ERA Ranger tailings corridor review

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1 Introduction

Sinclair Knight Merz were commissioned by the Office of the Supervising Scientist on 25 May 2000 to undertake a review and complete a report on the tailings corridor at the ERA Ranger Mine.

The objective of the study was to undertake an 'as is', and to some extent historic and look ahead, review of the corridor system sufficient to:

- assess the current suitability of key aspects of the design;
- assess the suitability of current operating, maintenance and system development regimes and responsibilities; and
- record any recommended actions or further investigations arising out of the review;

in order to ensure the adequacy of the design, operation and maintenance.

The scope of the study report was limited to the corridor itself, its associated sump and sump contents discharge and the branch corridors carrying pipelines to Pit 1.

A representative report contents was discussed and agreed with the Office of the Supervising Scientist prior to commencement of the study and this is included as appendix A to this report. The originally agreed content is, with only minor amendment, reflected in this report.

The study methodology comprised a review and assessment by SKM of the design of the existing system and current operations documentation and information obtained from investigations on site and discussions with ERA site personnel. Follow up information and advice as required to complete the study investigations was obtained by fax, phone and e-mail communications with the site.

Concurrent with the investigations for this report, a specialist pipeline inspection firm (Intico) was undertaking a condition assessment of the pipelines in the tailings corridor on behalf of ERA. The findings of the Intico assessment have been obtained from ERA and are included in this report.

2 Overview description of the existing system

2.1 System process and layout description

As part of the mine milling process, tailings produced by milling are carried by process water from the mill to a tailings repository. The process water is then returned to the process for reuse in the process, thereby providing what is essentially a closed process water system.

During the initial operation of the mill, the tailings were pumped to a purpose built tailings dam until mining in Pit 1 was complete. When Pit 1 mining was complete, the pumping of tailings from the process was, in line with ERA authorisation to operate, transferred to Pit 1 after suitable preparation of this pit to receive tailings. As part of the water management system, there is provision to transfer process water from the tailings dam to Pit 1 and vice versa.

Also, as part of the water management system and the ultimate plan to rehabilitate the site, some of the tailings from the tailings dam were transferred to Pit 1 when this pit was brought on line as a tailings repository.

The tailings corridor pipework currently handles the following streams:

- Tailings from the mill to Pit 1 (two lines – A&B)
- Process water return from either the tailings dam or Pit 1
- Process water transfer from Pit 1 to the tailings dam
- Process water/tailings transfer from the tailings dam to Pit 1 although there is currently no transfer of tailings
- Tailings corridor run off water from the tailings corridor sump ultimately to RP2.

An overview water management pictorial drawing no 05-P-8004 which includes these services is included in appendix B. The appendix B schematic also identifies a number of redundant lines from earlier tailings/water management operations at the site. Redundant lines are discussed in section 4.5 of this report.

The tailings corridor system overview layout is shown on water management layout drawing no 1253-05-A0014 and included in appendix C.

2.2 Design and operating philosophy

Accepting the primary objective of carrying the services listed in section 2.1 above, the principal design and operating criteria applied to the tailings corridor is that it forms part of the Restricted Release Zone (RRZ) for the site Water Management System (WMS).

The RRZ has been defined in terms of those areas affected by mining and milling operations where 'material' >0.02 per cent uranium dry weight is exposed. Accordingly the tailings corridor, which carries water and material from affected areas, is included in the RRZ.

Rainfall within the RRZ and resulting runoff must be managed within the RRZ unless the Supervising Authority grants special approval. It is noted that, as of 9 January 2000, water management objectives are being focused toward water quality targets for all waters rather that the previous objectives that sought to primarily manage surface waters in the context of its site origin. This shift in emphasis does not, however, appear to diminish in any way the design and operating criteria which must be applied to the tailings corridor.

The objectives and operation of the WMS are covered in the ERA Ranger 'Water Management System Operation Manual' .

3 Review of design

3.1 Original design

The key features of the original design are briefly described below under the following three headings:

- Corridor design
- Tailings and process water pumping and piping system
- Environmental