



Independent Monitor
McArthur River Mine

Annual Report Card 2022

Independent monitoring and reporting
1 May 2021 to 30 April 2022

Advisian
Worley Group

About the Independent Monitor

The Independent Monitor is an expert hired by the Northern Territory (NT) government to do a check (or an 'audit') to find out how well the McArthur River Mine is looking after the environment. The last audit was done in 2021 and now the Independent Monitor has completed the audit for 2022. The 2022 audit covered the time between 1 May 2021 and 30 April 2022.

During the audit the Independent Monitor checked:



**McArthur River Mining
(the Mine Operator)**



**The government
(NT Department of
Industry, Tourism and
Trade or 'the Department')**

The outcomes of the audit were written into a report called the Annual Environmental Performance Audit Report (audit report) 2022. This Annual Report Card is a summary of the main findings of the audit report.

The Independent Monitor did an audit to check how well McArthur River Mining and the government met the rules (called conditions) that are listed in McArthur River Mining's:

- **Mining Authorisation (approval)**
- **Waste Discharge Licence.**

The Independent Monitor also looked at other things that guide the environmental management of the mine, including:

- Recommendations made by the Northern Territory Environment Protection Authority (called the NT EPA recommendations)
- McArthur River Mining's voluntary environmental commitments
- The Department's approach to applying the Mining Authorisation rules to the mine
- The health of the McArthur River near and downstream of the mine.

During the audit the Independent Monitor gathered information in a couple of ways:



1. By looking at the documents that describe the ways that McArthur River Mining and the government are managing things.

For example, for the mine this was things like water quality monitoring information, and for the government this was things like a report that says what actions the government took if they found that the mine wasn't following the rules properly.



2. By asking people that work at the mine and the government questions about the mine's activities.

This included interviews and phone calls.



For illustrative purposes only (not to scale)

Key

- Mining Lease Area
- Haul route

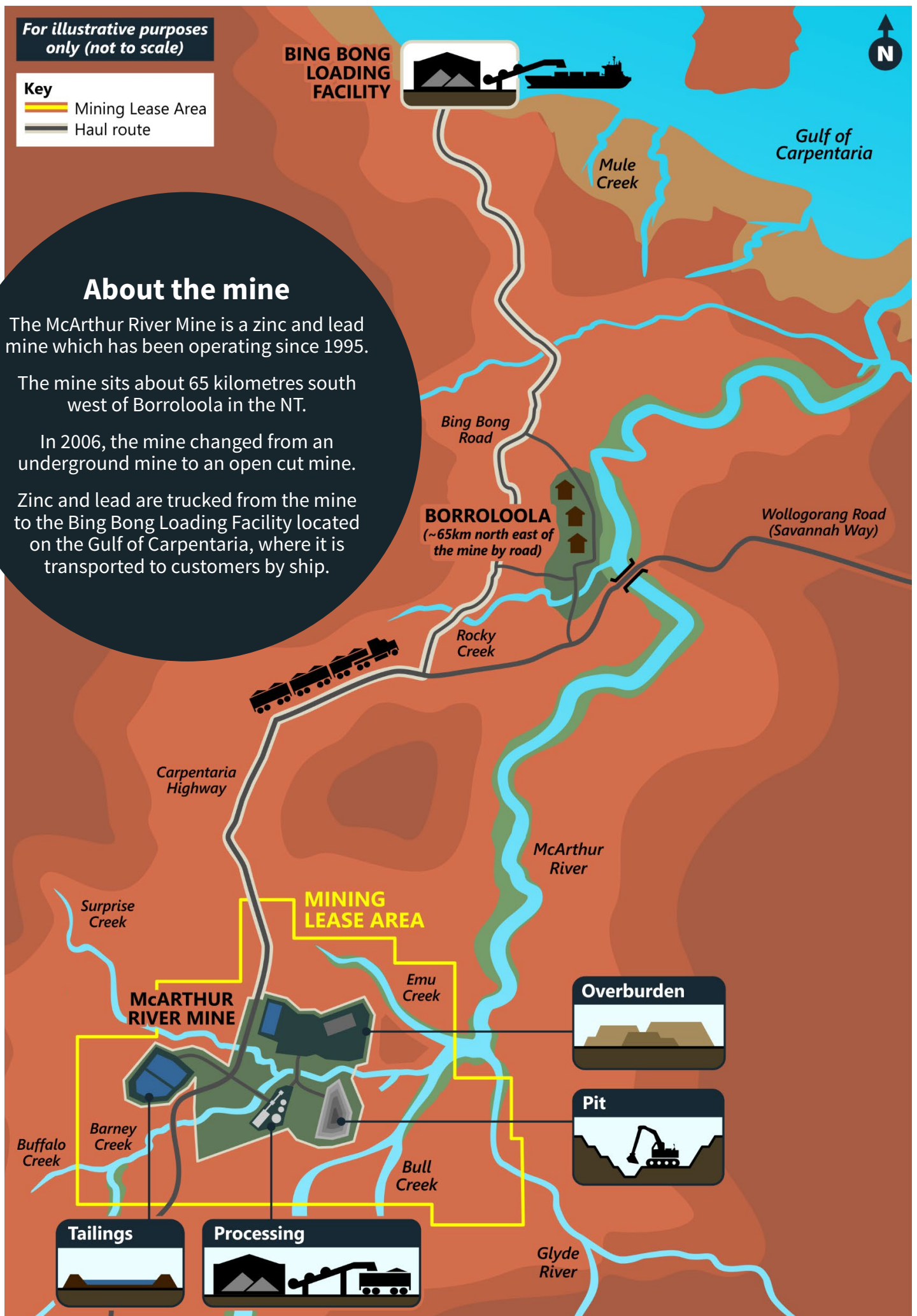
About the mine

The McArthur River Mine is a zinc and lead mine which has been operating since 1995.

The mine sits about 65 kilometres south west of Borroloola in the NT.

In 2006, the mine changed from an underground mine to an open cut mine.

Zinc and lead are trucked from the mine to the Bing Bong Loading Facility located on the Gulf of Carpentaria, where it is transported to customers by ship.





The Audit Process

How are the findings measured?

To check how well McArthur River Mining followed the rules (conditions) of the Mining Authorisation (approval), Waste Discharge Licence, and NT EPA recommendations, the Independent Monitor used a scoring system with a scale of 0 to 4 to score how well the rules were followed.

A score was given to each condition and recommendation, reflecting how well the rules were followed, and then the scores were added up and overall percentages (%) were worked out.

The Independent Monitor also looked at:

- ✓ **McArthur River Mining's environmental commitments**
- ✓ **The Department's approach to applying Mining Authorisation rules to the mine**
- ✓ **Overall health of the McArthur River.**

The Independent Monitor considered how well these were done, but did not score them.



What did people say about the 2021 audit findings?

How were people consulted?

In March 2022, the Independent Monitor spoke to people who live in Borroloola and outstations at Robinson River, Wandangula (Police Lagoon), Goolminyini (Devil Springs) and Minalini (Campbell Springs), to explain what the Independent Monitor does and to give the results of the previous audit. In 2022, the engagement program was extended to outstations in response to feedback from previous engagement, to better include community members unable to travel into Borroloola.



Face-to-face consultation

46 community members were spoken to in person in March 2022



Annual Report Card

People were given a copy of the Annual Report Card and copies were left at key locations in the community

What was talked about?

Engagement focused on the following main points regarding the Independent Monitor's role and the 2021 audit report findings:

- General findings of the 2021 audit report
- The health of the McArthur River, and its fish and mussels
- The approach to engagement.

What were the key outcomes of the engagement on the 2021 audit report?

During the consultation, community members were given the results of the 2021 audit report. The key outcomes of the engagement were:

- No concerns were mentioned about the health of fish or mussels in the McArthur River
- Community members were satisfied with the results that said that McArthur River Mining and the Department had a high level of compliance
- Community members said that they would like to be involved with the water quality monitoring program and think that their participation would increase their confidence in the results
- Some community members said there was a limited time within the engagement period for local people to think about the report and then ask questions, even with the longer time spent in community during this round of engagement. Even though time to think about the report and ask questions was a common request from community members, no follow-up calls and questions were received in the weeks following engagement.





The Mine Operator - Main Findings

The environmental performance of McArthur River Mining was worked out by checking how well they met the rules of the Mining Authorisation and Waste Discharge Licence plus other environmental commitments and recommendations.

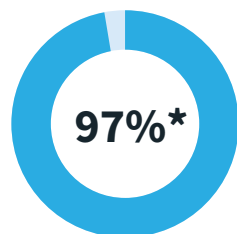
The Independent Monitor found that McArthur River Mining met most of the conditions of the Mining Authorisation and the Waste Discharge Licence. The scores given for how well McArthur River Mining followed the rules are shown below.

Waste Rock Handling Procedure

An audit conducted in June 2022 found that McArthur River Mining takes a lot of effort to identify the different types of waste rock material to make sure reactive material is transported and placed in the correct areas of the Northern Overburden Emplacement Facility.

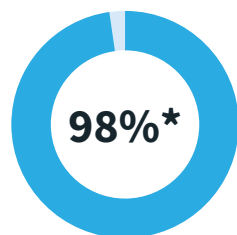
The mine achieved high scores for the waste rock handling requirements.

A big improvement in waste rock handling has happened in recent years with a better waste rock classification system, better Northern Overburden Emplacement Facility design and a new GPS (satellite) system that tracks mine trucks and the correct placement of waste.



Mining Authorisation compliance

- The audit looked at 199 Mining Authorisation conditions.
- The audit found the McArthur River Mining had a high level of overall compliance with the Mining Authorisation conditions at 97%.
- 181 conditions were fully met and 18 conditions were partly met.



Waste Discharge Licence compliance

- The audit looked at 98 Waste Discharge Licence conditions.
- The audit found the McArthur River Mining had a high level of overall compliance with the Waste Discharge Licence conditions at 98%.
- 90 conditions were fully met and 8 conditions were partly met.

Voluntary environmental commitments

McArthur River Mining have voluntarily committed to doing a list of things to improve the way they look after the environment, but these are not rules put on them by the government. These voluntary environmental commitments are written down in different documents including the Mine Management Plans and Environmental Mining Reports.

Most of the McArthur River Mining's commitments are met, with only 8 out of 158 ongoing commitments not fully addressed. There were improvements from last year's audit, but commitment tracking and reporting could be further improved.

Risk Review

McArthur River Mining's Risk Management Plan meets international risk standards and gives McArthur River Mining ways to manage environmental risks for the mine.

The review found the 2020 and 2022 Mine Management Plan Risk Assessment registers are better matched which means risks can be better tracked. The register also now includes a risk control check.





The Mine Operator - A Deeper Look at the Findings

To better understand McArthur River Mining's environmental performance, the compliance scores for conditions of the mine's approvals were matched against the key mining areas (Operator domains) and the key parts of the environment (Environmental aspects) that they relate to. This is explained further below and on the next page.

Mining activity areas (Operator domains)

As part of the audit, the mine was divided into 'domains' which represent the mine's key activity areas, plus an extra area called Governance/General which is about the mine's overall environmental management.

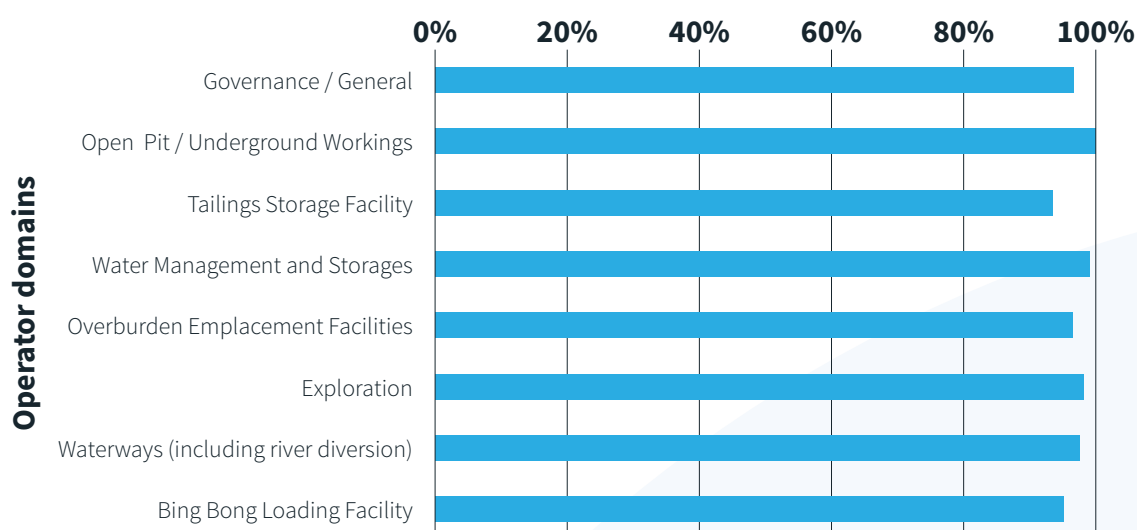
The compliance scores for these areas are shown in the graph below. All of these scores were 93% and above.

The two areas of the mine's activities that are seen to have the highest potential environmental risk, are the:



The Department has put the highest number of rules (Mining Authorisation conditions) on these domains because these activities are seen to have the highest chance of harming the environment if not managed properly. The score for the Tailings Storage Facility domain is not as high as last year's score (a drop from 95% to 93%). This was the lowest compliance score of all the domains. The key reasons for the reduction in score for the Tailings Storage Facility domain are:

- The design change for the Tailings Storage Facility extra wall work was approved by the engineer but was not reviewed by the Independent Tailings Review Board to independently validate the change and ensure environmental protection
- Tailings Storage Facility construction reports were late being prepared.

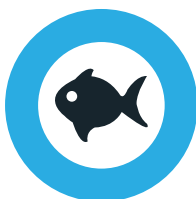




The Mine Operator - A Deeper Look at the Findings

Environmental aspects

Environmental aspects are the parts of the environment that may be impacted by the mine's operations. The audit checked how well McArthur River Mining met the rules of the Mining Authorisation that link to each of the environmental aspects. Overall, compliance levels were high with all environmental aspects scoring above 95%.



100%

Aquatic ecology

McArthur River Mining met all the rules for aquatic ecology.



100%

Marine water

McArthur River Mining met all the rules for marine water.



100%

Vegetation & rehabilitation

McArthur River Mining met all the rules for vegetation and rehabilitation.



99%

Groundwater

To improve this score, McArthur River Mining needs to make sure that disused bores are removed from the Water Management Plan.



99%

Surface water

To improve this score, McArthur River Mining needs to make sure water monitoring stations are installed on Emu River and Glyde River. Approval for installation has recently been given.

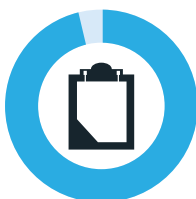


95%

Waste management

To improve this score, McArthur River Mining needs to:

- Arrange for the Tailings Storage Facility extra wall work to be endorsed
- Show that construction hold points are approved
- Prepare the Tailings Storage Facility construction reports on time.



96%

Monitoring and reporting

To improve this score, McArthur River Mining needs to submit the construction reports soon after construction finishes.



95%

Air quality

To improve this score, McArthur River Mining needs to make sure that monitoring sites have all weather access.

The Independent Monitor also scored how well McArthur River Mining met the rules for the Community environmental aspect, which scored 99%. The rule that was not met was for signage at the port.



The Mine Operator

- Key Successes and Opportunities for Improvement

Key successes

The key areas identified by the audit where McArthur River Mining did well to improve environmental performance, include:



Purple-crowned Fairy Wren Relocation

A small population of purple-crowned fairy-wrens were relocated and are now successfully breeding.



McArthur River Diversion Channel Vegetation Rehabilitation

Over 800,000 seedlings have been successfully planted since 2010 and a total of 120,000 seedlings have been planted in 2022 to date.



Tailings Storage Facility Interception Trench

A trench on the northern side of the Tailings Storage Facility that was built in 2020 has improved groundwater and surface water quality near Surprise Creek.



Barney Creek Sediment Management

Sediment removal from Barney Creek has reduced metal levels in the creek.



Djirrinmini Groundwater Monitoring

Groundwater levels and quality have stayed the same and there were no exceedances or actions triggered.



Water Quality Monitoring Indigenous Participation

McArthur River Mining is looking at further opportunities for Traditional Owners to be involved in the water quality monitoring program.

Key Opportunities for Improvement

The audit found that McArthur River Mining could do the following key things to help improve its environmental performance:

Waste Discharge Licence

- Build water monitoring stations at Emu Creek and Glyde River
- Ensure that turbidity testing is done by an approved laboratory
- Record in a register when conditions of the Waste Discharge Licence are not met
- Make sure all non-compliances with licence conditions are reported to the government within 24 hours.

Mining Authorisation

- Give all required monitoring data to the Department in the requested format
- Submit construction reports for the Tailings Storage Facility to the Department within 30 days after construction is finished
- Give Northern Overburden Emplacement Facility construction documentation to the Independent Certifying Engineer for design and construction sign-off
- Make sure the Tailings Storage Facility independent review board is asked to review and approve any design changes and operational document updates
- Update the Water Management Plan so that disused groundwater bores are deleted
- Update management plans to include a process for letting the government know about any changes to implementing the plans.

It is important to note that these are suggestions only and are not new rules that the Operator need to follow.



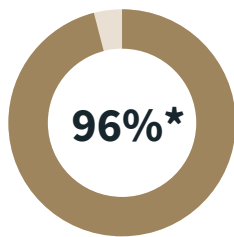
The Department - Main Findings

The environmental performance of the Department was assessed by checking how well the Department had:

- Followed up relevant conditions of the Mining Authorisation
- Taken action to follow the NT EPA recommendations
- Followed their own procedures for regulating McArthur River Mining.

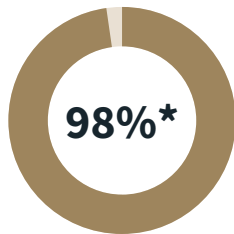
The Department's compliance with the Mining Authorisation rules supports meeting the stated environmental outcomes.

The findings are listed below.



Mining Authorisation compliance

- The audit looked at 68 Mining Authorisation conditions.
- The Department scored a high level of overall compliance of 96% against the relevant rules of the Mining Authorisation.
- 58 conditions were fully met and 10 conditions were partly met as they missed a small number of parts of the condition.



EPA Recommendations

- The audit looked at 116 NT EPA recommendations.
- The Department was given a high overall compliance score of 98%.
- 106 conditions were fully met and 10 conditions were partly met as they missed a small number of parts of the condition.

Regulatory procedures and approach review

The review looked at how well the Department managed the:

- Department's assessments and visits to the mine
- Environmental Mining Report review
- Department's regulatory strategy for the mine
- Establishment of the Community Reference Group
- Assessment and approval of Mining Management Plan for the Mining Authorisation.

The review found that the Department could be more efficient in how they manage regular activities, such as the annual Environmental Mining Report review.

Key achievements for the Department during the audit period were:

- Developing a new Mining Management Plan template that improves the approval process for mine changes
- Making the Mining Authorisation document simpler and easier to use
- Having the same dates for the Independent Monitor audit period and the Operator's reporting period so reporting is done in the same calendar year.





The Department - Main Findings

To better understand how well the Department met the rules of the Mining Authorisation, the rules were divided into six sections. These sections and their compliance scores are shown in the table below:

Mining Authorisation section	Compliance score
General	97%
Adaptive Management	94%
Tailings Storage Facility	96%
Environmental and Independent Monitoring	98%
Overburden Management Project	93%
Mine Closure	100%

The Overburden Management Project is the management of waste rock in the overburden emplacement facilities which is an area of high potential environmental risk, if not properly managed. The 93% compliance score for this area is not as high as last year. The lower score is due to:

- The Department being slow to review and approve documents submitted by McArthur River Mining e.g. the Northern Overburden Emplacement Facility Interception Scheme Report
- The Community Reference Group and Independent Panels (Northern Overburden Emplacement Facility and Tailings Storage Facility) have not yet been set up.

The Adaptive Management section scored 94%. Adaptive management is about having a framework in place to help make good decisions to manage environmental performance when things are uncertain. To improve this score the Department needs to be quicker at reviewing and approving Adaptive Management Plans submitted by McArthur River Mining.

The Waste Rock Management and Water Management sections are not included as these sections did not have any active conditions this reporting period.











The Department – Key Successes and Opportunities for Improvement

Key successes

The audit identified areas where the Department did well to improve environmental performance. These areas include:

- | | |
|--|---|
|  Continued strong focus on key environmental areas that could be high risk if adequate risk controls were not in place. |  Continued practical approach to compliance and monitoring. |
|  Better use of internal systems to manage environmental monitoring data and highlight any issues. |  The updated Environmental Mining Report format makes it easier to read. |
|  Regular communication between the Department and McArthur River Mining helps keep a good working relationship to solve potential problems early. |  Issued the Independent Panel of Experts terms of reference for both the Northern Overburden Emplacement Facility and the Tailings Storage Facility. |
|  Nominations for the Community Reference Group were advertised. |  Regular review of groundwater data at a sensitive site. |

Continued improved environmental performance and high levels of regulatory compliance by McArthur River Mining can be attributed, in part, to the processes and approach developed and adopted by the Department for the mine.

Key Opportunities for Improvement

The audit identified key things that the Department could do to help improve its regulatory activities related to the mine's environmental performance. These were:

- Make clear in the Mining Authorisation what construction reports for dams, waste rock and Tailings Storage Facility are needed
- Speed up the time it takes to review and approve the management plans submitted by McArthur River Mining
- Put a process in place to speed up the review and approval the Northern Overburden Emplacement Facility seepage interception trench and recovery system
- Set up the independent panels for the Northern Overburden Emplacement Facility and Tailings Storage Facility, to review management plans
- Set up the Community Reference Group
- Incorporate the tasks related to the NT EPA recommendations into a compliance tracking register
- Make sure the air quality monitoring plan is reviewed by the Independent Monitor every three years.

It is important to note that these are suggestions only and are not new rules that the Department need to follow.

River Health

McArthur River Mining uses lots of ways to protect the health of the McArthur River so that people can keep using the river. McArthur River Mining has programs in place that check and manage potential impacts on river health.

The Independent Monitor assessed the condition of the McArthur River system using river and fish monitoring information provided by McArthur River Mining and with a site visit. The check looked at how the fish numbers and different types of fish species indicate the health of the river. Overall, it was found that the McArthur River and its creeks were in good health.

Monitoring results for the reporting period found that lead levels in one specimen of fish (Eastern Rainbow Fish) at one site in Barney Creek was above the allowed levels in the Australian New Zealand Food Standards Code.

This creek holds little water for much of the year. This sample was taken from the area of the creek inside the mining lease boundary right next to where mining activities happen and where the community cannot access.

Data collected over the 2021-2022 monitoring program found that all other fish from the McArthur River catchment, including commonly eaten fish like the barramundi and sooty grunter, had low levels of metals, and were considered safe to eat.

Metal levels will need ongoing checking and management in line with what the mine is already doing to continue to protect the river and the community.

It was found that mussels in the river catchment in the region have naturally occurring high levels of metals, which is the same as testing results from each year between 2018 to 2021.

The types of metals found in the mussels (such as aluminium and manganese) are not the types of metals produced by McArthur River Mining's operations. The types of metals associated with the mining operations are zinc and lead. Because of the natural occurring level of metals in mussels across the region, based on scientific advice it is suggested that eating mussels should be limited. It is considered very unlikely that people would be able to catch and eat enough mussels for it to be bad for their health, as there are not enough mussels living in the McArthur River catchment and the metal levels in the mussels are also similar to those found in everyday foods.

The monitoring data collected suggests that works done to make the McArthur River diversion channel more like natural river channels by planting river plants and placing woody debris (tree branches etc.) in the river, has improved and will continue to improve the river habitat for the animals that live in the river.

The McArthur River and its creeks were found to be in good health and the fish were safe to eat





Comparison of results

River Health

There was no change in the river system health from 2021. The river monitoring showed:

- The same numbers and types of freshwater animals living in the McArthur River system
- That the McArthur River and its creeks are in good condition
- An extremely low risk to human health from eating the monitored fish species caught in the McArthur River catchment upstream or immediately downstream of the mine
- That effort made to reinstate animal habitat conditions like that of natural river channels has improved and is likely to continue to improve the habitat along the McArthur River diversion channel.

Status of the opportunities for improvement identified during the 2021 audit

- Four out of the 23 opportunities for improvement from 2021 have been carried over for McArthur River Mining
- Nine out of the 13 opportunities for improvement from 2021 have been carried over for the Department.

The Mine Operator



McArthur River Mining's overall high compliance score with the Authorisation has **increased by 1% to 97%** in 2022.



The number of Authorisation Opportunities for Improvement identified in 2022 was 18, three fewer than in 2021.

The Department



The Department's overall high compliance score with the Authorisation has **increased by 1% to 96%** in 2022.



The number of Authorisation Opportunities for Improvement identified in 2022 increased from 4 to 8.

Next Audit

The next environmental performance audit review will start in early 2023 and will look at the period between 1 May 2022 and 30 April 2023.

The Independent Monitor will continue to talk to the local community about the findings of the 2022 AEPAR and future reports.

Conclusion

Health of the McArthur River

The Independent Monitor found that overall, the McArthur River and its creeks were in good health and the fish were safe to eat.



Mine Operator: McArthur River Mining

- McArthur River Mining has continued to avoid or minimise potential environmental risks by proactively managing and monitoring environmental issues across a wide range of site activities while keeping a focus on continually improving its environmental performance
- McArthur River Mining scored a high level of overall compliance with the Mining Authorisation conditions and the Waste Discharge Licence conditions, which was a slight improvement from last year. That is, McArthur River Mining did well at following the government's rules
- The review did not identify any environmental issues requiring urgent investigation
- McArthur River Mining's compliance scores across all areas of the mine's operations showed that they met the rules put on them by the government
- McArthur River Mining had a good Risk Management Plan in place that helped lessen the environmental risks of the mine's operations. The risk process was improved by better matching risk descriptions and referencing individual risks which helped the tracking of risks and risk performance over time. The register also now includes a risk control check.



The Department: The NT Department of Industry, Tourism and Trade or 'the government'

- The Department scored a high level of overall compliance with the Mining Authorisation conditions and the NT EPA recommendations, which was a slight improvement from last year
- The Department had a strong focus on key potential environmental risks, and a practical approach to compliance and monitoring
- McArthur River Mining's good performance and high levels of compliance can be credited, at least in part, to the approach adopted by the Department
- It was found that the Department could simplify some of their processes, especially the ones that need to be done regularly
- The Department could focus on the set up of the independent panel of experts and providing faster formal review acceptance or approval responses
- Updating the Mining Management Plan process by making a new Mining Management Plan template has improved the approval process for mine changes
- Progress was made by the Department in forming a Community Reference Group, by preparing the terms of reference and the membership expressions of interest
- Progress was made by the Department in preparing the terms of reference for the Independent Panel of Experts for the Northern Overburden Emplacement Facility and the Tailings Storage Facility
- Regular site inspections by the Department helped check the mine's operations against the McArthur River Mining's management plans.



Acknowledgement of Country

Advisian Pty Ltd respectfully acknowledges the Traditional Owners of the Borroloola and Gulf region, and their continuing culture and connection to the lands and waters. We pay our respect to their Elders, past and present.

More information

If you would like more information about the Independent Monitor or to access the full Annual Environmental Performance Audit Report please visit the DITT Independent Monitor website at: www.industry.nt.gov.au/MRM-Independent-Monitor.

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