2

2. EIS Clarifications

2 EIS Clarifications

This section provides further clarification of a number of project aspects that, based on the submission comments received, appeared to have been misinterpreted or misunderstood readers of the environmental impact statement (EIS). Note that the following project aspects have also been individually addressed as required, as part of McArthur River Mining's responses to specific stakeholder submission comments (refer to **Supplementary EIS Section 7 – Stakeholder Submission Comments and MRM Responses)**. The key aspects requiring clarification include:

- the nature of project changes from the previous Phase 3 Development Project (Phase 3);
- the project timeline versus assessment timeline;
- current North Overburden Emplacement Facility (NOEF) conditions;
- risks to human health from consuming local fish; and
- the mine pit lake's connection with the McArthur River.

2.1 The Overburden Management Project is Not an Expansion of Previous Operations

It was evident from the Draft EIS submission comments received, that there was a perception that the Overburden Management Project (OMP) represents an expansion of Phase 3. This perception is incorrect. The OMP EIS relates specifically to the management of overburden. It does not propose an expansion of the mine footprint or output over and above previous approvals.

Phase 3 committed McArthur River Mining to further investigating overburden material classification. The results of this investigation have been incorporated into the mine plan, which is what has necessitated the OMP. The revised materials classification system supplemented the understanding of some environmental risks associated with the open cut wall rock and storage of mined overburden compared to what was previously understood (refer to **Draft EIS Chapter 3 – Project Description and Justification***)*. It was these altered environmental risks that triggered the requirement to conduct additional environmental assessment work at an EIS level.

During the site-wide review of the project, McArthur River Mining identified additional opportunities for environmental improvement which, as discussed in **Draft EIS Section 1.5.1** resulted in additional project changes. One of these changes included tailings reprocessing and disposal in the open cut final void, as discussed in **Draft EIS Section 3.4.5.**

A comparison of the OMP and Phase 3 is presented in **Draft EIS Section 3.2.3** and **Draft EIS Section 3.2.4**. The project's life of mine (LOM) period will extend by one year (from 2036 to 2037) due to the project running at a reduced rate, and there will also be an additional 10 year period (2038 to 2047) as a result of tailings reprocessing activities. McArthur River Mining believes this reprocessing period as having significant environmental benefits to the site and can be considered industry best practice. A comparison of the OMP final footprint with the Phase 3 final footprint is provided in **Supplementary EIS Section 6 – Simplified Project Description.**

Additionally, McArthur River Mining was required by the Northern Territory Government regulators to assess the project risks for 1000 years and this may have confused readers as constituting an expansion of its existing operations (refer to **Supplementary EIS Section 2.2** for further clarification on the assessment timeline).

2.2 Project Timeline versus Assessment Timeline

The OMP Draft EIS introduced a conceptual timeline for closure that extended for 1000 years. It was evident from the Draft EIS submission comments that this timeline may have been misinterpreted as an extension of the mining project for 1000 years. This is not the case.

The project timeline covers the duration of the MRM project throughout the period of mining, tailings reprocessing, domain closure and subsequent closure monitoring. In summary the project timeframe includes:

- Open Cut Mining Operations Phase (2018-2037);
- Tailings Reprocessing Phase (2038-2047); and
- Closure Phase (2048-3017).

Supplementary EIS Section 6.4 discusses this in more detail.

The project will not require active management for 1000 years, nor does this period mean that the site will take 1000 years to rehabilitate. The 1000 year timeline is a stipulated modelling and assessment period only and can be considered world's best practice. This period was required by the former NT Department of Mines and Energy (now the Department of Primary Industry and Resources) in 2015. This was decided at the time because the Department of Mines and Energy considered the engineering requirements of the NOEF to be similar to that of the Tailings Storage Facility (TSF). The TSF has been designed in accordance with the Australian National Committee on Large Dams (ANCOLD) Guidelines on Tailings Dams Planning, Design, Construction, Operation and Closure (ANCOLD, 2012). These guidelines include a requirement to assess and manage stability against seismic events over a 1000 year period. This 1000 year assessment period was required to be applied to the OMP EIS.

The assessment phase is discussed further in **Supplementary EIS Section 6 – Simplified Project Description** and **Supplementary EIS Appendix R – Adaptive Management Report**.

2.3 Current NOEF Conditions

MRM has significantly improved management of overburden stored in the NOEF since 2014, with reconfiguration of the current NOEF stage and remediation works for the control of spontaneous combustion well advanced. To date, the following have been completed or are well advanced:

- Complete elimination of large scale spontaneous combustion from the NOEF since 2014.
- Existing points of combustion have been excavated, reworked and extinguished.
- Permanent temperature and gas monitoring wells have been installed to monitor the evolution of internal temperatures. This monitoring has identified that cooling has commenced (refer to **Supplementary EIS Appendix F – NOEF Temperature Update**) as a result of ongoing remediation. Both the West D and Central West portions of the existing NOEF have been placed in low lifts with compaction to control oxygen ingress and oxidation rates; and reduced permeability base preparation to limit basal seepage.
- Construction of a paddock dumped halo layer of non-acid forming (NAF) material around the potentially acid forming (PAF) core (the halo layer provides a buffer between the core zone and the cover) to further isolate the core from air sources.

- Placement of a low air permeability barrier over the existing PAF cell to restrict air movement, consisting of a 0.5 m thick layer of alluvium (i.e. material that has been deposited in the past by flowing water) and a 1.5 m layer of NAF rock (final completion is scheduled for March 2018).
- Placement of a wet season fine grained cover over the PAF cell to limit water infiltration during the wet season.
- Construction of drainage pathways over the PAF cell to reduce water infiltration.
- Re-profiling of the NOEF geometry to reduce the surface area exposed to possible air ingress. This has included the flattening of the northern NOEF batter to a 1V:4H slope and the removal of the batter and berm configuration.

Supplementary EIS Figure 2-1 below provides an aerial view of the existing NOEF (August 2017) free of combustion and shows the:

- newly constructed West Perimeter Runoff Dam (WPROD) in the foreground;
- PAF being placed in a 2 m lift in the Central West stage to the lower left of picture;
- The northern batter with a 1:4 slope and no batters and berm; and
- the north western corner of the existing NOEF receiving the alluvial advection barrier on the batter.

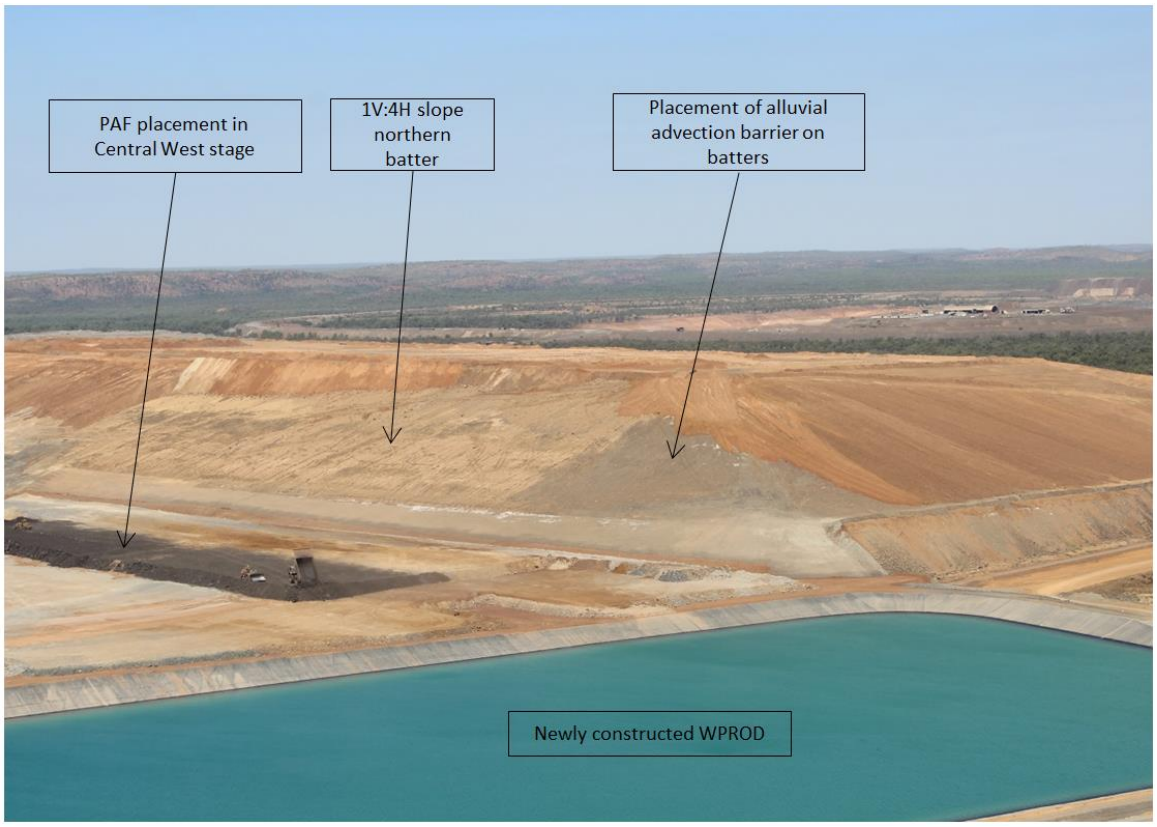

Figure 2-1 Existing NOEF and WPROD Looking Southeast

Decreases of up to 65°C have been observed on the eastern half of the northern NOEF batter. The average temperature at remediated "hot spots" in the NOEF has decreased significantly, from 118°C in October 2016 to 85°C in 2017. Temperature monitoring at the NOEF is discussed and interpreted further in the **Supplementary EIS Appendix F – NOEF Temperature Update.**

The plan for the existing NOEF is for any new construction prior to EIS approval to be undertaken as per the PAF(RE) cells (as described in the **Draft EIS Section 3.4.4.3.1**) plus the inclusion of the following strategic activities:

- planned NOEF construction schedule to target rapid encapsulation of the existing NOEF, including early progressive rehabilitation;
- the selection of a highly effective geosynthetic liner (GSL) barrier in the cover system of the EIS NOEF, in order to exclude air and water from previously placed materials; and
- continued groundwater, gas, temperature and settlement monitoring around, under, within and above the existing NOEF in order to inform MRM of mitigation performance and any further refinements that may be required.

This monitoring will be conducted during both the operations and closure phases in accordance with McArthur River Mining's Adaptive Management Framework (refer to **Supplementary EIS Appendix R – Adaptive Management Report**), which establishes performance criteria (trigger levels) and response plans.

In the event that overburden does inadvertently combust, McArthur River Mining has developed associated actions and controls to manage and remediate sources of sulphur dioxide and other pollutants. Refer to **Section 14.6.1.2.13.2 of Draft EIS Chapter 14 – Health and Safety** for further details. These include:

- removing NOEF overburden and allowing it to cool, in conjunction with reshaping and compacting of the NOEF batters; and/or
- covering the affected overburden with fine grained alluvial advection barriers.

As a result of the above management measures, modelling and scientific studies demonstrate that the existing PAF cell will not adversely impact on the receiving environment.

2.4 Metals Accumulation in Fish and Potential Human Health Risks

A number of concerns were raised in relation to potential for human consumption of fish containing elevated metal concentrations. Further discussion of the MRM monitoring program and associated results are provided below.

2.4.1 Monitoring Program Overview

McArthur River Mining has acknowledged the concerns associated with metal accumulation in fish and the potential human health risks. As such, monitoring has focused on the lower trophic level species (e.g. primary producers) and vegetation rather than all species taken for consumption. This approach was taken so that any identified variations can be discovered earlier in the food chain rather than later. This method provides a more robust approach and helps to better determine the source of any potential contaminants more accurately. **Supplementary EIS Figure 2-1** provides a simplified version of where in the aquatic food chain MRM undertakes its monitoring.

Draft EIS Appendix W – Aquatic Ecology Impact Assessment Report highlights a number of parameters tested within aquatic species. These included 17 elements (aluminium, arsenic, calcium, cadmium, cobalt, chromium, copper, iron, galium, mangesium, manganese, molybdenum, nickel, lead, uranium, vanadium and zinc) along with a lead isotope. The suite of parameters has been tailored as a result of past monitoring and information obtained to date.

From 2010 to 2015, the 17 elements plus a lead isotope were analysed within all sampled fish as part of the 'metals in fish' program. In 2017, after consulting with the appropriate Government Department, analysis was reduced to 10 parameters with the addition of mercury and a lead isotope and an adaptive management approach. Within this adaptive management approach, fluvial sediment will be compared from upstream and downstream sites within Barney and Surprise Creek. Where there are distinct differences identified in upstream and downstream sediment quality, this will trigger the requirement to test fish for the particular parameter.

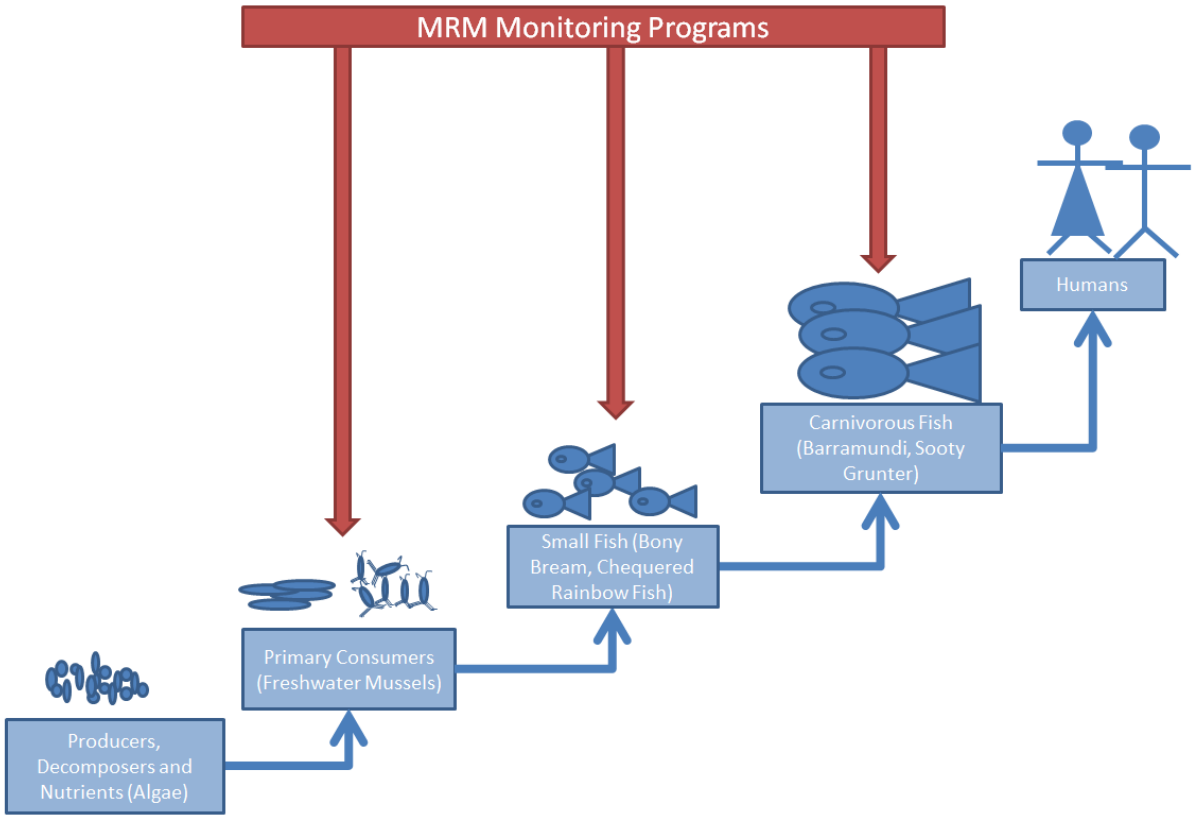

Figure 2-2 MRM's Aquatic Food Chain Monitoring Program

2.4.2 Lead in Fish

MRM's monitoring program has been conducted since 2006, and includes the collection of samples throughout the main channel of the McArthur River (including the diversion) and its Barney and Surprise Creek tributaries. Samples are also taken from regional reference sites in adjacent catchments of the Limmen and Robinson Rivers. Monitoring to date has found that no sample taken from fish in the McArthur River main channel has contained lead in excess of the relevant guidelines. In particular, for fish which are considered to be commonly consumed (i.e. Barramundi, Archerfish and Sooty Grunter); the highest recorded concentrations of lead in muscle have been found to be significantly lower than relevant guidelines.

In 2013, lead was detected in the tissues of several species of small fish at SW19 (a monitoring location on Barney Creek in a restricted mining operations area, below the main haul road bridge to the NOEF, and which cannot be accessed by the public). These species occupied a low trophic position in the food chain and tissue concentrations were found to be closely correlated to lead in sediment at this location. The source of the lead at SW19 was subsequently attributed to sediment from the haul road and to a lesser extent dust from haul trucks. In light of the above findings, a number of management actions were implemented including the installation of silt traps, a small bund in Barney Creek below the bridge to aid in the catchment of sediment and mechanical excavation and removal of sediment from SW19. These works reduced lead concentrations in fauna collected at SW19 in 2014. Repeating these mitigation measures saw further improvements in 2015. Sampling in 2016 has shown further improvement with lead concentrations in fauna at SW19 eight to ten times lower than 2013 results and below guidelines.

As commended in the 2016 and 2017 Independent Monitor Reports, McArthur River Mining has significantly improved its program of ongoing monitoring of metals in aquatic fauna, with the report noting that there was no evidence of mine derived lead in fish and shellfish off the mine site.

The Northern Territory Government (including Department of Health, former Department of Mines and Energy and former Department of Primary Industry and Fisheries) determined that an independent review of the MRM monitoring program and its results was required. The review aimed to assess potential heavy metal contamination emanating from MRM, as well as determining background levels in the broader region based on existing data. The focus was on potential effects on human health from consumption of affected aquatic species. Based on the data reviewed and people consulted for the study, the risk to human health posed by consumption of fish from the McArthur River system was considered to be low. This was particularly true when the likely consumption patterns from the early consultation works across the study area were taken into account.

It should be noted that McArthur River Mining has undertaken extensive community consultation on this issue outside of the EIS process. This has included providing the public with direct access to specialist aquatic ecology consultants in order to better understand research methodologies and results. This has resulted in a reduction in community concerns on health risks. At the latest community meeting no fish related concerns were raised.

2.5 Connection Between the McArthur River and The Final Mine Pit Lake

It was evident from the Draft EIS submission comments received that there were some stakeholder misconceptions as to the nature of the connection between the McArthur River and the final mine pit lake, in particular for the preferred flowthrough scenario. Several comments seemed to imply that MRM was proposing to completely direct the McArthur River through the mine pit lake to achieve a flowthrough lake. This is not the case. In all scenarios proposed, both as part of the Draft EIS and Supplementary EIS, the McArthur River Diversion Channel remains the primary flow path of the river. The connections to the mine pit lake are only a secondary flow path active during high flow events, with only a minor portion of river flows flowing through the mine pit lake each year. The vast majority of the flows still bypass the mine pit lake through the McArthur River Diversion Channel.