

## Scope of services

### Development of an integrated waste management strategy and plan for Rössing Uranium mine

Rio Tinto Rössing Uranium Limited (Rössing) seeks the services of a consultant to develop a best practice integrated non-mineral waste management strategy and plan for Rössing mine.

#### Background

Rössing is a member of the Rio Tinto Group and one of the largest open pit uranium mines in the world. While serving the world's energy industry, Rössing is equally cognisant of the impacts that its operations and activities may have on the environment and the health of its neighbouring communities. To this end the company have in place an ISO 14001/2004 accredited Environmental Management System and continuously strive in improving its environmental performance.

Rössing operates Mining and Processing facilities including maintenance workshops and administrative areas. All areas produce different waste streams of varying volumes according to activity levels.

Currently each function on the mine is responsible for its own waste management activities. This is supported by a transportation contractor and a recycling company both operating on site. There is a formal landfill site at Rössing receiving domestic and light industrial waste. Hazardous waste is either co-disposed on the tailings storage facility or taken to the external hazardous waste site operated by the Walvis Bay Municipality. Recycling of various materials, including hydrocarbons, takes place. However, there are a number of waste streams which are not handled in the most efficient and optimal manner, eventually causing operational constraints.

In the absence of specific Namibian waste management legislation, waste and hazardous materials management is guided by Rio Tinto performance standards as well as appropriate South African standards. An internal operational non-mineral waste management plan is in place but an overall long term mine wide strategy needs to be developed.

The strategy should be operationalised by either creating a dedicated waste management function on site or by outsourcing waste management and operations or a combination of the two. In order to decide on the best way to move forward and based on the strategy, an Order of Magnitude cost estimate for both alternatives is to be developed. The cost estimate needs to be done for operational and capital expenditure. In addition, solutions for the management of specific waste streams need to be developed.

Due to unfavourable market conditions for uranium, the mine operates under severe cost pressures currently.

#### Specific problems to be addressed

In order to allow an understanding of the effort needed to provide the consultancy services the following specific aspects are briefly described.

- An overall long term non-mineral waste management strategy is not in place. This is causing ad hoc activities which relieve operational problems temporarily only. The non-mineral waste management plan is in place for specific operational tasks only.
- Currently there is no overall accountability assigned at the mine to implement a strategy and to manage waste mine wide.
- There are a variety of formal and informal waste management facilities on site including temporary storage areas. For some waste streams appropriate recycling or disposal options have not been identified.
- Waste management operations including the land fill site and transportation is carried out by the Mobile equipment section which is mainly responsible to supply rigging services and cranes to the mine. Waste handling receives lower priority due to resource constraints.
- There is a lack of ownership and proactive management in some operational areas since waste removal associated activities are perceived as unwanted additional burden in the currently resource constrained environment.
- Decontamination of radioactively contaminated materials is not considered in the waste management plans.
- Sites for co-disposal on the tailings facility are temporary only and need to be re-established every quarter. Waste disposal activities interfere with the operations of the tailings facility. Radioactively contaminated waste (all from processing plant) including scrap metal, stainless steel, wood, plastic containers, electric motors, industrial copper, HDPE piping, oily rags and PPE, oily filters, grit blasting waste and paper is disposed of in trenches on the contaminated waste yard on the tailings facility. Transportation of these items to the contaminated waste yard is taken care of by both the contractor and Rössing operators. These items take up a lot of space (fills up trenches fast) due to their volume. This is a problem as a new tailings extension is being built on top of the previous contaminated waste sites. Trenches are limited in size and accessibility, and sometimes availability. If contaminated paper is not properly covered it might be blown into surrounding areas by strong winds.
- Asbestos, redundant chemicals, fluorescent tubes, uncontaminated oily rags and PPE, hydrocarbon containers, and uncontaminated grease are temporary stored in the Temporary Storage yard on site. From here it is taken to Walvis Bay Municipality's hazardous waste site for encapsulation. The management and continual upkeep of the Temporary storage yard is challenging. Cells at the Walvis Bay Municipality hazardous site for encapsulation are not always available, and the process is quite expensive (+/- N\$400 000-00 p.a.).
- There is no on-site hazardous waste facility at Rössing and disposal at the external facility is costly. Consideration could be given to establishing a suitable site at the mine.
- Incineration of hydrocarbon wastes is being considered.
- Electronic waste is only stored on site.
- Radioactively contaminated oil and grease are currently stored in the operational area. This waste cannot be disposed of on the tailings facility nor on the bioremediation facility as it might contaminate groundwater. According to Rio Tinto Standards and regulations of the National Radiation Protection Authority under the Ministry of Health and Social Services these items cannot be disposed of in a non-radioactive waste site.

- Oily water and sludge is disposed of on the bioremediation facility on the Tailings area. Hydrocarbon traces were found in the underground water in the vicinity of the sludge farm raising a concern if this activity should be operated in this area. A permanent site for this waste stream needs to be identified.
- Uncontaminated scrap metal and stainless steel accumulates on the recycling contractor's yard. Not enough loads are taken off site for recycling due to resource constraints from the recycling contractor. This results in suitable material not being recycled.
- Conveyor belts, scrap batteries, timber and wood and plastic containers are accumulating in their storage areas because they have a poor recycling market. A bigger market needs to be established to enforce recycling or an alternative use should be identified to reduce these items as waste.
- There is no satisfactory disposal solution for garden waste and it is stored at the landfill site.
- Recording of waste transported and disposed of is not happening diligently as the activity is not perceived to be important.
- Long term requirements of disposal space including the closure phase have not been quantified for all waste streams.

### **Deliverables**

The following deliverables are required from the consultant:

- Detailed review of Rössing's waste management practises in comparison with internal and external standards including gap analysis;
- Recommendations to upgrade current practises to best practise;
- Development of an integrated waste management strategy for the operational and closure phases;
- Development of alternatives to operationalise the strategy including a mine internal dedicated function and an outsourced solution;
- Costing of options to the Order of Magnitude level including capital and operating costs.