



DEPARTMENTAL RESPONSE

Independent Monitor

2015 Environmental Performance Report

(2014 Operation Period)

for

McArthur River Mine

November 2015

Executive Summary

The Independent Monitor's 2015 Environmental Performance Report for the McArthur River Mine 2014 Operational Period was submitted to the NT Government Minister for Mines and Energy on 8 October 2015. A review of the Audit Report's findings was undertaken by the Department of Mines and Energy ("DME" or "the Regulator").

The DME review focused on the compliance and technical issues raised by the appointed Independent Monitor (IM) relating to the environmental condition, management and monitoring of the McArthur River Mine ("MRM") by McArthur River Mining Pty Ltd ("the Operator"), as well as the regulatory overview of the mine by the DME.

In relation to assessing the regulatory performance of the DME, the IM concluded in its 2015 Performance Report that the change in waste rock classification had required extensive review and discussion between the DME and MRM. The process had evolved in a complex and time consuming manner and the approvals process had appeared to take longer than the previous year. The IM recommended:

- DME reviews in more detail MMP commitments being developed by MRM to ensure they are reduced and collated into a single list contained within the main MMP document.
- DME to ensure its review processes include a convention with regard to a consistent method for referring to the dates of correspondence/documents. Ideally, reference should be the date of correspondence/document (and this can be qualified with date received, if required).
- DME to revise the current MMP review process (including requests for additional information) with the objective of devising a more efficient process. In particular, a review to be undertaken of the 2013-2018 and 2013-2015 MMP assessment process to identify what actions could have been taken to improve the efficiency of the process.
- Rather than refer whole documents to EPA for consideration, ensure that the particulars of the project requiring assessment are clearly defined. Referring the entire MMP resulted in confusion regarding aspects of the project which had not substantially changed and for which MRM had approval to implement.

The DME is supportive of the IM's comments regarding the need for rationalisation of the commitments made by MRM within the MMP. DME has requested that MRM update these commitments in the past and has recommended the use of the SMART format for setting goals and objectives.

The DME notes the difficulties the IM had during the evaluation of over 900 documents for the operational period under review. The DME has adopted a convention which incorporates the DME's document management system known as TRIM. The DME will consider conducting a more formal presentation in future to provide an overview of the documents provided and how they are related to ensure confusion is minimised for the IM.

Mining Officers assessing MRM's MMP and associated amendments are cognisant that the timeframes for the assessment must be minimised. In order to achieve these timeframes the documentation presented must be technically adequate and address the risks posed by an operation. The DME takes its role as a mine regulator seriously and does not intend to increase the financial and environmental risks to the Northern Territory for the sake of timeliness.

The DME is confident that the referral process and the associated decision making are clearly outlined and straight forward. The DME has provided considerable technical support to the NT EPA during the referral process.

The DME welcomes the recommendations made in the IM's 2015 Environmental Performance Report. The DME is also supportive of the recommendations for further improvement put forward for both the Operator and the Regulator. Information and recommendations included in the 2015 Environmental Performance Report will be used by the DME in its review of the Operator's future Mining Management Plan, Environmental Monitoring Report and Operational Performance Report.

Having reviewed the findings of the IM's 2015 Environmental Performance Report, the DME will act on the issues highlighted and has already commenced action in many cases. The Operator is also working to address the issues, particularly those associated with the new waste classification system and the difficulties in having substantially less benign waste rock available to construct a waste rock dump that can encapsulate non-benign material in a stable landform that protects the receiving environment for perpetuity.

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1 Background

In October 2006 the Northern Territory Government (NTG) approved the open-cut expansion proposal for the McArthur River Mine. A condition of the approval was the appointment of an Independent Monitor (IM) to oversee the environmental performance of the mine. The requirements of the IM are outlined in the Independent Monitoring Assessment Conditions (IMAC), which forms schedule 2 of Mining Authorisation 0059-02.

In accordance with the IMAC, the role of the IM is to assess the environmental performance of the mine by reviewing environmental assessments and monitoring activities undertaken by the mine operator, McArthur River Mining Pty Ltd (“the Operator” or “MRM”) and environmental assessments and audit activities undertaken by the Department of Mines and Energy (“DME” or “the Regulator”). The IM is not responsible for mine safety or social matters regarding the operation.

In 2013, the second five-year contract for the services of an IM was awarded to the ERIAS Group from Adelaide. Due to unforeseen delays in the procurement and tender assessment process, the first annual Environmental Performance Report (2014) from ERIAS covered two operation periods, 2012 and 2013.

The IM has provided the 2015 Environmental Performance Report covering the 2014 operating period of the mine (i.e. October 2013 to September 2014). To ensure the report is as up-to-date as possible, it also includes assessment of current activities of the mine, including comments from the IM's site visit in June 2015.

1.1 Objectives

The stated objectives of the IM's 2015 Environmental Performance Report included:

- Document the review of environmental performance.
- Report on progress from the previous IM assessment.
- Identify any urgent issues that require investigation and reporting.
- Identify areas of the Operator's and DME's environmental performance that require improvement and recommend actions to address these deficiencies.
- Acknowledge areas of Operator and DME environmental performance that are done well.

1.2 Assessment Scope

The IM's 2015 Environmental Performance Report outlined the scope of the assessment and began with Clause 4.1(a) of the IMAC.

The IM is required to monitor the environmental performance of the mine (including the Bing Bong Port) by reviewing:

- I. Environmental assessments and monitoring activities undertaken by the Operator.
- II. Environmental assessments and audits undertaken by the Regulator.

Issues relating to mine safety, social issues, personnel matters, administration matters or governance arrangements resulting from the operation of the mine in the McArthur River region, were not included in the assessment.

The assessment of environmental performance addressed a one-year operating period from October 2013 to September 2014 and included:

- An inception meeting with the operator (MRM) and the Regulator (DME) in Darwin to discuss the process undertaken during the 2014 review and areas for improvement and the schedule for the 2015 review.
- Reviewing environmental assessments, monitoring activities and reviews undertaken by both MRM and DME.
- Reviewing relevant research required to inform monitoring activities.
- Discussions with DME personnel regarding progress on completion of recommendations from the last IM report.
- Updating the risk assessment and gap analysis (for the 2014 operational period).
- Undertaking a site visit and discussions with MRM personnel and MRM consultants.
- Preparing a report for the Northern Territory Government (NTG) Minister for Mines and Energy concerning the environmental performance of the MRM operation (by both the operator and regulator).
- Preparing and distributing a report to the Borroloola community and other key stakeholders concerning the environmental performance of the MRM operation. This includes a community presentation.
- Developing and maintaining a website for the display of the report, the response reports from the operator and regulator, community report and other relevant information.

1.3 Response to the Performance Report

The IM's Environmental Performance Report for the McArthur River Mine over the 2014 operational period was submitted to the NT Government Minister for Mines and Energy on 8 October 2015. The Minister then provided the report to the DME for comment on 14 October 2015. A review of the Environmental Performance Report's findings was undertaken by the DME.

The DME review focused on the compliance and technical issues raised by the IM relating to the environmental condition, management and monitoring of the McArthur River Mine by the Operator MRM as well as the regulatory overview of the mine by DME.

2 Risk Assessment

A risk assessment is performed by the IM each year and was undertaken accordance with ISO 31000:2009 – Risk Management Principals and Guidelines (Standards Australia, 2009) to assess the environmental risks associated with the MRM operation.

The stated objectives in the 2015 Environmental Performance Report were to:

- Identify environmental risks.
- Evaluate whether environmental monitoring and assessment practices undertaken by MRM are adequate and appropriate to mitigate the risk of potential environmental impacts.
- Determine if MRM is addressing the risks identified by the IM and if actions are appropriate.

The risk assessment identified a total of 78 risks, of which:

- 2 were **extreme**. Immediate intervention required to eliminate or reduce risk at a senior management/government level.
- 25 were **high**. It is essential to eliminate or reduce risk to a lower level by the introduction of monitoring and assessment measures implemented by senior management.
- 38 were **moderate**. Corrective action required, and monitoring and assessment responsibilities must be delegated.
- 12 were **low**. Corrective action should be implemented where practicable, and risk should be managed by routine monitoring and assessment procedures.

The updated risk register is provided in Appendix 2 of the IM's 2015 Environmental Performance Report.

This is an increase in the total number of risks compared to the 2014 IM Performance Report where a total of 68 risks were identified. A comparison between the results of the 2012, 2014 and the 2015 risk assessments (Table 1) summarises an increase in risks present at the site.

Table 1 Comparison of Risk Ratings between 2012, 2014 and 2015 IM Performance Reports

Risk Rating	2012 IM Assessment	2014 IM Assessment	2015 IM Assessment
Extreme	2	1	2
High	13	31	25
Medium	36	29	38
Low	19	7	12
Total	70	68	78

It is likely that a driver behind the increase in the number of risks is due to the changes to the MRM waste rock classification system introduced in late 2013.

The former waste rock classification system had two categories; Non Acid Forming (NAF) (benign waste rock) and Potentially Acid Forming (PAF) (non-benign waste rock). The currently authorised designs and management processes are based on this system.

This new classification system recognises that not all of the NAF waste rock is actually benign and that a significant portion of this NAF waste rock can produce environmentally harmful metalliferous and saline drainage at circum-neutral pH values. Over 89% of the total waste rock mined may now be non-benign and produce runoff with concentrations of contaminants harmful to the receiving environment. As a consequence there is insufficient benign waste rock to construct the waste rock dump, as per authorised designs, to effectively encapsulate the non-benign waste rock (including final cover and landform design) for the long term. For example, the 2012 ANCOLD Guidelines on Tailings Dams assigned “long term” a nominal period of 1000 years.

Following lodgement of the 2013-18 MMP the Northern Territory Environment Protection Authority (NT EPA) determined in March 2014 that an Environmental Impact Statement (EIS) for the long-term management of AMD would be required. This EIS is referred to as the “Overburden Management Project”. Effectively, the EIS requires MRM to redesign the waste rock dumps and the EIS process will assist in determining both the short and long term impacts associated with these new designs.

Under the Terms of Reference for the EIS, MRM are limited to the type of waste rock they handle and the locations they can place non-benign waste rock. The DME has worked closely with MRM to facilitate the continued operation of the mine site whilst ensuring that financial and environmental risks are effectively managed. There are a substantial number of significant investigations underway to inform the EIS and are directly related to the risks associated with the mine site.

Overall, the DME agrees with the output from the IM risk assessment and has undertaken actions in response to many of these risks, as detailed in later sections of this response report.

3 Gap Analysis

Gap analysis was undertaken as per previous assessments undertaken by the IM.

A total of 62 gaps were identified in the 2015 IM Performance Report:

- **13 Category 1 gaps.** Monitoring to mitigate potential associated environmental risk is not undertaken.
- **35 Category 2 gaps.** Monitoring is undertaken, but is not sufficient in design— that is, frequency, location, type and so on, are insufficient to identify or quantify potential environmental risks.
- **14 category 3 gaps.** Monitoring is undertaken and is appropriate in design; however data/output information is not adequately assessed, interpreted or managed to appropriately mitigate potential environmental risks.

The 2014 IM Performance Report identified a total of 88 gaps and it is likely that the decrease in the total number of identified gaps is due to the substantial investigations underway to inform the EIS. The DME consider that further gaps associated with waste rock dump design may be revealed when the IM undertakes an assessment of the 2015 Operational Period (October 2014 to September 2015).

The DME agrees with the gaps identified by the IM and has undertaken actions in response to these, as detailed in later sections of this response report.

4 Review of the Regulator, Department of Mines and Energy

The IM reviewed DME's performance over the 2014 operational period which included:

- Assessment of two MMPs and a number of MMP amendments.
- Referring two projects (2013-2018 MMP and the 2013-2015 MMP) to the NT EPA for consideration under the *Environmental Assessment Act* and providing review of the subsequent NT EPA draft EIS Terms of Reference (ToR) for these projects.
- Conducting one formal compliance audit and one site inspection.
- Undertaking one check monitoring campaign by the DME's Environmental Monitoring Unit (EMU).
- Investigating potential mine derived contamination in the tissue of freshwater aquatic species and livestock.
- Reviewing operational environmental monitoring data submitted by MRM.
- Issuing instructions relating to wet season preparations and the management and storage of water at the Tailings Storage Facility (TSF).
- Assessing the changes to the handling and management of waste rock at the site.
- Investigation into eight incidents (reported to the DME under Section 29 of the *Mining Management Act*) that occurred on the site during the review period.

4.1 Compliance Auditing

The IM noted the December 2013 compliance audit undertaken by the DME. The comments of note by the IM include:

- The compliance audit conducted in December 2013 was reviewed in the previous IM report and made a recommendation that reports for compliance auditing should be completed within six weeks of the audit.
- DME conducted a site inspection in November 2014, which fell outside of the reporting period, however was included in this IM review. The IM believes that recommendation for a final report within six weeks of an audit remains valid for site inspection reports and noted that the field inspection report was not finalised for five months following the site inspection.

The IM recommended:

- The IM provided comments on compliance auditing in its report however the IM did not make any formal recommendations for the DME to address.

The DME provides the following IM comments regarding its compliance auditing at the McArthur River Mine Site:

- An audit of the mine site was not undertaken during the 2014 operational period due to the significant changes to the operation prompted by the new waste rock classification system. As such an audit against the authorised document, 2012-2013 MMP, would have provided minimal benefit to the operation. The DME undertook a site inspection over three days in November 2014 that included senior DME Mining Officers and Directors to assess MRM's preparation prior to the wet season.
- The DME provided feedback to MRM on the last day of the site inspection at a closeout meeting which included senior staff from MRM and DME as well as DME Directors.

- The DME identified 18 items requiring action following the site inspection and issued an instruction letter to MRM within eight days of the site inspection.
- The time taken to finalise the field report did not influence the ability of DME or MRM to address the issues identified during the site inspection.
- The DME is committed to providing the shortest practical turnaround on all reporting and assessments.
- The DME prioritises tasks based on risk, the urgency for MRM and resource availability that facilitates a sustainable mining industry while minimising the risk to the receiving environment.

4.2 Assessments of Mining Management Plans

The IM reviewed the assessments of the 2013-2018 and 2013-2015 (Interim and revised Interim) MMPs undertaken by the DME. The comments of note by the IM include:

- The review of the 2013-2018 and 2013-2015 (Interim and revised Interim) MMPs has evolved in a complex way, especially given the submission of MMP amendments to ensure that the mine could continue to operate while the MMPs were being assessed.
- DME requested a level of information that is more detailed than previously provided, which is appropriate given the potential implications of the reclassification of the waste rock.
- Despite the longer currency of the MMP (the MMPs have been extended to cover a four year period rather than annually), assessment and approval of the document is still taking too long. The IM did recognise that the MMPs were captured in a referral process under the *Environmental Assessment Act*.
- There is disagreement between MRM and the DME regarding which project activities described in the 2013-2018 MMP and 2013-2015 MMP reflect those permitted in the Phase 3 Project EIS, and hence MRM can implement, and those which require an Environmental Impact Assessment (EIA).
- The naming of the 2013-2015 MMP and its subsequent revisions were confusing due to the similar naming convention used for both documents.
- The environmental commitments in the MMP are numerous and verbose and require rationalisation in order to bring benefit to MRM's performance.

The IM recommended that:

- DME reviews in more detail MMP commitments being developed by MRM to ensure they are reduced and collated into a single list contained within the main MMP document.
- DME to ensure its review processes include a convention with regard to a consistent method for referring to the dates of correspondence/documents. Ideally, reference should be the date of correspondence/document (and this can be qualified with date received, if required).
- DME to revise the current MMP review process (including requests for additional information) with the objective of devising a more efficient process. In particular, a review to be undertaken of the 2013-2018 and 2013-2015 MMP assessment process

to identify what actions could have been taken to improve the efficiency of the process.

- Rather than refer whole documents to the NT EPA for consideration, ensure that the particulars of the project requiring assessment are clearly defined. Referring the entire MMP resulted in confusion regarding aspects of the project which had not substantially changed and for which MRM had approval to implement.

The DME provides the following comments regarding its assessments and referrals:

- The DME is supportive of the IM's comments regarding the need for rationalisation of the commitments made by MRM within the MMP. DME has requested that MRM update these commitments in the past and has recommended the use of the SMART format for setting goals and objectives.
- The DME notes the difficulties the IM had during the evaluation of over 900 documents for the period under review. The DME has adopted a convention which incorporates the DME's document reference format on each item of correspondence received or sent to the operator. This reference number is applied by the NTG document control system called TRIM and is referred to on all documents sent by the DME. External correspondence received is also allocated a document reference and this number is referred to in a footnote when required. The DME will consider conducting a more formal presentation in future to provide an overview of the documents provided and how they are related to ensure confusion is minimised for the IM.
- Mining Officers assessing MRM's MMP and associated amendments are cognisant that the timeframes for the assessment must be minimised. In order to achieve these timeframes the documentation presented must adequately address the risks posed by an operation and infrastructure on the mine site must be designed and constructed accordingly. The documentation should also contain few technical deficiencies, errors or contradictory statements. The DME will continue to refine its responses to future assessments with the aim of making the process more efficient however this does not replace the obligation on the operator to provide accurate, succinct and well written documents which detail the management techniques and mining infrastructure that is based on appropriate designs and validated assumptions.
- The DME is aware of the complex nature of the mine operation, and the challenges posed from MRM's change in waste rock classification and the implications this has for the management of non-benign waste on the site. This change in waste rock classification necessitated the referral of the 2013-2018 MMP to the NT EPA for formal environmental assessment. The NT EPA referral process is clear, as is the decision making process behind referring the document. (Refer to the NT EPA document "*Environmental Assessment Guidelines – Mining exploration or production proposals submitted under the mining management act, April 2013*"¹). The change in

¹ Environmental Assessment Guidelines – Mining exploration or production proposals submitted under the mining management act, April 2013 can be downloaded from the following link:

classification of waste rock and the subsequent proposed new designs for the waste rock dump configuration presented in the 2013-2018 MMP triggered the referral to the NT EPA.

The referral of the 2013-2018 MMP to the NT EPA along with the substantial differences in designs for the Northern Overburden Emplacement Facility (NOEF) (waste rock dump) and the uncertainty around the classification of waste rock dictated that DME could not authorise the 2013-2018 MMP. DME invited MRM to withdraw the 2013-2018 MMP and submit an interim MMP for a shorter period detailing actions that did not fall under the Terms of Reference (ToR) for the EIS. This was intended to facilitate the continued operation of the mine site during the EIA process. As a result MRM submitted the 2013-2015 MMP which continued to be a substantial change from the previously approved 2012/13 MMP and many of the proposed actions for the period fell under the ToR for the EIS. The DME were then obliged to refer the 2013-2015 MMP to the NT EPA.

The DME considers it necessary to provide the NT EPA with complete versions of MMP's during referrals under the *Environmental Assessment Act* in order to provide the background and context under which the referral has been made. In order to provide clarity to officers at the NT EPA, DME prepared a summary document which provided detailed tables as well as analysis and interpretation which identified the key issues and main points that may have required formal environmental assessment. All correspondence between DME and the NT EPA was provided to the IM as part of this review period. The DME also provided technical support to the NT EPA for the preparation of the Draft Environmental Impact Statement ToR.

- The DME notes the IM's comment with respect to the confusing file naming system used at MRM. The DME does not determine naming conventions of files relating to MMPs submitted by operators. The DME did not therefore specify the names of the two documents. The DME has a clear understanding of the differences between the two versions of the 2013-2015 MMP as document details such as revision number, issue number and date written are clearly outlined on the cover page for each.

4.3 Environmental Monitoring Unit Check Monitoring

The IM noted that in the review period the IM reviewed field notes, photographs, videos and a spreadsheet of monitoring results for check monitoring at MRM prepared by the DME Environmental Monitoring Unit (EMU). The IM made the following comments:

- No formal field report was provided for the monitoring campaign.
- Unlike the previous reporting period, samples were not collected at the Bing Bong Loading Facility swing basin and dredge spoil drain. The reason for not sampling at this location was unknown.
- The IM has not seen any documents that identify the objectives of the check monitoring and criteria for assessment of performance.

http://www.ntepa.nt.gov.au/_data/assets/pdf_file/0004/167503/draft_guidelines_env_assessment_mining.pdf

The IM recommended:

- The IM provided comments on check monitoring in its report however the IM did not make any formal recommendations in this section of the report for the DME to address.

A formal field report was not prepared by EMU however this is not a requirement as the DME prefers EMU resources to be directed towards technical aspects of regulation. EMU did provide written field notes, photographs and videos of the site visit along with water quality monitoring data to the scientists in the DME Technical Support Unit (TSU) for analysis and interpretation. All of this data was provided to the IM as part of the review.

During the site inspection, EMU team members discovered the seep at the south west corner of the TSF and immediately communicated with TSU staff by telephone and email. This prompted immediate communication between DME and MRM and subsequently an investigation and further instructions to manage the seepage.

A description of the check monitoring process may provide further clarification:

- EMU undertake ground and surface water sampling annually. The program is based on feedback from the DME Technical Support Unit which is provided to EMU prior to the completion of scheduling.
- There are too many current and historical monitoring sites to practically sample all known locations every year hence the TSU scientists direct EMU to areas of concern based on risk. The choice and rationale behind future sampling campaigns is now being documented in 2015 and this will aid future audits and reviews by the IM.
- All monitoring data produced by EMU is entered into the DME database known as "DEEP" and is available for use immediately after entry. This data undergoes QA/QC prior to being finalised in the database to ensure accuracy.
- Photographs taken by EMU are placed on the server in the appropriate folder upon return to Darwin in line with DME records management procedures.

The DME acknowledges that formal reports on EMU sampling events may be beneficial to both operator and regulator and increase clarity for the IM on what has occurred during the EMU sampling events. The DME is considering having TSU scientists provide a formal report on the interpretation of the data provided by EMU after each sampling event.

The DME has recently introduced field based hardware to aid field based data capture and includes field record keeping, GPS, mobile phone, camera, maps and aerial photography all into a single package. The electronic record keeping and logging in the field enables EMU to upload field data, notes, photos and GPS tracks and waypoints without having to type them into excel back at the office. This not only saves time but also reduces the potential for error during transcription of data.

4.4 Action and Tracking of IM Recommendations

The IM reviewed the progress of addressing recommendations made during the review of the 2012 and 2013 operational years and presented the data in tabular format within the report. Comments of note include:

- No progress has commenced on review of the DME audit protocol. The IM was advised that DME is currently reviewing authorisation conditions with a specific intent for conditions to be specific and measurable to assist in auditing compliance.
- No progress by DME to define and document what constitutes best practice for specific areas of the operation and include this as part of the DME audit protocol.
- The Site inspection report was delivered five months following the inspection despite the recommendation that DME establishes a goal that audit reports are finalised within six weeks of the audit being conducted.
- DME requested on 4 September 2014 that MRM include in the MMP an action plan outlining actions to complete IM recommendations. MRM provided a response in the revised Interim 2013-2015 MMP. The IM notes however that MRM have responded to the risk assessment and not the IM recommendations.
- DME has developed a draft action plan to address IM recommendations. A system of quarterly reminders has been established to report on progress regarding implementing IM recommendations.
- DME issued a letter to MRM on 12 December 2014 requesting MRM resubmit the Interim 2013-2015 MMP and request that commitments be developed in accordance with the IM recommendation i.e., Smart, Measureable, Relevant, Attainable and Time based.
- A procedure for review of documents to include assessment of whether the project may trigger the EPBC Act. Procedure has not been reviewed. DME advised that EPA responsible for determining if project may trigger EPBC Act.

The IM recommended:

- The IM provided comments on actions and tracking of recommendations in its report however the IM did not make any formal recommendations for the DME to address.

The DME provides the following comments regarding its progress made against recommendations in the previous IM report:

- Mining Officers from the DME have participated in formal audit courses during 2015 as part of continuing education.
- The DME continues to undertake a review of the authorisation process which will be linked into audits. This process is ongoing and includes the use of expertise outside of the DME's internal skills base.
- The DME remains confident in the referral system currently in place for formal environmental assessment and believes that the current system adequately facilitates referral under the EPBC Act.
- As previously explained in Section 4.1 the DME does not regard the field inspection carried out in November 2014 as a formal audit and is satisfied that the instruction letter issued eight days after the inspection ensured issues identified during the inspection were acted on promptly by DME.

5 Review of the Operator, McArthur River Mining

The IM has detailed a total of 88 recommendations in the 2015 Performance Report. This is a decrease from the 112 recommendations in 2014. Recommendations were categorised as high, medium or low with high recommendations considered a priority and relate to the more significant risks and information deficiencies. The numbers of recommendations are summarised in Table 2.

Table 2 Recommendations made by the IM in recent Performance Reports

Category	2012 Performance Report	2014 Performance Report	2015 Performance Report
High	27	35	32
Medium	27	59	41
Low	15	18	15
Total	69	112	88

The decrease in recommendations is likely a consequence of the substantial number of investigations required in order to inform the development of the EIS. The DME welcomes the described intent of these investigations however the challenges presented by such a significant change in the proportions of benign versus non-benign waste rock are such that investigations alone do not ensure the effective management of environmental risks.

The DME will consider all recommendations included in the 2015 Environmental Performance Report which will be used in DME's review of the Operator's future Mining Management Plan, Environmental Monitoring Report and Operational Performance Report. In some circumstances, the DME had already begun to address items associated with the recommendations.

5.1 Mine Site Water Balance

The DME has continued to work with MRM during the development of a new mine site water balance based on the recommendations of the 2014 IM report. Submissions during 2014 appeared to remain technically deficient however further refinement and development was limited by major changes with the operation.

At the time of writing this report MRM were due to submit a fully revised version of the water balance in preparation for the upcoming wet season. All recommendations, including those not addressed by MRM to date will be considered by the DME during its review of the new mine site water balance.

5.2 Surface Water Quality

The DME undertakes regular assessment of water quality using its own scientists. The DME has increased the frequency of lodgement of MRM monitoring data from quarterly to monthly for all environmental monitoring undertaken (and not just monitoring taken as per the approved monitoring program). This ensures that DME's understanding of on-site conditions is as up to date as practicable and covers any additional monitoring undertaken by MRM outside of the authorised monitoring program in response to emerging issues.

Mine derived contaminant loads are an important aspect of monitoring and contribute significantly to understanding the risks posed to the receiving environment. The DME has

instructed MRM to install continuous monitoring points at locations both upstream and downstream of the mine site to assist with this determination.

The DME has provided detailed technical support to the NT EPA in relation to previous Waste Discharge Licences (WDL) and is due to provide further assistance for currently submitted changes to the WDL for the upcoming wet season.

5.3 Diversion Channel Hydraulics

The DME endorses all of the recommendations made by the IM and will consider issuing instructions associated with both the high and medium priority recommendations within the coming weeks. DME Mining Officers share similar views to the IM on erosion of the mine levee following site inspections during August and October 2015.

5.4 Groundwater

Groundwater monitoring at the Bing Bong Loading Facility was the subject of some comment by the DME during 2015. DME highlighted the need for:

- An updated site water balance
- Flow meters at various points around the site
- An update to the conceptual hydrogeological model for the site
- Further analysis on spikes in metals concentrations in groundwater including a description of what additional investigation had been undertaken in response to the spikes.
- Change to the analysis to include carbonate and bicarbonate.

To address DME comments MRM are undertaking further work such as the installation of additional groundwater monitoring bores and the appointment of a hydrogeologist to the mine site who will update the conceptual hydrogeological model for the Bing Bong Loading Facility. Once this is complete the DME will consider if further instructions are required in order to develop trigger values.

The DME understands that investigations into groundwater movements and quality around the open pit, in particular the eastern side are ongoing. The DME will consider whether or not further instruction is required to ensure MRM investigate inflows into the pit and underground workings.

The DME has scheduled a review of monitoring provided for the management and monitoring of the diesel spill in late 2015 early 2016. The IM recommendation will be considered at the time of the review.

5.5 Geochemistry

The DME is aware that substantial investigation is currently underway for the EIS to inform multiple aspects of managing waste rock at the mine site. The DME believes that many of the IM recommendations are covered by these investigations however the DME commits to discussing with MRM some of the recommendations to determine if they can be undertaken immediately.

5.6 Geotechnical

The DME endorses the recommendations for the Bing Bong Loading Facility.

The DME has imposed strict conditions on MRM for the construction of the Tailings Storage Facility Cell 2 lift including:

- The oversight of an independent certifying engineer (ICE).
- The requirement to meet ANCOLD 2012 guidelines.
- The appointment of an Independent Tailings Review Board (ITRB) to review the Tailings Dam designs and construction QA/QC and make recommendations for the future operation and expansion of the TSF.

The DME continues to work with MRM to ensure the NOEF can continue to accept waste without contravening the Terms of Reference for the EIS and ensuring risks to the receiving environment are minimised.

5.7 Closure Planning

The DME continues to work with MRM on a closure plan as it is closely related to the security bond calculation. Until substantial investigations are completed (most feeding into the EIS) then it is difficult for MRM to produce a closure plan that adequately represents the situation of the mine site. This is why the DME has insisted that the security bond is calculated based on returning tailings and waste rock back to the pit void until such a time as the new design for the waste rock dump is authorised and a comprehensive closure plan is completed and approved by DME.

The recommendations of the IM will be considered in future iterations of the closure plan.

5.8 Terrestrial Ecology

The DME endorses all of the recommendations by the IM and will instruct the operator to undertake the changes over time.

5.9 Aquatic Ecology

The DME considers that the Environmental Monitoring Reports and Mining Management Plans are the forum for MRM to synthesise the monitoring undertaken for all disciplines and provide feedback to management of the mine site and planning for future operations. Requests for additional information by the DME have focused on the need to not only present the data collected over the reporting period but to provide detailed analysis and conclude further actions.

The small weir at SW19 is providing a control to limit sulfate impacted water from migrating downstream however it does provide a barrier to fish movement. It is likely that without the Tailings Storage Facility creating a groundwater mound and seeping into Surprise Creek, water would not flow into Barney Creek during the dry season nor have elevated concentrations of metals and sulfate. Hence the DME has taken the approach that preventing the contaminated water migrating downstream during low flows is the better outcome as the weir does not provide a barrier during moderate to high flows.

The DME in conjunction with the Department of Health (DoH) and the Department of Primary Industries and Fisheries (DPIF) have commissioned an independent review of all fish data

collected and to provide recommendations for implementation of a more thorough sampling regime.

It is also unclear as to the effectiveness of increasing large woody debris and modifying channel morphology in the absence of a detailed review and management plan for the McArthur River Diversion Channel.

5.10 Marine Ecology

The DME will request long term data sets for marine seagrass and DGT monitoring is included in future Environmental Monitoring Reports and Mining Management Plans.

5.11 Soil and Sediment Quality

Mining Officers will confirm if the drainage holes in the Barney Creek Bridge are already plugged. If they are not then a formal instruction will be issued to undertake the work immediately.

The sediment traps at the Barney Creek Bridge have been a focus of the DME during recent site inspections and Mining Officers continue to question the effectiveness of the traps. Further review will be undertaken in light of the IM comments and recommendations.

The DME endorses all other recommendations and will instruct MRM to undertake the appropriate actions.

5.12 Dust

The DME endorses all of the recommendations by the IM and will consider issuing instructions within the next few weeks. Multiple timeframes will be stipulated to ensure high priority work is undertaken as soon as practicable.

6 Conclusions

The DME welcomes the recommendations made in the IM's 2015 Environmental Performance Report. The DME is also supportive of the recommendations for further improvement put forward for both the Operator and the Regulator. Information and recommendations included in the 2015 Environmental Performance Report will be used by the DME in its review of the Operator's future Mining Management Plan, Environmental Monitoring Report and Operational Performance Report.

Having reviewed the findings of the 2015 Environmental Performance Report, the DME will act on the issues highlighted and has already commenced action in many cases.