

## **Appendix 3**

### **ERA Internal Review Significant Incident Investigation Report Process Water Pipe Leak at ERA**



# Significant incident investigation report: process water pipe leak at ERA

## Introduction

An incident occurred at the ERA Ranger Mine in which a leak from a process water pipe within a bunded containment area became elevated to an issue of concern to Aboriginals, Commonwealth and Territory ministers and the national and international press. The incident was damaging to the reputation of North Limited and to its relationship with key stakeholders.

The purpose of this investigation was to examine the incident from a management systems and organisational perspective to identify improvements which will minimise the possibility of a recurrence of this type of event. A parallel study will be conducted to investigate the technical aspects of the incident.

## Incident Summary

The investigation considered in detail the chain of events giving rise to the incident. A summary of these events is as follows.

The physical location of the process water leak (figure 1) was the western section of the tailings corridor bund, a bunded corridor connecting the mill and tailings dam, designed to act as a secondary containment system for pipes carrying tailings to the dam and return process water to the mill. This infrastructure dates to the beginning of mill operations and while the tailings pipes are no longer in use in the section where the leak occurred, the steel process water pipe still carries process water from the tailings dam.

In December, 1999 an approved trial (the DW3A Trial) was initiated to test the ability of the Corridor Creek constructed wetland south of the Tailings corridor bund to attenuate solutes including heavy metals and nitrate. Water from a mill dewatering bore (DW3A) was pumped to the capped very low grade waste dump (VLG waste dump) to the north of the tailings corridor bund. From here it flowed through adjacent waste rock, under the tailings corridor via a concrete box culvert (the VLG tailings corridor culvert) and on to the wetland. Weekly samples were taken at the south end of the culvert to monitor the levels of various solutes in water entering the wetland system.

*On 2 February, the DW3A trial sample showed abnormally high manganese (Mn) content at 6,100 parts per billion (ppb). Various hypotheses were entertained to explain this but high Mn was most usually associated with the presence of process water. The following week the Mn level had dropped but was elevated again in the samples from 16 February to 8 March.*

On 13 March an investigation was formalised and various samples were taken to track down the source of the elevated Mn.

On 28 March, towards the end of the wet season, a small upwelling of water was found in an area to the west of the VLG tailings corridor culvert. At this point, where the process water pipe passed beneath a road culvert adjacent to the fence around the tailings dam, the pipe had become buried under silt. Excavation revealed the source to be a disused length of tailings pipe from which water flow was measured at 0.3 l/sec. By 4 April the source of the water was identified as the flange joint between fixed and flexible sections of the process water pipe on the other side of the road culvert. These pipes were also buried in silt and the leaking water

was draining below the surface, into the disused section of pipe, to emerge on the other side of the road culvert. The leak was repaired the next day.

Ranger ESH staff evaluated the incident as not breaching the Commonwealth Environmental Requirements for the mine (ERs) on the basis that the leak was contained within the tailings corridor bund. This analysis overlooked the fact that the search for the process water leak had been initiated in response to elevated Mn concentrations measured outside of the containment system.

A notification for the incident was prepared on 10 April in accordance with a commitment to advise main stakeholders of unplanned events. However, a sequence of delays (editing, absence from work due to sickness, and the Easter and Anzac day break) resulted in the fax (attachment 1) not being sent to stakeholders until 28 April. In summary the notification advised the following:

- An estimated 2000 m<sup>3</sup> of process water leaked into the tailings corridor bund over approximately three months, from where it would have flowed to a sump after considerable dilution by rainwater.
- There was minimal impact on water quality measured at the sump, which was pumped into the lower quality RP2 during the period when the leak was unidentified.
- The delay in repairing the pipeline was due to inability to identify the seepage during the wet season.
- There was no infringement or environmental damage involved.

The Office of the Supervising Scientist (OSS) found the information in the fax and the delay puzzling and thought there must be more to it. They called Ranger to discuss the incident and, after discussions, advised their belief that a regulatory breach had occurred. In a subsequent discussion with another Ranger staff member the fact emerged that the search for the leak was in response to the high Mn levels at the VLG tailings corridor culvert.

The OSS concluded that this was a breach of the ERs and were concerned that early recognition of the issues had not occurred. They were incensed at the delay in reporting and what they perceived as a failure to be forthcoming with all of the facts. The possibility was even entertained of a deliberate attempt to conceal the full extent of the incident. Over the weekend the OSS sent a briefing note on the issue to the Minister's office at Environment Australia, copied to the Department of Industry Science and Resources (DISR).

The DISR were similarly incensed and on Tuesday 2 May brought the issue to the attention of ERA's parent, North Limited, and raised the possibility of cancelling the export license for Ranger's next shipment. This very quickly caught the attention of North, at the most senior level.

North could not allow any suggestion of a cover up of the incident and on 2 May initiated a press release acknowledging that the delay in reporting the incident was unacceptable. The media interpreted this as a significant environmental incident. It was reported as far away as the *London Times*. The incident elevated ERA's operations in both the public and political arenas and provided opportunities for its critics to undermine its environmental management record.

On 3 May monitoring data from another trial conducted by EWL Services a year earlier emerged which showed even higher levels of heavy metals at the same sampling point. This cast some doubt over whether the abnormal readings were due to the process water leak or could instead have been associated with leaching from the VLG waste dump. However, it also

raised the question of why this data had not been reported to stakeholders or followed up when reported to site in April 1999.

On 5 May 2000 a trial was conducted that demonstrated that water in the tailings corridor bund could slowly seep through the roof of the VLG tailings corridor culvert, confirming the possibility that process water sitting in the drain for a prolonged period could escape to the natural drainage system.

## Gap Analysis Summary

Where did our handling of these events fall short of the standard required for managing Australia's most environmentally and politically sensitive mine? A detailed gap analysis was conducted to answer this question, applying a yardstick of *best practice* to determine the expected response at each key decision point.

The analysis is summarised by reference to four critical periods in the sequence of events:

1. The conditions existing prior to the leak
2. The *detection period* between the first anomalous sample result and the locating and repair of the leak
3. The *reporting period* between fixing the leak and the reporting to stakeholders
4. The *crisis period* during which the outrage had to be managed

## Pre-Existing Conditions

The tailings corridor bund and piping had been engineered with the objective of managing the environmental risk from possible pipe leakage. The tailings lines and process water return were all steel pipes and were set on concrete blocks to minimise corrosion and facilitate identification of any leakage. In the one location where the tailings dam road passed over the pipes, a concrete box culvert protected them. The corridor in which the pipes lay was carefully designed to contain any spillage.

It appears that for many years the pipes were managed with careful maintenance and regular three hourly inspections. However, when the tailings lines were decommissioned in 1997 (tailings were pumped direct to Pit #1) the perceived hazard and the response to it reduced. The pipes had become buried in several locations by sediment deposition as they approached the tailings dam resulting in corrosion, which ultimately appears to have given rise to the leak (or perhaps vice versa) and prevented the identification of the leak throughout the wet season.

The VLG tailings corridor culvert was installed in 1997. It has now been demonstrated that its construction allows seepage of water from the tailings drain and as such is a compromise to the original design integrity of the tailings secondary containment structure.

Whilst we understand that the risk of process water leakage is less than that for tailings, best practice would have recognised and responded to the combination of technical and political sensitivity surrounding water management issues to a greater extent than that which is apparent. It should be noted, however, that in the course of the rigorous inspection and audit regime many experienced observers failed to identify the potential environmental hazard of the buried process water pipe.

The response to the 1998 EWL trial data also warrants review. The consensus now is that when these results were reported to Ranger in April 1999, they were sufficiently anomalous that they should have triggered follow up to better understand the situation. Follow up did not

occur due in part to the fact that there are no established action trigger points for managing discretionary monitoring data and that investigation into elevated uranium levels in RPI assumed a higher priority at that time.

*Ideally, the 1998 EWL trial data would also have warranted consultation with the OSS and NT Department of Mines and possibly the NLC. Standing in the way of this approach is a concern that sharing information which is of interest but not critical to environmental protection is more likely to generate a political response than a technical one.*

## **The Detection Period**

The period of time between the first anomalous reading at the VLG tailings corridor culvert and detection of the leak was almost eight weeks. While pursuit of the issue might have been somewhat more vigorous, in practice there may have been very little that could have been done during the wet season in the area of the buried pipes without causing more environmental harm than would have been saved. However, once the leak of process water was identified, more vigorous followup would have located and addressed the source in less than the almost one week taken.

In relation to reporting, we should aspire to a relationship with the regulators in which test results which are anomalous could be discussed with the regulators in an open and timely way.

## **The Reporting Period**

The correct interpretation of the situation, having identified the leak, was that a significant volume of process water had escaped the primary containment system to the secondary containment system *and* that there was some evidence that smaller volumes may have seeped or flowed from the secondary containment system to the environment.

*The Commonwealth Environmental Requirements for the mine require reporting of any breach of the regulations or of any mine related event which:*

- (a) results in significant risk to ecosystem health; or
- (b) which has the potential to cause harm to people living or working in the area; or
- (c) which is of or could cause concern to Aboriginals or the broader public.

The Requirements also provide that process water must be contained within a closed system except for, *inter alia*, seepage of a quality and quantity that will not cause detrimental environmental impact outside the Ranger Project Area.

Whether or not a regulatory breach occurred is not the subject of this report. A best practice model would demand under these circumstances early discussion with Aboriginals, the NLC and the regulators.

Written notification, sent with considerable delay and without prior verbal warning and all relevant facts, invited misinterpretation and concern.

North's internal incident reporting procedure and "no surprises" culture also demanded notification upon finding the leak, if not before.

It is important to note however, the firm conclusion that there was no deliberate intent by Ranger management to deceive or dissemble in relation to this matter.

## **The Crisis Period**

The response at Ranger to the crisis was proportionate to their evaluation that from an environmental perspective there was no impact from the event as measured at the statutory monitoring point.

The appropriate evaluation was that since the event had triggered ministerial interest and concern it was a crisis of considerable dimensions, regardless of one's perception of the underlying facts.

The expected response is that relevant personnel would give the issue the very highest priority and within a matter of hours have to hand a detailed account of the sequence of events and all data and information which might be related to the issue. The management team would be expected to make every effort to understand what is generating the concern and be proactive in relation to developing an appropriate management response. In this case that would include immediately restoring the integrity of the mill process water containment system.

The actual response fell short of this expectation.

## **Summary of Causal and Contributing Factors**

1. Over recent years the original design integrity of the mill process water pipe and containment system was changed.
2. No systematic process existed to address anomalous monitoring data to ensure that the possible concerns of stakeholders are addressed.
3. Decision making in relation to consultation, notification and remediation was based on assessment of *environmental impact*, focussing on statutory compliance. This approach stems from a concern of ERA management that release of information beyond the required minimum will generate a political rather than a technical response. It does not place adequate weight on *political risk* or address the need to manage stakeholder relationships by understanding and servicing their differing expectations on reporting and consultation.
4. Differing messages were received by the regulators from Ranger personnel due to a lack of a single contact point with both the complete picture and consistent messages.
5. There has been a long-term issue with the management and ultimate disposal of water on the lease that has not been adequately addressed. The Ranger staff face an increasingly intractable water management problem which is becoming the primary driver behind operational and environmental decision making.
6. Substantial and rapid change in the management structure and personnel occurred without adequate consideration of the impact on the overall competence of the management team to deal with both commercial and stakeholder issues.

## **Discussion of Organisational Issues arising from this Incident**

*The following discussion of organisational issues attempts to identify the root causes where performance fell short of expectations and the issues which will need to be addressed.*

### **ERA Structure**

- The establishment of the Jabiluka Project Team and the elimination of the General Manager Operations position have reduced the exposure of management at Ranger to the political environment in which the mine must operate.
- Without adequate planning, after the Jabiluka Project Team has fulfilled its purpose, there is the potential for an unacceptable gap in the relationships management function which needs to be managed.

### **Site Management Structure**

Since August 1999 the General Manager's role at Ranger has been replaced with a self-directed team made up from the senior functional managers. The enthusiasm, energy and commercial focus of that team is evident. This is important for a mine in mid-life, operating under commercially and politically difficult circumstances and must be preserved. However, the organisational structure needs review against the following:

- The fact that the responsibilities of some individual team members is so broad that they cannot adequately focus on relationship management.
- That the structure has no effective redundancy to deal with performance or competency gaps of individual members or to provide continuity through operations management changes.
- Functional managers need to continue the focus on commercial imperatives whilst at the same time ensuring understanding of the big picture against which those imperatives must be balanced.
- Some stakeholders find difficulty interacting with Ranger where the area of responsibility for their issue is not clear or where they have a need to go beyond the functional management role.
- When crises arise the relevant functional manager takes responsibility. There is a need to ensure that in such situations the required level of expertise and experience, which may not yet have been developed by the functional manager, is brought to bear.

### **The Environment Safety and Health Department**

- While the ESH Department has maintained its numerical strength, there is a need to ensure that its *depth* of capability is also sustained. The relocation of ERAES to Darwin and more recently the promotion of the Senior Scientist to Department Manager without a replacement of similar capability in his former position have opened up a potential gap in this area.
- There is considerable tension between the role of acting as Ranger's "environmental conscience" and level of involvement in the pursuit of difficult commercial objectives.
- Managing the increasing excess of process and RP2 water has become an all consuming task at Ranger which appears to be a major distraction from the task of achieving site-wide best possible environmental outcomes and relationships with key stakeholders.

## **Conclusion**

This incident has highlighted a number of opportunities for improvement at ERA in the areas of its management systems and in taking a broader view of its consultation and notification obligations. However, underlying all of the issues is the need to change the dynamics of relationships between ERA, Aboriginals and regulators so that each party's expectations can be met through more positive and open interactions.