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McArthur River Mine Open Cut Project.

Comments on the Draft Environmental Impact Statement, October 2005.

General comments

The Environment Centre NT (ECNT) is strongly of the view that the McArthur River Mine Open Cut Project does not meet acceptable environmental standards and that the project should therefore not be approved.

At a time when the Northern Territory Government has set a course towards providing a greater level of protection for NT rivers through its proposed Living Rivers initiative, and at a time when the environmental and financial disaster at Mt Todd mine has highlighted the expensive legacy that the irresponsible management of mine wastes can leave for the community, it would be negligent in the extreme to approve this particular mining proposal. Permanently altering the channel of such an important Top End river is unacceptable. Excavating a large open pit right on top of the river, involving the removal and relocation of millions of tonnes of rock waste, a significant proportion of which has the potential to contribute to an ongoing acid mine drainage problem, is also unacceptable.

MRM's own water quality monitoring data shows that some heavy metal concentrations in the McArthur River are already twice the level downstream from the mine as they are upstream. This indicates that discharges from the existing underground mining operation are already having a detrimental impact on the receiving environment. ECNT is not convinced by the information presented in the Draft Environmental Impact Statement (EIS) that the Open Cut Project will lead to improved environmental outcomes.

The ecological footprint of the open cut proposal is considerably larger than the existing operation. The pit will be 210 metres deep, 1400 metres long and 750 metres wide (an area of 83 hectares); the waste rock dump will cover 255 hectares, rise up to 50 metres in height and hold 185 million tonnes of overburden material; the McArthur River will be re-routed over a 5.5 kilometre stretch with a second 2.5 kilometre channel to re-align Surprise and Barney Creeks; 23 million cubic metres of tailings will eventually cover approximately three times the area used to this point in the life of the underground mine; 7,700 tonnes of contaminated waste will be disposed of in the tailings storage area every year; groundwater drawdown by the end of the 25 year life of the mine will be more than 200 metres around the open cut itself; and over 300 hectares of native vegetation will be destroyed, including at least 3.6 kilometres of valuable riparian habitat. It is also clear from the Draft EIS that not all of the toxic materials produced at the mine over its life can be contained on-site, or managed in a way that will not lead to substantial environmental degradation.

There are many additional reasons why ECNT believes this project should not be approved, including the lack of adequate consultation with Aboriginal Traditional Owners, the lack of research and monitoring carried out on the downstream impacts of the mine, the potential impacts on threatened species such as the Freshwater Sawfish and the Purple-crowned Fairy-wren, and the poorly conceived rehabilitation strategy. We will now outline our specific concerns with the Draft EIS in greater detail.

Specific comments

Section 2. Objectives and Benefits

The Draft EIS justifies the need to change to an open cut operation as follows: 'The underground operation would require backfill paste after 2005 and this additional cost results in the mine becoming uneconomical as a bulk concentrate producer' (2.2. Project need). Why then was this obviously forseeable problem with the viability of the existing operation not discussed in the original 1992 Environmental Impact Statement? This raises serious questions about the operational planning capabilities of MRM.

Section 3. Existing Operations

The Draft EIS states that the channel at MRM's Bing Bong port has filled with sediment since the 2001 cyclones. Dredging will therefore be undertaken progressively over the next 5 years or so, starting in 2004. 400,000 to 500,000 cubic metres of sediment will need to be relocated to return the channel to the original drainage depth (3.6.5. Dredging).

What are the likely impacts of further cyclones on this dredging program and will it need to be continued for the life of the operation? What other areas for the relocation of sediments are available once the designated areas, 100 metres to the west of the channel, are full?

Section 4. Proposed Open Cut Operations.

Question marks remain over the stability of the proposed open cut pit in proximity to underground workings (4.2.4. Pit stability). We are, however, told that selected voids will be targeted for backfilling (4.2.5. Mining activities) and that a range of other operational practices, such as drawing the water table back to at least 100 metres from the walls of the pit by drilling weep holes to drain water out of the rock, will suffice. However, with the large amount of ground water set to accumulate in the pit, requiring dewatering at a rate of 6.3 million litres per day by year 17 of the mine, ECNT has major concerns that pit stability will be an ongoing and significant risk to workers and the environment. Surely this issue requires much more study before any approval can even be contemplated for a move to open cut.

Over 3 million tonnes/year of process and decant water will be used in the mining process as well as 6,635 tonnes/year of copper sulphate pentahydrate (see Table 4.9. for other inputs e.g. isopropyl xanthate, MIBC). How toxic are these particular chemicals to humans and to aquatic ecosystems?

Section 6. Alternatives

There is no discussion of the environmental benefits of not proceeding with the open-cut project (6.14. No Project).

Section 7. Waste Management

ECNT has the following concerns about the information presented in the Draft EIS regarding the management of the potentially toxic mine waste overburden:

- According to the Draft EIS 11 percent of the total overburden, or 21.8 million tonnes of waste rock, could be Potentially Acid Forming (PAF) (7.2.1. Overview). There are high metal concentrations present in the overburden rock types (arsenic, up to 800mg/kg; cadmium, up to 236 mg/kg; copper, up to 979 mg/kg; manganese, up to 15,700 mg/kg). These are all highly toxic materials.

- The wide concentration range depicted in Table 7.3., however, does not provide a sufficient picture. The high end of the range is many times over the ANZECC Environmental Investigation Level for soils (7.2.3. Multi Element Nature of Overburden). Were most of the samples towards the higher end of the range or the lower end?

- It is deeply worrying that the company does not know what effect elevated metal concentrations in potential outer cover materials will have on rehabilitation of the Overburden Emplacement Facility (OEF) (p 7-6). This, we are informed in the Draft EIS, will require field trials.

- Seepage from PAF overburden materials may contain elevated levels of soluble metals (generally Cd, Fe, Mn, Pb and Zn) and sulfate compared to relevant livestock drinking water criteria. Tests showed that soluble metals in runoff/seepage from overburden materials will remain within ANZECC /NEPM concentration guidelines criteria for livestock drinking water under neutral or alkaline pH conditions (7.2.4. Overburden Emplacement Facility). But what about under acid conditions?

- Infiltration could saturate and ultimately penetrate the clay surround to the PAF cell within the western zone of the Overburden Emplacement Facility (OEF). However, MRM admits to being unsure yet of the actual permeability characteristics of the clay (7.2.4).

- Whilst the PAF pond is designed to exclude a 1 in 100 year ARI flood, the pond will have an emergency spillway to discharge excess water in extreme rainfall conditions (which will go straight into Surprise Creek). The actual size of pond is not shown on Figure 7.3.

- The Draft EIS says that runoff from the surface of the OEF will encounter Non Acid Forming (NAF) and PAF materials and therefore should be of acceptable quality to be released into the environment (7-10). We presume this is meant to say that runoff will encounter NAF/AC materials, as stated on 7-11.

- Surface and seepage flows from the eastern zone of the OEF will eventually end up in Barney Creek, including some increased sediment load. How much water will eventually end up in the creek and will there be elevated heavy metal concentrations in the water? If so, what will the long term and downstream impacts be?

- Section 7 does not discuss the key problem of ongoing acid leaching once the OEF has been rehabilitated. This is unacceptable.

ECNT has similar concerns about the expanded Tailings Storage Facility (TSF):

- According to the Draft EIS, recent tests on near-surface tailing samples at the Tailing Storage Facility (TSF) indicate that some near-surface tailing materials are likely to be PAF if exposed to oxidising conditions for a significant period of time (7.3.3. Tailing characterisation).Table 7.6 shows a high concentration of arsenic in the existing tailings - also lead, manganese and zinc. Leachate may contain elevated soluble levels of Cadmium, Manganese, lead and SO_4.

- We are told in the Draft EIS that the existing tailings dam was designed not to leak. However, in June 1997 seepage was discovered in Surprise Creek adjacent to the Tailings Storage Facility (TSF). There are also significant areas of surface soils containing permeable sands and gravels. Underlying siltstone is also relatively permeable and containing karst features (7.3.4 Seepage).

- We are also told that there is evidence of elevated salinity levels and soluble sulfate concentrations in seepage from the existing TSF. Some metal concentrations in seepage/groundwater can be greater than ANZECC water quality guideline criteria for fresh water ecosystems (7.3.5. Groundwater quality).

- Furthermore, the Draft EIS states that runoff collected from the revegetated surface of Cell 1 of the TSF following rehabilitation of the cell will be discharged 'in a controlled manner' to Surprise Creek. How much water is likely to run into Surprise Creek and what are the likely environmental impacts? Why will this water not be contained within the Water Management System? (7.3.6. Cell 1 Closure Strategy).

- 7,700 tonnes of contaminated waste per year, and an unquantified amount of sludge, is to be disposed of in a 'designated section' of the TSF (7.5.2. Waste management strategies). Which section of the TSF will the waste be disposed of in? Is MRM going to continue to use the area in the south-east of the TSF? Insufficient detail is provided here. Moreover, what will the effects of this contaminated waste be on seepage water, or on any water that spills into Surprise Creek during extreme rainfall events?

- The hazard category of the TSF is rated as high given the potential impacts from an uncontrolled release or embankment failure. An emergency spillway from Cell 2 will allow for overflows in extreme weather conditions, discharging to Surprise Creek. The design of the spillway is to incorporate the probable maximum flood on the highest pond level in normal year; or the worst wet season on record less water returned to plant, plus 100-year average recurrence interval (ARI) storm plus waves. Why are there two design condition options given here? Which one is MRM more likely to adopt? (7.4.3. Design of the TSF). It is not entirely clear to ECNT how often Cell 2 water will spill into Surprise Creek.

The inadequacy of the Draft EIS in dealing with these crucial issues raises concerns that environmentally damaging seepage into surrounding creek and river systems will occur again with the new, expanded TSF. How can we have confidence in the design objectives (7-25) when they so plainly failed with the existing TSF? (7.4.7. Seepage analysis). This is especially so when we are told that groundwater recovery bores may need to be operated for 30 years or longer after decommissioning to avoid surface expression of the seepage.

Section 8. Air Quality

There is no discussion of the possible implications of climate change on extreme events. The proponents should refer to, and discuss the implications of, the CSIRO report *Climate Change in the Northern Territory* (Hennessy et al 2004) (8.1.3. Extreme events).

According to the Draft EIS, there are elevated levels of lead and zinc concentrations in soils at some sites close to Barney Hill. But as no background data has been collected at these sites, it is not possible to say whether it is due to dust deposition (8.4.1. McArthur River Mine). More information based on solid research is required here.

176,919 kg/annum of Total Suspended Particulates from the open cut operations will be less than 10 microns, compared to 87,000 kg/annum currently. Lead emissions will be 2,226 kg/annum, an increase of 926 kg/annum from current operations (8.5.1 Fugitive emissions). This seems like an excessive increase.

The Draft EIS argues that because changing to open cut will have no significant effect on emissions, an offsets program is not warranted (8.14.4. Management of GHG emissions). However, given that MRM says the mine would close if it does not change to open cut (6.14. No project), and therefore zero emissions would occur, an offsets program is definitely warranted. Annual CO_2 emissions will be approximately 120,000 tonnes (8.14.3. Projected GHG Inventory to 2012). Extrapolating this over the 25 year life of the mine, the mine will result in 3 megatonnes of greenhouse gas emissions. This is the amount that MRM should offset.

Furthermore, there is no discussion of the life-cycle greenhouse gas emissions arising from the export of lead/zinc bulk concentrate.

Section 9. Noise.

What are the possible impacts of blasting and mine operations on surrounding wildlife? Will 40dB have an impact on birds and other animals?

Section 10. Terrain and Soils

ECNT is very concerned about the increased potential for soil erosion during the duration of the proposed open cut project. The Draft EIS states that in some locations gully erosion is already occurring e.g. on the river backplains where there are extensive areas of brown and grey cracking clay soils which tend to have dispersive soil layers (10.5.1. Erosion potential). The proposed Barney Creek realignment crosses deep cracking and highly erodable clay soils (10.3.1. Physical characteristics (soils)). Moreover, 1,225,000 cubic metres of topsoil and 1,400,000 cubic metres of subsoil (Table 10.3) will be stripped and used for rehabilitation and revegetation (10.3.3. Topsoil management). ECNT believes it is inevitable, despite the mitigation measures outlined in the Draft EIS, that this large-scale disruption of the soil layer will lead to an unacceptable increase in sediment loads in the McArthur River and affected creeks.

Section 11. Groundwater

Groundwater inflow into the pit is a huge potential problem for this mine proposal. The Draft EIS states that alluvial and bedrock aquifers in the area are unconfined and are in hydraulic connection where large-scale permeable structures in the bedrock, such as faults, underlie the major river channels (11.2. Groundwater geology and groundwater occurrence). The Draft EIS also says that the paleochannel is approx 800 m wide across the southern perimeter of the proposed mine pit and could represent a significant source of groundwater inflow into the pit (11.2.1. Alluvium). Moreover, the exact location of the paleochannel is not yet known within the area of the proposed open cut. Tests, we are told, are to be completed by the end of August 2005. An additional drilling transect is also being undertaken at Djirrinmini Waterhole to confirm aquifer characteristics (11.2.4. Further field investigations). Obviously, no environmental approvals should be considered until this work is completed and independently reviewed.

Added to these concerns is the geochemistry of the groundwater itself. According to the Draft EIS, large concentrations of SO_4 in the groundwater in the upper weathered rock area are due to sulphide materials being common in the area. In both the bedrock and alluvial groundwaters, lead and zinc are elevated (11.6.1. Mining area).

By the end of mining, the depth to groundwater will be approx 230-240 metres in the bedrock at the open cut. This will result in a total drawdown of about 210 to 220 metres below the initial static groundwater level. It is of great concern that the drawdown cone will migrate significant distances along the more permeable structures that intersect the pit, such as faults (11.11.1. Magnitude of groundwater drawdown). How far away from the pit area will the drawdown cone migrate, and what impacts will this have?

Again, we can not stress highly enough that insufficient research has been conducted to date on groundwater issues around the mine pit area. In ECNT's opinion this should be reason enough to reject this open cut proposal.

More information is also required on the groundwater/ surface water relationship upstream and downstream of the mine. The discussion presented in the Draft EIS is based on only one stream gauging study conducted in June 2005 (11.7. Stream Flows). The importance of Djirrimini waterhole as an ecological refuge should not be underestimated. The language used in the Draft EIS to describe the impacts on the waterhole is unconvincing i.e. there was *likely* to be enough groundwater inflow (in June) to maintain water levels and there *appeared* to be enough outflow to minimise salt build up as a result of evaporation.

The Draft EIS also maintains that modelling of water levels at Djirrinmini Waterhole indicates a 0.5m reduction in the levels of both the weathered bedrock and alluvial aquifers after 25 years. This will reduce lateral flows to the waterhole at the end of dry season (11.11.4. Potential McArthur River impacts). This is a very significant predicted decrease in water levels after 25 years of mining. Given the knowledge gaps that exist regarding the hydrogeology of the pit area and surrounds, ECNT must

consider this to be a minimum expected decrease in water levels, not a maximum as stated in the Draft EIS.

Section 12. Surface Water

Already, from the operation of the underground mine, an increased environmental load of toxic materials in surrounding watercourses is evident.

- Downstream median sulfate concentrations are approximately 60 percent higher than upstream median concentrations. The Draft EIS speculates that this could be due to natural sulfate concentrations in Barney and Surprise Creek catchments and minor historical seepage from the existing Tailings Storage Facility into Barney Creek (12.7.1. McArthur River Water Quality Monitoring Program).

- Throughout the McArthur River system, concentrations of copper, lead and zinc frequently exceed ANZECC 95th percentile trigger values of 1.4, 3.4 and 8 micro grams/L respectively. The downstream copper median concentration is 2.3, lead 3.9 and zinc 23. Downstream Zinc concentrations are therefore already almost 3 times the ANZECC trigger value! Upstream concentrations are closer to the guidelines at 2.2, 3.2 and 9 respectively.

The Draft EIS claims that the ANZECC guidelines are considered unsuitable for tropical freshwater systems. In such instances, it says, where 'adequate' water quality data are available, interim trigger levels can be used (*note: surely this should be where there is 'insufficient information on ecological effects' as in ANZECC 2000 s.3.3.2.4*). MRM therefore analyses water quality at the downstream test site using the 80th percentile reading at the upstream site (5.8, 9.1 and 34.4 micro grams/L for copper, lead and zinc respectively). The Draft EIS concludes: 'consequently it is considered unlikely that adverse impacts on aquatic ecosystems have occurred to date from elevated metal concentrations'.

ECNT disputes the adoption of the 80th percentile reading at the upstream site and the conclusions reached by MRM. We fear a lower environmental standard than the norm is becoming acceptable practice. The water quality monitoring program has already accumulated almost 10 years of data, so we question why it has taken so long to develop more ecologically appropriate trigger values. It is also essential, in our view, that any new site-specific trigger values currently being negotiated with DPIFM (formerly DBIRD) are independently reviewed and based on the precautionary principle.

We must also point out that downstream copper, lead and zinc concentrations can be up to 100 micro grams/L early in the wet season, three times the 80th percentile trigger value. Figure 12.9 also shows some alarming spikes in metal concentrations from 2001, which are not even acknowledged in the Draft EIS (e.g. lead concentrations of 130 micro grams/L in early 2003). What are the ecological impacts of these late dry season/ early wet season increases in concentrations downstream of the mine?

Water quality data in Surprise Creek and Barney Creek show signs of elevated lead and sulfate concentrations. There is also elevated zinc in Barney Creek, 'probably as a result of runoff from the processing area, from dry season dust or historical tailings seepage'. Surprise Creek has elevated levels of sulfates, 'probably sourced from leachate from the northern side of the Tailings Storage Facility' (12.7.2. Surprise and Barney Creeks). It is disturbing that there is not a clearer picture than this of the cause of these elevated concentrations. Again, the ability of MRM to manage a mine with a significantly expanded ecological footprint has to be challenged.

The Draft EIS states that concentration of sediment and metals tends to decline downstream of the mine to Borroloola as a result of dilution with cleaner water. It also maintains that in the estuarine reaches, the concentration of suspended sediment decreases rapidly due to flocculation caused by increasing salinity and pH from tidal waters (seawater). However, no studies or monitoring reports to prove this claim are cited in this all too brief section (12.7.3. Water quality influences downstream of the mine).

In Section 13 the Draft EIS recognises that water quality downstream could be degraded by mine activities. A strategic peak wet season release procedure is to be implemented opportunistically to discharge excessive accumulation of cleaner waters in the mine water management system to the McArthur River when it is carrying greater than a pre-determined flow rate (13.5.6. Project effects and management). This needs to be clarified as the only release into the McArthur River that ECNT can see in Fig 12.11 is from the Bund Wall Runoff Pond.

Other concerns that ECNT has about the proposed water management system and the realignment of McArthur River and Barney Creek are as follows:

- It will take 50 years or more for the realigned channel hydraulic roughness to eventually become similar to the existing channel. There will also be a higher sediment load in the new channel during low flow period (20-100 cubic m/s) (12.10.2. Hydraulic impacts on river stability and geomorphology). Again this is an unwarranted permanent alteration of the hydrology and geomorphology of the river.

- The Draft EIS states that significant sedimentation well downstream of the mine is extremely unlikely. It argues that increased sedimentation that is expected to occur in the 2-3 km stretch of the river between the new channel and the Bukalara Range may not be due to the new channel, but to cattle grazing and other factors. What are these unspecified 'other factors'?

- In the following section of the Draft EIS it is stated that during dry years when river flows cease the predicted vertical leakage through alluvial sections of the new channel will not significantly extend the no-flow period (13.5.6. Project effects and management). What is meant by 'significant' here?

- For a 5-year ARI flood, water levels upstream of the mine will increase by 2.3 metres in the long term. What are the biological impacts of this significant increase in flood levels? The Draft EIS does not address this important question (12.10.3. Impacts on flood levels).

- The Draft EIS says that flow velocities in the new channel may exceed the swimming ability of fish. However, there is no quantified data on swimming velocities of fish species known to inhabit the river. It is proposed that post-construction surveys be undertaken to confirm the minimal impact on fish passge. Yet surely the research on fish swimming velocities should be undertaken prior to seeking approvals for the construction of the new channel (12.10.4. Impacts on fish passage).

- There are elevated levels of metals in material that will be used for the levee construction (sourced from the new river channel). The Draft EIS explains that elevated metal concentrations are common throughout the area as a result of the natural geology. However, this reasoning should not be used as a justification for digging up this potentially hazardous material and exposing it to the wider environment (12.10.6 Impacts on water quality).

<u>Section 13. Biology</u>

No flora sampling was completed directly where the open cut or the Tailings Storage Facility or where most of the river realignment will go (see Fig. 13.1) (13.1.1 Introduction). ECNT considers this to be an extraordinary state of affairs. Further sampling must be taken in these areas before approval of the mine project can even be considered.

Very few aquatic plants were observed within the project area during the flora surveys (just 8 species). But how many sites were actually surveyed in the river channel? The Draft EIS does not specify. Given that the yellow flowering fringe lily *Nymphoides crenata* was found in 'an isolated pond on a minor drainage way', located within the area of the proposed Overburden Emplacement Facility, ECNT considers it likely that more comprehensive sampling will turn up more aquatic plants (13.1.4 Aquatic plants).

According to the Draft EIS, two Traditional Owners and one Senior Custodian said that the local flora had no cultural significance, apart from one plant that had historically been used for food (13.1.6 Significant flora species). This is clearly not a wide enough consultation process, particularly with communities downstream of the mine, or in the Bing Bong and coastal areas. A similar criticism can be made with regards to the stated lack of animals with any cultural, spiritual or traditional use significance (13.3.5 Significant fauna species).

The total area of native vegetation to be cleared is not specified (13.2.1. Clearing schedule). The loss of approximately 3.6 kilometres of valuable riparian habitat, to be replaced by a manufactured channel, is unacceptable and will constitute a clear breach of NT land clearing regulations such as the NT Planning Scheme – Clearing of Native Vegetation. Part 2 stipulates that the clearing of native vegetation is to 'avoid impacts on drainage areas, wetlands and *waterways*' as well as avoid impacts on 'sensitive vegetation' such as riparian vegetation.

The Draft EIS says that lowering of groundwater levels will not have a significant environmental impact as most flora in the area are likely to rely on soil moisture (rather than the water table) for survival. Is there any real evidence for this, apart from the observation that groundwater levels are already 10-15 m below ground surface over most of the area (but only away from the major drainages)? (13.2.4 Drawdown from water extraction). More information is required here.

A perennial species of Mitchell grass was found at a single site on the black soil plain on the eastern side of the McArthur River. The Draft EIS goes on to say that some local populations of this species could be lost during construction of the new channel. However, we are informed, there is no evidence to suggest that this species is confined to the local region (13.2.7. Effects on significant species). This is hardly reassuring. There is no evidence provided by the proponents to demonstrate that it is not confined to the local region or that the population will not be severely impacted by this project.

The Draft EIS also says that some species of high conservation significance may remain undetected by flora surveys within the project area (13.2.7. Effects on significant species). Surely this just reinforces the need for additional flora surveys in the areas that will be directly affected by the project.

As the Glyde River component of the project is no longer relevant, it turns out that there were only 4 new fauna sampling sites in the project area in 2002/03. This is not sufficient and perhaps explains why only one species of small mammal (common rock-rat) was trapped (13.3.1 Introduction).

ECNT is particularly concerned about the *potential impacts on threatened and significant fauna species*. One of our major concerns, based on information provided to date, lies with the NT-listed Near threatened Purple-crowned Fairy-wren. We highlight the plight of this bird in the following discussion. The flaws in the treatment provided in the Draft EIS regarding the potential impacts of the mine project on the Fairy-wren also raises grave doubts about how other threatened or significant species may be affected should the open cut project proceed.

The Draft EIS says that the Purple-crowned Fairy-wren and White-browed Robin (near threatened – NT) are common species found in suitable riverine habitat along both the McArthur River and Glyde River. The wren is also seen in adjacent grasslands. Astonishingly, the text of the Main Report does not mention that the Purple-crowned Fairy-wren was found at sites F4 and F5, right in the area of the proposed open cut (see Appendix I). The Draft EIS surmises that the Fairy wren and Robin are not dependent on a continuous riverine habitat corridor for dispersal (13.4.1 Open cut and river realignment), though this is based on one set of observations in the Glyde River area rather than on any solid research.

Previous research on the western race of this bird species (*coronatus*) has shown that it is generally confined to riparian vegetation, often within 10 metres of permanent rivers or associated swamps (see Rowley 1993). Recent (as yet unpublished) PhD research confirms that the Fairy-wren is rarely seen dispersing through any vegetation other than riparian habitat, which they require for nesting (Annmarie van Doorn: pers. comm). Even in *Chionachne cyathopoda* (river grass) dominated habitat on the Victoria River, populations are generally restricted to 200-300 metre lengths of the corridor. Individuals

have only been seen on 3 occasions foraging away from this habitat and never more than 40 metres away (whilst in pandanus habitat the restrictions on dispersal are even greater) (Annmarie van Doorn: pers. comm.). Unless the behaviour of the local species (*macgillivrayi*) is markedly different, and there is no reason that ECNT is aware of to suspect that it is, the loss of 3.6 kilometres of riparian corridor along the McArthur River will therefore almost certainly lead to increased population fragmentation, and hence vulnerability, of the near-threatened Purple-crowned Fairy-wren. ECNT therefore rejects the proponent's claim that there will be no significant impacts on the Purple-crowned Fairy-wren.

Other threatened and significant species that ECNT has concerns about, given the inadequate fauna surveys to date, include:

- The Red Goshawk (listed as Vulnerable – IUCN; EPBC; NT) was tentatively recorded from the mine project area in 1992, but not since. But it has been recorded elsewhere in the McArthur River region (13.3.5 Significant fauna species).

- The Australian Bustard (Near threatened - IUCN; near threatened - NT) is present in low numbers in open woodland and grassland habitat on the McArthur River floodplain. In fact, according to Appendix I, it was found during the fauna survey at site F7 on the area proposed for the Overburden Emplacement Facility.

- The Northern Quoll (Vulnerable – NT), it is stated in the Draft EIS, is *likely* to be locally extinct in the project area, but populations may still exist in the sandstone ranges. Indeed, Appendix I, shows that it was found at F1 in the Glyde River area.

- The Carpentarian grasswren (endangered – NT) was observed in Glyde River area in the mid-1980s and has been seen recently at Caranbirini Conservation Reserve. The Draft EIS says that it does not occur in the vicinity of the proposed open cut project. However, the Gulf-Fall and Uplands Bioregion map, released recently as part of the *Draft NT Parks and Conservation Masterplan*, indicates the presence of the Carpentarian grasswren in the vicinity of the mine project area. This clearly needs to be examined further.

- Worrell's turtle (near threatened – NT), we are also told, is poorly known and there are no indicators of threat. However, it is a very common inhabitant of the McArthur River system. Again, there is no excuse for neglecting to mention in the Main Report that this species was found at sites F4 and F5 in the area of the proposed open cut.

- The Gouldian finch and Carpentarian rock-rat (endangered), occur in the region, but have not been recorded in the vicinity of the project area. There will also be a potential loss of habitat for the Spectacled hare-wallaby (13.4.4. Effects on significant species).

- The Draft EIS states that the distribution and ecology of threatened terrestrial invertebrates is poorly known, but these species are not likely to occur in the project area. No surveys have been conducted.

- Of further concern is that nine species of migratory birds listed under the EPBC Act are present on the McArthur River mine project area.

- Freshwater sawfish were not recorded in more recent surveys, but there is no reason why it should not still be present. It was anecdotally observed upstream of the mine project area recently (13.5.4. Aquatic fauna species).

The lowering of water levels in Djirrinmini Waterhole by 0.5 metres after 25 years of mining activity is unacceptable. Inadequate discussion is provided on the likely impacts on aquatic flora and fauna in the waterhole.

The Draft EIS recognises that the Port McArthur Tidal Wetlands System is ecologically significant, i.e. it is in the Directory of Important Wetlands; it is a Shorebird migration stop-over area; seagrass beds are a major breeding area for prawns and important feeding area for dugong; and it is an important seabird breeding area (13.7.1. McArthur River Estuary). However, there is no discussion of the cultural, spiritual or traditional use significance of these areas for Traditional Owners. Moreover, there are major concerns within local communities in this area about impacts on dugong, fish and turtle (such as the Hawksbill) of lead concentrations in the water of the McArthur River as a result of discharges from the existing mine. These concerns must be fully acknowledged and addressed in the Draft EIS.

The Draft EIS assure us that, regionally, there have been no impacts identified as a result of the Bing Bong operations (13.7.2 Bing Bong). However, it is ECNT's understanding that there has been no Department of Health involvement in the monitoring of cadmium, copper, lead and zinc in seawater, surface sediment, molluscs and seagrass.

Moreover, we are told in the Draft EIS that the concentration of lead and zinc in surface sediments from the beach immediately west of the channel have shown elevated levels since 1996. The PhD research into the rate of metal dissolution from the sediments in the swing basin is not yet completed, nor has it been independently reviewed, so it is premature for the Draft EIS to base its environmental health assurances on this one study.

Section 14. Cultural Heritage

During surveys for the Test Pit project, two archaeological sites were found that will be destroyed by the open cut project – one assessed as having moderate to high significance. This certainly calls into question the integrity of the 2002 archaeological survey conducted for MRM, which had concluded that no further investigation of sites was required. ECNT believes that the forthcoming additional archaeological survey discussed by MRM in the Draft EIS should cover all areas to be affected by all components of the open cut project (14.4.3. Test pit survey).

Section 15. Social & Community Effects

There is a weak and unconvincing discussion of employment benefits for local people, i.e. they 'may be enhanced due to open cut operation requiring a different level of skills for some workers' (15.4.2. Operations phase). Flow-on employment effects will also not be as great as for the existing mine. Training benefits should also not be oversold. From 2000-02 STEP trained 19 Aboriginal participants, but only 6 have ended up working at the mine permanently.

Fig 15.1 on visual impact is surely designed to mislead. Most people will see this project from the ground, not from the air.

The section contained no discussion of the potential impacts on Aboriginal people – no history of opposition and protest or outline of the concerns of Traditional Owners downstream of the mine. Moreover, Section 16 on Community Consultation simply lumps together all Traditional Owners and local elders, with another group named 'local Indigenous women'. There is very little attempt to differentiate between local language or clan groups, which may have different perspectives and concerns about the project proposal.

Section 19. Risk Management

It is not clear exactly what the hazardous inputs into the process operations are (19.1.2 Hazardous substances).

Table 19.4. is a worry. There are some risks with major consequences considered likely to occur once in 10 years (e.g. inadequate management of on-site water; less than adequate understanding of flood impact; adverse impact of open cut on permanent waterholes). The risk of modified fish habitat and adverse impact on sacred sites are assessed as possible once per year (19.4.2. Open Cut Project).

Other risks with catastrophic consequences are considered rare and given a likelihood of once per 30 to 100 years, so are not ruled out once in the life of the facility (e.g. structures not designed for flood velocities; inadequate civil design for the bund wall). These risks are far too great to allow the project to be approved.

There is also an increased risk of haul road accidents on the Carpentaria Highway to Borroloola. Five accidents have resulted in spillage since 1999 (19.5.3. Risk analysis).

In the case of a minor spill at the loading facility no recovery is planned unless routine monitoring detects a significant and adverse impact on the environment. What is a minor as opposed to a major spill? (19.5.4. Risk management and control).

Section 20. Rehabilitation and Closure

Table 20.2. makes some unwarranted claims, including that groundwater contamination will pose no risk to biota following rehabilitation. It also falsely states that no archaeological sites exist on the disturbed area (yet see 14.4.3).

The goal for rehabilitation is to return all disturbed areas to stable landforms to minimise off-site deleterious effects (20.3.4. Closure commitments). It is not proposed to rehabilitate tailings, the overburden dump and contaminated hardstand areas to resemble surrounding areas (20.3.7. Closure strategy – mine). It is not clear whether any consultation with Traditional Owners or the wider community has contributed to these very modest and inadequate rehabilitation objectives.

ECNT considers that MRM's preferred option - Rehabilitation Scenario 4 - namely to maintain the McArthur River in the new river channel but breach the flood bund wall to allow flood flows of 400 cubic m/s and greater to enter the pit, constitutes irresponsible environmental management. It is not specified in the Draft EIS exactly how long it would take the pit to fill up with sediment. Even under Scenario 3 – putting a permanent breach in the flood bund to allow the river to take its orginal course – it would take 77 years to completely fill the pit. Presumably then it will take hundreds of years under Scenario 4. The open cut project, should it proceed, will therefore leave a very long-term scar on the landscape, which will require long-term, and potentially expensive, management and monitoring.

Furthermore, sulfate levels in the void water will be at best 60 percent higher than existing surface water concentrations. We note that the mass balance modelling of water quality in the final pit void does not simulate any chemical reactions or changes that may occur. There is no discussion about the reliability of the results, given the methodological constraints.

Surface water runoff from the Overburden Emplacement Facility will flow to sedimentation ponds. Will these eventually fill up? How quickly? Where will the water go?

At Bing Bong, the Draft EIS states that contaminated material will be cleaned out of the site run off pond, which will remain as the site catchment and discharge point. This will collect contaminants and sediments from erosion. The discharge will be allowed at the southern wall to reduce the volume contained. Discharged to where? What are the likely effects? (20.3.8. Closure Strategy – Bing Bong).

An 8 year monitoring program will be conducted upon mine closure. But there will be only a 5 year management program (thereafter staffed as necessary). What about the seepage water from the Tailings Storage Facility, which will need to be collected for 30 years or more? Which will be the responsible agency for carrying out this task? (20.3.9. Post operational closure requirements).

Section 21. Biodiversity Offsets

ECNT finds it highly ironic that Glyde River Gorge is now being discussed as a possible biodiversity offset when two years ago, MRM was proposing to dam it (21.3.2. Glyde River Gorge). ECNT does not support the notion that one area of high conservation value can be sacrificed in order to protect another. The 5 options under consideration (Abner Range, Glyde, Upper McArthur, Caranbirini Conservation

Reserve expansion, Port McArthur Tidal Wetlands) should be accorded a higher level of protection and conservation management regardless of whether the open cut project proceeds or not. ECNT considers this to be an issue of responsible biodiversity and land management on the part of McArthur River Station, the NT Government and the broader community, independent of the mine proposal. Conservation objectives are more appropriately pursued as part of the implementation of the NT Parks and Conservation Masterplan.

Section 22. Environmental Management Plan

The plan to pump water to the Tailings Storage Facility from the underground void storage should a level of 2100ML be reached and to then upgrade the water management system at a trigger value of 2300ML, needs additional detail (22.4.4. Surface Water Management Plan).

There has been an inadequate level of social impact assessment conducted and detail provided about future actions (22.4.9 Social and Community Management Plan).

The Draft EIS proposes to continue the operation of interception bores at the toe of the Tailings Storage Facility perimeter wall for a period of at least 15 years and possibly longer to ensure that the risks of future seepage to Surprise Creek are limited (22.4.11 Rehabilitation Management Plan). Again, given that MRM is seeking relinquishment before this 15 year period ends, which agency will undertake this task?

Conclusion

The Draft EIS for the McArthur River Open Cut Project is deeply flawed, reflecting the environmentally unsustainable and inappropriate conception and design of this project proposal. Accordingly, the NT Government should reject this proposal outright on environmental and social impact grounds. The defects in the Draft EIS outlined in this submission are of such a serious nature that in ECNT's opinion they can not possibly be addressed adequately in any subsequent Supplementary EIS statements, Environmental Management Plans or Mining Management Plans.

The valuable ecosystems of the McArthur River, and the local communities that depend upon the ecosystem services that the river provides, deserve much better than this highly polluting mining proposal.

References

ANZECC 200. *National Water Quality Management Strategy: Australian and NZ Guidelines for Fresh and Marine Water Quality*, Canberra.

Hennessy, K., Page, C., McInnes, K., Walsh, K., Pittock, B., Bathols, J. & Suppiah, R. 2004. *Climate Change in the Northern Territory*. Consultancy report for the NT Department of Infrastructure, Planning & Environment, CSIRO.

Rowley, I. 1993. The Purple-crowned Fairy-wren Malurus coronatus. I. History, distribution and present status. *Emu* 93:220-34.