risk at an optimal total cost of ownership (TCO) over life cycle of the operation.

Design consideration: Every facility will:

1. Design TMFs meeting permit requirements, based on recognized national or international standards for dam or TMF design with best possible factors of safety based on risk classification of the site.
2. Conduct Hydrological and hydrogeological studies to understand potential impact of the facility on the surface and groundwater regime, and take appropriate measures to protect the same.
3. Divert natural/ surface water streams from the proposed TMF while designing a new tailing dam. Evaluate potential of preventing natural / surface water steams entering into existing tailing dams.
4. Install impervious liners if either the tailings are classified and characterized hazardous or if it is required to meet a regulatory permit requirement.
5. Engage a competent designer/engineering firm in managing a TMF over the life cycle of the facility to the extent possible. The activities of engagement will include but not limited to TMF siting, geotechnical investigations, planning, designing, periodical site visits and Tailing management performance evaluation.
6. Incorporate following best practices while designing the dam to the extent possible:
    a. Undertake comprehensive site survey, geotechnical foundation investigation, analyses of tailings, soil borrow and liner material as per recommendation of designer/consultant requirement and ensure that geotechnical investigation values are used in design by the consultant/designer. Typical content of a report consist of site survey, geotechnical investigation and analysis, and TMF design is prescribed in the **Annexure 2**.
    b. Install TMF monitoring and surveillance devices including piezometers, embankment survey monuments etc. on every raise of dam as recommended by the designer / engineering firm / Third party auditors.
    c. Design freeboard, decant, and return water system to manage worst case flood scenario.
    d. Design decant pool away from the TMF embankments.
    e. Install dust control system to meet prevailing regulations or permit requirements as applicable. This may include water sprinkling, dust control additives, or covering with a layer of dust resistant material, e.g., rock.
    f. Design spigot and ring-main discharge system for tailing distribution (for conventional tailing system only).
    g. Obtain designer / engineering firm's approval for temporary raises.
2. Engage one designer/engineering firm to act as "Engineer-of-Record" to the extent possible. Typical Role and Responsibility of the EOR is given in **Annexure 3**.
3. Include "stage storage" curve for the normal production in the design document and update the same in whenever production changes.

Construction:

Every unit will appoint qualified 3rd Party consultant for supervision and quality assurance of TMF construction, and obtain construction report toward completion of the work. Typical content of Construction report is given in the **Annexure 4**.

TMF Operation and Management: every facility will:

1. have a tailing management committee with defined roles and responsibility lead by the process or ash department.
2. develop, operate, monitor and manage TMF in line with "Tailings Management Plan (TMP)". Typical TMP content is presented in **Annexure 5**.
3. conduct periodical TMF risk assessment and develop mitigation plan to minimize public health and safety, environment, social and economic risk to the business. Discuss and escalate the risk in line with Vedanta risk management framework.
4. develop emergency response plan and test effectiveness of the same through desktop evaluation and mock drill annually.
5. conduct / facilitate TMF audits against the requirements set in this performance standard. Typical aspects covered in internal audit are given in the **Annexure 6**.
    - Internal audit - Bi-annually.
    - Designer / engineering firm audit – annually.
    - Third party expert audit – once in 3 year.

Documentation:

1. Risk assessment and mitigation plan.
2. Tailing Management plan.
3. Emergency response program and effectiveness evaluation report.
4. Investigation, design, construction reports over life of the asset.
5. Internal and external audit reports and corrective action plans.