Management of Uranium Tailings: Indian Experience

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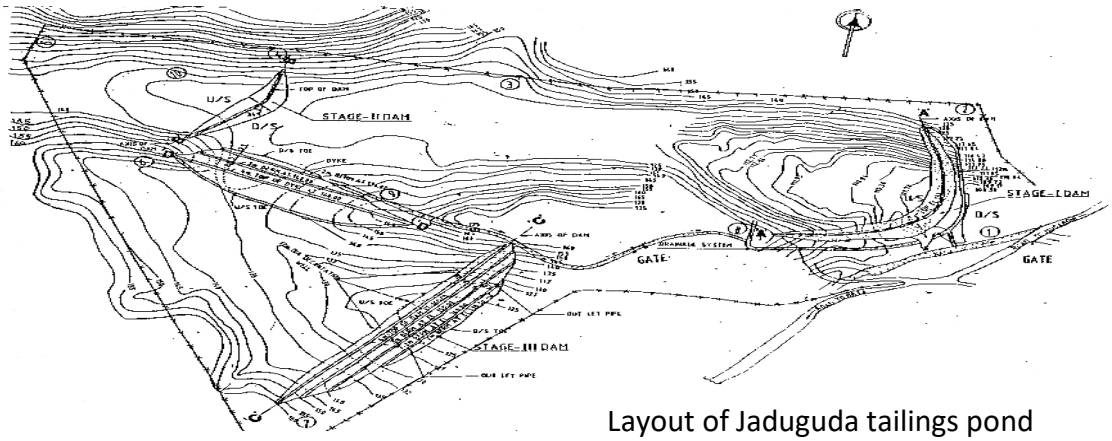
Indigenous uranium production plays a critical role in Indian's strategic nuclear power programme. Uranium production facilities in the country are located in two States. In Jharkhand, two process plants adopting acid leaching are in operation. In Andhra Pradesh, one plant is in operation based on alkali leaching. The courser fraction of the tailings of these plants are used in underground mines for back-filling, while the remaining tailings are stored in two separate valley-filled well-engineered impoundment facilities in Jharkhand and in Andhra Pradesh.

The area for the tailings storage facilities were chosen based on the impermeability of bed rock, presence of hill as natural barriers, preferably in three sides, absence of major geological disturbances, safe distance from rivers / lakes and population etc. The down-stream method of embankment construction is preferred to provide adequate stability to the structure. Desired impermeability of bed rock is attained either by laying selected geo-membranes or through other engineering measures for isolating the aquifer of the region. The decantation wells and channel ways in the pond are planned to redirect the flow of excess water. The contaminated water from the tailings pond collected via the decantation wells / channel ways is stored in decant water pond. This water further undergoes treatment in the effluent treatment plant before it is re-used in the process. Garland drains surrounding the tailings pond are appropriately placed to prevent rain water flowing into the pond from the catchment area. A large part of the pond is maintained in a wet condition to prohibit re-suspension of dust into the atmosphere. Presently, a new method of near-surface trench disposal system of dry tailings is under consideration.

The reclamation philosophy of the filled tailings pond includes laying a soil cover of about 30 cm and planting of non-edible, self-surviving plants whose roots can grow horizontally within 20 – 25 cm of soil cover. Pilot scale reclamation over part-area in one the ponds has been proved very effective.

Typha latifoliea, *ipomiea carniea*, wild grasses like *cynodon dectylon* etc. are some of the special varieties grown on the surface of the pond.



Layout of Jaduguda tailings pond