

would logically be carried out at the same time as any work to increase the width of the corridor in this area as recommended in section 3.3 above.

#### **4.8 Current developments**

Ongoing current developments which impact either directly or indirectly on the tailings corridor are as follows:

- New 500 mm Polyethelene sections are being installed in the process water transfer lines between the tailings dam and Pit 1. This is due to the original sections having been damaged by fire apparently caused by the burning of bolts to break a flange connection.

#### **4.9 Environmental**

The roles and responsibilities of the ERA Environmental Health and Safety department in respect of the tailings corridor are briefly summarised in section 4.1. There were no specific issues in this regard which came to light during the review investigations

### **5 Anticipated future developments**

There are no currently anticipated future developments which it is envisaged will, either directly or indirectly, impact the tailings corridor during the operating life of the mine.

## **6 Discussion and recommendations**

The significant finding of this report is that, whilst there are a number of matters that need to be checked/addressed, the fundamental design and operation basis for the corridor was appropriate at the time of initial construction and operation, and is still appropriate. It has not been practical, in the time available to undertake and document this review, to follow all of the issues through to obtain full details and make final recommendations. Accordingly, in respect of a number of items, this report includes recommendations for further consideration before deciding on any action.

Whilst a number modifications affecting the corridor are recommended for further consideration, the main findings/ recommendations of the report relate to operating and maintenance practices which should be adopted for the remainder of the mine/mill life.

The review recommendations are summarised as follows primarily under the report headings used in section sections 3.3 and 4 of this report.

#### **6.1 Suitability of key aspects of the original design**

- Investigate the widening of the western end section of the corridor where the 500 mm polyethylene pipes run in the drainage trench in order to reduce the risk of a pipe leak resulting in contaminated water falling outside the corridor embankment. Incorporate an examination of the other potential impacts of the polyethylene pipe routing noted in this report as part of the review.
- Obtain and review the particle grade and impermeability etc specifications for all main and branch corridor coverings to confirm their acceptability with respect to prevention of seepage/leakage from the corridor.
- Specifically review all areas where the original corridor base material has been significantly disturbed/alterd to ensure that the cover now provided is adequate.

- Review the design of the recently completed corridor concrete cover modification carried out at the retrofit culvert location for the south waste run off.
- Obtain and review the corridor sump overflow details to ensure that the overflow capacity is adequate

## **6.2 Inspection, operating, maintenance and development regimes and responsibilities**

- Prepare a fully updated formal routine maintenance program covering all aspects of corridor maintenance and inspections including recording of maintenance and inspections carried out.
- Review the roles and responsibilities of the various departments within ERA with respect to operation and maintenance of the corridor ensure that all aspects are properly covered and confirm a regime most suited to the foreseeable remaining life of the facility.
- Undertake a review of corridor related drawings to ensure that a fully representative set of updated drawings is available.
- Review and confirm the procedure for advice to Engineering Technical Services Section regarding modifications affecting the currency of corridor drawing information.

## **6.3 Pipe materials condition/integrity**

- Assemble and review all available evidence with respect to tailings lines lining condition. Based on this and specific capability and cost information on internal inspection techniques, review the justification for undertaking an investigation of the tailings lines polyethylene lining condition.
- Progressively strip and paint the pipe ends on the process water return line to prevent deterioration of the pipe ends and reduce the risk of joint failures

## **6.4 Pipes support**

No specific recommendations in respect of pipe supports have arisen out of the review.

## **6.5 Pipe jointing**

- Carry out a survey of flange bolting to ensure that all bolts are adequately sized.
- Carry out a visual inspection for deterioration of bolts etc of all joints which were buried up until recently.
- Check and properly fit guards on all flange joints.
- Emphasise in procedures and to maintenance staff the importance of careful handling of pipes/pipe ends during assembly of victualic coupling joints especially on the non lined process water return line. Provide documentation and training via the maintenance system.
- Ensure that the manufacturers instructions for installation and maintenance of the couplings are included in the standard maintenance procedures for these activities.
- Ensure that manufacture/supply quality continues to be ensured in any future purchases of victualic couplings.

## **6.6 Redundant pipework**

- Identify all pipework not currently being used and establish whether or not it is or should be made permanently redundant.
- Establish a program to remove all redundant pipework as soon as practical

## **6.7 Maintenance of corridor**

- Inspect the embankments which form the corridor enclosure to confirm that they are still as per the original design intent.
- Ensure that the corridor clean up operation recently undertaken has returned all corridor levels, drainage and other features as appropriate to original specifications.
- Document the procedure for future grading operations for the main corridor road and general maintenance of the corridor.
- Safely remove all grass and other growth which has developed along the corridor.
- Initiate and continue a regular supervised poisoning program to prevent further re-growth of grass etc along the corridor.
- As far as possible avoid cold burn-offs of grass etc growth as these place pipe jointing components and pipe linings at risk.

## **6.8 External threats**

- Investigate options to reshape/cut back the waste rock stockpile in the vicinity of the corridor at the tailings dam end in order to reduce the risk of falling rocks damaging the adjacent corridor pipework.

## **6.9 Current developments**

Other than as covered by the foregoing there are no specific recommendations arising out of the review of current developments.

## **6.10 Environmental**

As above for Current Developments.

## **6.11 General**

- Other than the routine 3 times and preferably 4 times per shift inspection of the corridor pipework, there is no automatic means of detecting leaks. Consideration should be given to installing magnetic flow meters to detect major leaks which could have a significant impact if they occurred some time before the next inspection.